KYOCERA

2020-2021

KYOCERA Cutting Tools



ADVANCING PRODUCTIVITY

KYOCERA

2020 - 2021

KYOCERA Cutting Tools

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KYOCERA

KYOCERA Asia Pacific Pte. Ltd.

https://asia.kyocera.com/products/cuttingtools/

ADVANCING PRODUCTIVITY

Advancing your productivity through efficient cutting tool products and advanced tooling solutions

Kyocera is the global and comprehensive cutting tool manufacturer who provides innovative materials and tool designs as well as proposes solutions for technological improvements.

Kyocera contributes to a world manufacturing by the innovative products and technology.

Kyocera's Management aims to be focused on the User's Perspective.

We promise to be a Comprehensive Value-Added Manufacturer.



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Kyocera Cutting Tools

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See the front page of each section for details.

New Product Highlight

Insert

Hybrid Cermet for Steel Machining

PV720/PV730

B16~



PV730

The Toughest Cermets in the History of Kyocera
High Stability and Excellent Finish



New PVD Coated Carbide

PR1725/PR1705

B19~

PR1725

Great for Machining Steel and other Materials
Wide Range of Machining Applications with Various Lineup Available

PR1705

Excellent Wear Resistance and High Precision Machining of Free-Cutting Steel

Molded Sharp Edge Chipbreaker

SKS Chipbreaker

B53, B62, B92, B94

1st Recommendation for Finishing
Excellent Chip Control with Good Surface Finish



CBN and PCD

Molded PCD Chipbreaker

APD Chipbreaker

C25, C28

APD Chipbreaker shows good chip control from small to large D.O.C.

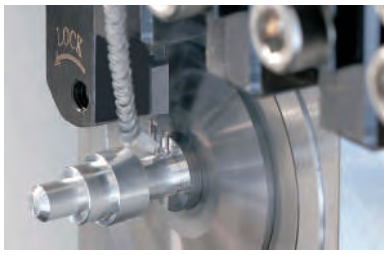


Molded PCD Chipbreaker for KTKF holders

AGT Chipbreaker

C32, E20

Unique chipbreaker design provides excellent chip control





External Turning Toolholders



Toolholders for High Pressure Coolant

JCT Series

Excellent Chip Control and Long Tool Life

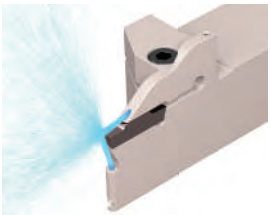
Lineup Expansion for Double Clamp-JCT Series
DTGN type
DVLN type
DVPN type
DVVN type



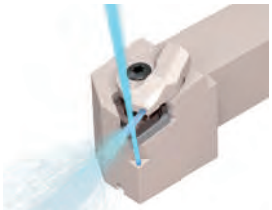
External
Double Clamp-JCT
D8~



External Shallow Grooving
KGBA-JCT
G10



External Grooving
KGD-JCT
G26



Threading
KTN-JCT
J21

New Product Highlight

Small Parts Machining



EZ Bars

Added to Lineup

90° Lead Angle EZBF type

F19

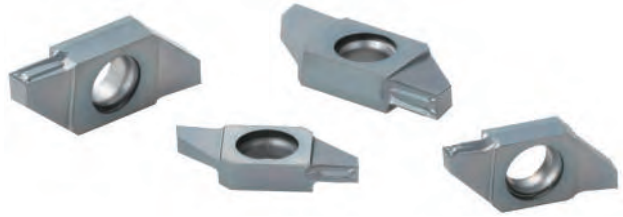


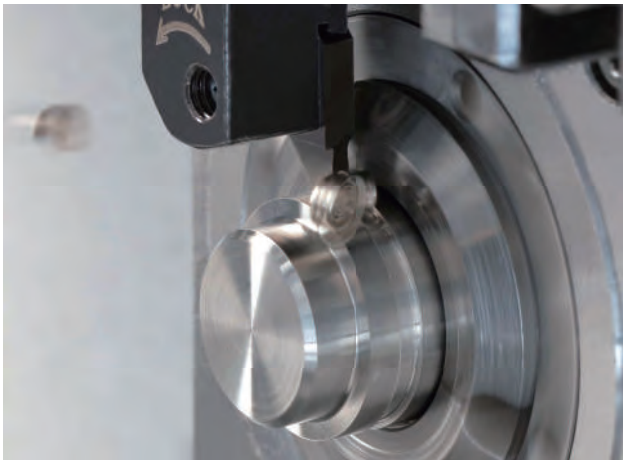
KTKF for Small Part Machining Applications

GTP Chipbreaker

E18, E19

Reduce Cycle Time with Grooving and Turning Capabilities
Stable Chip Control for Wide Range of Machining Applications





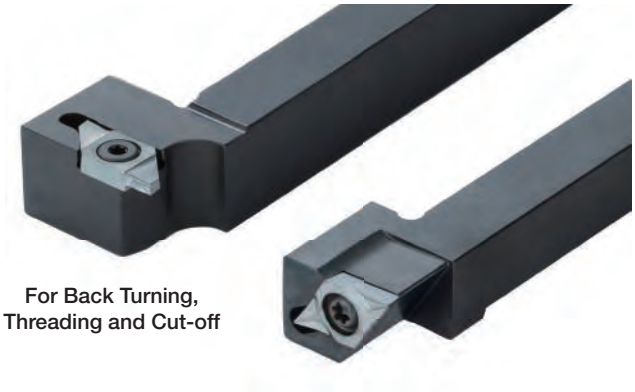
Improved Chip Control

Y-axis Toolholder

E12~, H8~, J24~

Excellent Chip Evacuation with Y-axis Tuning Prevents Chip Entanglement





For Back Turning, Threading and Cut-off

For External Turning

Grooving



High precision　Small Dia. Internal Grooving

SIGC

G54~G57

Newly Developed Clamping System Ensures a Firm Insert Hold
High-Precision Machining
Minimum Cutting Diameter ø8mm

Excellent Bars and Carbide Shank Bars Added to the Lineup

Cut-off



High-Performance Cut-Off Solutions

KPK Series

H36~H43

Easy Insert Replacement
Strong Clamping Mechanism for Added Safety and Security
Long Tool Life and Stable Machining with Unique Chipbreaker Designs
Jet Coolant-Through Styles Available (JCT)



Drilling

High Efficiency Modular Drill
MagicDrill DRA
High Precision Insert for Steel Machining

HQP

K6, K7

Improved Centripetal Forces with Special Two-step Bottom
Excellent Cylindricity, Roundness and Surface Finish in Steel Machining





New Product Highlight

Solid Tools



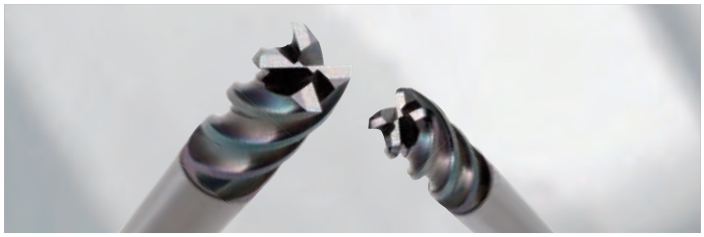
Flat Bottom Drill
2ZDK-HP
L48~L59

Stable Machining in a Wide Range of Applications Including Counterboring and Drilling in Cylinder Surfaces
Low Cutting Force Minimizes Burrs

2ZDK-HP Short type Added to Lineup

New 2ZDK-HP-OH with Internal Coolant for Stainless Steel Machining





High Efficiency End Mill for Steel Machining
4MFK/4MFR
L16~L19

Chatter Resistant with Unique Variable Helix Design
Excellent Chip Evacuation
Lineup Expansion

Milling

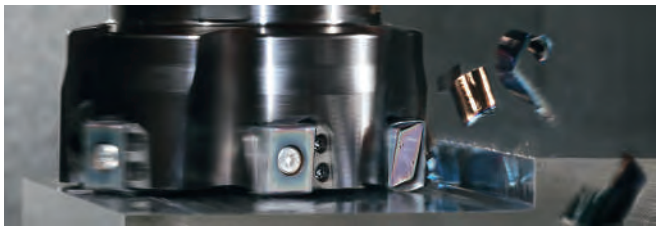
High Performance Milling
MEV
M78~M85

Newly Developed Triangle Inserts Provide Numerous Solutions to Machining Challenges
- **High Performance - Low cutting forces and Higher Rigidity for Excellent Chatter Resistance**
- **Economical - Longer Insert and Holder Tool Life**
- **Multi-functional - Can be Used in Shouldering, Slotting, and Ramping Applications**



4-edge Face Mills with Vertical Inserts for Heavy Milling
MFLN
M38~M43, M114~M117

Tough 4-edge Vertical Inserts Provide High Reliability on Heavy Milling at Large Depths of Cut and High Feed Rates
Three Cutting Edge Angles Optimized for Various Machining Applications



Helical End Mill for Titanium Alloy Machining

MECHT

M98, M99

Unique Design for Stable Titanium Alloy Milling
Insert combination for increased stability
Special holder design for increased reliability
Excellent chip evacuation



Low Cutting Force 90° Milling Cutter with Double-sided 6-Edge Inserts

MFWN Mini

M106~M109

MFWN Mini Uses Cost-Efficient 6-Edge Inserts (Depth of cut ~ 5mm)
Additional Fine Pitch, Small Diameter Toolholders Available



High Efficiency and High Feed Cutter

MFH Series

MFH Harrier

M20

MFH Mini

M15

GH Chipbreaker and PR015S Added to Lineup

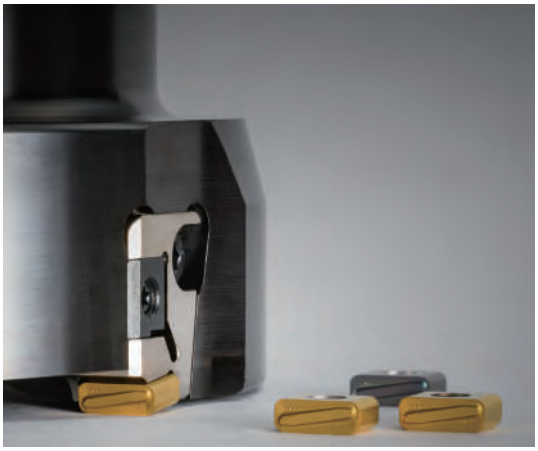


High-Precision Cutter for Finishing Applications

MFF

M168~M173

Enhanced Cutter Design for a Better Finishing Solution
Molded Wiper Inserts Increases Machining Efficiency



Safety Notes for Cutting Tools

1. Introduction

Kyocera has put a “caution” or a “warning” label on the package of the cutting tool products, but it is not on the tool itself.
Before using and handling any cutting tool products and cutting tool materials, be sure to read this guideline so they are used correctly.
Also, as part of your safety education, please make sure to familiarize all of your actual operators with the contents of this guideline.

2. Basic Information for Cutting Tool Materials

2-1. Technical Terms

Cutting Tool Material: Terminology for cutting tool materials, such as Cemented Carbide, Coated Carbide, Cermet, Coated Cermet, Ceramics, CBN and PCD
Carbide Material : Cemented Carbide with WC (Tungsten Carbide) as the main component

2-2 Physical Properties

Appearance: Depends on materials. (e.g. Gray, Black, Gold, etc.)
Smell : None
Hardness : Carbide / Cermet 5 ~ 30GPaHV, Ceramic 10 ~ 40GPaHV
CBN 20 ~ 50GPaHV, PCD 80 ~ 120GPaHV
Sp. Gr. : Carbide 9 ~ 16, Cermet 5 ~ 9, Ceramic 2 ~ 7, CBN / PCD 3 ~ 5

2-3 Composition

Carbide, Nitride, Carbon-nitride and Oxide with W, Ti, Al, Si, Ta, B, etc. and additionally, metals such as Co, Ni, Cr, Mo are included in some cutting materials.

3. Notes for Handling Cutting Tool Materials

- These cutting tool materials are very hard, but also brittle. Therefore, they may brake by shock or excessive clamp force.
- Carbide base material, in particular, can be very heavy. Handle with care when transferring and storing large size products or large quantities as heavy load.
- Carbide base material has a different rate of thermal expansion to that of normal metals. When brazing the cutting tool material, use the proper temperature to prevent the tool from breaking.

4. Notes for Cutting Tools

- The cutting edge is very sharp; wear gloves when handling or installing tools to prevent injury.
- When cutting, cutting tools may brake due to shock, excessive tool wear or improper conditions.
  It is essential to wear protective clothing such as safe guards, safety eyeglasses, and gloves to prevent injury.
- Depending on workpiece material and cutting conditions, sparks or fire may occur. Use protective material such as safe guards, safety eyeglasses and gloves.
- When cutting, flying chips or metal pieces may be dangerous. Use protective materials such as safe guards and safety eyeglasses to prevent injury.

Safety Notes for Cutting Tools

Precaution for using cutting tools

Target Products	Precariousness	Countermeasures
General Cutting Tools	○ Direct touch to a sharp cutting edge may cause injury.	* When you set up tools to the machine or take tools out of the case, please wear protective gloves.
	○ Misuse or inappropriate working conditions may cause tool breakage or dispersion of broken pieces.	* Please use safety items, such as safety glasses and protective gloves. * Please use in the range of our recommended cutting condition. See our catalog or instruction manuals.
	○ Excessive impact or heavy wear will increase cutting force and may cause tool breakage and dispersion of broken pieces.	* Please use safety items, such as safety glasses and protective gloves. * Early exchanging tools is prefereable.
	○ Dispersion of heated or prolonged chips may cause injury or burn.	* Please use safety items, such as safety glasses and protective gloves. * For chips removal, please stop the machine beforehand and use safety items, such as safety glasses and protective gloves.
	○ Tools and materials reach high temperatures during cutting operation. Direct touch to the tools and materials shortly after cutting may cause burn.	* Please prepare safety items, such as safety glasses and protective gloves.
	○ Sparks, generation of heat or chips in high temperature during operation may cause fire.	* Please do not operate around Hazardous zone, in which there is some possibility of fire or explosion. * In case of using oil-coolant, please make sure there is sufficient fire-protection equipment.
	○ Lack of dynamic balance during high-speed revolutions leads to vibrations which can make the tool break.	* Please use safety items, such as safety glasses and protective gloves. * Please conduct test-operation before cutting, and confirm that there is no vibration or unusual sound.
	○ Direct touch to burrs which were generated on the rough surface of the workpiece may cause injury.	* Do not touch workpiece with bare hand.
Indexable Cutting Tools	○ If the inserts or other tool parts are not installed properly, they can fall down or break which may cause injuries.	* Please clean up insert pockets or clamping parts before setting insert. * Please set up inserts with supplied wrench only, and confirm that the inserts or parts are clamped completely. Never use inserts or parts other than those prescribed.
	○ If inserts are clamped too tightly by supplementary tools like pipe etc, inserts or body may brake.	* Do not use aids such as pipes. Please set up using supplied wrench only.
	○ When tools are used in high-speed revolution, inserts or parts may burst out of the body due to centrifugal force. When handling, please pay special attention to safety.	* Please use in the range of our recommended cutting conditions. See our catalog or instruction manuals.
Milling Cutters and other Milling Tools	○ Since milling cutters have sharp edges, direct contact with bare hands may cause injury.	* Please use safety items, such as safety glasses and protective gloves.
	○ If a cutter lacks balance, the tool can start to vibrate. The dispersion of broken pieces can cause injuries.	* Please use in the range of our recommended cutting condition. * Accuracy and balance of machine spindle should be checked and adjusted regularly to prevent wear of the bearings due to eccentric rotation.
Drilling	○ When drilling a through-bore, it is possible that a disc is created during the drilling procedure that can fly out of the workpiece at a high speed. This is very dangerous since the disc has sharp edges.	* Please use safety items, such as safety glasses and protective gloves. Also attach a cover on a chuck part.
Brazed Tools	○ Dispersion or falling down of broken inserts may cause injury.	* Please check that the cutting inserts are brazed firmly before use. * Please do not use brazed tools in the condition that requires high cutting temperature.
Others	○ If brazing is carried out many times, the strength of carbide insert is deteriorated and can break easily during cutting.	* Please do not use tools that have been brazed several times. The quality of the tool deteriorates.
	○ The tools can only be used for the appropriate application. It may damage tools and machines.	* Please follow our recommended usage for the tools.

Preface

Thank you very much for using **"2020-2021 Kyocera Cutting Tools"**.

- This General Catalog contains major Kyocera cutting tools.
- This General Catalog is as of **October, 2020**.
- The stock status of products will be shown as follows:

● …Standard Item	○ …Check Availability
R …Right-hand Only	MTO…Made to order
L …Left-hand Only	None…No Stock
▲ : To be replaced by a new product	

- The specifications of products in this catalog may be changed due to research / development / modification without prior notice. Also conventional products might be integrated or centralized due to new material or new product development.

- Kyocera Cutting Tools will continue to improve product quality and safety.
  1) For handling and usage of Kyocera Cutting Tool Products, please carefully read **"Safety Notes of Cutting Tools"** in the previous page.
  2) For **Safety Data Sheet (SDS)** of each Insert Grade, please refer to our machine tool homepage, **https://www.kyocera.co.jp/prdct/tool/sds/**

■ Quantities for inventory sales

1) Toolholder Body / Parts

Type	Sales piece per one box	Remarks
Toolholder	1 piece/box	
Milling	1 piece/box	
Parts	1 piece/box	Light weight parts (Clamp screws) are in a plastic bag

2) Insert / Solid End Mill / Fine Micro Drill

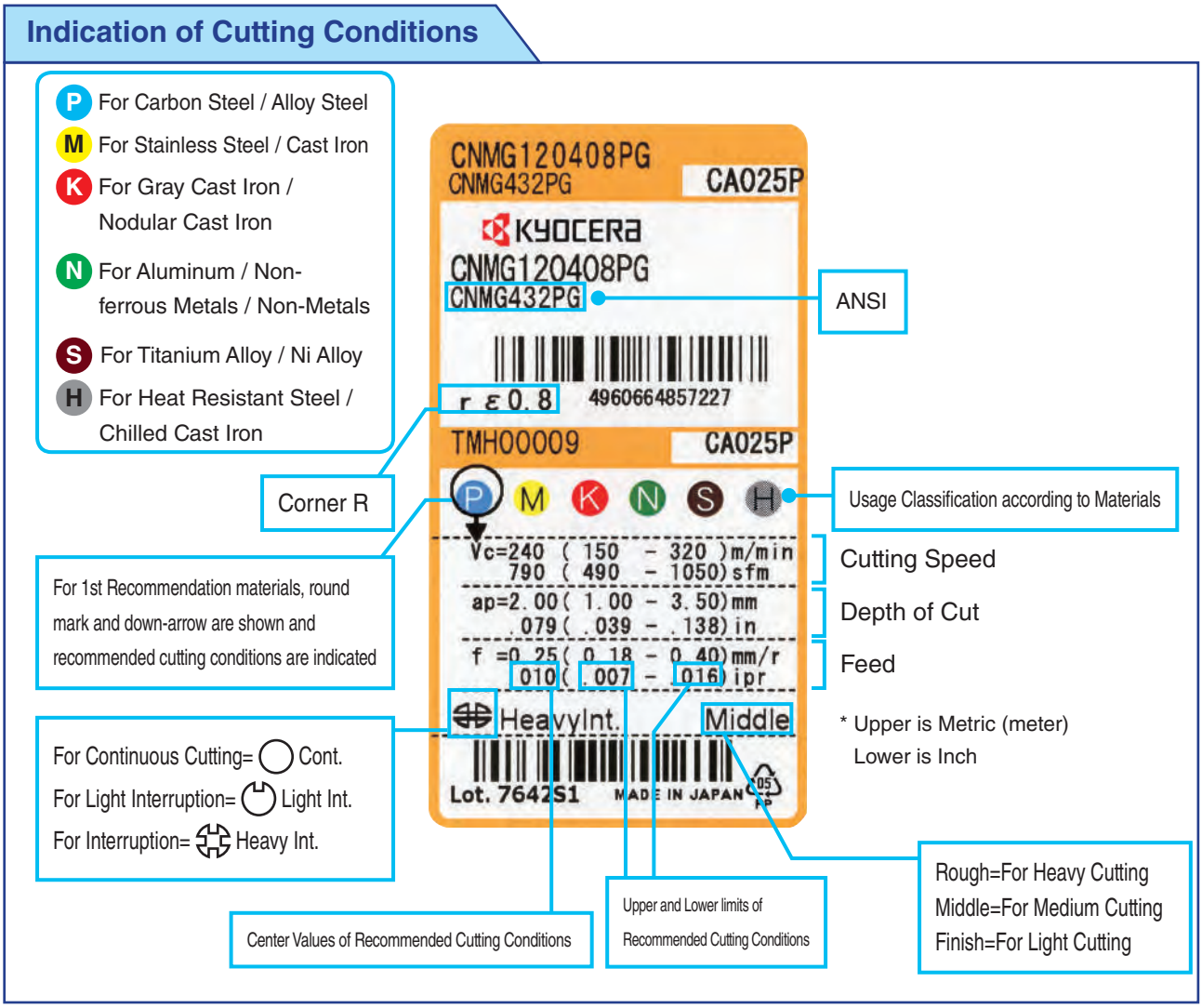
Type	Sales piece per one box	Remarks
Twin Bars	5 pieces/box	TWB / TWBT / TWFG / TWFGT Insert
System Tip-Bars	5 pieces/box	VNB / VNBT / VNFG / VNG / VNT Insert
EZ Bars	1 piece/box	EZB / EZVB / EZFG / EZG / EZT Insert
CBN Inserts	1 piece/box	Insert Grades: KBN···
PCD Inserts	1 piece/box	Insert Grades: KPD···
Threading Inserts	5 pieces/box	Insert Grades: PR1215 / PR1515 / PR1535 / PR1115 / GW15 only
DA…M… type Insert	1 piece/box	Inserts for "MagicDrill DRA"
DC…M-SC type Insert	1 piece/box	Inserts for "MagicDrill DRC"
GC Inserts	5 pieces/box	Insert for "SIGC"
SEEN-W Inserts	5 pieces/box	Insert Grades: TN100M / KW10 only
PNEG-W Inserts	5 pieces/box	MFK Insert with wiper Edge
PNEU-W Inserts	5 pieces/box	MFPN Insert with wiper Edge
RDFG Type Insert	2 pieces/box	MRF / MRFW Ball End Mill Insert
RBG Type Insert	1 piece/box	
Fine Micro Drill	1 piece/box	Fine Micro Drill are sold in 1 piece boxes
Solid Tools	1 piece/box	
Other than above inserts	10 pieces/box	

■ Change to New Label

Indication of Cutting Conditions

To improve usability, cutting conditions are indicated in the label.

* This will apply to only new insert grades temporarily.





Insert Grades

A

A1~A21

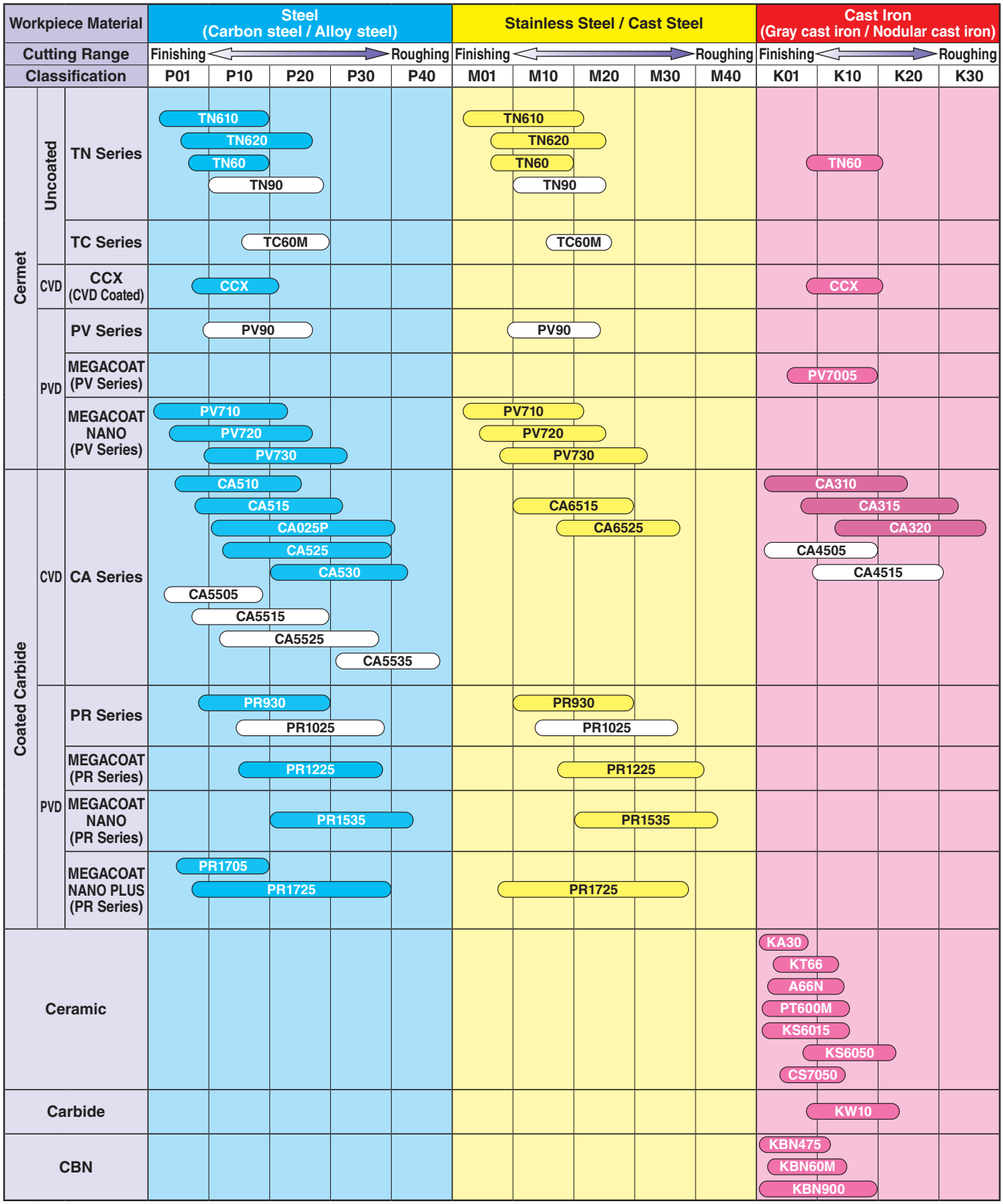
Summary of Insert Grades	A2~A5
Turning	A2~A3
Small Parts Machining	A3
Grooving / Cut-off / Threading	A4
Drilling	A5
Milling	A5

Insert Grades	A6~A21
Cermet	A6
CVD Coated Carbide (Turning)	A8
PVD Coated Carbide (Turning)	A10
PVD / CVD Coated Carbide (Milling / Drilling)	A12
Carbide	A14
DLC Coated Carbide	A14
Ceramic	A15
CBN (Cubic Boron Nitride)	A16
PCD (Polycrystalline Diamond)	A17
Honeycomb structure CBN / Ceramic	A18
Insert Material Selection Table	A19
Grade Properties	A20

Summary of Insert Grades

Kyocera promotes research and development to help improve customers' productivity and profitability.
Kyocera provides high-quality inserts in various grades including Cermet, Coated Carbide, Coated Super Micro Grain Carbide, Carbide, Ceramic, PCD and CBN.

Turning



Turning

Workpiece Material			Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Heat-resistant alloys / Ni-base heat-resistant alloys)				Hard Materials (Hardened steel / Chilled cast iron)				Sintered Steel			
Cutting Range			Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification			N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Coated Carbide	CVD	CA Series						CA6515	CA6525									
	PVD	MEGACOAT HARD (PR Series)					PR005S		PR015S									
		MEGACOAT NANO (PR Series)							PR1535									
Cermet																TN610		
																TN60		
Ceramic								CF1			KT66							
								KS6030			A66N							
								KS6040			PT600M							
CBN											KBN510							
											KBN525							
											KBN900							
MEGACOAT											KBN05M							
											KBN10M							
											KBN25M					KBN70M		
											KBN35M					KBN570		

Workpiece Material			Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast iron)				Sintered Steel			
Cutting Range			Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification			N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Coated Carbide	PVD	MEGACOAT NANO (PR Series)							PR1535									
Carbide							SW05											
								SW10										
				GW05					SW25									
				KW10				KW10										
DLC Coated Carbide				PDL010														
				PDL025														
PCD				KPD001				KPD001										
				KPD010				KPD010										
				KPD230														
				KPD250														

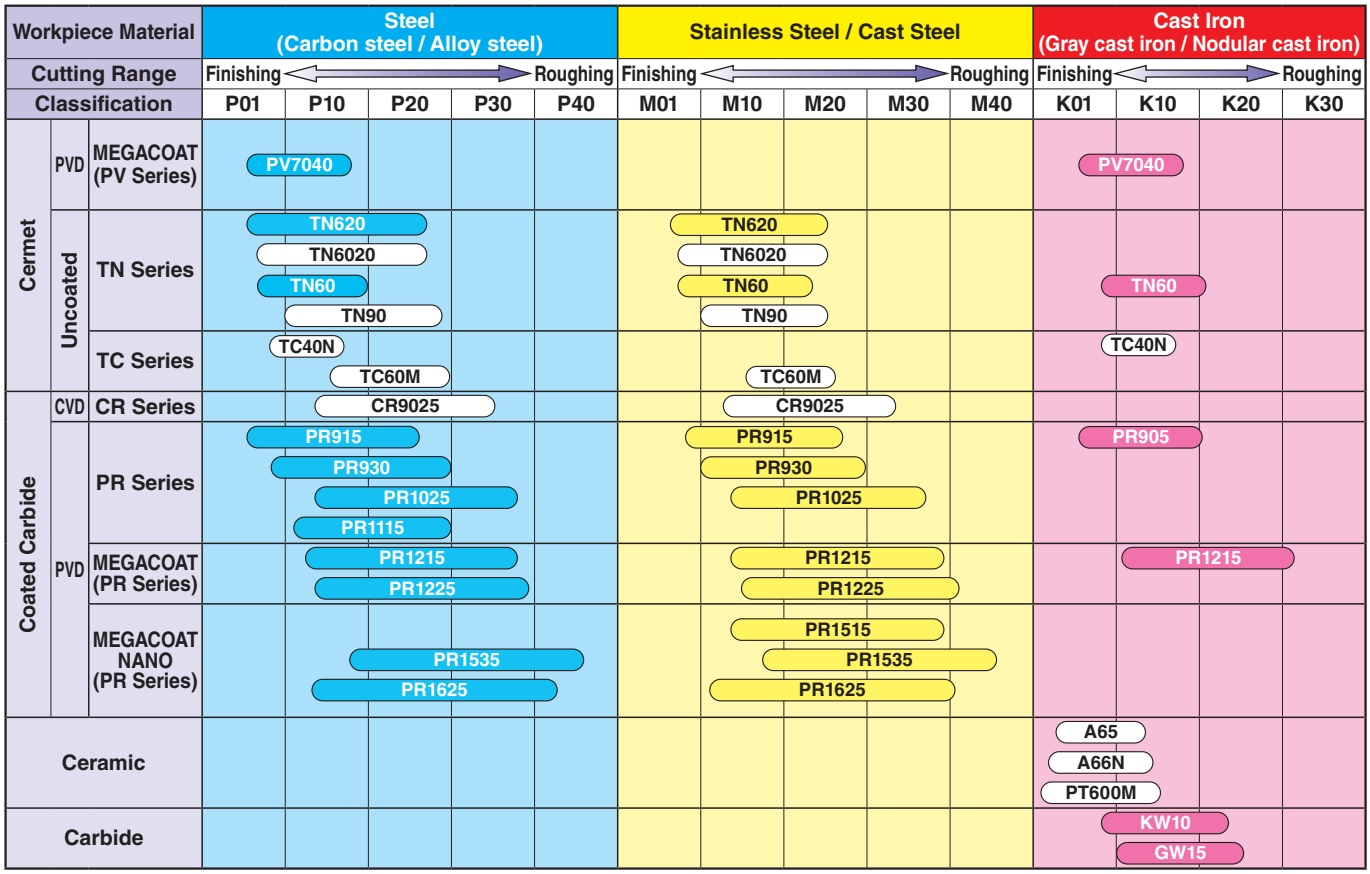
Small Parts Machining

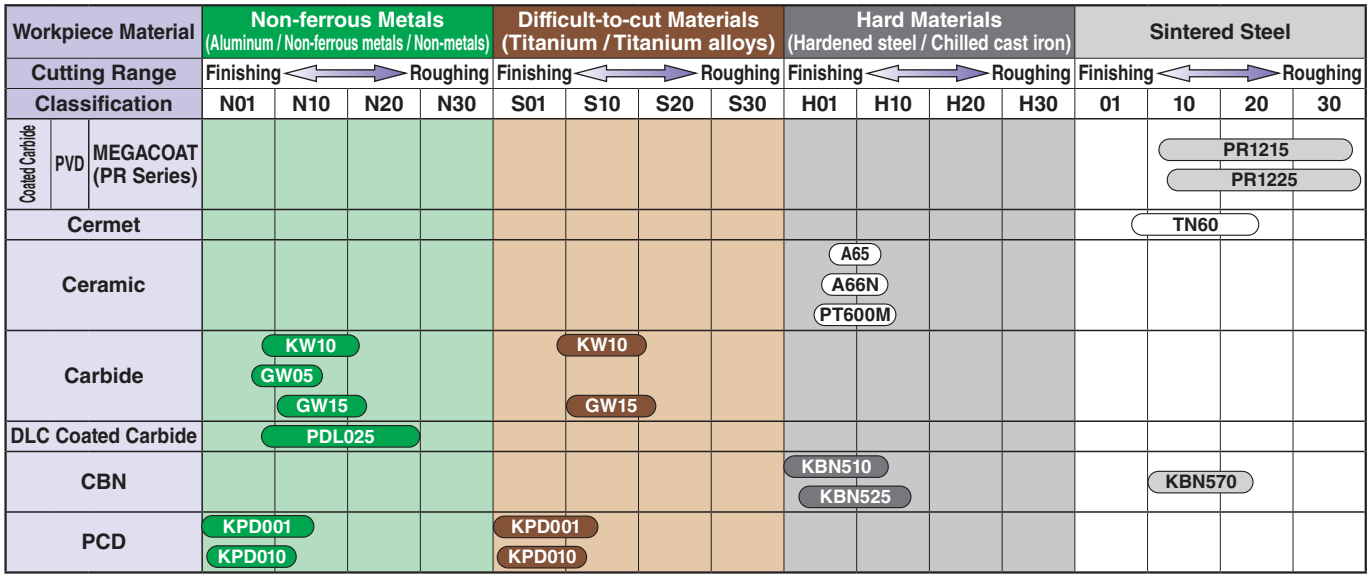
Workpiece Material			Steel (Carbon steel / Alloy steel)					Stainless Steel / Cast Steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range			Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification			P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Coated Carbide	PVD	PR Series		PR930					PR930							
				PR1025					PR1025							
		MEGACOAT (PR Series)			PR1225					PR1225						
		MEGACOAT NANO (PR Series)			PR1535					PR1535						
		MEGACOAT NANO PLUS (PR Series)	PR1705													
			PR1725						PR1725							

Workpiece Material	Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast iron)				Sintered Steel			
Cutting Range	Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification	N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Carbide		GW05														

Summary of Insert Grades

Grooving / Cut-off / Threading





Drilling

Workpiece Material			Steel (Carbon steel / Alloy steel)					Stainless Steel / Cast Steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range			Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification			P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Coated Carbide	CVD	CA Series		CA520D						CA6535				CA415D		
	PVD	MEGACOAT (PR Series)		PR1225						PR1225				PR1210		
				PR1230												
		MEGACOAT NANO (PR Series)		PR1535					PR1535							
Carbide														KW10		
														GW15		

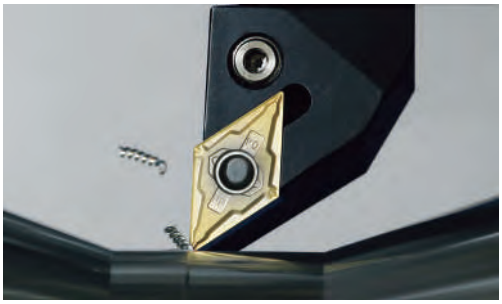
Workpiece Material			Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast iron)			
Cutting Range			Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification			N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30
Coated Carbide	PVD	MEGACOAT (PR Series)									PR1230			
Carbide				KW10				KW10						
				GW15				GW15						

Milling

Workpiece Material			Steel (Carbon steel / Alloy steel)					Stainless Steel / Cast Steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range			Finishing ⟷ Roughing					Finishing ⟷ Roughing					Finishing ⟷ Roughing			
Classification			P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Cermet	Uncoated	TN Series		TN620M												
				TN60					TN60							
				TN100M					TN100M							
	PVD	MEGACOAT NANO (PV Series)		PV60M												
Coated Carbide	CVD	CA Series								CA6535				CA420M		
	PVD	MEGACOAT (PR Series)		PR1225						PR1225				PR1210		
				PR1230												
		MEGACOAT NANO (PR Series)		PR1525						PR1525				PR1510		
										PR1535						
Carbide														KW10		
														GW25		

Workpiece Material			Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Heat-resistant alloys / Ni-base heat-resistant alloys)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast iron)			
Cutting Range			Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification			N01	N10	N20	N30	S01	S10	S20	S30	S01	S10	S20	S30	H01	H10	H20	H30
Coated Carbide	CVD	CA Series						CA6535				CA6535						
	PVD	MEGACOAT (PR Series)										PR1210						
		MEGACOAT HARD (PR Series)														PR015S		
		MEGACOAT NANO (PR Series)						PR1535				PR1535						
Carbide				KW10								KW10						
				GW25								GW25						
DLC Coated Carbide				PDL025														
PCD				KPD001								KPD001						
				KPD010								KPD010						
				KPD230														
				KPD250														

Cermet



Cermet

KYOCERA is known as one of the leading manufacturers of cermets.
Cermets combine toughness with superior wear resistance, and provide longer tool life and excellent surface finishes.
Typical materials used in cermets are TiC, TiN, TiCN and NbC.

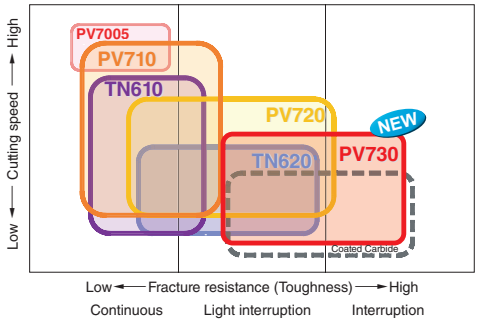
PVD Coated Cermet (MEGACOAT / MEGACOAT NANO Cermet)

PVD Coated Cermet is coated on cermet substrate with a thin layer of high wear resistance and high adhesion resistance by PVD (Physical Vapor Deposition) technology. Generally because of the low processing temperature of PVD compared with CVD, PVD coated cermet features less deterioration and more bending strength.

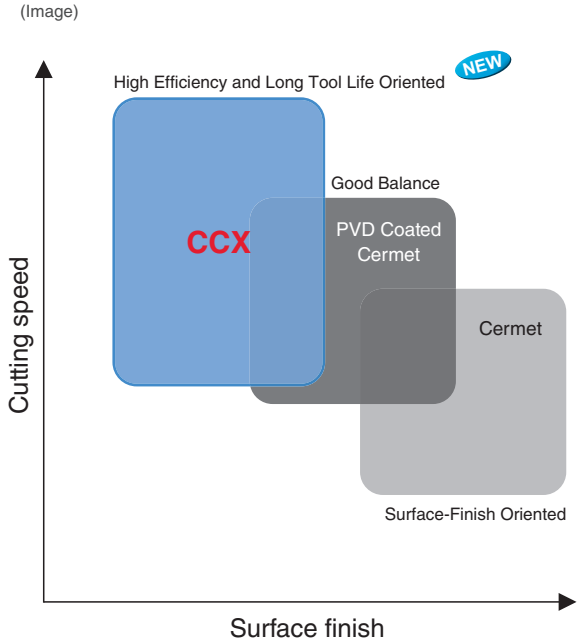
Features of Cermet and PVD Coated Cermet

Classification	Symbol		Color	Main Component (Coated Composition)	Advantages and Applications
P Steel	Cermet	TN610	Gray	TiCN	· High wear resistant cermet due to three types of special reinforcement technology · Application : Cermet for steel machining, long tool life in high speed and continuous
		TN620	Gray	TiCN	· Three types of special reinforcement technology realized the superior fracture resistance and wear resistance · Application : Stable machining of steel
		TN60	Gray	TiCN+NbC	· Application : Machining of steel, continuous to interruption
		TN6020 (Super Micro-Grain)	Gray	TiCN	· Application : Uncoated cermet for grooving of steel
		TN620M	Gray	TiCN	· Tough cermet for milling with excellent balance of wear resistance and toughness · Application : Milling of steel with high quality surface finish and long tool life
		TN100M	Gray	TiCN+NbC	· Tough cermet with improved oxidation resistance and thermal shock resistance · Application : Milling of steel at high speed
		TC40N	Gray	TiC+TiN	· Good balance of wear resistance and toughness · Application : Grooving and threading of steel
	CVD Coated Cermet	CCX	Gold	TiCN ($TiCN+Al_2O_3+Tin$)	· Specialized high-strength micro grain cermet base material with superior wear-resistant thick CVD coating Excellent wear resistance leads long tool life in high speed machining · Application : High speed finishing to light interrupted machining of steel
	MEGACOAT NANO Cermet	PV710	Gold	TiCN (MEGACOAT NANO)	· Superior wear and adhesion resistant MEGACOAT NANO on the high wear resistant cermet · Application : Long tool life and stability in high speed continuous machining of steel, excellent surface
		PV720	Gold	TiCN (MEGACOAT NANO)	· Superior wear and adhesion resistant MEGACOAT NANO on the special reinforcement cermet · Application : The 1st choice PVD coated cermet for steel machining provides high efficient machining and high quality surface finish
		PV730	Gold	TiCN (MEGACOAT NANO)	· Specialized high-strength micro grain cermet with MEGACOAT NANO coating technology with wear and adhesion resistance · Application : Stable machining and high quality surface finish of steel machining
		PV60M	Gold	TiCN+NbC (MEGACOAT NANO)	· Improved stable grade for milling by MEGACOAT NANO coating technology · Application : Milling of steel with high quality surface finish and stable machining
	MEGACOAT Cermet	PV7040	Blackish Red	TiC+TiN (MEGACOAT)	· MEGACOAT cermet for grooving · Application : Excellent surface finish and longer tool life in steel grooving
K Cast Iron	MEGACOAT Cermet	PV7005	Blackish Red	TiC+TiN (MEGACOAT)	· Heat-resistant MEGACOAT on cermet with excellent wear resistance · Application : High speed finishing of gray and nodular cast iron

Application Map (Hybrid Cermet)



Application Map



TN Series

(Uncoated Cermet)

TN610 : Superior wear resistant cermet
TN620 : Superior fracture and wear resistance

PV Series

(MEGACOAT NANO Cermet)

PV710 : Long tool life and stable machining of steel at high speed and continuous
PV720 : High efficiency and excellent surface finish (1st choice)
PV730 : Stable machining and high quality surface finish

Uncoated Cermet

TN610 / TN620

MEGACOAT NANO Cermet

PV710 / PV720 / PV730

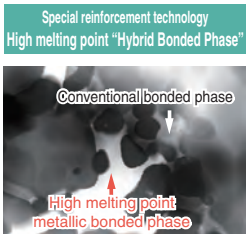
NEW

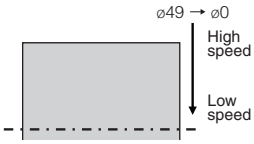
Special Reinforcement Technology (Hybrid Technology) Realized the Superior Surface Finish and Stability

1 Excellent Surface Finish

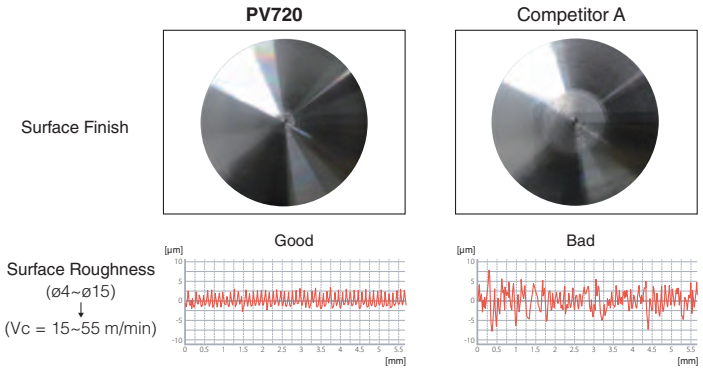
Combining the conventional cermet bonded phase (nickel, cobalt) and the special high melting point metallic bonded phase

Minimizing softening bonded phase at cutting and high deposition resistance and excellent finishing surface quality





Surface finish comparison
(Internal evaluation) Cutting Conditions : Vc=180 ~ 0 m/min (Constant rate), ap = 0.5 mm
f = 0.1 mm/rev, Wet, CNMG120404 type Workpiece Material : S10C



For Finishing

CCX

Kyocera's New Insert Grade Technology. Excellent High Speed Finishing Leads to Greater Productivity. Applicable to a Wide Range of Cutting Conditions from General to High Speed Machining. Maintains Long Tool Life in Soft Steel, Carbon Steel and Cast Iron Machining.

1 Excellent High Speed Finishing Leads to Greater Productivity

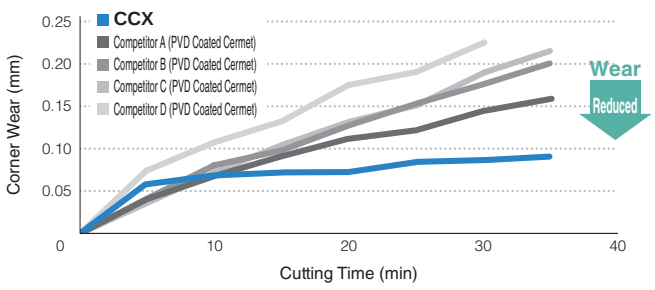
2 Unique Cermet Base Material with Thick CVD Coating

3 Superior Wear Resistance to PVD Coated Cermets

Alloy Steel (SCM435) **High Speed Comparison : Vc = 400 m/min**

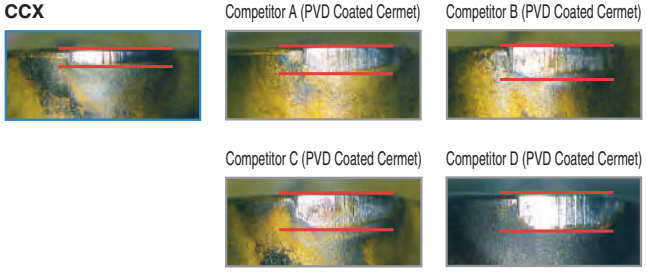
CCX provided better tool life than competitor's CVD cermets by greatly reducing the amount of wear

Wear Resistance Comparison (Internal evaluation)



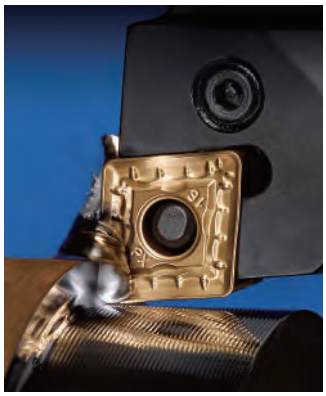
Cutting Conditions : Vc = 400 m/min, ap = 0.3 mm, f = 0.12 mm/rev, Wet CNMG120408 type External Turning

Cutting Edge (After Machining 35 min)



*Picture shows 30 min after machining due to a large amount of wear.

CVD Coated Carbide (Turning)



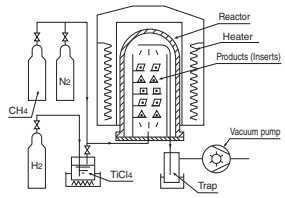
CVD Coated Carbide

Using Chemical Vapor Deposition coating technology, CVD coated carbide grades provide stable, efficient machining at high speeds or for heavy interrupted applications.

Features

- Applicable from low to high speed machining and from finishing to roughing
- Stable machining is achieved due to the superior toughness and crack resistance
- Cutting times are reduced due to good chip control from effective chipbreakers

CVD (Chemical Vapor Deposition)



● Features
1) Equally deposited on face
2) Easy application for multilayer deposition
3) Enabling thick coating

Processing temperature : 900~1100ºC

Features of CVD Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
P Steel	**CA510**	Gold	TiCN+Al_2O_3+TiN	· Special substrate with thermal deformation resistance along with a thick and tough coating layer providing high wear resistance · Application : High speed and high efficiency steel machining
	CA515	Gold	TiCN+Al_2O_3+TiN	· Improved wear resistance and stability due to special substrate with heat deformation resistance and hard and tough coating layer with reinforced interface · Application : Light interrupted machining of steel
	CA025P	Gold	TiCN+Al_2O_3+TiN	· Tough CVD coating and substrate with excellent wear resistance, improved fracture resistance, deposition resistance and chipping resistance · Application : Stable machining of steel for continuous to interrupted machining
	CA525	Gold	TiCN+Al_2O_3+TiN	· Stable and long tool life machining due to special substrate with heat deformation resistance and tougher coating layer and reinforced interface · Application : Interrupted to general machining of steel
	CA530	Gold	TiCN+Al_2O_3+TiN	· Special tough substrate and tough coating layer providing high stability and wear resistance · Application : General to heavy interrupted machining (stability oriented)
	CA5505	Gold	TiCN+Al_2O_3+TiN	· Application : High speed continuous machining of steel, continuous to light interrupted machining of cast iron
	CA5515	Gold	TiCN+Al_2O_3+TiN	· Application : Machining of steel, continuous to light interruption
	CA5525	Gold	TiCN+Al_2O_3+TiN	· Application : For general machining of steel, roughing to interruption
	CA5535	Gold	TiCN+Al_2O_3+TiN	· Application : Roughing to heavy interrupted machining of steel
	CR9025	Gold	TiCN+TiN	· Improved toughness and stability due to specialized carbide substrate with plastic deformation resistance · Application : Cut-off, grooving and multi-function machining of steel
M Stainless Steel	**CA6515**	Gold	TiCN+Al_2O_3+TiN	· Specialized carbide substrate for machining stainless steel, excellent wear resistance · Application : Continuous machining of stainless steel
	CA6525	Gold	TiCN+Al_2O_3+TiN	· Specialized carbide substrate for machining stainless steel, excellent notching resistance and toughness · Application : The 1st choice for general machining of stainless steel, from finishing to roughing, continuous to interruption
K Cast Iron	**CA310**	Rose Gold	TiCN+Al_2O_3+Ti base	· Grade for high-speed continuous machining and improved tool life through the deposition of a thickened Al_2O_3 coating layer · Application : For finishing to roughing of gray cast iron
	CA315	Rose Gold	TiCN+Al_2O_3+Ti base	· High efficiency and long tool life For continuous to interrupted machining with a good balance of wear resistance and stability · Excellent performance for machining gray and nodular cast iron For machining of nodular cast iron
	CA320	Rose Gold	TiCN+Al_2O_3+Ti base	· Improved stability with CVD layer structure with high adhesion · Application : Heavily interrupted or High-speed machining for Nodular Cast Iron. The 1st recommendation for the FCD500 or higher application
	CA4505	Blackish Gray	TiCN+Al_2O_3	· Stable, longer tool life due to improved bonding strength of coating layers and special treatment of the surface of the top coating layer · Application : For gray cast iron and nodular cast iron at high speed in continuous to light interrupted machining
	CA4515	Blackish Gray	TiCN+Al_2O_3	· Stable, longer tool life due to improved bonding strength of coating layers and special treatment of the surface of the top coating layer · Application : The 1st choice for gray cast iron and nodular cast iron in light to heavy interrupted machining

CVD Coated Carbide Grade for Steel

CA025P

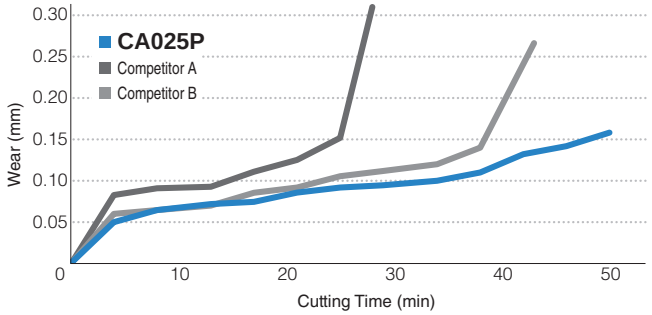
Next Generation CVD Coating for Longer Tool Life

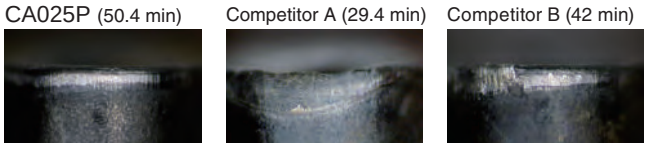


1 Improved Wear Resistance with New CVD Grade for Steel

Thickened alumina with good thermal resistance (Twice as thick as conventional coating)
Improved plastic deformation resistance by increased temperature strength

Wear Resistance Comparison (Internal evaluation)



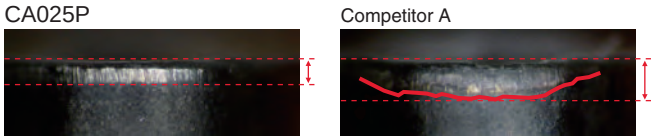


Good Surface Condition

Cutting Conditions : Vc = 300 m/min, ap = 1.5 mm, f = 0.3 mm/rev, Wet
Workpiece Material : SCM435

Wear Comparison (Internal evaluation) **Cutting Time 25.2 min**

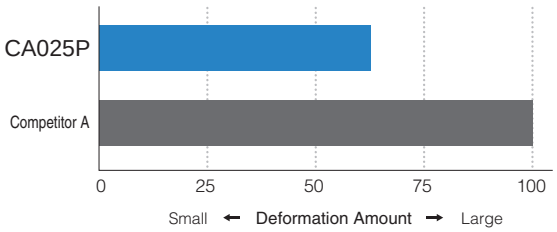
CA025P maintains smooth and flat surface with stable tool life



Stable Wear on Surface | Unstable Wear Pattern

Cutting Conditions : Vc = 300 m/min, ap = 1.5 mm, f = 0.3 mm/rev, Wet
Workpiece Material : SCM435

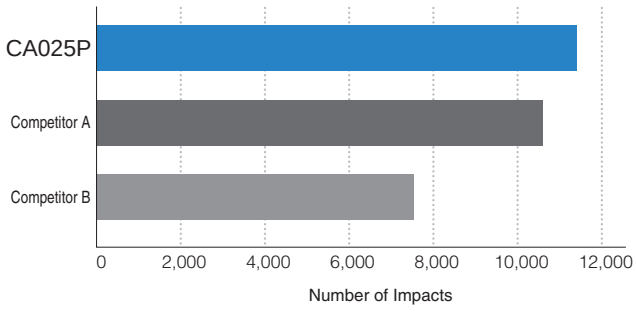
Plastic Deformation Comparison under High Temperature (Internal evaluation)
Comparison with Competitor A



2 Excellent Fracture Resistance

New substrate with high stability provides excellent chipping resistance

Fracture Resistance Comparison (Internal evaluation) **Average of 5 times**



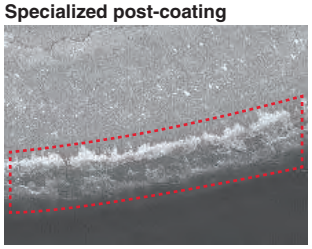
Cutting Conditions : Vc = 250 m/min, ap = 1.5 mm, f = 0.35 mm/rev, Wet
Workpiece Material : SCM440 (with 4 slots)

3 Excellent Adhesion Resistance and Chipping Resistance

Specialized post-coating process prevents adhesion

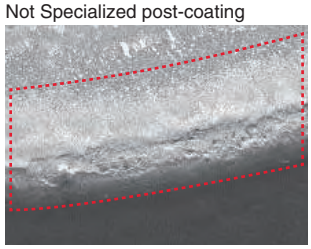
Adhesion on the Edge after Cutting (Internal evaluation)

Specialized post-coating



Less Adhesion

Not Specialized post-coating



Wide area of adhesion
* Adhesion area appears white

Cutting Conditions : Vc = 270 m/min, ap = 1.0 mm, f = 0.1 mm/rev, Wet
Workpiece Material : SCM440 (with 4 slots)

PVD Coated Carbide (Turning)



PVD Coated Carbide

Using a Physical Vapor Deposition coating technology, generally because of the low processing temperature of PVD compared with CVD, PVD coated carbide features less deterioration and more bending strength.
PVD coated carbide grades are coated on a very tough carbide substrate and suitable for turning.

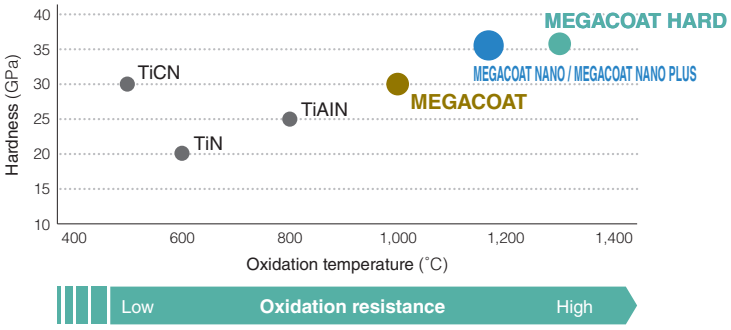
PVD Coated Super Micro-Grain Carbide

- **Smooth fine surface of PVD coated carbide provides good surface finish and high precision machining**
- **Stable machining with excellent toughness**

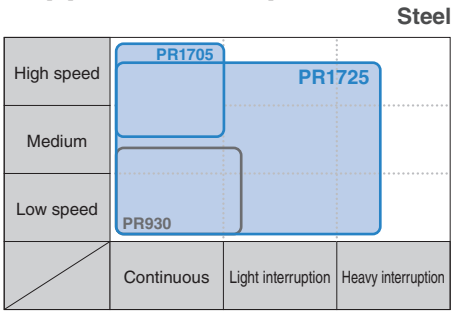
Features of PVD Coated Carbide

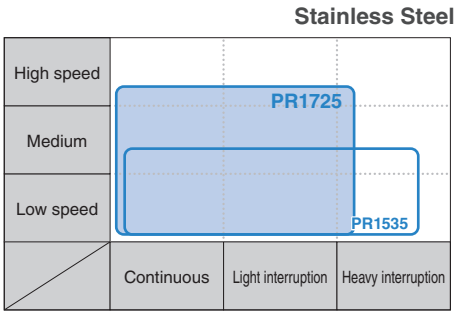
Classification	Symbol	Color	Coated Composition	Advantages and Applications
P Steel	**PR915** (Super Micro-Grain)	Bluish Violet	TiAlN	· Application : Stable and reliable high precision machining of steel
	PR930 (Super Micro-Grain)	Reddish Gray	TiCN	· Application : Low machining speed, precise machining with sharp edge
	PR1025	Reddish Gray	TiCN	· Application : General machining of steel and stainless steel, stable and longer tool life
	PR1115	Purple Red	TiAlN	· Superior oxidation resistance with well balanced wear resistance and toughness · Application : Machining of steel and stainless steel, for grooving, cut-off and threading
	PR1215	Blackish Red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application : Superior adhesion resistance and longer tool life for steel and stainless steel machining
	PR1625	Reddish Green	MEGACOAT NANO	· Nano thin multi-layer coating, [MEGACOAT NANO] provides superior wear resistance and high lubrication · Stable machining and long tool life for grooving of steel and stainless
	PR1705	Silver	MEGACOAT NANO PLUS	· High-hardness ultrafine particle carbide substrates with special multilayer nano coating MEGACOAT NANO PLUS offer excellent wear resistance and high precision machining. · Application : For free-cutting steel turning. Long tool life with excellent wear resistance and high-precision machining.
	PR1725	Silver	MEGACOAT NANO PLUS	· New coating technology [MEGACOAT NANO PLUS] with superior wear resistance and adhesion resistance · Application : General grade for steel and stainless steel machining provides stability and longer tool life
M Stainless Steel	**PR1225**	Blackish Red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application : Light interrupted to interrupted machining of stainless steel
	PR1515	Reddish Green	MEGACOAT NANO	· Nano thin multi-layer coating [MEGACOAT NANO] on micro-grain carbide substrate improved wear resistance and stability · Application : Threading of stainless steel
	PR1535	Reddish Green	MEGACOAT NANO	· Nano thin multi-layer coating [MEGACOAT NANO] improved wear resistance and stability · Application : Medium to roughing of stainless steel and heat-resistant alloys, cut-off of stainless steel
K Cast Iron	**PR905**	Bluish Violet	TiAlN	· Smooth fine surface PVD coated hard carbide with plastic deformation resistance · Application : Suitable for machining gray and nodular cast iron
S Heat-resistant alloys	**PR005S**	Blackish Gray	MEGACOAT HARD	· Superior high temperature properties of special carbide substrate and excellent heat-resistance of MEGACOAT HARD enables high wear resistance · Application : Finishing and high speed machining of heat-resistant alloys
	PR015S	Blackish Gray	MEGACOAT HARD	· Superior high temperature properties of special carbide substrate and MEGACOAT HARD improved heat-resistance and stability · Application : Recommended for continuous to light interruption machining and finishing of heat-resistant alloys

Properties of PVD Coating



Application Map





New PVD Coating

PR1725

1st Recommendation for Steel Machining. Excellent Surface Finish and Long Tool Life. Great Performance in Small Parts Machining Applications.



1 MEGACOAT NANO PLUS Maintains Long Tool Life and Excellent Surface Finish

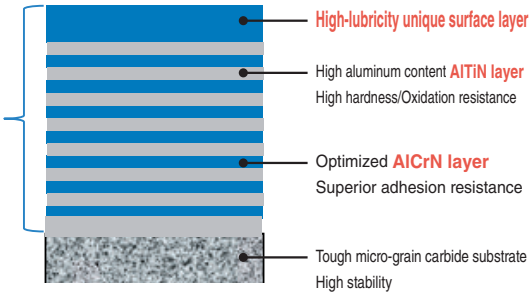
2 One solution can be used in various workpiece materials

3 Applicable to a Wide Range of Machining Applications

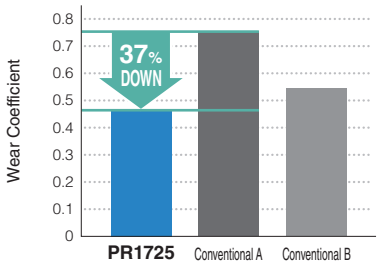
MEGACOAT NANO PLUS

AlTiN/AlCrN Nano laminated film with superior wear resistance and adhesion resistance. Excellent surface finish and long tool life

<Reduces cracking>
Reduces abnormal damages such as chipping because of increased lamination layer with a thinner gap than conventional coatings



Wear Coefficient Comparison (Internal evaluation)



Superior wear and chipping resistance

High hardness with nano laminated film layer properties
Internal stress optimization reduces chipping

Excellent surface finish

Special surface layer with great lubricity reduces adhesion

Applicable to various workpiece materials

Excellent oxidation resistance. Superior high temperature properties maintains good performance in steel, stainless steel and free-cutting steel

High machining stability

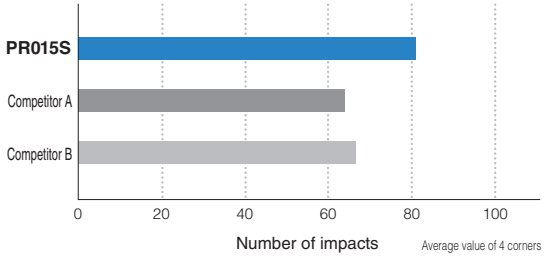
Tough micro-grain carbide substrate provides stable machining

Features of PR005S / PR015S

1) **Improved thermal properties help to reduce sudden fracture and decrease edge wear**
Improved thermal conductivity by optimum distribution of WC coarse grains
Resists heat concentration at the cutting edge to promote stable machining

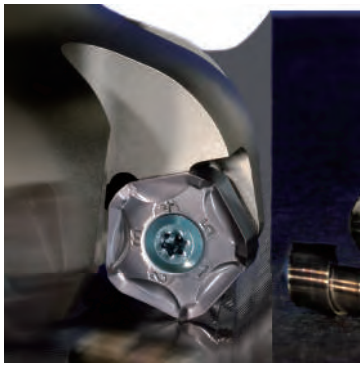
2) **Improved wear resistance with MEGACOAT HARD coating**
Excellent wear resistance with high-hardness and resists boundary damage with improved thermal properties

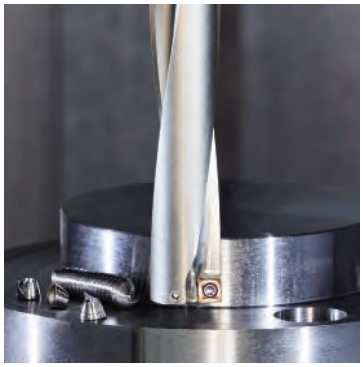
Fracture Resistance Comparison (Internal evaluation)



Cutting Conditions : Vc = 25m/min, ap = 1.0 mm, f = 0.10 mm/rev, Wet
CNMG120408 type Workpiece Material : Ni-based Superalloy Cylindrical workpiece with 1 flat face

PVD / CVD Coated Carbide (Milling / Drilling)





PVD Coated Carbide (MEGACOAT/MEGACOAT NANO)

PVD coated carbide grades for milling and drilling are coated on a very tough carbide substrate.
Because of the low processing temperature of PVD compared with CVD, it features less deterioration and more bending strength.

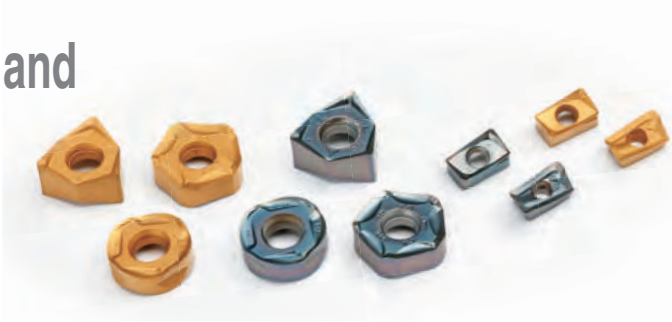
CVD Coated Carbide

CVD coated carbide grades provide stable, efficient machining at high speeds or for heavy interrupted applications.
Ti-base (TiN, TiCN) coating with superior hardness and wear resistance or ceramic-base (Al_2O_3) coating with high-thermal stability is applied on a tough carbide substrate. Superior fracture resistance and wear resistance.

Features of PVD / CVD Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
P Steel	**PR1230**	Blackish Red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on a special tough carbide substrate · Application : Stable and high feed milling and drilling of steel
	PR1525	Reddish Green	MEGACOAT NANO	· New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance · Application : Stable and longer tool life for milling of steel and stainless steel
	CA520D	Gold	TiCN+Al_2O_3+TiN (CVD)	· Combination of High toughness substrate, Coating crystal control technology and advanced layer adhesion coating allow both wear and fracture resistance · Application : 1st Recommendation for drilling of steel (at high speed application)
M Stainless Steel	**PR1225**	Blackish Red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application : General machining and high feed milling and drilling of steel and stainless steel
K Cast Iron	**PR1210**	Blackish Red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT coated on special carbide substrate · Application : Highly efficient stable milling and drilling of gray and nodular cast iron
	PR1510	Reddish Green	MEGACOAT NANO	· New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance · Application : Highly fracture resistance and wear resistance for gray and nodular cast iron
	CA415D	Gold	TiCN+Al_2O_3+TiN (CVD)	· Special carbide substrate for cast iron, coating crystal control technology and advanced layer adhesion coating enable superior wear resistance · Application : 1st Recommendation for drilling cast iron (at high speed application)
	CA420M	Gold	TiCN+Al_2O_3+TiN (CVD)	· Kyocera's unique crystal control technology and advanced layer adhesion CVD coating with superior wear resistance and toughness · Application : Milling of gray and nodular cast iron
S Heat-resistant alloys Titanium alloys	**PR1535**	Reddish Green	MEGACOAT NANO	· Nano thin multi-layer coating [MEGACOAT NANO] improved wear resistance and stability · Application : For milling of Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
S Heat-resistant alloys	**CA6535**	Gold	TiCN+Al_2O_3+TiN (CVD)	· High heat-resistance and wear resistance with CVD coating · Application : For milling of Ni-base heat-resistant alloys and martensitic stainless steel
H Hard Materials	**PR015S**	Blackish Gray	MEGACOAT HARD	· Substrate with improved thermal properties reduces sudden fracture and decrease edge wear. MEGACOAT HARD coating technology delivers the high hardness and superior wear resistance Excellent wear and chipping resistance maintains stable machining for high hard materials · Application : Difficult-to-cut materials and high hard (less than 60HRC) machining

Grade for Heat-resistant Alloys and Difficult-to-cut Materials



CA6535 (CVD) For martensitic stainless steel and Ni-base heat-resistant alloys

PR1535 (PVD) For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel

Suitable for variety of workpiece materials

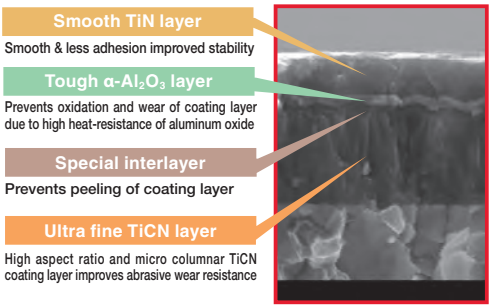
Stable machining by preventing sudden insert fracture
Suitable for high-efficiency machining

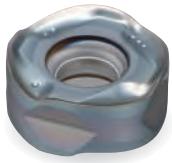


CA6535

For martensitic stainless steel and Ni-base heat-resistant alloys
High heat resistance and wear resistance with CVD coating
Improved stability due to thin layer coating technology

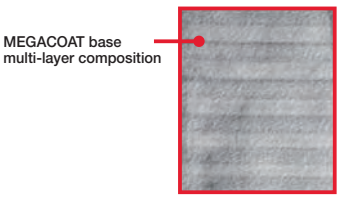






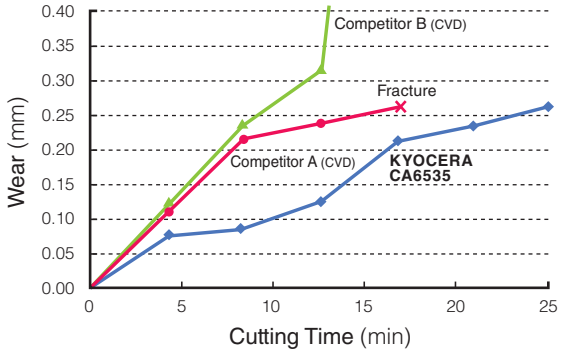
PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable machining and longer tool life in milling by special nano thin multi-layer coating [MEGACOAT NANO]



Tool Life Comparison

●Ni-base heat-resistant alloys



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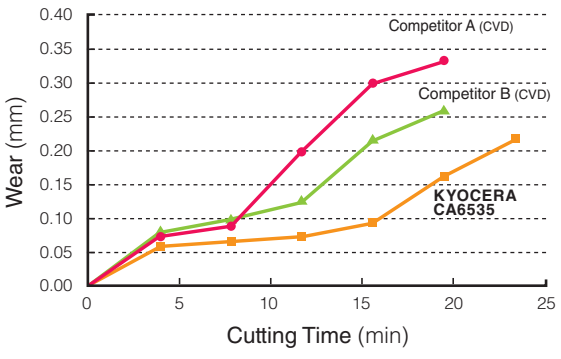
(Internal evaluation)

●Martensitic stainless steel



<Cutting Conditions> Vc=300m/min,ap=2.0mm,fz=0.2mm/t,Wet
(Internal evaluation)

Longer tool life and more stable machining than competitors!

Insert Grades

Carbide



Carbide

Uncoated tungsten carbide grade is used in a variety of applications due to its superior mechanical properties.

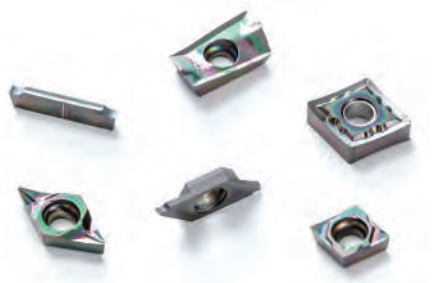
Features

- **KW10 : Suitable for machining cast iron with high hardness and toughness**
- **GW05,GW15,GW25 : Suitable for machining of cast iron, non-ferrous metals and non-metals**
- **SW series : Suitable for machining of titanium and titanium alloy**

Features of Carbide

Classification	Symbol	Color	Main Component	Advantages and Applications
N Non-ferrous Metals	**KW10**	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant) · Application : Machining cast iron, non-ferrous materials and non-metals
	GW05	Gray	WC+Co	· ISO identification symbol K carbide (K05 relevant) · Application : Excellent wear resistance for machining of cast iron and non-ferrous metal
	GW15	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant), tough micro-grain carbide · Application : Machining cast iron, non-ferrous materials and non-metals
	GW25	Gray	WC+Co	· ISO identification symbol K carbide (K30 relevant) · Application : Milling operations of aluminum
S Heat-resistant alloys	**SW05**	Gray	WC+Co	· ISO identification symbol K carbide (K05 relevant) · Application : Titanium alloys for continuous machining and finishing
	SW10 (Made to order)	Gray	WC+Co	· ISO identification symbol K carbide (K10 relevant) · Application : Titanium alloys for continuous and light interrupted machining
	SW25 (Made to order)	Gray	WC+Co	· ISO identification symbol K carbide (K25 relevant) · Application : Titanium alloys for interrupted and light interrupted machining

DLC Coated Carbide



DLC Coated Carbide

DLC (Diamond-Like Carbon) Coated Carbide is coated on carbide substrate with a thin layer of amorphous carbon.

Features

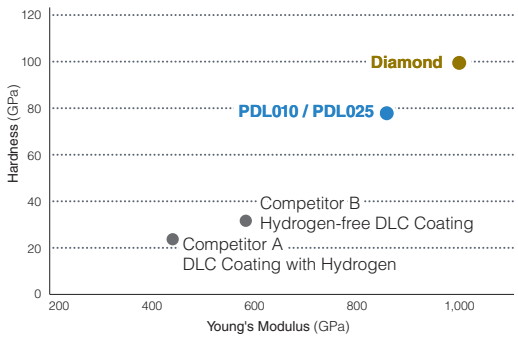
- **High hardness with Kyocera's proprietary hydrogen-free DLC coating delivers hardness close to that of diamond provides longer tool life for aluminum alloys machining**
- **Excellent surface finish achieved through anti-adhesion performance**

Features of DLC Coated Carbide

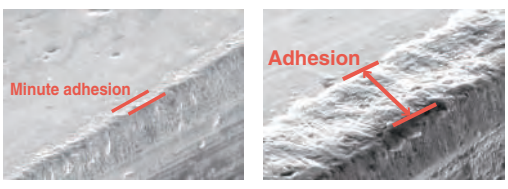
Classification	Symbol	Color	Coated Composition	Advantages and Applications
N Non-ferrous Metals	**PDL010**	Rainbow Color	C	· High hardness with Kyocera's proprietary hydrogen-free DLC coating provides excellent adhesion and peeling resistance · Application: Long tool life machining and stable surface finishing for aluminum alloys
	PDL025	Rainbow Color	C	· High hardness with Kyocera's proprietary hydrogen-free DLC coating provides excellent adhesion and peeling resistance · Application : Long tool life and stable interrupted machining of aluminum alloys

Properties of DLC Coating

High hardness with Kyocera's proprietary hydrogen-free DLC coating delivers hardness close to that of diamond



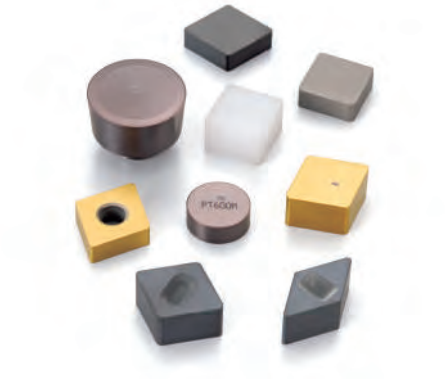
Superior adhesion resistance



PDL025 Competitor A

Cutting Conditions : Vc = 800 m/min, fz = 0.1 mm/t, ap X ae = 3 X 5 mm, Dry
Cutter Dia. ø25 mm Workpiece Material : A5052
Cutting length : 57 m (Internal evaluation)

Ceramic



Ceramic

Ceramics inserts are capable of machining at high speeds. Recommended for hard turning of hardened steel or rough to finish turning of cast iron and heat-resistant alloys.

Features

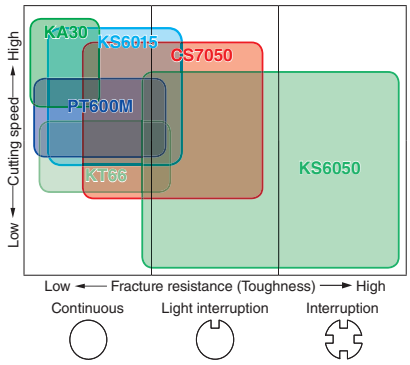
- Excellent wear resistance provides high speed machining of cast iron
- Ceramic maintains good surface finishes due to the low affinity to workpiece materials
- Silicon nitride ceramic can machine cast iron with coolant due to its superior thermal shock resistance

Features of Ceramic

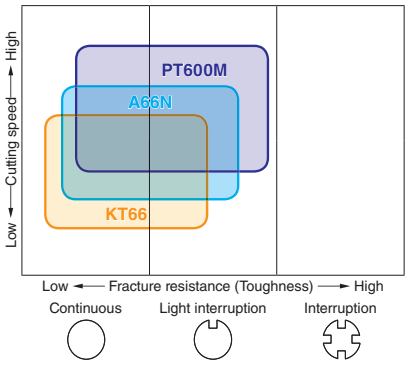
Classification	Symbol	Color	Main Component (Coated Composition)	Coating Layer	Hardness of Substrate (GPa)	Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)	Advantages and Applications
K Cast Iron	**KA30**	White	Al_2O_3	-	17.5	4.0	750	· Aluminum oxide ceramic (Al_2O_3) · Application : Finishing of cast iron at high cutting speeds without coolant
	KS6015	Gray	Si_3N_4	-	15.2	7.8	1,000	· Silicon nitride ceramic with superior wear resistance reduces heat at the cutting edge. · Application : Roughing and high speed machining of cast iron (with or without coolant)
	KS6050	Gray	Si_3N_4	-	15.6	8.0	1,200	· Silicon nitride ceramic (Si_3N_4) · Application : Roughing and interrupted machining of cast iron. Focusing on stability. (with or without coolant)
	CS7050	Grayish White	Si_3N_4 (Special Al_2O_3 COAT)	Thin coating	15.6	8.0	1,200	· Silicon nitride ceramic (Si_3N_4) + CVD Coating (Special Al_2O_3 COAT) · Application : Finishing and continuous machining, and high speed and high efficient machining (with or without coolant)
K Cast Iron H Hard Materials	**KT66**	Black	Al_2O_3+TiC	-	20.1	4.1	980	· Aluminum oxide and Titanium carbide ceramic (Al_2O_3+TiC) · Application : Semi-roughing to finishing of cast iron, and hard materials
	A66N	Gold	Al_2O_3+TiC (TiN COAT)	Thin coating	20.1	4.1	980	· TiN PVD coated Aluminum oxide and Titanium carbide ceramic (TiN coated Al_2O_3+TiC) · Application : Semi-roughing to finishing of hard materials
	PT600M	Blackish Red	Al_2O_3+TiC (MEGACOAT)	Thin coating	20.1	4.1	980	· Heat-resistant MEGACOAT on Aluminum oxide and Titanium carbide ceramic (MEGACOAT Al_2O_3+TiC) · Application : Semi-roughing to finishing of cast iron, hard materials and hardened roll materials
S Heat-resistant alloys	**KS6030**	Gray	SiAlON	-	15.2	6.0	600	· SiAlON ceramic with superior wear resistance and high resistance against boundary wear · Application : Finishing to medium machining of heat-resistant alloys
	KS6040	Brown	SiAlON	-	16.7	7.0	900	· High stability SiAlON ceramic with wear resistance and fracture resistance · Application : Roughing of heat-resistant alloys

Application Map

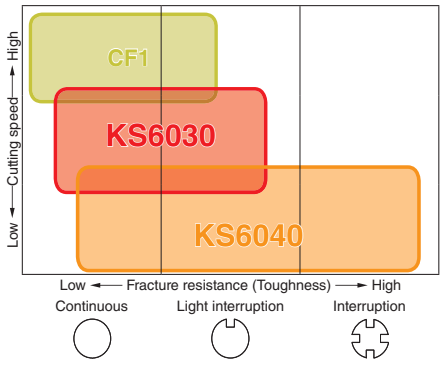
Cast Iron



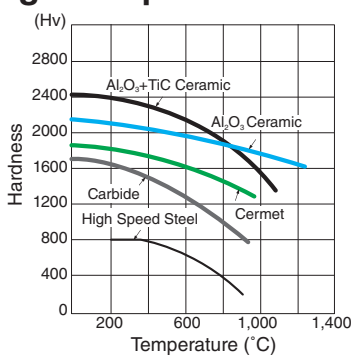
Hard Materials



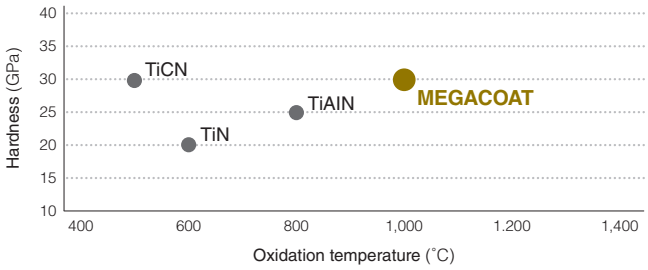
Heat-resistant alloys



High-Temperature Hardness



Properties of PVD Coating



Low — Oxidation resistance — High

CBN (Cubic Boron Nitride)



CBN

CBN (Cubic Boron Nitride) is second only to diamond in hardness, and is a synthetically produced material with high thermal conductivity.

Features

- **Superior wear resistance when machining hard materials**
- **Suitable for high speed machining of hard materials, sintered steel and cast iron**
- **High thermal conductivity provides stable machining**

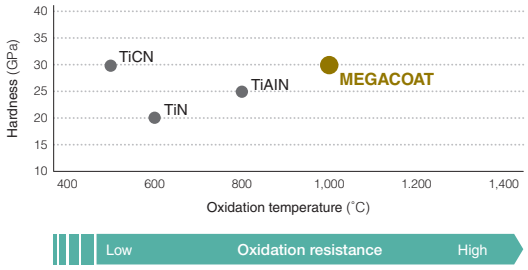
Features of CBN

Classification	Symbol	Color	Ave. grain size (μm)	Hardness of Substrate (GPa)	Transverse Strength (MPa)	Advantages and Applications
H Hard Materials	**KBN510**	Black	2	28	1,000	· Excellent wear resistance and crack resistance, non-coated CBN · Application : Finishing and continuous machining of hardened die steel
	KBN525	Black	1 or less	25	1,250	· Application : General purpose for hardened steel
	KBN05M (MEGACOAT)	Blackish Red	0.5-1.5	27	1,000	· Heat-resistant MEGACOAT on highly heat-resistant CBN substrate · Application : High speed finishing of hardened steel
	KBN10M (MEGACOAT)	Blackish Red	2	28	1,000	· Application : High speed finishing of hardened die steel
	KBN25M (MEGACOAT)	Blackish Red	1 or less	25	1,250	· Heat-resistant MEGACOAT on micro-grain CBN with heat-resistant binder phase · Application : Stable machining of hardened steel at high cutting speeds
Sintered Steel	**KBN570**	Black	2-4	34	1,350	· High CBN content ratio · Application : Machining of sintered steel (preventing burr formation)
	KBN70M (MEGACOAT)	Blackish Red	2-4	34	1,350	· Heat-resistant MEGACOAT on CBN rich substrate · Application : Stable machining of sintered steel (ferrous sintered alloys)
K Cast Iron	**KBN475**	Black	2	39	1,400	· Excellent wear resistance due to high CBN content and special binder · Application : High speed machining of gray cast iron
	KBN60M (MEGACOAT)	Blackish Red	0.5-6	33	1,250	· Heat-resistant MEGACOAT on CBN rich substrate with hard binder phase · Application : High speed finishing of gray cast iron
	KBN900 (TiN COAT)	Gold	9	31	630	· TiN coated solid CBN · Application : Heavy duty, interrupted machining and finishing of hardened steel, hardened roll steel and cast iron

· For KBN35M , see page ➔**A18**

MEGACOAT CBN

Properties of PVD Coating

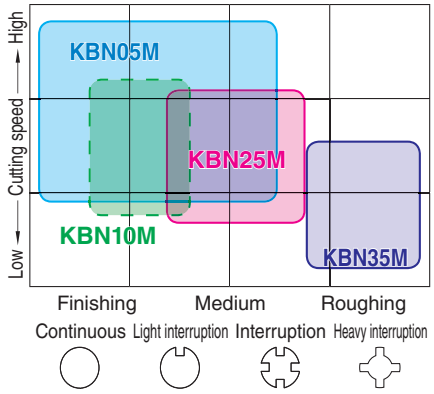


Advantages of MEGACOAT

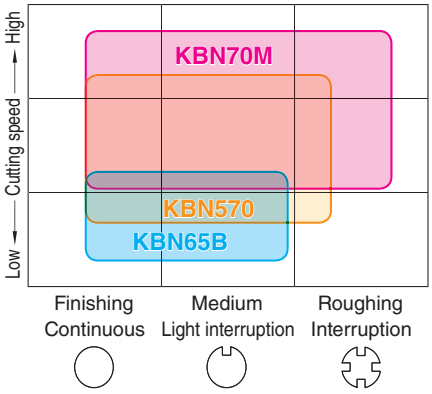
- **Longer tool life and high speed machining due to superior heat resistance and hardness**
- **Stability improvement through prevention of crater wear (oxidation, diffusional wear)**
- **High thermal stability and surface smoothness provide excellent surface finish**

Application Map

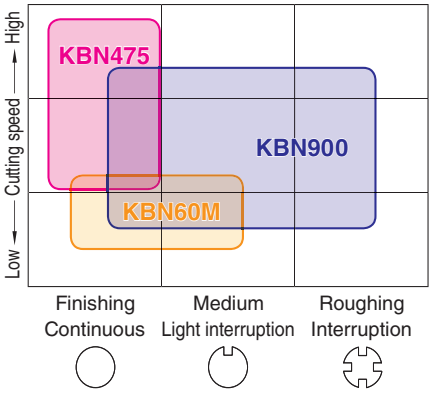
Hard Materials



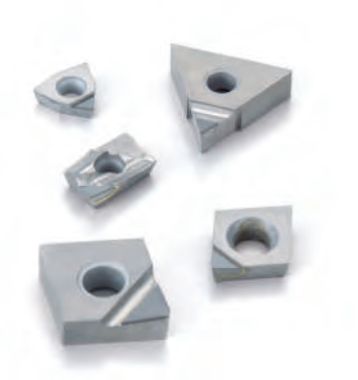
Sintered Steel



Cast Iron



PCD (Polycrystalline Diamond)



PCD (Polycrystalline Diamond)

PCD (Polycrystalline Diamond) is a synthetic diamond sintered under high temperatures and pressures.

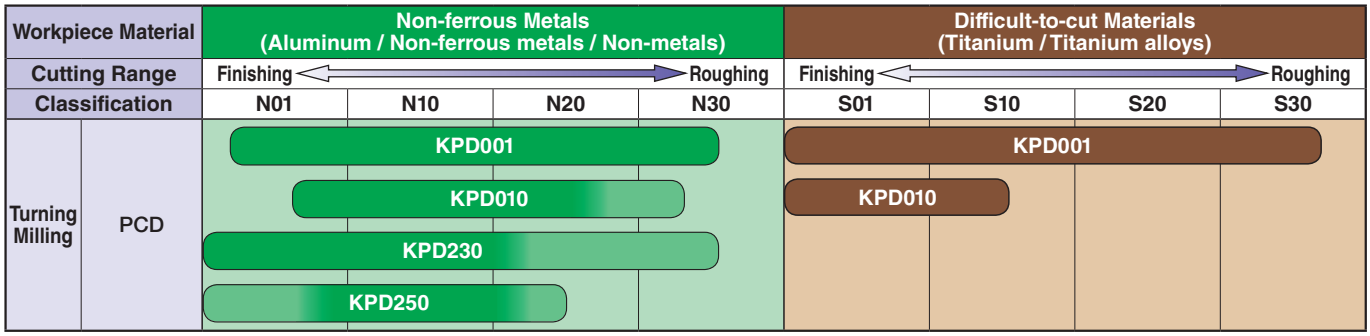
Features

- Applicable for milling of non-ferrous metals and non-metals
- No edge build-up provides high precision machining
- Diversified applications for machining of non-ferrous metals and non-metals
- Finished surface will be rainbow colored
  (Because of polycrystalline diamond, a mirror-like finished surface will not be obtained)

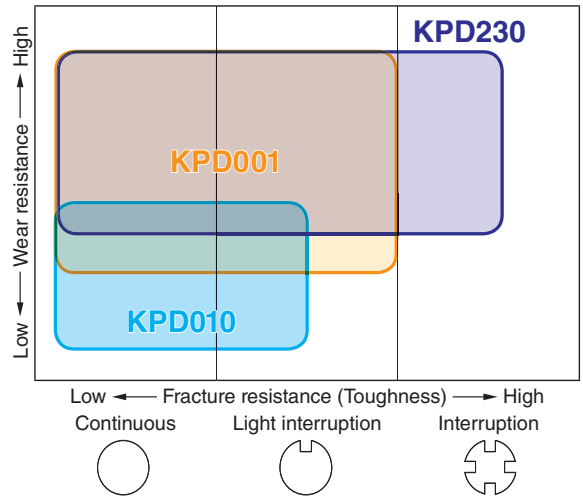
Features of PCD

Classification	Symbol	Ave. grain size (μm)	Advantages and Applications
N Non-ferrous Metals	**KPD001**	0.5	· Super micro-grain PCD features cutting edge strength, wear resistance, fracture resistance, good edge-sharpening performance and longer, stable tool life · Application : High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, and carbide
	KPD010	10	· Good wear resistance and toughness, good grindability · Application : High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, and carbide
	KPD230	2-30	· Superior abrasive wear resistance and toughness due to high density PCD with mixed rough and fine grains · Application : High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics
	KPD250 (Made to order)	25	· Superior wear resistance due to rough grain PCD (25μm) · Application : High speed machining of high silicon aluminum alloy and machining of carbide

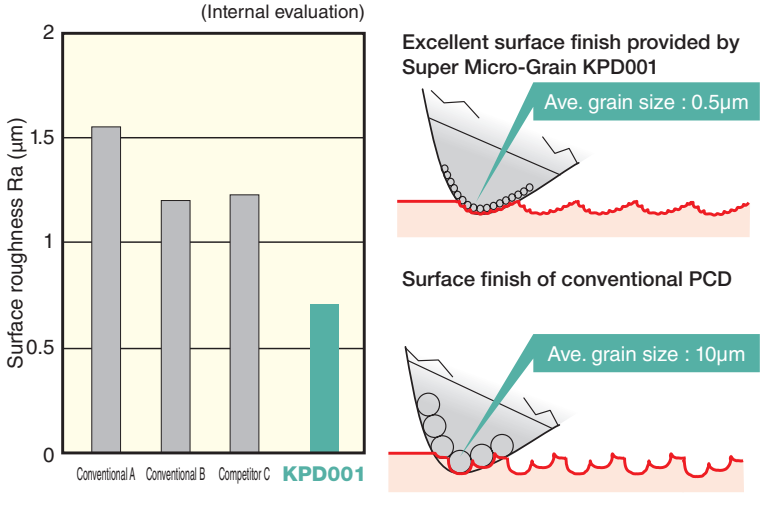
Applications



Application Map



Surface Finish Roughness Comparison of Aluminum Machining

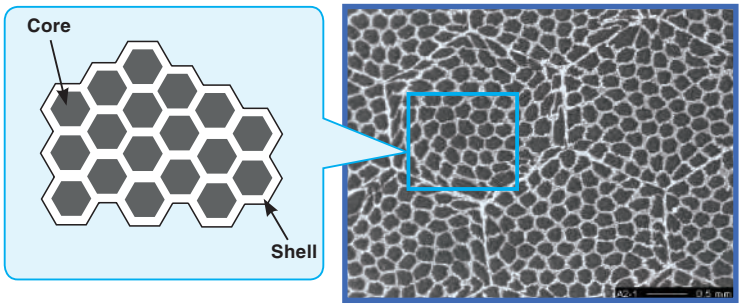


(Grain size affects surface finish quality)

Honeycomb structure CBN / Ceramic

Honeycomb structure CBN / Ceramic

Honeycomb structure is the high structural controlled composite material consisting of a hard and superior wear-resistance core (gray portion) and a tough shell (white portion).



Features

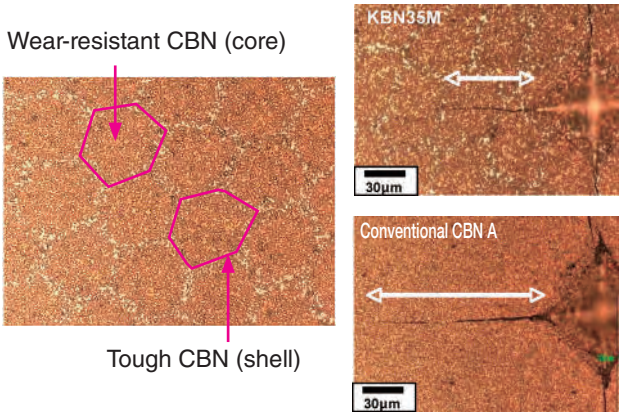
- Honeycomb structure CBN / Ceramic combine a hard, wear-resistant core and a tough shell into one insert.
- The tough shell stops cracks that form in the core.
- CBN is suitable for interrupted machining of exceptionally hard materials and ceramic is suitable for heat-resistant alloys

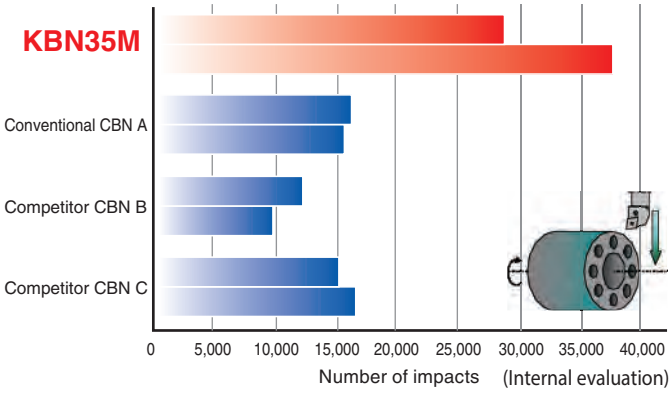
Features of Honeycomb structure CBN / Ceramic

Classification	Symbol	Color	Main Component	Advantages and Applications
H Hard Materials	KBN35M (MEGACOAT)	Blackish Red	CBN	· Honeycomb structure CBN composite material consisting of wear resistant CBN (core) and tough CBN (shell) · Heat-resistant MEGACOAT on tough Honeycomb structure CBN · Application : Stable machining of hardened steel at interrupted machining
S Heat-resistant alloys	CF1	Gray	Ceramic	· Honeycomb structure ceramic composite material consisting of wear resistant ceramic (core) and tough ceramic (shell) · Application : Machining of heat-resistant alloys like Ni-base heat-resistant alloys

KBN35M (MEGACOAT Honeycomb structure CBN)

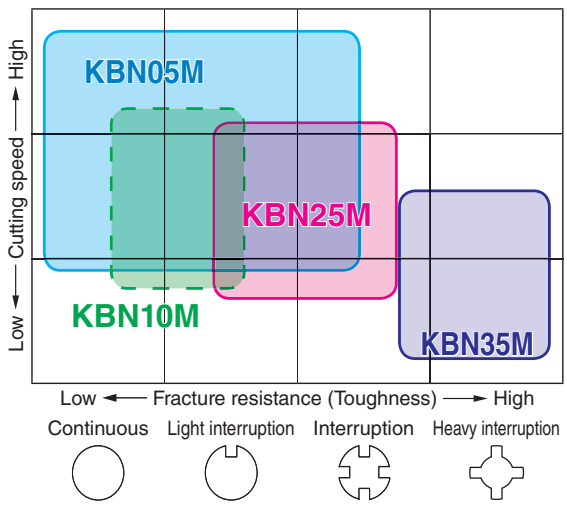
Tough CBN (shell) prevents crack growth



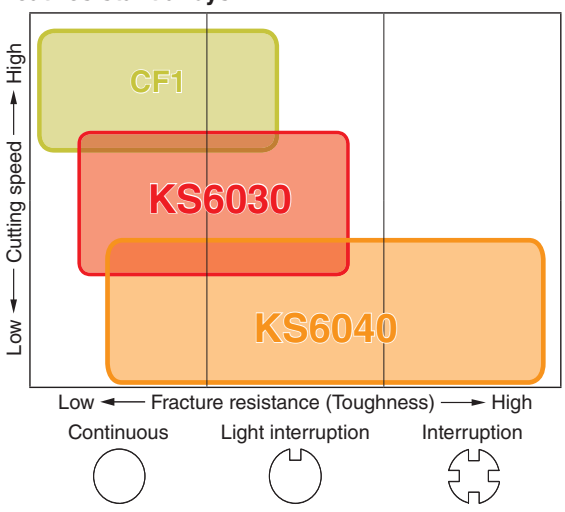


Application Map

Hard Materials



Heat-resistant alloys



Insert Material Selection Table

Applications		Cutting Range	P	M	K		N	S		H	Sintered Steel
			Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant alloys	Titanium alloys	Hard Materials	
Turning		Finishing ↕ Roughing	TN610 CCX TN620 TN60 PV710 PV720 PV730 CA510 CA515 CA025P CA530	TN610 TN620 TN60 PV720 CA6515 CA6525 PR1535	KBN475 KBN60M KA30 PV7005 CA5505 CA310 CA315	TN60 PV7005 CA5505 CA310 CA315 CA320	KPD001 KPD010 PDL010 PDL025 KW10	CF1 KS6040 KW10 CA6515 CA6525 PR005S PR015S PR1535	KPD001 KPD010 SW05 SW10 SW25	KT66 A66N PT600M KBN05M KBN10M KBN25M KBN35M KBN900	TN610 TN60 KBN570 KBN70M
Small Parts Machining		Finishing ↕ Roughing	TN610 TN620 PV710 PV720 PR1705 PR1725 PR930 PR1025 PR1535	TN610 TN620 PV720 PR1725 PR930 PR1025 PR1225 PR1535	CA310 CA315 KW10	CA310 CA315 CA320 KW10	KPD001 KPD010 PDL010 PDL025 GW05 KW10	CA6515 PR1125 PR1225 PR1535	KPD001 KPD010 KW10 PR1535	KBN05M KBN10M KBN25M	TN610 TN60 KBN570 KBN70M
Boring		Large ↕ Small (Bore Dia.)	TN610 TN620 PV710 PV720 PV730 CA515 CA025P CA530 PR1705 PR1725 PR1025 PR930 PR1535	TN60 CA6515 CA6525 PR1725 PR1025 PR1225 PR930 PR1535	KBN475 KBN60M PV7005 CA310 CA315 KW10	PV7005 CA310 CA315 CA320 KW10	KPD001 KPD010 PDL010 PDL025 GW05 KW10	CA6515 CA6525 PR1125 PR1225 PR1535	KPD001 KPD010 KW10 SW05 PR1535	PT600M KBN05M KBN10M KBN25M	TN610 TN60 KBN570 KBN70M
Cut-off		Large ↕ Small (Cutting Dia.)	CR9025 PR930 PR915 PR1215 PR1225 PR1535	CR9025 PR930 PR915 PR1215 PR1225 PR1535	KW10 PR1215	KW10 PR1215	PDL025 KW10	KW10 PR1225 PR660	KW10	-	-
Cut-off		(Depends on the workpiece material)	PR1025 PR1225 PR1535	PR1025 PR1225 PR1535	KW10	KW10	PDL025 KW10	KW10 PR1025 PR1225	KW10	-	-
Grooving		Glossy finish ↕ Stable	TC40N TN620 TN90 PV7040 PR930 PR1115 PR1215 PR1225 PR1625	TC40N TN620 TN90 PV7040 PR930 PR1115 PR1215 PR1225 PR1625	PR905 PR1215 KW10 GW15	PR905 PR1215 KW10 GW15	KPD001 PDL025 KW10 GW15	PR915 KW10 PR1215 PR1225 PR1535	KPD001 KW10 PR1535	KBN510 KBN525 PT600M	TC40N KBN570
Threading		Glossy finish ↕ Stable	TC60M PR1215 PR1115 PR930	TC60M PR1515 PR1115 PR930	KW10 GW15	KW10 GW15	KW10 GW15	KW10 GW15	KW10 GW15	-	PR1515 PR1115
Drilling		Wear Resistance ↕ Toughness	CA520D PR1225 PR1230 PR1535	PR1225 PR1535	CA415D PR1210 KW10	PR1210 KW10	KW10 GW15	PR1225 KW10 GW15	KW10	-	-
Milling		Finishing ↕ Roughing	TN100M TN620M PV60M PR1225 PR1230	CA6535 PR1225 PR1525 PR1535	PR1210 PR1510 KW10	PR1210 PR1510 KW10	KPD230 KPD001 KPD010 PDL025 KW10 GW25	CA6535 PR1225 PR1535	KPD230 KPD001 KW10 PR905 PR1210 PR1535	PR015S	-

· Highlighted materials are recommended choice.

Grade Properties

Cermet

Symbol	Color	Main Component	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
TN610	Gray	TiCN	-	6.6	1,750	17.2	6.0	2,100
TN620	Gray	TiCN	-	6.9	1,550	15.2	9.0	2,500
TN620M	Gray	TiCN	-	6.9	1,550	15.2	9.0	2,500
TN6020	Gray	TiCN	-	6.4	1,500	14.7	10.0	2,500
TN60	Gray	TiCN+NbC	-	6.6	1,600	15.7	9.0	1,760
TN90	Gray	TiCN+NbC	-	6.4	1,450	14.2	10.0	1,960
TN100M	Gray	TiCN+NbC	-	6.7	1,520	14.9	10.5	1,860
TC40N	Gray	TiC+TiN	-	6.0	1,650	16.2	9.0	1,570
TC60M	Gray	NbC	-	8.1	1,500	14.7	10.5	1,670

CVD Coated Cermet

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
CCX	Gold	TiCN+Al_2O_3+TiN	Thick Coating	7.0	1,500	14.7	10.0	2,600

PVD Coated Cermet

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
PV710	Gold	MEGACOAT NANO	Thin Coating	6.6	1,750	17.2	6.0	2,100
PV720	Gold	MEGACOAT NANO	Thin Coating	6.9	1,550	15.2	9.0	2,500
PV730	Gold	MEGACOAT NANO	Thin Coating	7.0	1,450	14.2	10.0	2,500
PV7005	Blackish Red	MEGACOAT	Thin Coating	6.0	1,650	16.2	8.5	1,470
PV7040	Blackish Red	MEGACOAT	Thin Coating	6.0	1,650	16.2	9.0	1,570
PV90	Gold	TiN	Thin Coating	6.4	1,450	14.2	10.0	1,960
PV60M	Gold	MEGACOAT NANO	Thin Coating	6.6	1,600	15.7	9.0	1,760

CVD Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
CA310	Rose Gold	TiCN+Al_2O_3+Ti base	Thick Coating	15.0	1,570	15.4	12.0	2,780
CA315	Rose Gold	TiCN+Al_2O_3+Ti base	Thick Coating	15.0	1,570	15.4	12.0	2,780
CA320	Rose Gold	TiCN+Al_2O_3+Ti base	Thick Coating	15.0	1,570	15.4	12.0	2,780
CA415D	Gold	TiCN+Al_2O_3+TiN	Thick Coating	15.0	1,570	15.4	12.0	2,780
CA420M	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.5	1,600	15.8	13.0	3,400
CA4505	Blackish Gray	TiCN+Al_2O_3	Thick Coating	15.0	1,790	17.5	9.5	2,350
CA4515	Blackish Gray	TiCN+Al_2O_3	Thick Coating	15.0	1,570	15.4	12.0	2,780
CA510	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.5	1,470	14.4	11.5	2,500
CA515	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.4	1,440	14.1	12.5	2,650
CA520D	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.7	1,370	13.4	16.0	3,100
CA025P	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.2	1,400	13.7	13.5	2,800
CA525	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.2	1,360	13.3	13.5	2,750
CA530	Gold	TiCN+Al_2O_3+TiN	Thick Coating	13.9	1,340	13.1	14.5	2,850
CA5505	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.7	1,730	17.0	10.0	2,540
CA5515	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.7	1,550	15.2	12.0	2,750
CA5525	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.5	1,400	13.7	12.0	2,780
CA5535	Gold	TiCN+Al_2O_3+TiN	Thick Coating	14.1	1,340	13.1	16.5	2,970
CA6515	Gold	TiCN+Al_2O_3+TiN	Thin Coating	14.7	1,530	15.0	12.0	2,780
CA6525	Gold	TiCN+Al_2O_3+TiN	Thin Coating	14.7	1,370	13.4	16.0	3,100
CA6535	Gold	TiCN+Al_2O_3+TiN	Thin Coating	14.3	1,320	12.9	16.0	3,700
CR9025	Gold	TiCN+TiN	Thick Coating	14.5	1,400	13.7	12.0	2,780

PVD Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
PR005S	Blackish Gray	MEGACOAT HARD	Thin Coating	15.0	1,750	17.2	8.0	2,000
PR015S	Blackish Gray	MEGACOAT HARD	Thin Coating	14.9	1,680	16.5	9.0	2,400
PR905	Bluish Violet	TiAlN	Thin Coating	14.8	1,720	16.8	9.0	2,450
PR915	Bluish Violet	TiAlN	Thin Coating	14.1	1,700	16.7	11.0	4,140
PR930	Reddish Gray	TiCN	Thin Coating	14.1	1,700	16.7	11.0	4,140
PR1025	Reddish Gray	TiCN	Thin Coating	14.5	1,600	15.8	13.0	3,400
PR1115	Purple Red	TiAlN	Thin Coating	14.7	1,700	16.7	11.0	3,000
PR1210	Blackish Red	MEGACOAT	Thin Coating	14.8	1,720	16.8	9.0	2,450
PR1215	Blackish Red	MEGACOAT	Thin Coating	14.7	1,700	16.7	11.0	3,000
PR1225	Blackish Red	MEGACOAT	Thin Coating	14.5	1,600	15.8	13.0	3,400
PR1230	Blackish Red	MEGACOAT	Thin Coating	13.7	1,450	14.2	13.0	2,250
PR1510	Reddish Green	MEGACOAT NANO	Thin Coating	14.8	1,720	16.8	9.0	2,450
PR1515	Reddish Green	MEGACOAT NANO	Thin Coating	14.7	1,700	16.7	11.0	3,000
PR1525	Reddish Green	MEGACOAT NANO	Thin Coating	14.5	1,600	15.8	13.0	3,400
PR1535	Reddish Green	MEGACOAT NANO	Thin Coating	14.3	1,320	12.9	16.0	3,700
PR1625	Reddish Green	MEGACOAT NANO	Thin Coating	14.5	1,600	15.8	13.0	3,400
PR1705	Silver	MEGACOAT NANO PLUS	Thin Coating	14.9	1,800	17.6	10.0	3,300
PR1725	Silver	MEGACOAT NANO PLUS	Thin Coating	14.5	1,600	15.8	13.0	3,400

Carbide

Symbol	Color	Main Component	Ratio	Hardness of Substrate		Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)
				(HV)	(GPa)		
KW10	Gray	WC+Co	15.0	1,650	16.2	10.0	1,470
GW05	Gray	WC+Co	14.9	1,800	17.6	10.0	3,300
GW15	Gray	WC+Co	14.7	1,700	16.7	11.0	3,000
GW25	Gray	WC+Co	14.5	1,600	15.8	13.0	3,400
SW05	Gray	WC+Co	15.0	1,790	17.5	9.5	2,350
SW10	Gray	WC+Co	14.8	1,720	16.8	9.0	2,450
SW25	Gray	WC+Co	14.7	1,370	13.4	16.0	3,100

DLC Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
PDL010	Rainbow Color	C	Thin Coating	15.0	1,650	16.2	10.0	1,470
PDL025	Rainbow Color	C	Thin Coating	14.5	1,600	15.8	13.0	3,400

Turning Indexable Inserts

B

B1~B115

Turning Indexable Inserts Identification System B2

Insert Color B3

Chipbreaker Selection B4~B14

Chipbreaker shape of Negative Inserts B4

Chipbreaker shape of Positive Inserts B12

How to read pages of "Turning Inserts" B15

Cermet / Coated Carbide / Carbide Lineup B16~B104

Turning Negative Inserts	CN□□ 80° Rhombic	B16
	DN□□ 55° Rhombic	B23
	KN□□ 55° Parallelogram	B31
	RN□□ Round	B31
	SN□□ 90° Square	B32
	TN□□ 60° Triangle	B36
	VN□□ 35° Rhombic	B44
	WN□□ 80° Trigon	B46
	Small Double Sided Tools	B50
Turning Positive Inserts	CC□□, CP□□ 80° Rhombic	B53
	DC□□, DP□□ 55° Rhombic	B62
	JC□□ 70° Rhombic	B73
	RC□□ Round	B74
	SC□□, SP□□ 90° Square	B75
	TB□□, TC□□, TP□□ 60° Triangle	B76
	VB□□, VC□□, VP□□ 35° Rhombic	B89
	WB□□, WP□□ 80° Trigon	B97
Inserts for Back Turning	TKFB	B100
	ABS15 / ABW15 / ABW23	B102
Bearing Machining	R□MT-BB / SNMF	B103
Solid Tip-Bars		B104

Ceramic Inserts Identification System B105

Ceramic Lineup B106~B115

Turning Negative Inserts	CN□□ 80° Rhombic	B106
	DN□□ 55° Rhombic	B107
	EN□□ 75° Rhombic	B107
	RN□□ Round	B108
	SN□□ 90° Square	B109
	TN□□ 60° Triangle	B111
	VN□□ 35° Rhombic	B112
Turning Positive Inserts	RP□□ Round	B113
	SP□□ 90° Square	B113
	TB□□, TC□□, TP□□ 60° Triangle	B113
Inserts for Hardened Roll Materials	RBG / RCGX / RPGX	B114
Grooving Inserts	GH	B115

Turning Indexable Inserts Identification System

Symbol	Shape
H	Hexagon
O	Octagon
P	Pentagon
S	Square
T	Triangle
C	80° Rhombic
D	55° Rhombic
E	75° Rhombic
F	50° Rhombic
M	86° Rhombic
V	35° Rhombic
W	80° Trigon
L	Rectangle
A	85° Parallelogram
B	82° Parallelogram
K	55° Parallelogram
R	Round

Shown angle stands for acute angle for rhombic and parallelogram inserts.

(1) Shape

Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°

(2) Relief Angle

Symbol (Class)	Tolerance (mm)		
	Corner Height	Thickness	I.C. Size
A	±0.005	±0.025	±0.025
F			±0.013
C	±0.013		±0.025
H			±0.013
E	±0.025		±0.025
G		±0.13	
J	±0.005	±0.025	±0.05~±0.15
K*	±0.013		
L*	±0.025		
M*	±0.08~±0.18	±0.13	
N*		±0.025	
U*	±0.13~±0.38	±0.13	±0.08~±0.25

* Insert's periphery is as fired. Tolerance difference is depending on insert size.

(3) Tolerance

Symbol	Hole	Hole Shape	Chipbreaker	Shape
N	No	-	No	
R			Single-sided	
F			Double-sided	
A	Yes	With Hole	No	
M			Single-sided	
G			Double-sided	
W		With Hole and One Countersink 40°~60°	No	
T			Single-sided	
Q		With Hole and Two Countersink 40°~60°	No	
U			Double-sided	
B		With Hole and One Countersink 70°~90°	No	
H			Single-sided	
C		With Hole and Two Countersink 70°~90°	No	
J			Double-sided	
X	-	-	-	-

(4) Hole / Chipbreaker

ISO (metric)

C	N	M	G	12	04	08	PG
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

ANSI (inch)

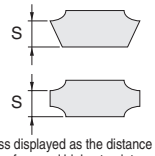
C	N	M	G	4	3	2	PG
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(5) Edge Length (ISO)

C	D	R	S	T	V	W	I.C. Size (mm)	(5) I.C. Size (ANSI) IC Size (inch)	Symbol
03	04		03	06			3.97	5/32	12
04	05		04	08	08		4.76	3/16	15
		05					5		
05	06		05	09		03	5.56	7/32	18
		06					6		
06	07		06	11	11	04	6.35	1/4	2
08	09		07	13		05	7.94	5/16	25
		08					8		
09	11	09	09	16	16	06	9.525	3/8	3
	12	10					10		
		12					12		
12	15	12	12	22	22	08	12.7	1/2	4
16	19	15	15	27	27	10	15.875	5/8	5
		16					16		
19	23	19	19	33	33	13	19.05	3/4	6
		20					20		
22	27		22	38			22.225	7/8	7
		25					25		
25	31	25	25	44	44	17	25.4	1	8
32	38	31	31	54	54	21	31.75	1-1/4	10
		32					32		

(6) Thickness

ISO Thickness (mm)	ISO Symbol	ANSI Thickness (inch)	ANSI Symbol
1.59	01	1/16	1
1.98	T1	5/64	12
2.38	02	3/32	15
2.78	T2	–	–
3.18	03	1/8	2
3.97	T3	5/32	25
4.76	04	3/16	3
5.56	05	7/32	35
6.35	06	1/4	4
7.94	07	5/16	5
9.525	09	3/8	6



Thickness displayed as the distance between bottom surface and highest point on cutting edge.

(7) Corner-R(RE)

ISO Corner-R (RE) (mm)	ISO Symbol	ANSI Corner-R (RE) (inch)	ANSI Symbol
Sharp Corner	00	.000	00
0.03	003	.001	01
0.05	005	.002	013
0.1	01	.004	02
0.2	02	.008	05
0.4	04	1/64	1
0.8	08	1/32	2
1.2	12	3/64	3
1.6	16	1/16	4
2.0	20	5/64	5
2.4	24	3/32	6
2.8	28	7/64	7
3.2	32	1/8	8
Round insert	00 (inch) or M0 (metric)	Round insert	0

(8) Manufacturer's Option

Hand Symbol
Chipbreaker Symbol, etc.

· Expressed as edge length for ISO.
· ANSI expresses the inscribed circle diameter in inches.

Positive Inserts Identification System

CCGT060201M F P - SK

- Minus tolerance on Corner-R(RE)
- Sharp edge
- Polished
- Chipbreakers

CCET060201M F R - U SF

- Minus tolerance on Corner-R(RE)
- Sharp edge
- Insert Hand
- Chipbreakers
- Super Fine (High Quality Ground Insert)

When a minus tolerance is specified for the corner-R(RE)

If a minus tolerance is specified for the corner-R(RE) as shown in the Fig. 1, using an insert with corner-R(RE)=0.2 mm may result in larger radius than specified.
Use an insert the corner of which R(RE) has a minus tolerance.

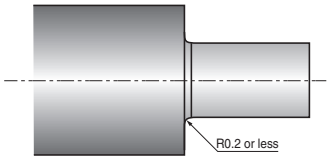
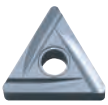


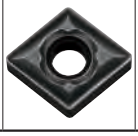
Fig. 1 Example of a specified corner-R in the drawing

Insert Color

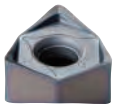
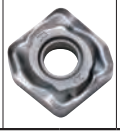
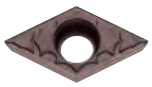
Cermet, CVD Coated Cermet, MEGACOAT NANO Cermet, MEGACOAT Cermet and PVD Coated Cermet

Grades	Cermet									CVD Coated Cermet	MEGACOAT NANO Cermet				MEGACOAT Cermet		PVD Coated Cermet
	TN610	TN620	TN620M	TN6020	TN60	TN90	TN100M	TC40N	TC60M	CCX (NEW)	PV710	PV720	PV730 (NEW)	PV60M (NEW)	PV7005	PV7040	PV90
Insert Color																	

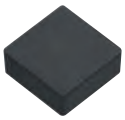
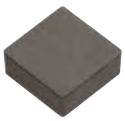
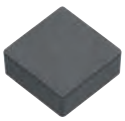
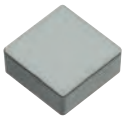
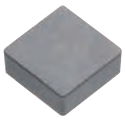
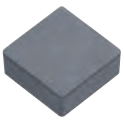
CVD Coated Carbide

Grades	CVD Coated Carbide														
	CA310	CA315	CA320	CA415D	CA520D	CA420M	CA45 series	CA510	CA515	CA025P	CA525	CA530	CA55 series	CA65 series	CR9025
Insert Color															

PVD Coated Carbide

Grades	MEGACOAT NANO					MEGACOAT NANO PLUS		MEGACOAT HARD		MEGACOAT				PVD Coated Carbide				
	PR1510	PR1515	PR1525	PR1535	PR1625 (NEW)	PR1705 (NEW)	PR1725 (NEW)	PR005S (NEW)	PR015S (NEW)	PR1210	PR1215	PR1225	PR1230	PR905	PR915	PR930	PR1025	PR1115
Insert Color																		

Ceramic

Grades	Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		CVD Coated Silicon Nitride Ceramic	SiAlON Ceramic		Honeycomb structure Ceramic
	KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1
Insert Color											

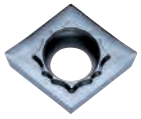
CBN and PCD

Grades	CBN				PCD			MEGACOAT CBN	PVD Coated CBN
	KBN475	KBN510	KBN525	KBN570	KPD001	KPD010	KPD230	KBN..M	KBN900
Insert Color	 CBN and PCD								

DLC Coated Carbide

Grades	DLC Coated Carbide
	PDL010 PDL025
Insert Color	

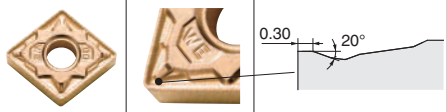
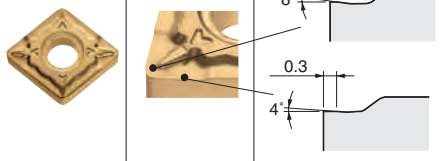
Carbide

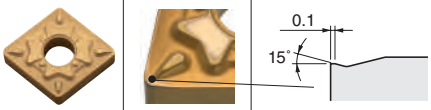
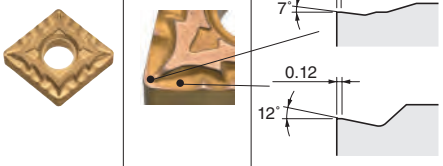
Grades	Carbide				
	GW05	GW15	GW25	KW10	SW05
Insert Color					

Chipbreaker Selection (Negative Inserts)

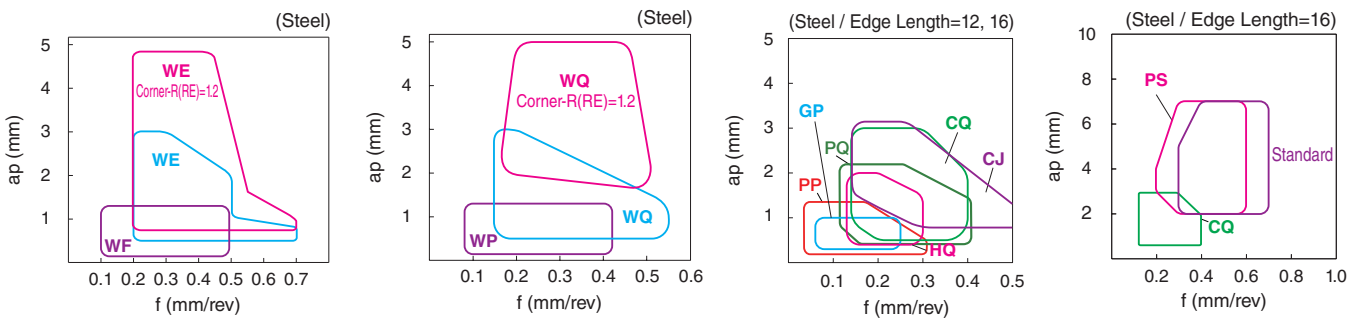
Steel

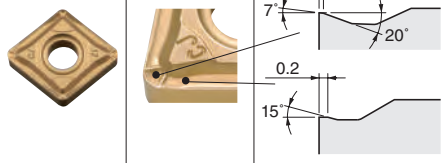
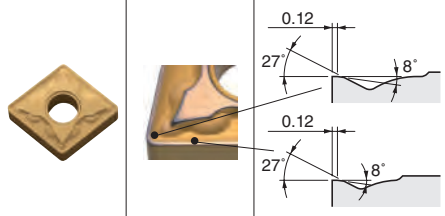
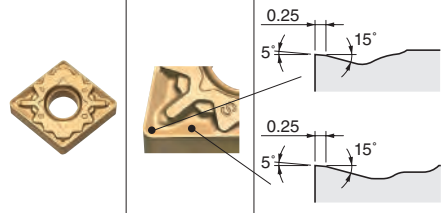
1 Molded Chipbreaker

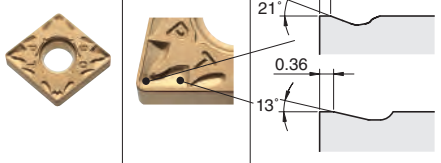
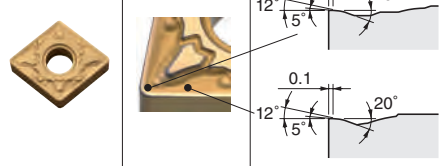
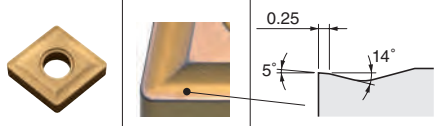
Cutting Range	Name	Design	Advantages
Finishing (With Wiper Edge)	WF		·Wiper insert ·Good chip control in finishing operations ·Excellent surface roughness by controlling adhesion ·Less cutting force due to sharp cutting edge
Finishing (With Wiper Edge)	WP		·Wiper insert ·Good chip control at small machining
Finishing - Medium (With Wiper Edge)	WE		·Wiper insert ·Good surface finish at high feed machining ·High productivity with smooth chip control in a wide range of applications
Finishing - Medium (With Wiper Edge)	WQ		·Wiper insert ·Double feed rate possible while maintaining a smooth finish ·High efficiency and good chip control

Cutting Range	Name	Design	Advantages
Finishing	PP		·3-step dot structure realizes stable chip control at a wide range of feed rate ·Less cutting force due to sharp cutting edge and smooth rake face
Finishing - Medium	PQ		·Stable chip control in a wide feed rate range by breaking chips effectively ·The well-balanced edge sharpness and toughness
Finishing	GP		·Finishing to light machining ·Good chip control
Finishing - Medium	HQ		·Sharp cutting performance with 3-D rake angle and double projection design
Finishing - Medium	CQ		·Good chip control for varied ap such as copying ·Applicable to up facing

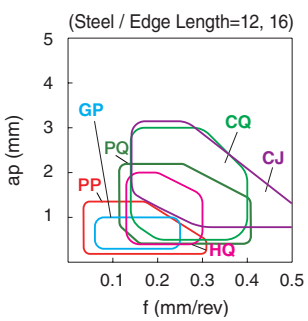
Applicable Chipbreaker Range (ap indicates radius)

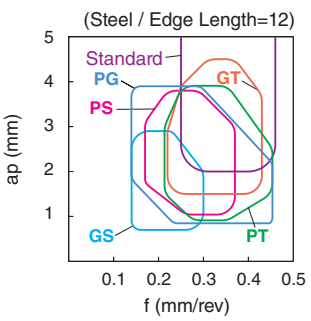


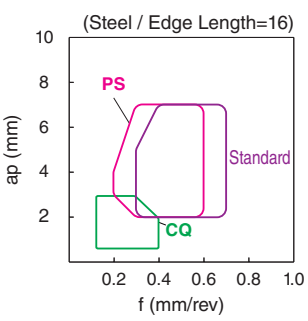
Cutting Range	Name	Design	Advantages
Finishing - Medium (Up Facing)	**CJ**		·Improved chip curing at small machining and high feed rate machining ·Improved chip evacuation at copying and up facing
Medium - Roughing	**PG**		·Stable machining with good balance of edge sharpness and strength ·Prevent chip clogging at high feed rate ·Good chip control at low feed rate ·Stable machining with wide chip control range
Medium - Roughing	**GS**		·Strong edge chipbreaker ·Stable for continuous machining and light interrupted machining
Medium - Roughing	**PS**		·General purpose chipbreaker ·More stable due to large contact surface

Cutting Range	Name	Design	Advantages
Medium - Roughing / High Feed Rate	**PT**		·Low cutting force at high feed machining ·Land support structure
Medium - Roughing / High Feed Rate	**GT**		·Strong edge chipbreaker ·Wide land design and smooth chip control even at high feed rate machining
Roughing	**Standard (Without Indication)**		·Low cutting force and applicable to large ap roughing

Applicable Chipbreaker Range (ap indicates radius)

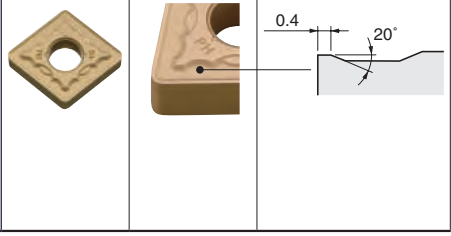


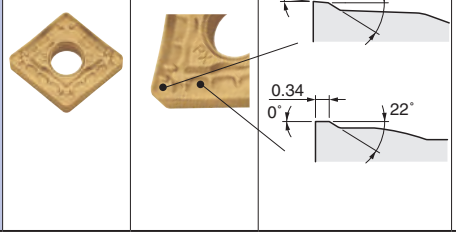




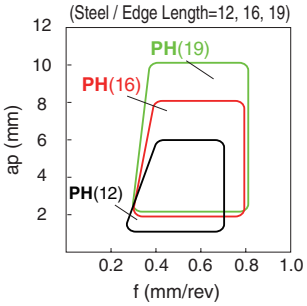
Steel

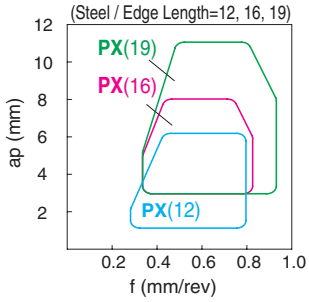
1 Molded Chipbreaker

Cutting Range	Name	Design	Advantages
Roughing	PH		·For roughing of steel ·Suitable for heavy interrupted machining and for workpieces with scale due to strong cutting edge

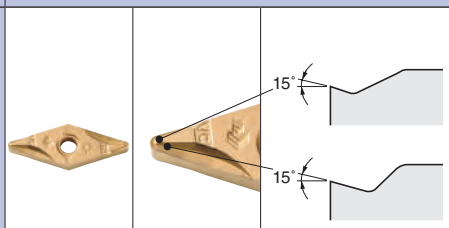
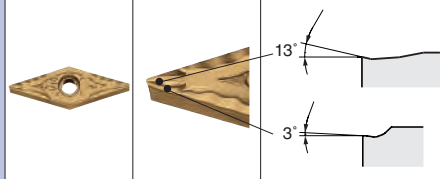
Cutting Range	Name	Design	Advantages
Single-sided Roughing (High Feed Rate)	PX		·Roughing and high feed rate operation ·Low cutting force chipbreaker

Applicable Chipbreaker Range (ap indicates radius)

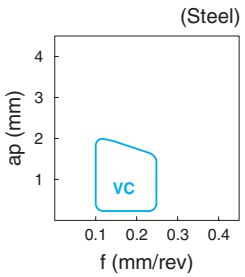


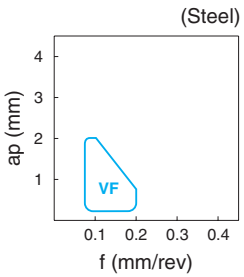


Steel (Copying / Undercutting , Varied ap)

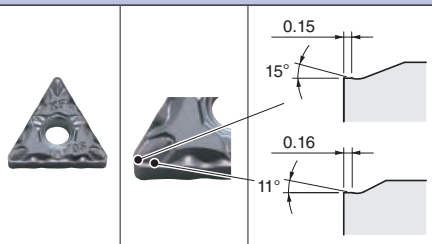
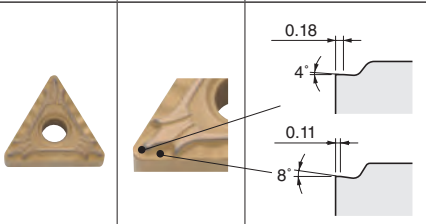
Cutting Range	Name	Design	Advantages
Finishing - Medium	VC		·Handed chipbreaker for copying ·Good chip control at varied ap because of the large space on the main cutting edge side
Finishing - Medium	VF		·Good chip control at varied ap such as copying and undercutting

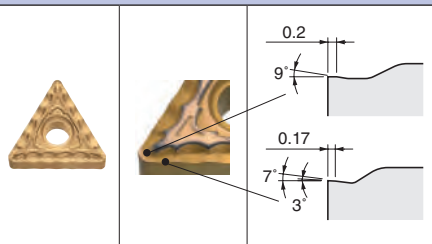
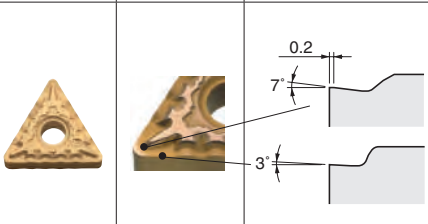
Applicable Chipbreaker Range (ap indicates radius)





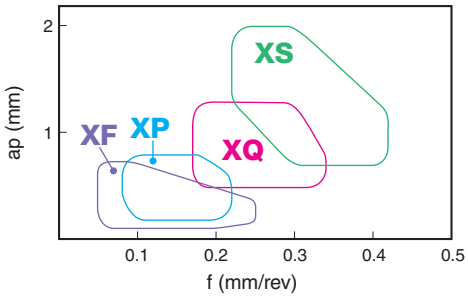
Low Carbon Steel (Pipe / Rolled Plate / Rolled Steel)

Cutting Range	Name	Design	Advantages
Finishing	XF		·Excellent chip control at high speed and small ap machining of low carbon steel
Finishing	XP		·Short chips when finishing due to sharp cutting and special design

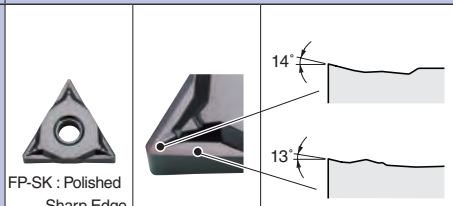
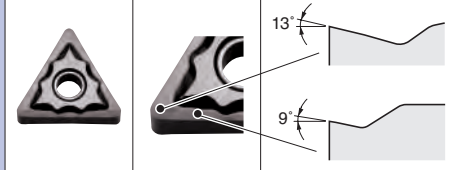
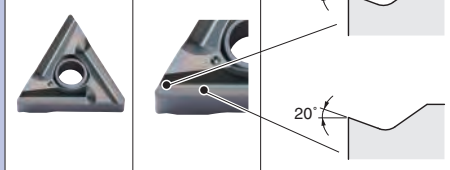
Cutting Range	Name	Design	Advantages
Medium	XQ		·Consistent chip breaking at medium machining due to moderate rake face and special design
Roughing	XS		·Consistent chip breaking when roughing due to special rake face and rake angle design

Applicable Chipbreaker Range (ap indicates radius)

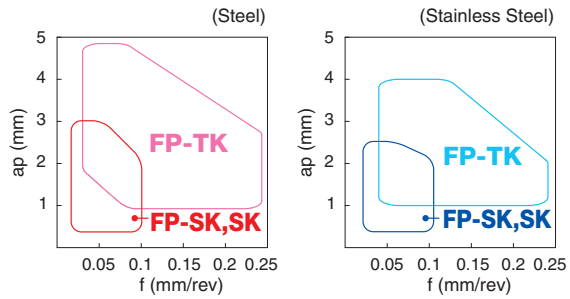
(Low Carbon Steel)

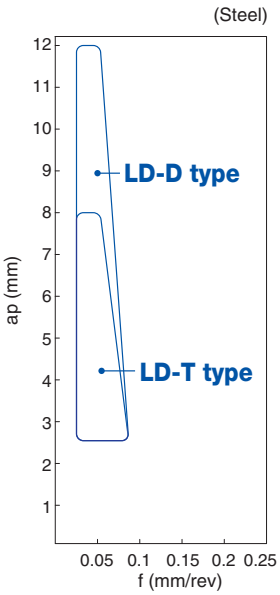


Steel / Stainless Steel (for automatic lathe)

Cutting Range	Name	Design	Advantages
Finishing - Medium	SK	 FP-SK : Polished Sharp Edge -SK : Honed	·For finishing to medium machining in automatic lathes ·Sharp cutting performance equivalent to positive inserts ·2-step dot design provides reliable chip control at various ap
Medium - Roughing	FP-TK		·For medium to large ap in automatic lathes (When machining workpieces of medium to large dia.) ·Superior cutting performance achieved by sharp edge and polished surface ·Smooth chipbreaker geometry improves chip flow with less adhesion ·Large curled chips
Large D.O.C.	LD		·Available for greater depths of cut than many conventional chipbreakers ·Achieves high-precision machining in a single pass ·Chipbreaker shape optimized for various depths of cut ·Stable chip control in a wide range of machining applications

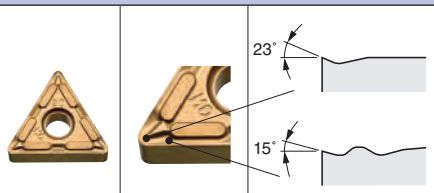
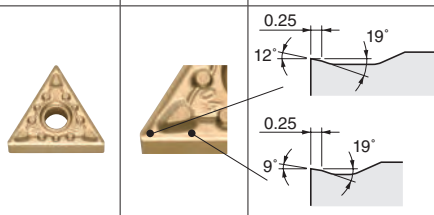
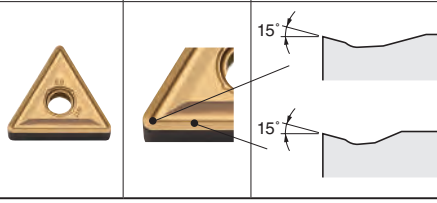
Applicable Chipbreaker Range (ap indicates radius)

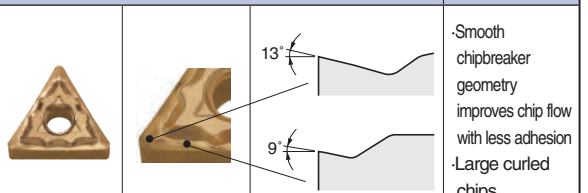
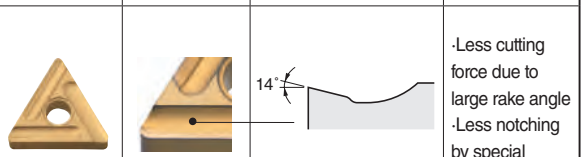




Chipbreaker Selection (Negative Inserts)

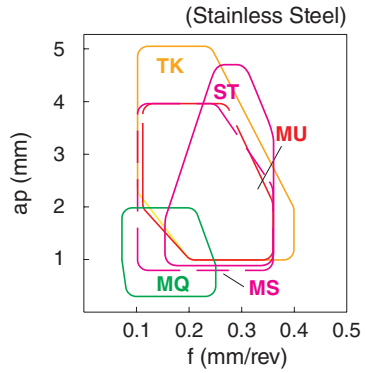
Stainless Steel / Heat-Resistant Alloys / Titanium Alloy

Cutting Range	Name	Design	Advantages
Finishing	MQ		·Large rake angle ·Low cutting force and good chip control
Medium - Roughing	MS		·Superior cutting edge sharpness and strength achieved by a positive land ·Extra strength of cutting edge inhibits damage from wall shouldering
Medium - Roughing	MU		·Large rake angle reduces cutting force ·Less burring achieved by diminishing damage from notching

Cutting Range	Name	Design	Advantages
Medium - Roughing	TK		·Smooth chipbreaker geometry improves chip flow with less adhesion ·Large curled chips
Medium - Roughing	ST		·Less cutting force due to large rake angle ·Less notching by special design

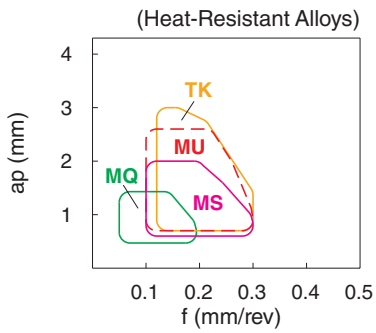
Stainless Steel

Applicable Chipbreaker Range (ap indicates radius)



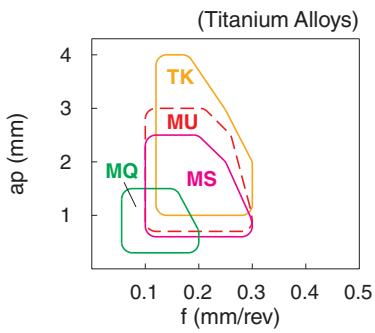
Heat-Resistant Alloys

Applicable Chipbreaker Range (ap indicates radius)

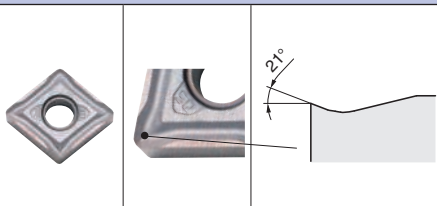
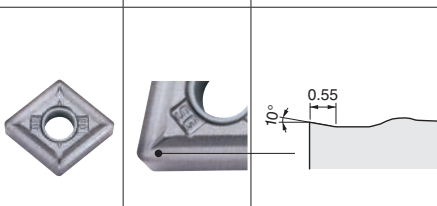
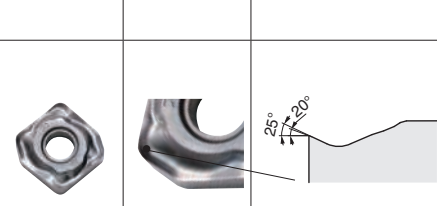


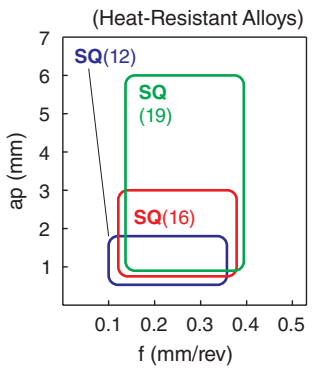
Titanium Alloys

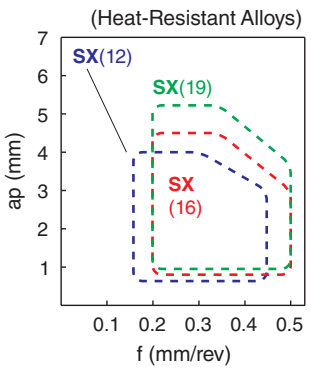
Applicable Chipbreaker Range (ap indicates radius)

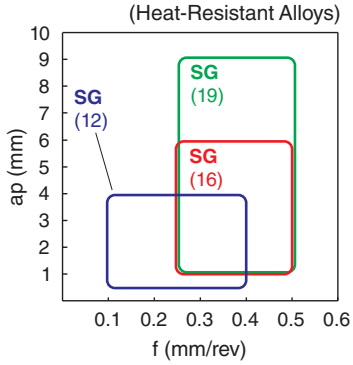


Heat-Resistant Alloys

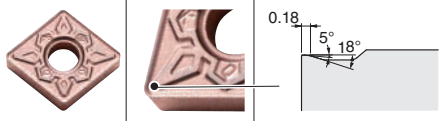
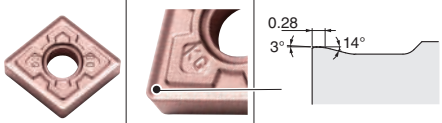
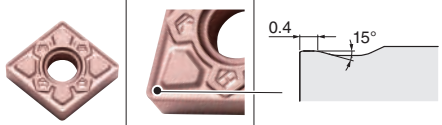
Cutting Range	Name	Design	Advantages
Finishing - Medium	SQ		·Effective for burr suppression and reducing notching by slant cutting edge (inclined in (-) direction)
Roughing	SG		·Provides well-balanced edge strength and cutting force reduction to maintain stable machining at high-load cutting ·Shallow and gently curved breaker controls chips smoothly
Roughing	SX		·Slant cutting edge reduces cutting force ·Less burring achieved by unique cutting edge design



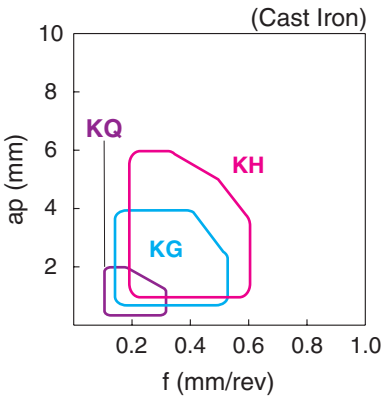




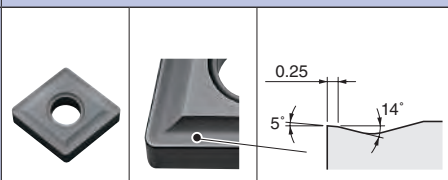
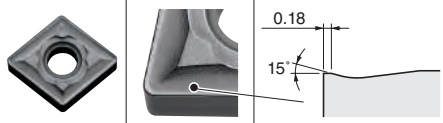
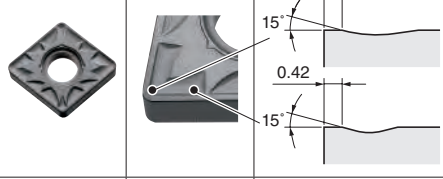
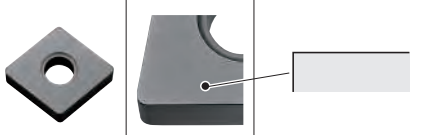
Cast Iron (K series)

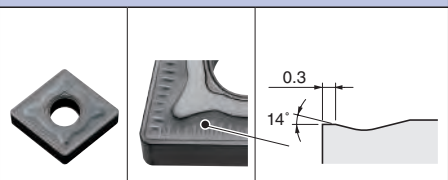
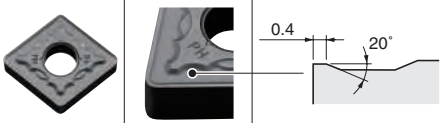
Cutting Range	Name	Design	Advantages
Sharp Cutting Oriented	KQ		·Sharp cutting chipbreaker ·Edge geometry is suitable for workpieces that require sharpness such as thin-walled
Roughing	KG		·Excellent balance of sharpness and strength ·Realized stability at continuous machining
Roughing	KH		·Good for heavily interrupted machining ·Strong edge chipbreaker ·Improved locating / seating in the toolholder pocket, high reliability achieved

● Applicable Chipbreaker Range (ap indicates radius)

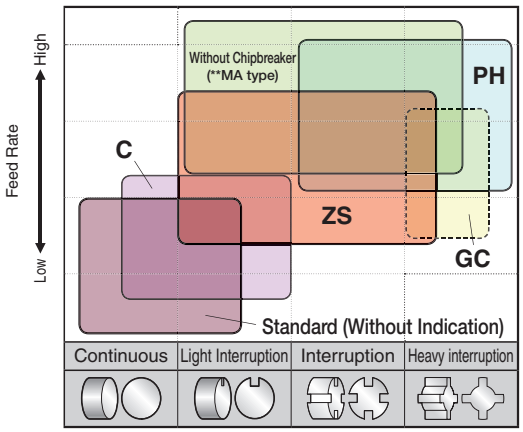


Cast Iron

Cutting Range	Name	Design	Advantages
Sharp Cutting Oriented	Standard (Without Indication)		·Standard chipbreaker for continuous to light interrupted machining of cast iron (Low cutting force)
	C		·High feed rate chipbreaker for continuous to light interrupted machining of cast iron
	ZS		·Standard chipbreaker for light interrupted to interrupted machining of cast iron (Stability oriented)
	Without Chipbreaker		·High feed rate chipbreaker for light interrupted to interrupted machining of cast iron

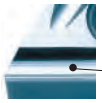
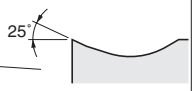
Cutting Range	Name	Design	Advantages
Stability Oriented	GC		·Chipbreaker for heavy interrupted machining of cast iron (Tough edge chipbreaker)
	PH		·Chipbreaker for roughing of cast iron ·Suitable for heavy interrupted machining and for workpieces with scale due to strong cutting edge

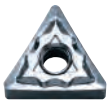
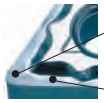
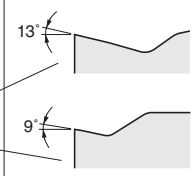
Chipbreaker Selection (Negative Inserts)



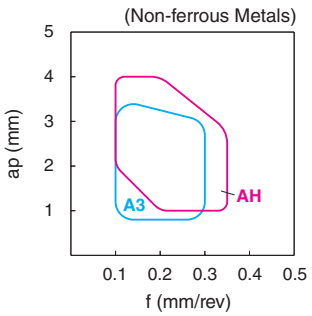
Chipbreaker Selection (Negative Inserts)

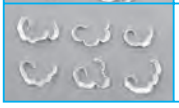
Non-ferrous Metals

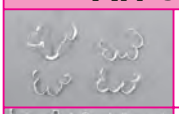
Cutting Range	Name	Design	Advantages
Finishing - Medium	A3	  	·Large rake angle and smooth surface ·Good chip control and less adhesion

Cutting Range	Name	Design	Advantages
Medium - Roughing	AH	   G Class : Sharp Edge M Class : Horned Edge Prep.	·Polished chipbreaker ·Smooth chip control and less adhesion

Applicable Chipbreaker Range (ap indicates radius)

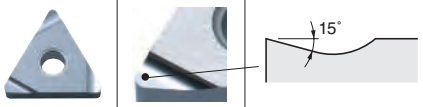
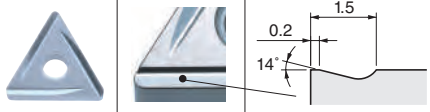


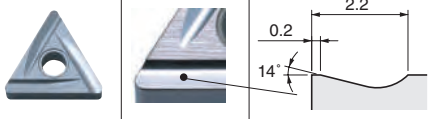
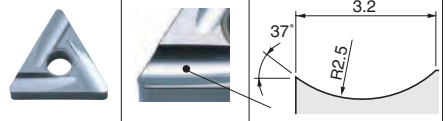
A3 Chipbreaker	
	ap=2mm f=0.2mm/rev
	ap=2mm f=0.3mm/rev

AH Chipbreaker	
	ap=2mm f=0.2mm/rev
	ap=2mm f=0.3mm/rev

Steel

2 Ground Chipbreaker

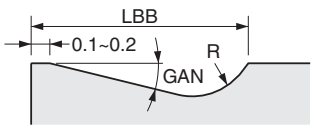
Cutting Range	Name	Design	Advantages
Finishing	S		·Sharp edge and less cutting force ·Good chip control and smooth chip evacuation
Finishing - Medium	B		·Suitable for general purpose machining at feed rate 0.15 to 0.25mm/rev

Cutting Range	Name	Design	Advantages
Medium - Roughing	C		·Suitable for general purpose machining at feed rate 0.20 to 0.35mm/rev
Medium - Roughing / Low Cutting Force	25R		·Applicable to sticky material such as low carbon steel ·Large rake angle and suitable for stainless steel

Effectiveness of ground chipbreaker

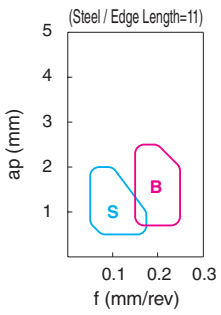
(1) Lower cutting force and improve edge
(2) Improved adhesion resistance
(3) Improved dimension accuracy and finishing surface accuracy
(4) Controlled chip evacuation direction

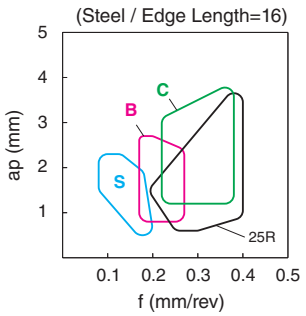
Specification of B, C and parallel ground chipbreaker

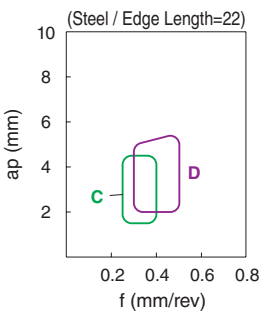


Insert Type	Size	Chipbreaker Name	LBB	GAN	R
CNGG	09,12	Without Indication (Similar to C)	2.2	14°	1.0
WNGG	06	Without Indication (Similar to C)	2.2	14°	1.0
TNGG	11,16	B	1.5	14°	0.5
	16,22	C	2.2	14°	1.0
DNGG	11,15	Without Indication (Similar to C)	2.5	14°	2.0
VNGG	16	Without Indication (Similar to B)	1.5	14°	0.5
SNGG	09,12	B	1.5	14°	0.5
	12	C	2.2	14°	1.0

Applicable Chipbreaker Range (ap indicates radius)



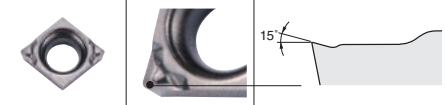
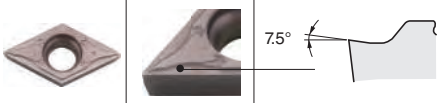
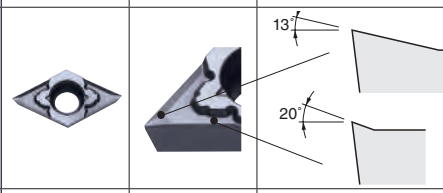
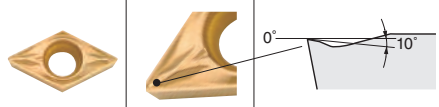


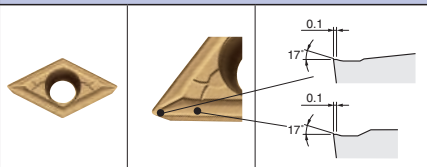
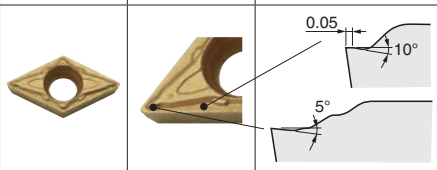
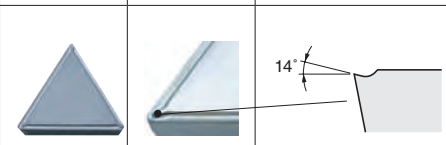
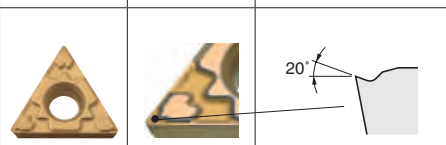
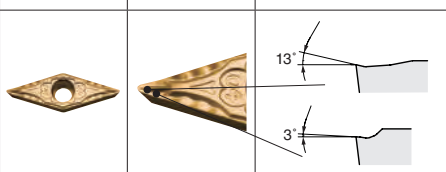
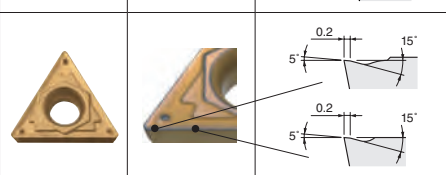
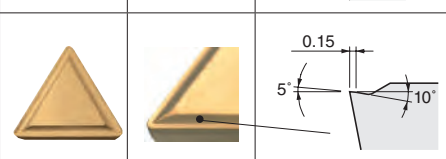
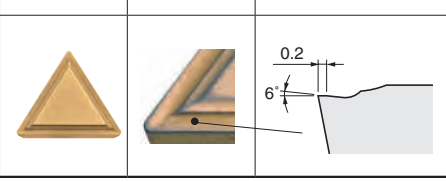


Chipbreaker Selection (Positive Inserts)

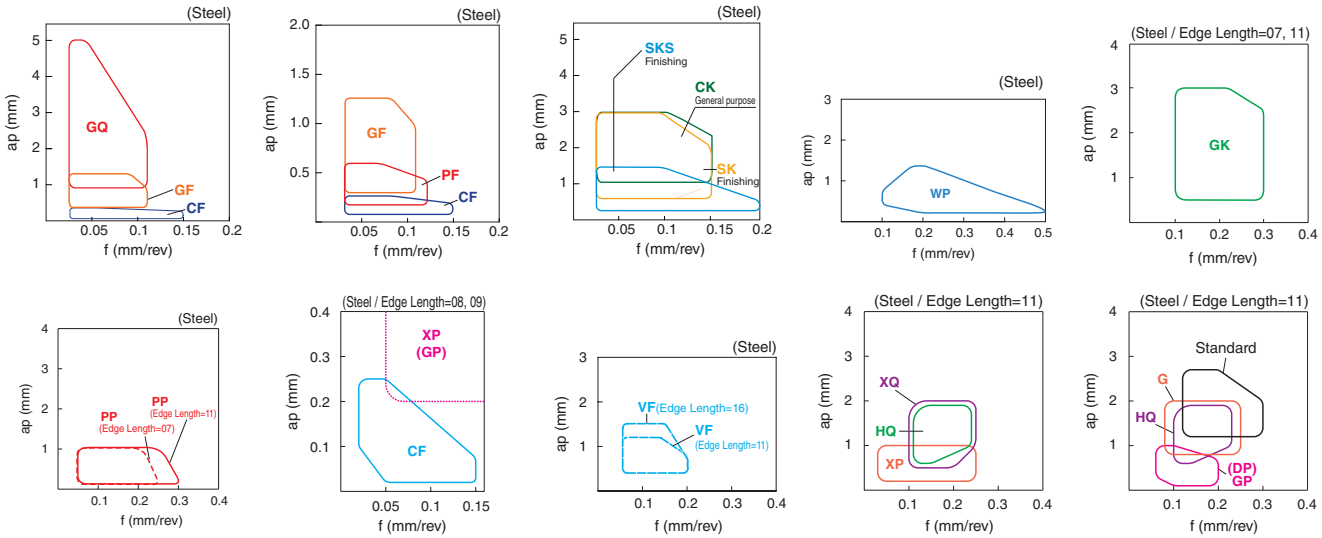
Steel

1 Molded Chipbreaker

Cutting Range	Name	Design	Advantages
Minute ap	CF		·Available for minute ap (0.02 to 0.2mm) finishing
Finishing	PF		·Chipbreaker for finishing boring available from ap 0.15~0.6mm
Finishing	GF		·Chips fragmented in small pieces in machining of small ap
Finishing - Medium	GQ		·Enables machining over a wide range of conditions by using the optimum chipbreaker width according to the cutting depth
Finishing	SKS		·Chipbreaker for finishing available from 0.2~1.5mm ·Rake face, bottom face and chipbreaker face provide stable chip control.
Finishing	SK		·Sharp cutting performance due to large rake angle ·Large dot to the corner edge improved chip control in a wide feed rate range
Finishing	CK		·Good cutting performance ·Applicable without hand for two direction machining on automatic lathe
Finishing	WP		·Wiper insert ·Good surface finish and good chip control at high feed machining ·Reduces surface finish galling

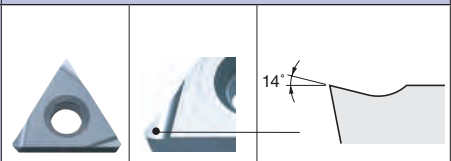
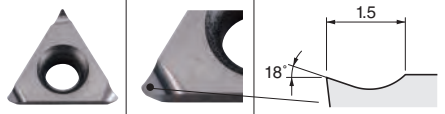
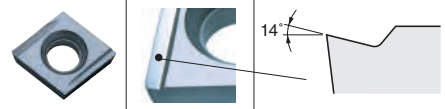
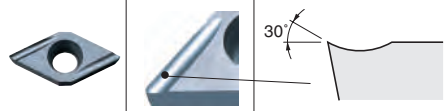
Cutting Range	Name	Design	Advantages
Finishing - Medium	GK		·Good chip evacuation at wide range by breaker dot and wide chip pocket
Finishing	PP		1st Recommendation at steel finishing ·Stable chip control in a wide feed rate range ·Stable tool life due to special edge design with sharpness and improved strength
Finishing	DP		·Consistent chip breaking performance for finishing
Finishing	GP		·Good chip control
Finishing	VF		·Good chip control for varied ap such as copying and undercutting
Finishing - Medium	HQ		·General purpose chipbreaker for medium machining
Medium	G		·Chipbreaker for short chips at medium machining
Medium	Standard (Without Indication)		·Strong edge chipbreaker for medium machining range

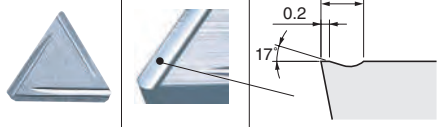
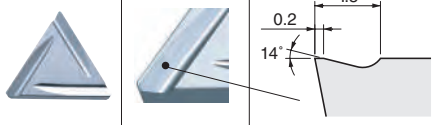
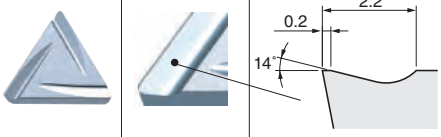
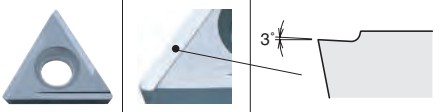
Applicable Chipbreaker Range (ap indicates radius)



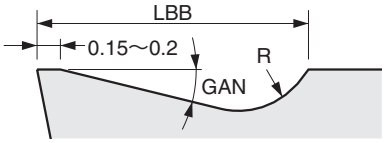
Steel

2 Ground Chipbreaker

Cutting Range	Name	Design	Advantages
Finishing	Lead (Without Indication)		·Good chip control at finishing to light machining with low cutting force
Finishing	F		·Good chip control at finishing to light machining with low cutting force
Finishing	P		·Flows chips towards the inlet of hole ·Sharp edge
Medium	Y		·Sharp cutting performance and good surface finish
Low Feed	J		·Slant chipbreaker width and chip control at various ap ·Applicable to automatic lathes
Low Feed	U		·Good chip control at low feed rate and varied ap with low cutting force

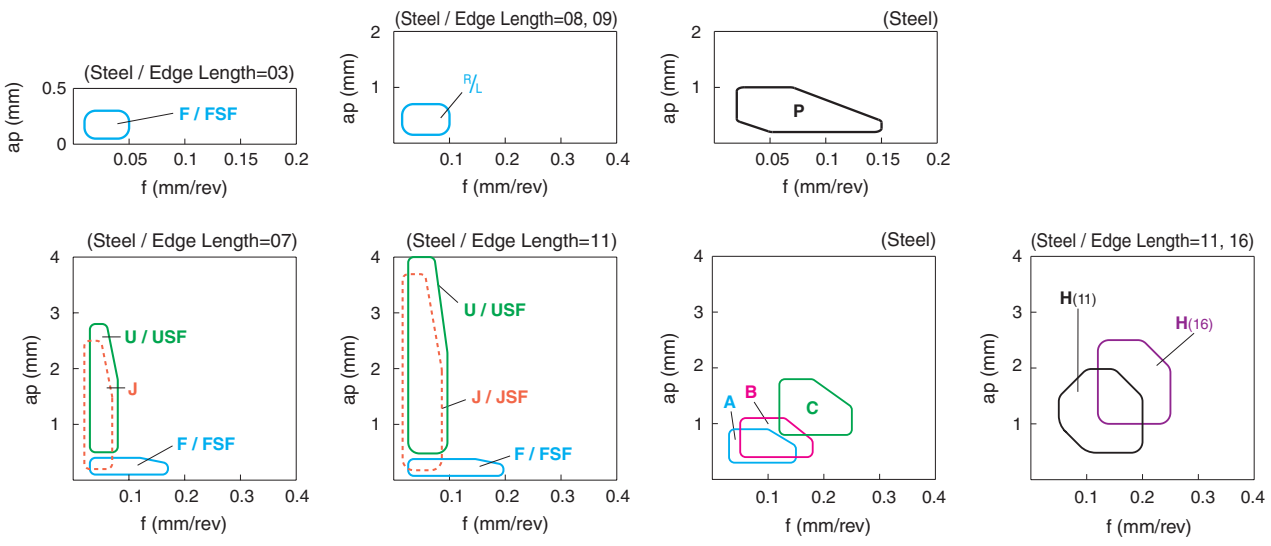
Cutting Range	Name	Design	Advantages
Finishing	A		·Large rake angle and low cutting force ·Narrow chipbreaker width and consistent chip control
Finishing - Medium	B		·General purpose chipbreaker for medium machining ·Good balance between chip control and sharp cutting
Medium	C		·Applicable to high load machining ·Good chip flow and less resistance
Medium	H		·Sharp cutting performance and small curled chips

Specification of A, B, C and parallel ground chipbreaker



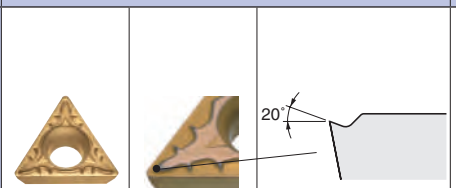
Insert Type	Size	Chipbreaker Name	LBB	GAN	R
TPGR	11	A	1.0	17°	0.5
	11,16	B	1.5	14°	0.5
	16	C	2.2	14°	1.0
SPGR	09	Without Indication (Similar to B)	1.5	14°	0.5
	12	Without Indication (Similar to C)	2.2	14°	1.0

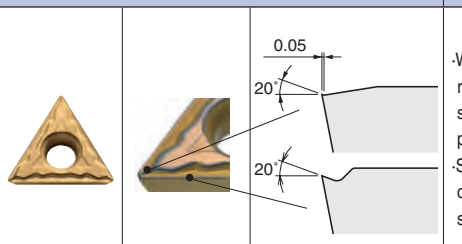
Applicable Chipbreaker Range (ap indicates radius)



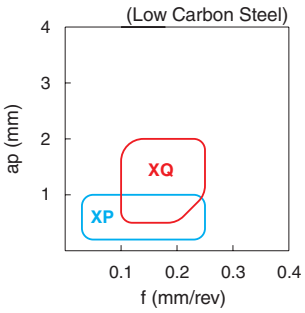
Chipbreaker Selection (Positive Inserts)

Low Carbon Steel (Pipe / Rolled Plate / Rolled Steel)

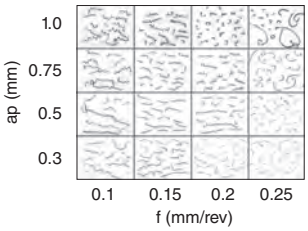
Cutting Range	Name	Design	Advantages
Finishing	XP		·Consistent chip breaking performance even for low carbon steel and sticky material

Cutting Range	Name	Design	Advantages
Finishing - Medium	XQ		·Wide chip control range and sharp cutting performance ·Suitable for low carbon steel and sticky material

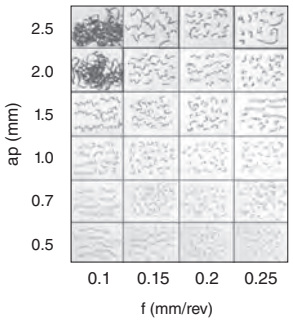
Applicable Chipbreaker Range (ap indicates radius)



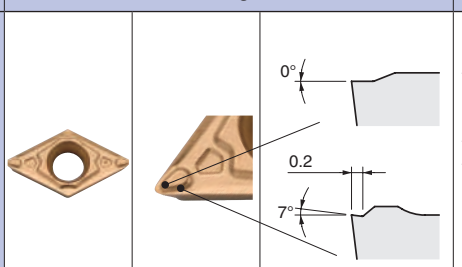
XP Chipbreaker



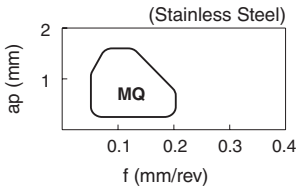
XQ Chipbreaker



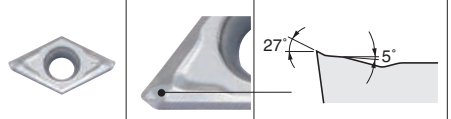
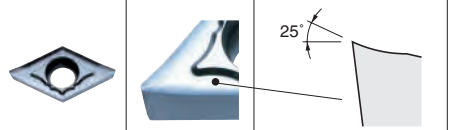
Stainless Steel

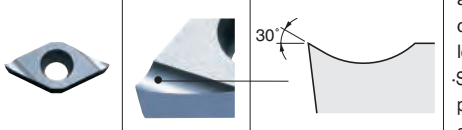
Cutting Range	Name	Design	Advantages
Finishing	MQ		·Good chip evacuation at internal turning ·Small curled chips ·Prevents chip entanglement with toolholder and stabilizes surface roughness

Applicable Chipbreaker Range (ap indicates radius)

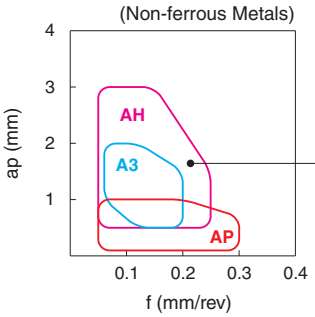


Non-ferrous Metals

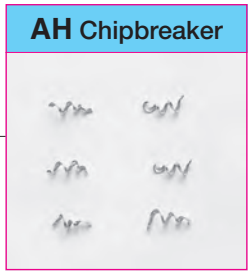
Cutting Range	Name	Design	Advantages
Finishing	AP		·Curved edge and shape of chipbreaker lead good chip control for finishing ·Sharp cutting edge provides excellent surface finish ·Polished chipbreaker
Finishing - Medium	AH		·Positive chip groove and good chip control with low cutting force ·Polished surface reduces adhesion

Cutting Range	Name	Design	Advantages
Finishing - Medium	A3		·Large rake angle, smooth chip flow and less adhesion ·Superior cutting performance achieved by sharp edge

Applicable Chipbreaker Range (ap indicates radius)



AH Chipbreaker



How to read pages of “Turning Inserts”

- Ref. to below for page contents of “Turning Inserts”
- Some contents are same in Chapter C

Classification of usage
✱: Interruption / 1st Choice
✱: Interruption / 2nd Choice
●:Light Interruption / 1st Choice
○:Light Interruption / 2nd Choice
●:Continuous / 1st Choice
○:Continuous / 2nd Choice
(In case hardness is 45HRC or under)

Recommended grades for each applications are shown here.

Insert's ISO Classification of usage (Workpiece materials are written on the right side)

Insert Dimensions

Insert Grades (Red characters mean new)

Insert Corner-R(RE)

Insert Shape

Insert descriptions

Explanation for inserts

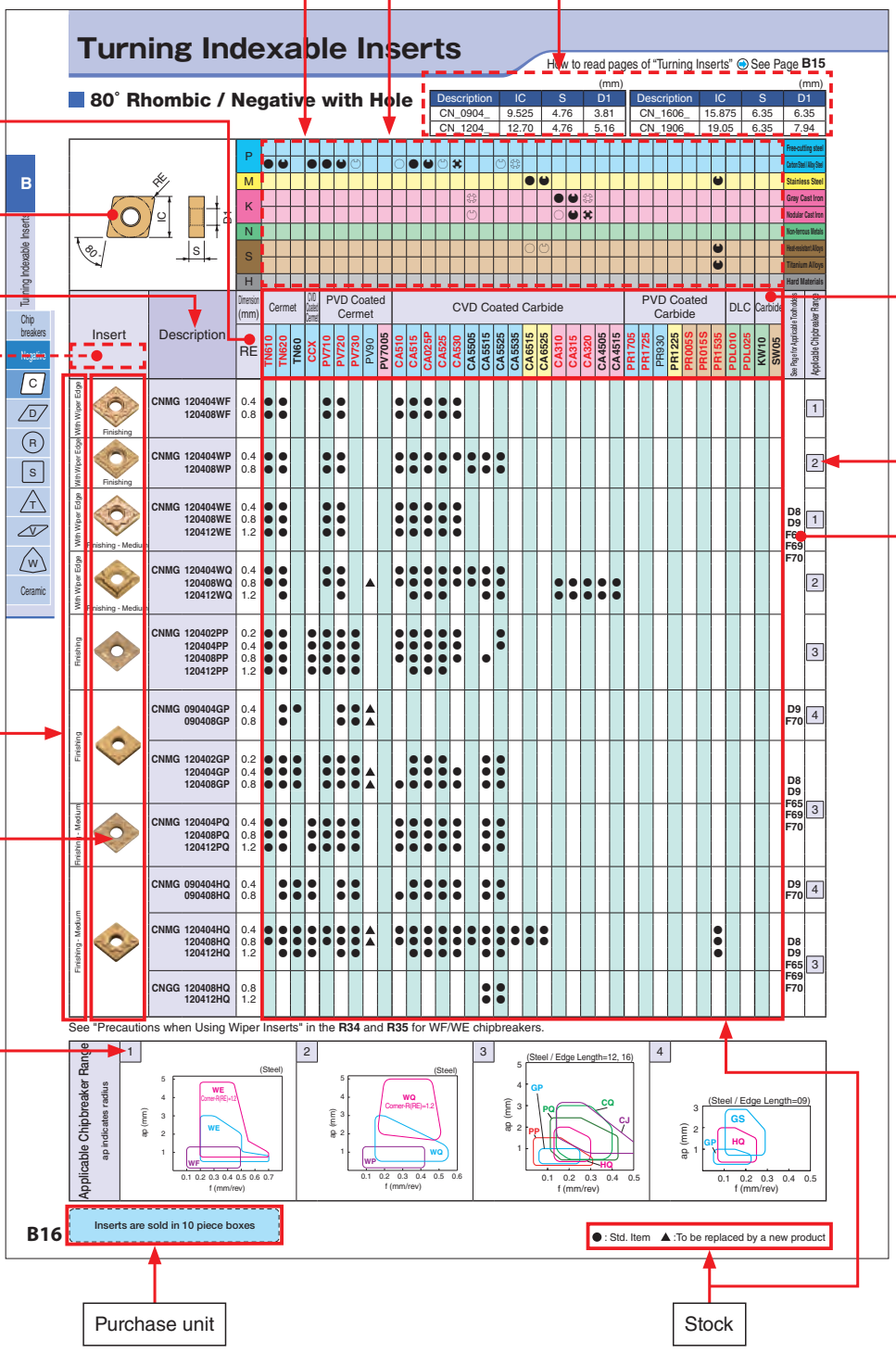
Example

Handed Insert shows Right-hand	Handed Insert shows Left-hand
	

Application / Recommended workpiece material

Insert Appearance Image
See Page **B3** for insert color

Applicable chipbreaker range map No.



Applicable chipbreaker range map No.

Purchase unit

Stock

Applicable Toolholder

Applicable chipbreaker range map No.

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

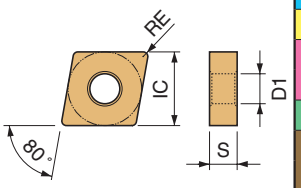
80° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94



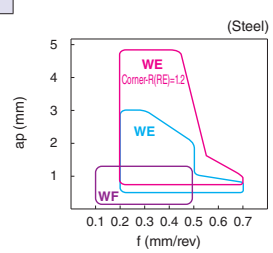
		Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet				CVD Coated Carbide												PVD Coated Carbide							DLC		Carbide			
Insert	Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	Finishing																																						
	CNMG 120404WF	0.4	●	●			●	●				●	●	●	●	●																						D8 D9 F65 F69 F70	1
	120408WF	0.8	●	●			●	●				●	●	●	●	●																							
With Wiper Edge	Finishing																																						
	CNMG 120404WP	0.4	●	●			●	●				●	●	●	●	●	●	●	●																				2
	120408WP	0.8	●	●			●	●				●	●	●	●		●	●	●																				
With Wiper Edge	Finishing - Medium																																						
	CNMG 120404WE	0.4	●	●			●	●				●	●	●	●	●																							
	120408WE	0.8	●	●			●	●				●	●	●	●	●																							
	120412WE	1.2	●	●			●	●				●	●	●	●	●																						D8 D9 F65 F69 F70	1
With Wiper Edge	Finishing - Medium																																						
	CNMG 120404WQ	0.4	●	●			●	●				●	●	●	●	●	●	●	●																				
	120408WQ	0.8	●	●			●	●		▲		●	●	●	●	●	●	●	●				●	●	●	●	●												2
	120412WQ	1.2		●				●					●	●	●			●	●				●	●	●	●	●											
Finishing																																							
	CNMG 120402PP	0.2	●	●		●	●	●	●			●	●	●	●	●			●																				
	120404PP	0.4	●	●		●	●	●	●			●	●	●	●	●			●																				
	120408PP	0.8	●	●		●	●	●	●			●	●	●	●	●		●																				
	120412PP	1.2	●	●		●	●	●	●				●	●	●																								3
Finishing																																							
	CNMG 090404GP	0.4		●	●			●	●	▲																												D9 F70	4
	090408GP	0.8		●				●	●	▲																													
	CNMG 120402GP	0.2	●	●	●		●	●	●				●	●	●			●	●																				
	120404GP	0.4	●	●	●		●	●	●	▲			●	●	●	●		●	●																				
	120408GP	0.8	●	●	●		●	●	●	▲		●	●	●	●	●		●	●																			D8 D9 F65 F69 F70	3
Finishing - Medium																																							
	CNMG 120404PQ	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●																				
	120408PQ	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●																				
	120412PQ	1.2	●	●		●	●	●	●			●	●	●	●	●		●	●																				3
Finishing - Medium																																							
	CNMG 090404HQ	0.4		●	●	●		●	●				●	●	●	●		●	●																				
	090408HQ	0.8		●	●	●		●	●			●	●	●	●	●		●	●																				4
	CNMG 120404HQ	0.4	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●	●	●												●					
	120408HQ	0.8	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●	●	●												●				D8 D9 F65 F69 F70	3
	120412HQ	1.2		●	●	●		●	●				●	●	●	●		●	●															●					
	CNGG 120408HQ	0.8																●	●																				4
	120412HQ	1.2																●	●																				

See "Precautions when Using Wiper Inserts" in the **R34** and **R35** for WF/WE chipbreakers.

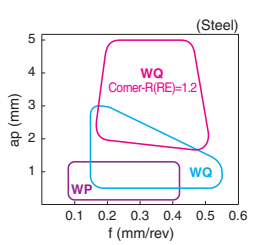
Applicable Chipbreaker Range

ap indicates radius

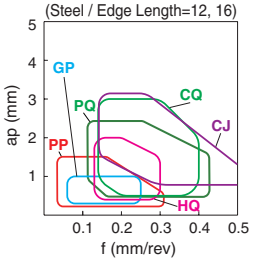
1



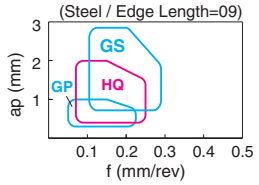
2



3



4



Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page B15

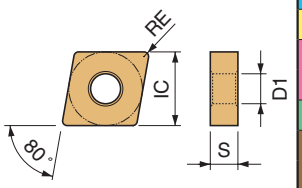
80° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94



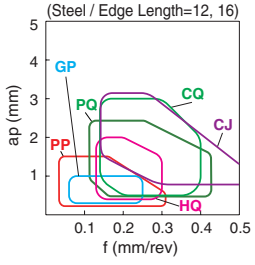
		Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		● ●	● ● ◔	○ ● ● ◔ ✱	◔ ⇳	● ●				
M							● ●	○ ◔	●	
K					⇳					●
					◔					●
N										
S							○ ◔		●	
									●	
H										

Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium / Up Facing		CNMG 120404CQ 120408CQ 120412CQ	0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ●		● ● ● ●	● ● ● ●	● ● ● ●	▲ ▲		● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ●	● ● ● ●	● ● ● ●	● ● ● ●															D8 D9 F65 F69 F70	
		CNMG 160608CQ 160612CQ	0.8 1.2										● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● 		● ● 	● ● ●																D9	1
Finishing - Medium / Up Facing		CNMG 120408CJ 120412CJ	0.8 1.2										● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● 	● ● ● ●	● ● ● ●	● ● ● ●															D8 D9 F65 F69 F70	
		CNMG 160612CJ 160616CJ	1.2 1.6										 	● ● ● ●	● ●	 ● ●	● ●		● ●	 	 															D9	
Medium		CNMG 120404TN-V 120408TN-V	0.4 0.8			● ●																															D8 D9 F65 F69 F70	2
Medium - Roughing		CNMG 090404GS 090408GS	0.4 0.8		● ● ● ●	● ● ● ●			● ● ● ●	● ● ● ●			 ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●		● ● ● ●																			D9 F70	B16 4
Medium - Roughing		CNMG 120404GS 120408GS 120412GS	0.4 0.8 1.2		● ●				● ● ● ●	● ● ● ●	▲ ▲		 ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●		● ● ● ●	● ● ● ●																				
Medium - Roughing		CNMG 120404PG 120408PG 120412PG 120416PG	0.4 0.8 1.2 1.6	● ● ● ●	● ● ● ● ●			● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●			● ● ● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●																	● ● ●				D8 D9 F65 F69 F70	3
Medium - Roughing		CNMG 120404PS 120408PS 120412PS 120416PS	0.4 0.8 1.2 1.6		● ●				● ● ● ●	● ● ● ●			● ● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●	● ● ●	● ● ● ● ● ●	● ● ● ● ● ●	● ● ● ● ● ●	● ● ●	● ● ●																
		CNMG 160612PS 160616PS	1.2 1.6										● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ●	● ● ● ●	● ● ● ●	● ● ● ●	● 	● 													D9	

Applicable Chipbreaker Range

ap indicates radius

1



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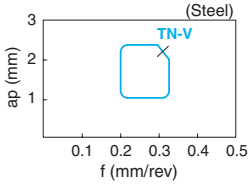

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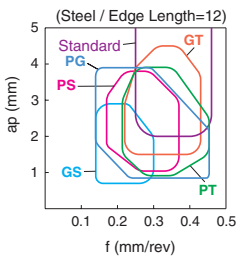
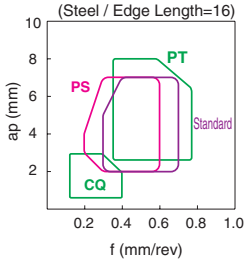




● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

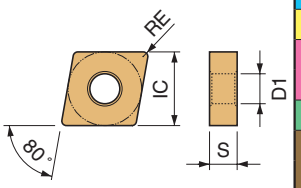
80° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94

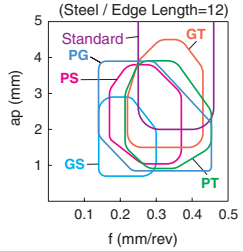


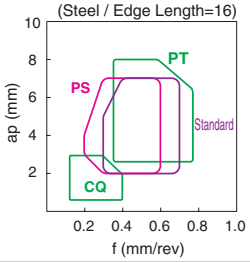
		Insert	Description	Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide														PVD Coated Carbide							DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
				RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Medium - Roughing / High Feed Rate			CNMG 120408PT 120412PT	0.8 1.2										● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●																D8 D9 F65 F69 F70	
			CNMG 160608PT 160612PT 160616PT	0.8 1.2 1.6										● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●																D9	
			CNMG 120408GT 120412GT	0.8 1.2								▲		● ●	● ●	● ●	● ●	●		● ●	● ●																			D8 D9 F65 F69 F70	1
Roughing			CNMG 120404 120408 120412 120416	0.4 0.8 1.2 1.6	● ●	● ●	● ● ●	● ● ●	● ●	● ●	● ●		● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●							● ● ●					
			CNMG 160608 160612 160616	0.8 1.2 1.6												● ●	● ●	● ●	● ●	● ●	● ●	● ●			● ●	● ●	● ●		● ●											D9	2
			CNMG 190608 190612 190616	0.8 1.2 1.6										● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●	● ●												
Roughing			CNMG 120408PH 120412PH 120416PH	0.8 1.2 1.6										● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●												D8 D9 F65 F69 F70	
			CNMG 160608PH 160612PH 160616PH	0.8 1.2 1.6										● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●													3
			CNMG 190608PH 190612PH 190616PH 190624PH	0.8 1.2 1.6 2.4										● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●												D9	

Applicable Chipbreaker Range

ap indicates radius

1





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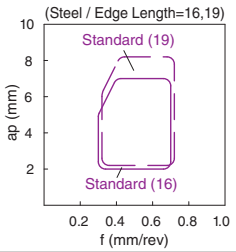

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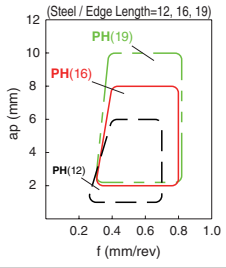


Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page B15

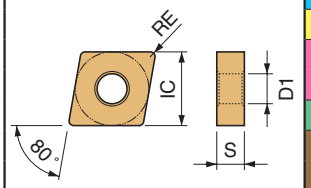
80° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94



		Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide														PVD Coated Carbide							DLC		Carbide			
Insert	Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Single-sided / Roughing / High Feed Rate	CNMM 120408PX 120412PX 120416PX	0.8 1.2 1.6										● ●	● ●	● ● ●	● ● ●	●		● ●	●									●									D8 D9 F65 F69 F70	
	CNMM 160608PX 160612PX 160616PX	0.8 1.2 1.6											● ●	● ● ●	● ● ●	●		● ●	● ●																			1
	CNMM 190608PX 190612PX 190616PX 190624PX	0.8 1.2 1.6 2.4											● ● ●	● ● ● ●	● ● ●			● ● ●	● ● ●																		D9	
Low Carbon Steel	CNMG 120404XF 120408XF	0.4 0.8	● ●	● ●		● ●	● ●	● ●	● ●																													
Low Carbon Steel	CNMG 120404XP 120408XP	0.4 0.8	● ●	● ●	● ●	● ●	● ●	● ●	● ●	▲			● ●	● ●	● ●	●		● ●	● ●																		D8 D9 F65 F69 F70	2
Low Carbon Steel	CNMG 120404XQ 120408XQ	0.4 0.8	● ●	● ●	● ●	● ●	● ●	● ●	● ●	▲ ▲		● ●	● ●	● ●	● ●	● ●		● ●	● ●																			
Low Carbon Steel	CNMG 120408XS	0.8	●	●	●		●	●	●	▲		●	●	●	●	●		●	●																	
Finishing - Medium	CNGG 120402MFP-SK 120404MFP-SK	<0.2 <0.4							● ●																			● ●	● ●		● ●			● ●				D8 D9 E48	3
Medium - Roughing	CNGG 120404FP-TK 120408FP-TK	0.4 0.8																										● ●	● ●		● ●			● ●				F65 F69 F70	
Heat-Resistant Alloys	CNGG 120404TK 120408TK	0.4 0.8																																		● ●		D8 D9 F65 F69 F70	B20 1
Stainless Steel	CNMG 120404TK 120408TK	0.4 0.8																			● ●	● ●											● ●					

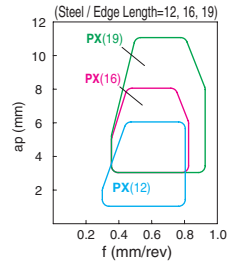
Finishing / Small ap
Finishing
Medium
Roughing
Sharp Edge / Polished
Sharp Edge / Polished
Medium - Roughing / Sharp Edge
Medium - Roughing

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g.**<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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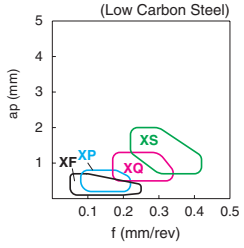

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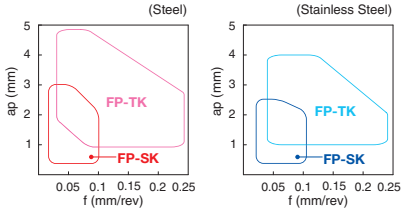


● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

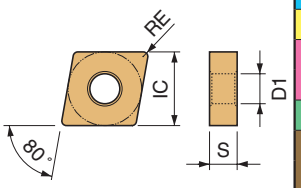
80° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94



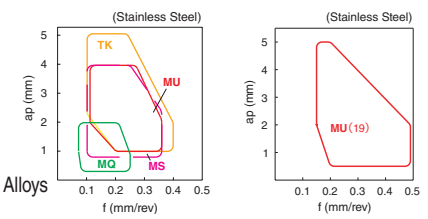
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Stainless Steel / Heat-Resistant Alloys	Finishing - Medium	CNMG 120404MQ	0.4											●	●							●	●									●	●	●			●		D8 D9	1
		CNMG 120408MQ	0.8											●	●							●	●									●	●	●			●			
Heat-resistant Alloys	Finishing - Medium	CNMG 120404SQ	0.4																													●	●						F65 F69 F70	
		CNMG 120408SQ	0.8																													●	●							
		CNMG 120412SQ	1.2																													●	●							
		CNMG 160612SQ	1.2																													●	●							2
		CNMG 160616SQ	1.6																													●	●							
		CNMG 190612SQ	1.2																													●	●						D9	
		CNMG 190616SQ	1.6																													●	●							
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	CNMG 120404MS	0.4											●	●																	●	●	●			●			
		CNMG 120408MS	0.8											●	●																	●	●	●			●		D8 D9 F65 F69 F70	
		CNMG 120412MS	1.2											●	●																	●	●	●			●			
		CNMG 120416MS	1.6												●																	●	●	●						
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	CNMG 120404MU	0.4											●	●																	●	●	●			●			1
		CNMG 120408MU	0.8											●	●																	●	●	●			●		D8 D9 F65 F69 F70	
		CNMG 120412MU	1.2											●	●																	●	●	●						
		CNMG 160608MU	0.8											●	●																	●	●	●						
		CNMG 160612MU	1.2											●	●																	●	●	●						
		CNMG 160616MU	1.6												●																	●	●	●					D9	
		CNMG 190612MU	1.2																													●	●	●						
		CNMG 190616MU	1.6																													●	●	●						
Heat-resistant Alloys	Roughing	CNMG 120408SG	0.8																													●	●	●			●		D8 D9 F65 F69 F70	
		CNMG 120412SG	1.2																													●	●	●			●			
		CNMG 160612SG	1.2																													●	●	●			●		D9	3
		CNMG 160616SG	1.6																													●	●	●			●			
		CNMG 190612SG	1.2																													●	●	●			●			
		CNMG 190616SG	1.6																													●	●	●			●			

Applicable Chipbreaker Range

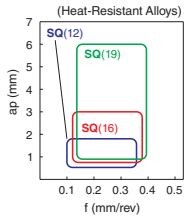
ap indicates radius

1



Heat-Resistant Alloys
Titanium Alloys
See Page B8

2



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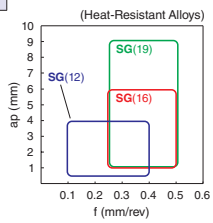


Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page B15

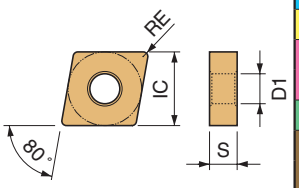
80° Rhombic / Negative with Hole

* S Dimension : ( ) indicates SX Chipbreaker (mm)

Description	IC	S	D1
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76(4.42)	5.16

Description	IC	S	D1
CN_1606_	15.875	6.35(5.96)	6.35
CN_1906_	19.05	6.35(5.93)	7.94

(mm)



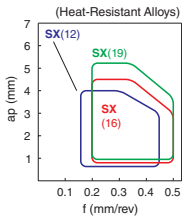
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	PDL025	Carbide KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Single-sided / Heat-Resistant Alloys	Roughing	CNMM 1204XR-SX	-																												●	●									
		1204XL-SX	-																												●	●									
		CNMM 1606XR-SX	-																												●	●								D8 D9	1
		1606XL-SX	-																												●	●									
		CNMM 1906XR-SX	-																												●	●									
		1906XL-SX	-																												●	●									
Cast Iron	Sharp Cutting Oriented	CNMG 120404KQ	0.4																					●	●	●														
		120408KQ	0.8																					●	●	●														
		120412KQ	1.2																					●	●	●														
Cast Iron	Roughing	CNMG 120404KG	0.4																					●	●	●														
		120408KG	0.8																					●	●	●														
		120412KG	1.2																					●	●	●													D8 D9 F65 F69 F70	2
Cast Iron	Roughing	CNMG 120408KH	0.8																					●	●	●														
		120412KH	1.2																					●	●	●														
		120416KH	1.6																					●	●	●														
Cast Iron	Roughing	CNMG 120404C	0.4																					●	●	●	●	●												
		120408C	0.8																					●	●	●	●	●												
		120412C	1.2															●						●	●	●	●	●												
		120416C	1.6															●						●	●	●	●	●												
		CNMG 160612C	1.2																					●	●	●		●											D9	3
Cast Iron	Roughing	CNMG 120408ZS	0.8															●						●	●	●	●	●												
		120412ZS	1.2															●						●	●	●	●	●												
Cast Iron	Roughing	CNMG 120408GC	0.8															●						●	●	●	●	●												
		120412GC	1.2																					●	●	●	●	●											D8 D9	
Cast Iron	Without Chipbreaker	CNGA 120404	0.4									●																								●			F65 F69 F70	-
		120408	0.8									●																								●				
		CNMA 120404	0.4				●					●						●						●	●	●	●	●								●				
		120408	0.8				●					●						●						●	●	●	●	●								●				
		120412	1.2															●						●	●	●	●	●												
		120416	1.6															●						●	●	●	●	●												

Applicable Chipbreaker Range

ap indicates radius

1



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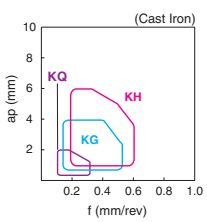

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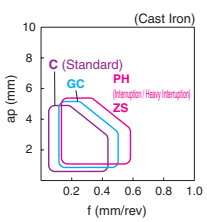


● : Std. Item

Inserts are sold in 10 piece boxes

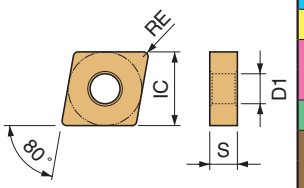
80° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94

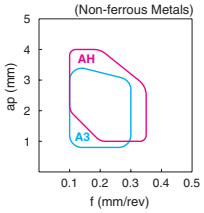


		Insert / Handed Insert shows Right-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Non-ferrous Metals	Finishing - Medium / Sharp Edge		CNGG 120404R-A3	0.4																															●	●	●		D8 D9 F65 F69 F70	1
			120404L-A3	0.4																															●	●	●			
			120408R-A3	0.8																															●	●	●			
			120408L-A3	0.8																															●	●	●			
Non-ferrous Metals	Medium - Roughing / Sharp Edge		CNGG 120404AH	0.4																															●	●	●			
			120408AH	0.8																															●	●	●			
Non-ferrous Metals	Medium - Roughing		CNMG 120404AH	0.4																															●	●	●			
			120408AH	0.8																															●	●	●			
Finishing	Surface Roughness Oriented / Sharp Edge		CNGG 090402R-S	0.2	●	●	●		●	●																													D9 F70	
			090402L-S	0.2	●	●	●		●	●																														
			090404R-S	0.4	●	●	●		●	●																														
			090404L-S	0.4	●	●	●		●	●																												●		
			090408R-S	0.8	●				●																															
			090408L-S	0.8	●				●																															
Medium			CNGG 090404L	0.4																																		●		D9 F70	2
			090408L	0.8																																		●			
			CNGG 120404R	0.4	●	●	●		●	●	●																													D8 D9 F65 F69 F70	
			120404L	0.4	●	●	●		●	●	●																														
			120408R	0.8	●	●	●		●	●	●																														
			120408L	0.8	●	●	●		●	●	●																														
Medium - Roughing	Low cutting force		CNGG 120404R-25R	0.4	●	●	●		●	●																												●			
			120404L-25R	0.4	●	●	●		●	●																												●			
			120408R-25R	0.8	●	●	●		●	●																												●			
			120408L-25R	0.8	●	●	●		●	●																												●			
Medium - Roughing			CNGG 120404Z	0.4			●																																		

Applicable Chipbreaker Range

ap indicates radius

1



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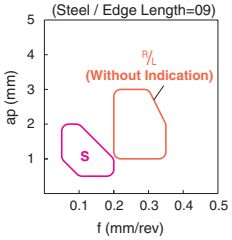
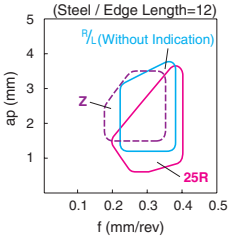




Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page B15

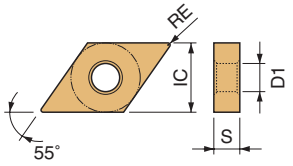
55° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
DN_1506_	12.70	4.76	5.16



P: Free-cutting steel / Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron / Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys / Titanium Alloys
H: Hard Materials

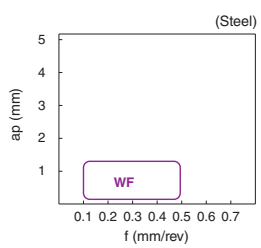
Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	 Finishing	DNMX 150404WF	0.4	●	●			●	●				●	●	●	●	●																					D12 D13 F66 F72 F73	1
		DNMX 150408WF	0.8	●	●			●	●				●	●	●	●	●																								
		DNMX 150412WF	1.2	●	●			●	●				●	●	●	●	●																								
		DNMX 150604WF	0.4	●	●			●	●				●	●	●	●	●																					D12 D13 F66	
		DNMX 150608WF	0.8	●	●			●	●				●	●	●	●	●																								
		DNMX 150612WF	1.2	●	●			●	●				●	●	●	●	●																								
Finishing		DNMG 150402PP	0.2	●	●		●	●	●	●				●	●	●	●			●																		D12 D13 F66 F72 F73	
		DNMG 150404PP	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●																				
		DNMG 150408PP	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●																				
		DNMG 150412PP	1.2	●	●		●	●	●	●			●	●	●	●	●																								
		DNMG 150602PP	0.2	●	●		●	●	●	●				●	●	●																					D12 D13 F66	
		DNMG 150604PP	0.4	●	●		●	●	●	●			●	●	●	●			●																				
		DNMG 150608PP	0.8	●	●		●	●	●	●			●	●	●	●																								
		DNMG 150612PP	1.2	●	●		●	●	●	●					●	●																								
Finishing		DNMG 110404GP	0.4		●	●			●	●	▲			●	●	●	●		●	●																		D13 F71	2
		DNMG 110408GP	0.8		●	●			●	●	▲		●	●	●	●				●																				
		DNMG 150402GP	0.2	●	●	●		●	●	●	▲		●	●	●	●			●	●																		D12 D13 F66 F72 F73	
		DNMG 150404GP	0.4	●	●	●		●	●	●	▲		●	●	●	●	●		●	●																				
		DNMG 150408GP	0.8	●	●	●		●	●	●	▲		●	●	●	●	●	●	●	●																				
		DNMG 150602GP	0.2	●				●																														D12 D13 F66	
		DNMG 150604GP	0.4	●				●																																
		DNMG 150608GP	0.8	●				●																																
Finishing - Medium		DNMG 150404PQ	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●																		D12 D13 F66 F72 F73	
		DNMG 150408PQ	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●																				
		DNMG 150412PQ	1.2	●	●		●	●	●	●			●	●	●	●	●		●	●																				
		DNMG 150604PQ	0.4	●	●		●	●	●	●			●	●	●	●	●																					D12 D13 F66	
		DNMG 150608PQ	0.8	●	●		●	●	●	●			●	●	●	●	●			●																				
		DNMG 150612PQ	1.2	●	●		●	●	●	●				●	●	●																								

See "Precautions when Using Wiper Inserts" in the **R34** and **R35** for WF chipbreaker.

Applicable Chipbreaker Range

ap indicates radius

1



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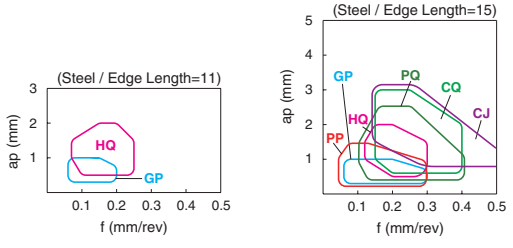


● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

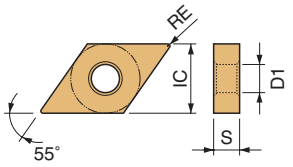
55° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
DN_1506_	12.70	6.35	5.16

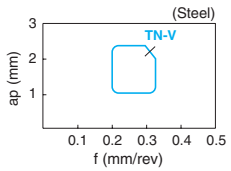


		Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide														PVD Coated Carbide							DLC		Carbide			
Insert	Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium	DNMG 110402HQ 110404HQ	0.2 0.4		● ●	● ●	● ●		● ●	● ●	▲		●	● ●	● ●	● ●	●		● ●	● ●																		D13 F71	
	DNMG 150404HQ 150408HQ 150412HQ	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	▲ ▲		● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	●	● ● ●	● ● ●	● ● ●	● ●	● ●												● ●			D12 D13 F66 F72 F73	
	DNMG 150604HQ 150608HQ 150612HQ	0.4 0.8 1.2	● ● ●			● ● ●	● ● ●					●	● ● ●	● ● ●	● ● ●	● ● ●	●	● ● ●	● ● ●		● ●	● ●												● ●			D12 D13 F66	
Finishing - Medium / Up Facing	DNMG 150404CQ 150408CQ 150412CQ	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●	▲ ▲ ▲		● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ●	● ● ●	● ● ●	● ● ●																		D12 D13 F66 F72 F73	B23 2
	DNMG 150604CQ 150608CQ 150612CQ	0.4 0.8 1.2	●				●					● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	●	● ● ●	● ● ●																		D12 D13 F66	
Finishing - Medium / Up Facing	DNMG 150408CJ 150412CJ	0.8 1.2											● ●	● ●	● ●			● ●	● ●																		D12 D13 F66 F72 F73	
	DNMG 150608CJ 150612CJ	0.8 1.2										●	● ●	● ●	● ●			● ●	● ●																		D12 D13 F66	
Medium	DNMG 150404TN-V 150408TN-V	0.4 0.8			● ●																																D12 D13 F66 F72 F73	1
Medium - Roughing	DNMG 110404GS 110408GS	0.4 0.8		● ●	● ●			● ●	● ●	▲ ▲		●	● ●	● ●	● ●	● ●		● ●	● ●																		D13 F71	
	DNMG 150404GS 150408GS 150412GS	0.4 0.8 1.2		● ●				● ●	● ●	▲ ▲			● ● ●	● ● ●	● ● ●	●		● ● ●	● ● ●																		D12 D13 F66 F72 F73	2
	DNMG 150604GS 150608GS	0.4 0.8												● ●	● ●																						D12 D13 F66	

Applicable Chipbreaker Range

ap indicates radius

1



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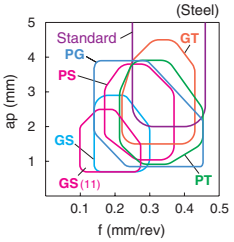


Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page B15

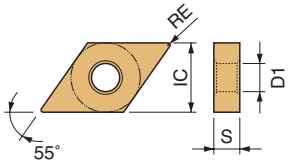
55° Rhombic / Negative with Hole

(mm)

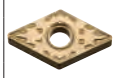
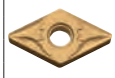
Description	IC	S	D1
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
DN_1506_	12.70	6.35	5.16



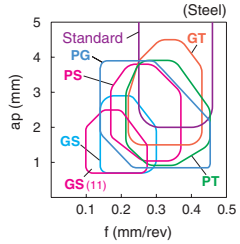
		Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		● ●	● ● ◔	○ ● ● ◔ ✱	◔ ✣					
M						● ●			●	
K					✣					
					◔					
N										
S						○ ◔			●	
									●	
H										

Insert		Description	Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet				CVD Coated Carbide															PVD Coated Carbide							DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
			RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Medium - Roughing		DNMG 150404PG	0.4	●	●			●	●	●			●	●	●	●																		●				D12 D13 F66 F72 F73	
		DNMG 150408PG	0.8	●	●			●	●	●			●	●	●	●	●																		●					
		DNMG 150412PG	1.2		●				●	●			●	●	●	●																		●					
		DNMG 150416PG	1.6												●	●																							
		DNMG 150604PG	0.4	●	●			●	●	●			●	●	●	●	●																		●				D12 D13 F66	
		DNMG 150608PG	0.8	●	●			●	●	●			●	●	●	●	●																		●					
		DNMG 150612PG	1.2		●				●	●			●	●	●	●																		●					
		DNMG 150616PG	1.6												●																							
Medium - Roughing		DNMG 150404PS	0.4		●				●	●			●	●	●	●	●		●	●	●	●	●															D12 D13 F66 F72 F73	
		DNMG 150408PS	0.8		●				●	●			●	●	●	●	●	●	●	●	●	●	●																
		DNMG 150412PS	1.2											●	●	●	●		●	●	●		●																
		DNMG 150416PS	1.6																●	●																			
		DNMG 150604PS	0.4										●	●	●	●	●		●	●		●	●																1
		DNMG 150608PS	0.8										●	●	●	●	●		●	●	●	●	●																
		DNMG 150612PS	1.2										●	●	●	●	●		●	●	●		●																
		DNMG 150616PS	1.6											●	●	●	●		●	●																			
Medium - Roughing / High Feed Rate		DNMG 150408PT	0.8										●	●	●	●	●	●	●	●	●		●															D12 D13 F66 F72 F73	
		DNMG 150412PT	1.2										●		●	●	●	●		●	●		●																
		DNMG 150608PT	0.8										●	●	●	●	●	●	●	●	●		●															D12 D13 F66	
		DNMG 150612PT	1.2										●	●	●	●	●	●	●	●	●	●																	
Medium - Roughing / High Feed Rate		DNMG 150408GT	0.8											●	●	●	●		●	●																		D12 D13 F66 F72 F73	
		DNMG 150412GT	1.2											●	●	●																						
		DNMG 150608GT	0.8										●	●	●	●	●		●	●																		D12 D13 F66	
		DNMG 150612GT	1.2											●	●	●	●		●	●																			

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item

Inserts are sold in 10 piece boxes

55° Rhombic / Negative with Hole

(mm)

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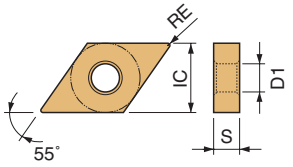
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
DN_1506_	12.70	4.76	5.16



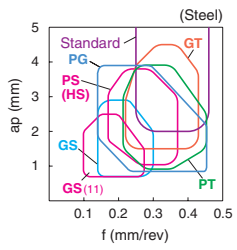
P: Free-cutting steel / Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron / Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys / Titanium Alloys
H: Hard Materials

Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Roughing		DNMG 150404 150408 150412	0.4 0.8 1.2	● ●	● ●	● ●	 ●	● ●	● ●	● ●	▲ ●	 ●	 ●	● ●	● ●	● ●	 ●	 ●	● ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●											D12 D13 F66 F72 F73	1
		DNMG 150604 150608 150612	0.4 0.8 1.2										 ●	● ●	● ●	● ●	● ●	 ●	 ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●											D12 D13 F66	
Roughing		DNMG 150408PH 150412PH 150416PH	0.8 1.2 1.6										●	● ●	● ●	● ●	 ●	 ●	● ●	● ●	 ●			● ●	● ●	● ●	● ●	● ●											D12 D13 F66 F72 F73	2
		DNMG 150608PH 150612PH 150616PH	0.8 1.2 1.6										 ●	● ● ●	● ● ●	● ● ●	● ● ●	 	 	● ● ●	 			● ●	● ●	● ●	 	● 											D12 D13 F66	
Single-sided / Roughing / High Feed Rate		DNMM 150408PX 150412PX 150416PX	0.8 1.2 1.6										 	 	● ● ●	● ● ●	 	 	 	● ● ●	 																		D12 D13 F66 F72 F73	
		DNMM 150608PX 150612PX 150616PX	0.8 1.2 1.6										 	● ● ●	● ● ●	● ● ●	 ●	 	● ●	● ● ●	● 																		D12 D13 F66	
Low Carbon Steel	Finishing / Small ap	DNMG 150404XF 150408XF	0.4 0.8	● ●	● ●	 	● ●	● ●	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 			 	 	 	 	 											D12 D13 F66	
Low Carbon Steel	Finishing	DNMG 150404XP 150408XP	0.4 0.8	● ●	● ●	● ●	● ●	● ●	● ●	● ●	▲ ▲	 	● ●	● ●	● ●	● ●	 ●	● ●	● ●	● ●	 			 	 	 	 	 											F72 F73	
		DNMG 150604XP 150608XP	0.4 0.8	● ●	 	 	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 			 	 	 	 	 											D12 D13 F66	3
Low Carbon Steel	Medium	DNMG 150404XQ 150408XQ	0.4 0.8	● ●	● ●	● ●	● ●	● ●	● ●	● ●	▲ ▲	 	 	● ●	● ●	● ●	● ●	 	● ●	● ●	 			 	 	 	 	 											D12 D13	
Low Carbon Steel	Roughing	DNMG 150408XS	0.8	●	●	 	 	●	●	●	 	 	 	●	●	●	●	 	●	●	 			 	 	 	 	 											F66 F72 F73	

Applicable Chipbreaker Range

ap indicates radius

1



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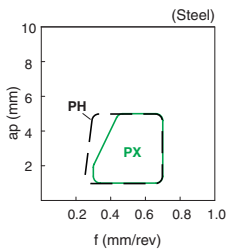

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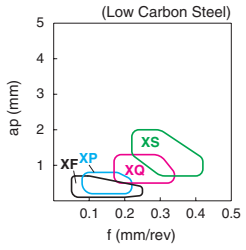


Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page **B15**

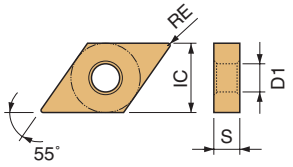
55° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
DN_1506_	12.70	4.35	5.16



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

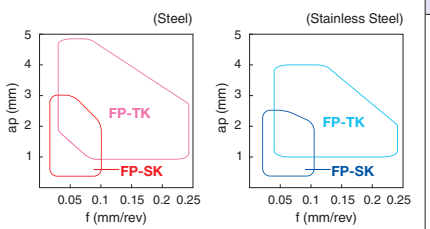
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	PDL025	Carbide KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium Sharp Edge / Polished	DNGG 150402MFP-SK 150404MFP-SK	<0.2 <0.4							● ●																			● ●		● ●				● ●						1
Large D.O.C.	DNMG 150402R-LD 150404R-LD	0.2 0.4																										● ●						● ●					D12 D13 F66 F72 F73	2
Medium - Roughing Sharp Edge / Polished	DNGG 150404FP-TK 150408FP-TK	0.4 0.8																										● ●			● ●			● ●						1
Stainless Steel / Heat-Resistant Alloys Medium - Roughing / Sharp Edge	DNGG 150404TK 150408TK	0.4 0.8																																				● ●		
	DNGG 150604TK 150608TK	0.4 0.8																																				● ●	D12 D13 F66	
Stainless Steel / Heat-Resistant Alloys Medium - Roughing	DNMG 150404TK 150408TK	0.4 0.8																			● ●	● ●													● ●					D12 D13 F66 F72 F73	3
	DNMG 150604TK 150608TK	0.4 0.8																			● ●	● ●													● ●					D12 D13 F66	
Stainless Steel / Heat-Resistant Alloys Finishing - Medium	DNMG 150404MQ 150408MQ	0.4 0.8																			● ●	● ●										● ●	● ●	● ●				● ●	D12 D13 F66 F72 F73	
	DNMG 150604MQ 150608MQ	0.4 0.8																			● ●	● ●										● ●	● ●	● ●				● ●	D12 D13 F66	

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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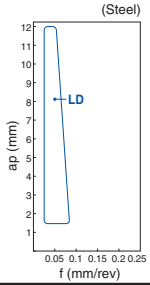

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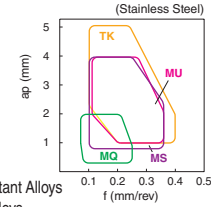

Heat-Resistant Alloys
Titanium Alloys

See Page **B8**

● : Std. Item

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

55° Rhombic / Negative with Hole

(mm)

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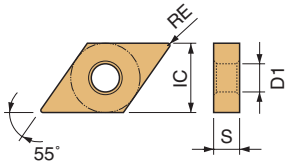
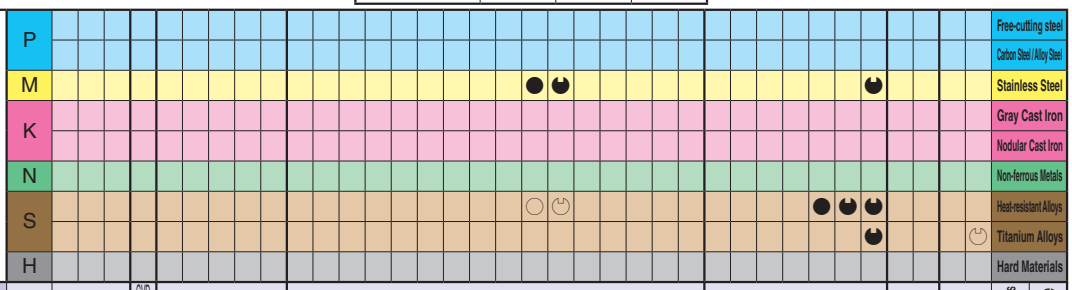
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
DN_1506_	12.70	6.35	5.16



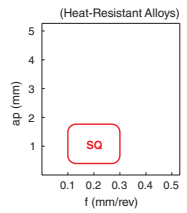


Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Heat-resistant Alloys	Finishing - Medium	DNMG 150404SQ 150408SQ 150412SQ	0.4 0.8 1.2																			●	●										●	●					D12 D13 F66 F72 F73	1
		DNMG 150604SQ 150608SQ 150612SQ	0.4 0.8 1.2																			●	●										●	●					D12 D13 F66	
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	DNMG 150404MS 150408MS 150412MS	0.4 0.8 1.2																			●	●										●	●			●	●	D12 D13 F66 F72 F73	2
		DNMG 150604MS 150608MS 150612MS	0.4 0.8 1.2																			●	●										●	●	●				D12 D13 F66	
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	DNMG 150404MU 150408MU	0.4 0.8																			●	●										●	●			●	●	D12 D13 F66 F72 F73	
		DNMG 150604MU 150608MU	0.4 0.8																			●	●										●	●			●	●	D12 D13 F66	
Heat-resistant Alloys	Roughing	DNMG 150408SG 150412SG	0.8 1.2																			●	●										●	●			●	●	D12 D13 F66 F72 F73	3
		DNMG 150608SG 150612SG	0.8 1.2																			●	●										●	●			●	●	D12 D13 F66	

Applicable Chipbreaker Range

ap indicates radius

1



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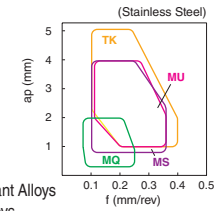
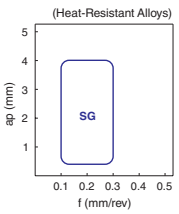


Heat-Resistant Alloys
Titanium Alloys

See Page **B8**

3



Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page B15

55° Rhombic / Negative with Hole

(mm)

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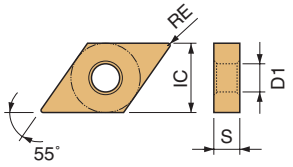

| | | |

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

55° Rhombic / Negative with Hole

(mm)

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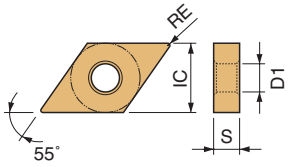


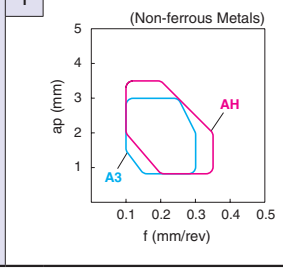
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Cast Iron	Without Chipbreaker	DNMA 150404	0.4				●					●						●						●	●	●	●	●										●		D12 D13 F66 F72 F73	-
		150408	0.8				●					●						●						●	●	●	●	●										●			
		DNMA 150604	0.4																					●	●	●													D12 D13 F66	
		150608	0.8																					●	●	●	●	●													
Non-ferrous Metals	Finishing - Medium / Sharp Edge	DNGG 150404R-A3	0.4																																	●	●	●			
		150404L-A3	0.4																																	●	●	●			
		150408R-A3	0.8																																	●	●	●		D12 D13 F66 F72 F73	1
		150408L-A3	0.8																																	●	●	●			
Non-ferrous Metals	Medium - Roughing / Sharp Edge	DNGG 150404AH	0.4																																	●	●	●			
		150408AH	0.8																																	●	●	●			
		DNGG 150604AH	0.4																																			●		D12 D13 F66	
		150608AH	0.8																																			●			
	Medium - Roughing	DNMG 150404AH	0.4																																	●	●	●		D12 D13 F66 F72 F73	
		150408AH	0.8																																	●	●	●			
Finishing	Surface-Finish Oriented / Sharp Edge	DNGG 110402R-S	0.2			●					▲																											●		D13 F71	2
		110402L-S	0.2			●					▲																											●			
		110404R-S	0.4			●					▲																											●			
		110404L-S	0.4			●					▲																											●			
		110408R-S	0.8			●					▲																															
		110408L-S	0.8			●					▲																															
Medium		DNGG 110404R	0.4			●																																	●			
		110404L	0.4			●																																	●			
		110408R	0.8			●																																				
		DNGG 150404R	0.4	●	●	●		●	●	●		●																				●						●		D12 D13 F66 F72 F73	
		150404L	0.4	●	●	●		●	●	●		●																				●						●			
		150408R	0.8	●	●	●		●	●	●																						●						●			
		150408L	0.8	●	●	●		●	●	●																						●						●			

Applicable Chipbreaker Range

ap indicates radius

1



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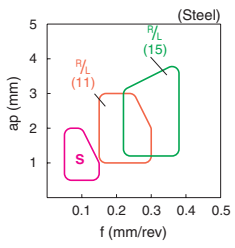


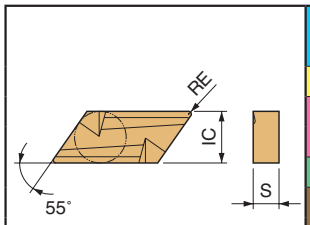
Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

55° Parallelogram / Negative without Hole

(mm)

Description	IC	S	D1
KNMX1604_	9.525	4.76	-



Insert	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing	KNMX 160405R-1	0.5																●	●																				-	1
	160405L-1	0.5																●	●																					
	160410R-1	1.0																●	●																					
	160410L-1	1.0																●	●																					

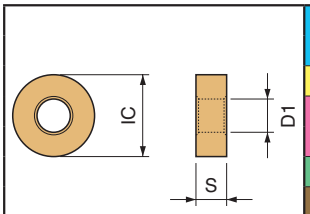
Round / Negative with Hole

(mm)

Description	IC	S	D1
RN_0903_	9.525	3.18	3.81
RN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
RN_1506_	15.875	6.35	6.35

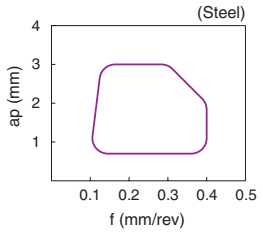


Insert	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing	RNMG 090300	-		●	●			●					●	●	●				●																			D23	
	RNMG 120400	-		●	●			●			●		●	●	●	●		●	●				●	●	●														2
	RNMG 150600	-												●	●				●					●	●	●													-	

Applicable Chipbreaker Range

ap indicates radius

1



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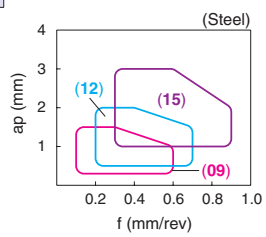


● : Std. Item

Inserts are sold in 10 piece boxes

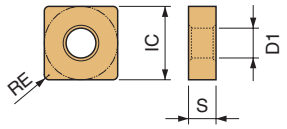
90° Square / Negative with Hole

(mm)

Description	IC	S	D1
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
SN_1506_	15.875	6.35	6.35
SN_1906_	19.05	6.35	7.94

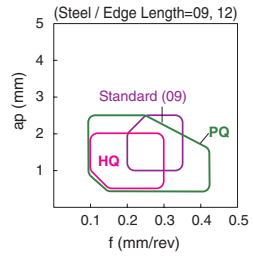


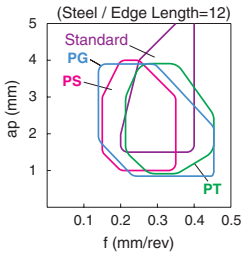
		Insert	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium			SNMG 120404PQ 120408PQ 120412PQ	0.4 0.8 1.2	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●	● ● ●			● ● ●	● ● ●	● ● ●	● ● ●	 ● ●																							
Finishing - Medium			SNMG 120404HQ 120408HQ 120412HQ	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	 ▲ 		 ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ●	● ●	● ●	● ●	● ●															●			
Medium - Roughing			SNMG 120408PG 120412PG 120416PG	0.8 1.2 1.6	● 	● ● ●		 	● ● ●	● ● ●	● ● ●			● ● 	● ● 	● ● ●	● ● ●	● ● 																			●				D14 D15 F75	
Medium - Roughing			SNMG 120408PS 120412PS 120416PS	0.8 1.2 1.6										● ● 	● ● 	● ● ●	● ● ●	● ● ●	● 	● ● ●	● ● ●	● ● ●	● 	● ● 																1
Medium - Roughing High Feed Rate			SNMG 120408PT 120412PT	0.8 1.2										● ●	● ●	● ●	● ●	● ●	● 	 ●	● ●	● ●	 	● ●																
Roughing			SNMG 090304 090308	0.4 0.8	● ●	● ●	● ●		● ●	● ●	● ●					● ●	● ●				● ●					● ●	● ●	● 	 ●											D14 D15	
			SNMG 120404 120408 120412 120416 120420	0.4 0.8 1.2 1.6 2.0	● ●	● ●	● ●	 ●	● ●	● ●	● ●	▲ 	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●	 ●											D14 D15 F75	
			SNMG 190612 190616	1.2 1.6																		● ●																	-	2

Applicable Chipbreaker Range

ap indicates radius

1





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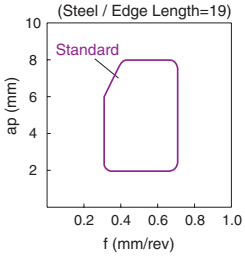


Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page B15

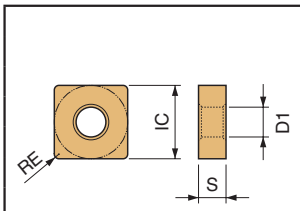
90° Square / Negative with Hole

(mm)

Description	IC	S	D1
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

(mm)

Description	IC	S	D1
SN_1506_	15.875	6.35	6.35
SN_1906_	19.05	6.35	7.94



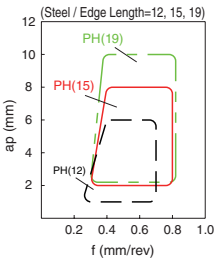
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

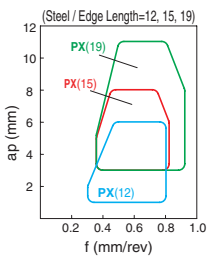
Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Roughing		SNMG 120408PH 120412PH 120416PH	0.8 1.2 1.6										● ● ●	● ● ●	● ● ●	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●			● ● ●	● ● ●	● ● ●		● ● ●											D14 D15 F75	
		SNMG 150612PH 150616PH	1.2 1.6											● ●	● ●	● ●	● ●			●				● ●	● ●	● ●		●											-	
		SNMG 190612PH 190616PH	1.2 1.6												● ●	● ●	● ●		● ●	● ●	●																				
Single-sided / Roughing / High Feed Rate		SNMM 120408PX 120412PX 120416PX	0.8 1.2 1.6											● ●	● ● ●	● ●	● ●		● ●																				D14 D15 F75	1
		SNMM 150612PX 150616PX	1.2 1.6												● ●	● ●	●																						-	
		SNMM 190612PX 190616PX 190624PX	1.2 1.6 2.4											●	● ● ●	● ● ●	● ● ●			● ●	● ●																			-	
Low Carbon Steel	Finishing	SNMG 120408XP	0.8	●	●		●	●	●	●				●	●	●			●	●																			D14 D15 F75	2
Low Carbon Steel	Medium	SNMG 120408XQ	0.8	●	●	●	●	●	●	●	▲			●	●	●			●	●																				
Low Carbon Steel	Roughing	SNMG 120408XS	0.8	●	●		●	●	●	●				●	●	●	●		●																				

Applicable Chipbreaker Range

ap indicates radius

1





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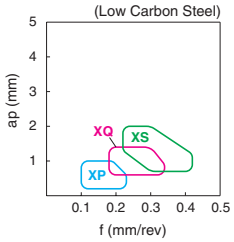


● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

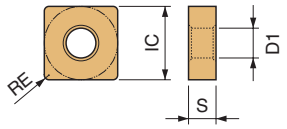
90° Square / Negative with Hole

(mm)

Description	IC	S	D1
SN_1204_	12.70	4.76	5.16
SN_1506_	15.875	6.35	6.35

(mm)

Description	IC	S	D1
SN_1906_	19.05	6.35	7.94
SNMN1204_	12.70	4.76	-

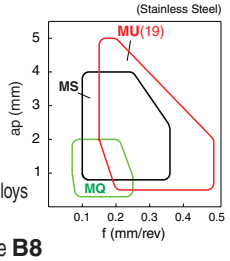


			Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide												PVD Coated Carbide						DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
	Insert	Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
P																																							
M																					●	●											●						
K																	◔						●	●	✣														
N																							◯	●	✣														
S																					◯	◔									●	●	●						
H																																	●		◔				
Free-cutting steel																																							
Carbon Steel / Alloy Steel																																							
Stainless Steel																																							
Gray Cast Iron																																							
Nodular Cast Iron																																							
Non-ferrous Metals																																							
Heat-resistant Alloys																																							
Titanium Alloys																																							
Hard Materials																																							
Stainless Steel / Heat-Resistant Alloys	Finishing - Medium	SNMG 120404MQ	0.4																			●	●											●					D14 D15 F75	
		120408MQ	0.8																			●	●											●						
	Medium - Roughing	SNMG 120404MS	0.4																			●	●											●					D14 D15 F75	1
		120408MS	0.8																			●	●											●						
		120412MS	1.2																			●	●											●						
		120416MS	1.6																			●	●											●						
	Medium - Roughing	SNMG 190612MU	1.2																															●	●	●			-	
		190616MU	1.6																															●	●	●				
Heat-resistant Alloys	Roughing	SNMG 120408SG	0.8																															●	●	●			D14 D15 F75	
		120412SG	1.2																															●	●	●				2
	Roughing	SNMG 190612SG	1.2																															●	●	●			-	
		190616SG	1.6																															●	●	●				
Cast Iron	Roughing	SNMG 120408KG	0.8																					●	●	●														
		120412KG	1.2																					●	●	●														3
Cast Iron	Roughing	SNMG 120408KH	0.8																					●	●	●														
		120412KH	1.2																					●	●	●														
		120416KH	1.6																					●	●	●														
Cast Iron	Roughing	SNMG 120408C	0.8																					●	●	●		●											D14 D15 F75	
		120412C	1.2																					●	●	●		●												
Cast Iron	Roughing	SNMG 120408ZS	0.8															●						●	●	●	●	●												4
		120412ZS	1.2																					●	●	●		●												
Cast Iron	Roughing	SNMG 120408GC	0.8																					●	●	●		●												
		120412GC	1.2															●						●	●	●		●												

Applicable Chipbreaker Range

ap indicates radius

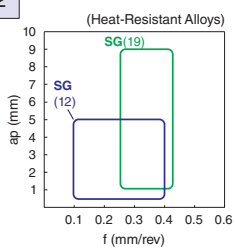
1



Heat-Resistant Alloys
Titanium Alloys

See Page B8

2



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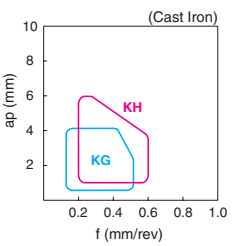

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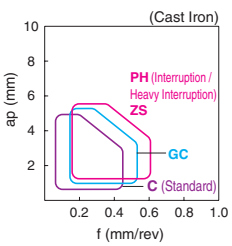


Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

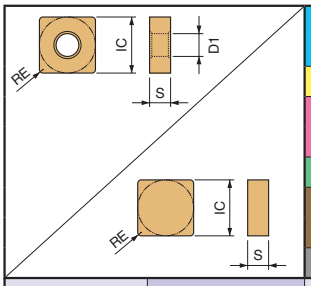
90° Square / Negative with Hole
90° Square / Negative without Hole

(mm)

Description	IC	S	D1
SN_0903_	9.525	3.18	3.81

(mm)

Description	IC	S	D1
SN_1204_	12.70	4.76	5.16
SNMN1204_	12.70	4.76	-



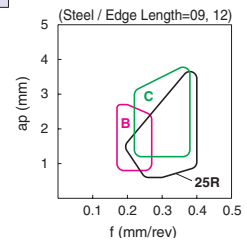
		Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		●	◕		●	◕				
M										
K					●	◕	✣		✣	
					○	◕	✣			
N									✣	
S									✣	
H										

Insert (Handed Insert shows Right-hand)	Description	RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Cast Iron	SNGA 120404	0.4									●																										●			
	SNGA 120408	0.8									●																										●			
	SNMA 120404	0.4																					●	●	●		●												D14 D15 F75	-
	SNMA 120408	0.8															●						●	●	●	●	●													
	SNMA 120412	1.2															●						●	●	●	●	●													
	SNMA 120416	1.6															●						●	●	●		●													
	SNMA 120420	2.0															●						●	●	●		●													
Without Chipbreaker																																								
Cast Iron	SNMN 120408	0.8																					●	●	●														D29 D34 D35 F81	
	SNMN 120412	1.2																					●	●	●															
Without Chipbreaker																																								
Finishing - Medium / Medium - Roughing	SNGG 090304R-B	0.4	●	●	●		●	●			●																										●		D14 D15	1
	SNGG 090304L-B	0.4	●	●	●		●	●			●																										●			
	SNGG 090308R-B	0.8	●	●	●		●	●																													●			
	SNGG 090308L-B	0.8	●	●	●		●	●																													●			
	SNGG 120404R-C	0.4	●	●	●		●	●																													●			
	SNGG 120404L-C	0.4	●	●	●		●	●																													●			
	SNGG 120408R-C	0.8	●	●	●		●	●			●																										●			
	SNGG 120408L-C	0.8	●	●	●		●	●			●																										●			
	SNMG 120404R-C	0.4	●	●	●		●	●																															D14 D15 F75	
	SNMG 120404L-C	0.4	●	●	●		●	●																																
	SNMG 120408R-C	0.8	●	●	●		●	●																																
	SNMG 120408L-C	0.8	●	●	●		●	●																																
-B : Finishing - Medium -C : Medium-Roughing																																								
Medium - Roughing	SNGG 120404R-25R	0.4	●	●	●		●	●																																
	SNGG 120404L-25R	0.4	●	●	●		●	●																																
	SNGG 120408R-25R	0.8	●	●	●		●	●																																
	SNGG 120408L-25R	0.8	●	●	●		●	●																																
Low cutting force																																								

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item

Inserts are sold in 10 piece boxes

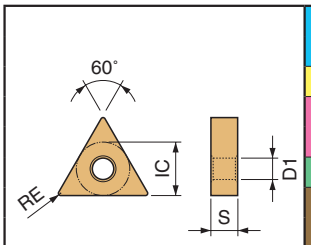
60° Triangle / Negative with Hole

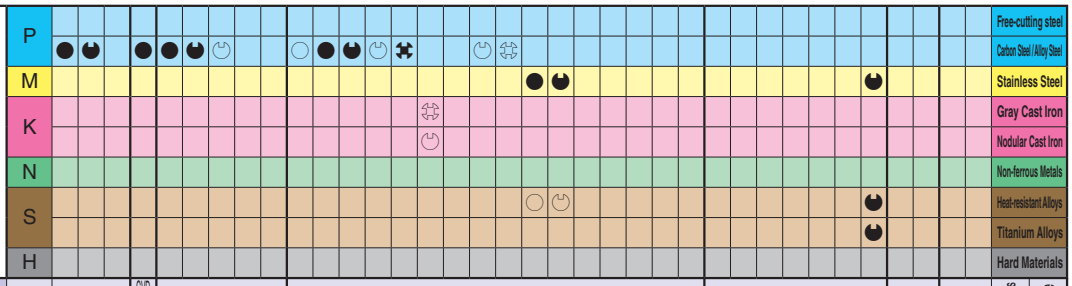
(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



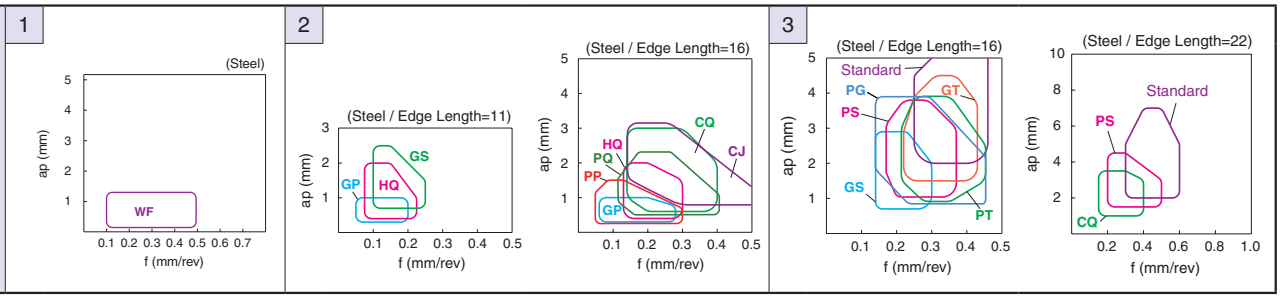


Insert	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge (Finishing)	TNMX 160404WF	0.4	●	●			●	●				●	●	●	●	●																					D16 D17 F76	1
	160408WF	0.8	●	●			●	●				●	●	●	●	●																						
	160412WF	1.2	●	●			●	●				●	●	●	●	●																						
Finishing	TNMG 160402PP	0.2	●	●		●	●	●	●			●	●	●	●	●			●																	D16 D17 D18 F66 F76 F77	
	160404PP	0.4	●	●		●	●	●	●			●	●	●	●	●			●																		
	160408PP	0.8	●	●		●	●	●	●			●	●	●	●	●																					
	160412PP	1.2	●	●		●	●	●	●					●	●	●																					
Finishing	TNMG 110404GP	0.4		●	●			●	●																											D17 F77	
	110408GP	0.8		●	●			●	●																												
	TNMG 160402GP	0.2	●	●	●		●	●	●	▲		●	●	●	●	●	●	●	●																	D16 D17 D18 F66 F76 F77	
	160404GP	0.4	●	●	●		●	●	●	▲		●	●	●	●	●	●	●	●																		
	160408GP	0.8	●	●	●		●	●	●	▲		●	●	●	●	●		●	●																		
Finishing - Medium	TNMG 160404PQ	0.4	●	●		●	●	●	●			●	●	●	●	●			●																		2
	160408PQ	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●																		
	160412PQ	1.2	●	●		●	●	●	●					●	●	●			●																		
Finishing - Medium	TNMG 110404HQ	0.4		●	●	●		●	●	▲			●	●	●				●																	D17 F77	
	110408HQ	0.8		●	●	●		●	●	▲		●	●	●	●	●		●	●																		
	TNMG 160404HQ	0.4	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●	●	●												●		D16 D17 D18 F66 F76 F77	
	160408HQ	0.8	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●	●	●												●			
	160412HQ	1.2		●	●	●		●	●			●	●	●	●	●		●	●																		
Finishing - Medium / Up Facing	TNMG 160404CQ	0.4	●	●	●		●	●	●	▲		●	●	●	●	●		●	●	●																	
	160408CQ	0.8	●	●	●		●	●	●	▲		●	●	●	●	●	●	●	●	●																	
	160412CQ	1.2		●	●			●	●	▲		●	●	●	●	●		●	●	●																	
	TNMG 220408CQ	0.8										●	●	●	●	●		●	●																		
	220412CQ	1.2												●	●	●			●																		
Medium - Roughing	TNMG 110404GS	0.4		●	●			●	●						●	●			●																	D17 F77	
	110408GS	0.8													●	●			●																		
	TNMG 160404GS	0.4		●				●	●	▲		●	●	●	●	●		●	●																		3
	160408GS	0.8		●				●	●	▲		●	●	●	●	●		●	●																	D16 D17 D18 F66 F76 F77	
Medium - Roughing	TNMG 160404PG	0.4	●	●			●	●	●			●	●	●	●	●																		●			
	160408PG	0.8	●	●			●	●	●			●	●	●	●	●																		●			
	160412PG	1.2		●				●	●			●	●	●	●	●																		●			

See "Precautions when Using Wiper Inserts" in the **R34** and **R35** for WF chipbreaker.

Applicable Chipbreaker Range

ap indicates radius



Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page **B15**

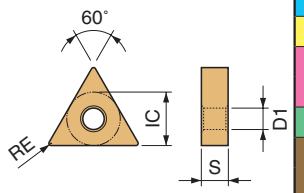
60° Triangle / Negative with Hole

(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

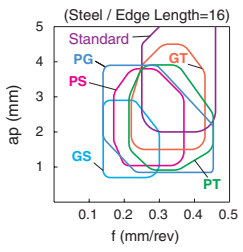


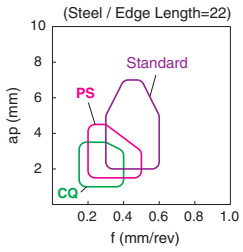
Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing		TNMG 160404PS 160408PS 160412PS	0.4 0.8 1.2		●				●	●			●	●	●	●	●	●	●	●	●	●															D16 D17 D18 F66 F76 F77	
		TNMG 220404PS 220408PS 220412PS 220416PS	0.4 0.8 1.2 1.6										●	●	●	●	●		●	●	●	●	●															D16 D17 F76	
Medium - Roughing / High Feed Rate		TNMG 160408PT 160412PT	0.8 1.2										●	●	●	●	●	●	●	●	●		●																
Medium - Roughing / High Feed Rate		TNMG 160408GT 160412GT	0.8 1.2								▲		●	●	●	●	●		●	●																		D16 D17 D18 F66 F76 F77	1
Roughing		TNMG 160404 160408 160412 160416 160420	0.4 0.8 1.2 1.6 2.0	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●		●	●	●	●	●	●							●					
		TNMG 220404 220408 220412	0.4 0.8 1.2		●	●			●				●	●	●	●	●	●	●	●			●	●	●	●	●	●											D17 F76	
Roughing		TNMG 160408PH 160412PH	0.8 1.2										●	●	●	●	●			●			●	●	●	●	●											D16 D17 D18 F66 F76 F77	2
		TNMG 220408PH 220412PH 220416PH	0.8 1.2 1.6										●	●	●	●	●			●	●																	D17 F76	

Applicable Chipbreaker Range

ap indicates radius

1





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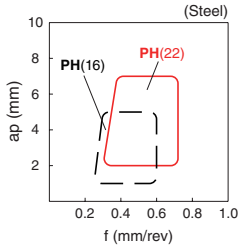

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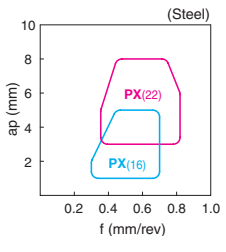


● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

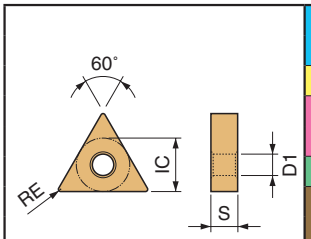
60° Triangle / Negative with Hole

(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



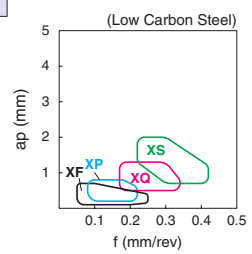
					Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet				CVD Coated Carbide															PVD Coated Carbide						DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
	Insert Handed Insert shows Right-hand		Description		RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Single-sided / Roughing / High Feed Rate			TNMM 160408PX 160412PX		0.8 1.2											●	●	●			●																		D16 D17 D18 F66 F76 F77	B37
			TNMM 220408PX 220412PX 220416PX		0.8 1.2 1.6											●	●	●			●																		D17 F76	3
Low Carbon Steel		Finishing / Small ap	TNMG 160404XF 160408XF		0.4 0.8	●	●		●	●	●	●																											
Low Carbon Steel		Finishing	TNMG 160404XP 160408XP		0.4 0.8	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●																		D16 D17 D18 F66 F76 F77	1
Low Carbon Steel		Medium	TNMG 160404XQ 160408XQ		0.4 0.8	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●																			
Low Carbon Steel		Roughing	TNMG 160408XS		0.8		●	●			●	●	▲			●	●	●	●		●	●																			
Finishing - Medium		Sharp Edge / Polished	TNGG 160401MFP-SK 160402MFP-SK 160404MFP-SK		<0.1 <0.2 <0.4							●																			●	●		●		●				D16 D17 D18 E49 F66 F76 F77	2
Finishing - Medium			TNGG 160402M-SK 160404M-SK		<0.2 <0.4						●	●																											
Large D.O.C.			TNMG 160402R-LD 160404R-LD		0.2 0.4																										●	●				●					3

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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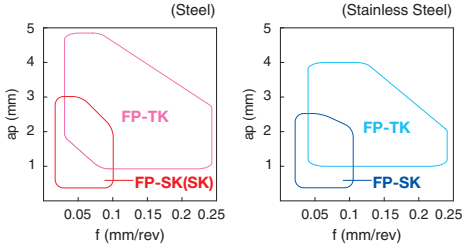

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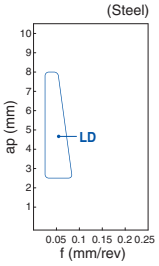


Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page **B15**

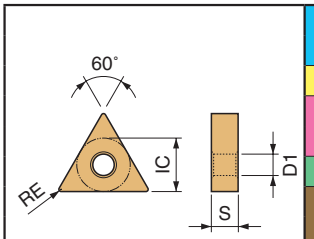
60° Triangle / Negative with Hole

(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

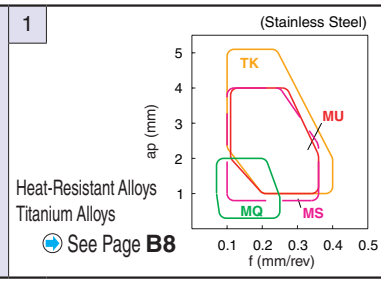


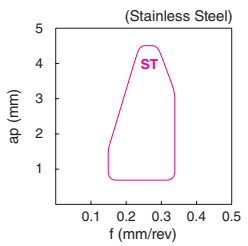
			Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide												PVD Coated Carbide						DLC		Carbide			
Insert Handed Insert shows Right-hand		Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing	Sharp Edge / Polished	TNGG 160404FP-TK 160408FP-TK	0.4 0.8																										● ●		● ●			● ●					D16 D17 D18 E49 F66 F76 F77	
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing / Sharp Edge	TNGG 160404TK 160408TK	0.4 0.8																																			● ●		
	Medium - Roughing	TNMG 160404TK 160408TK	0.4 0.8																			● ●	● ●												● ●					
	Finishing - Medium	TNMG 160404MQ 160408MQ	0.4 0.8																			● ●	● ●										● ●	● ●	● ●			● ●			1
	Medium - Roughing	TNMG 160404MS 160408MS 160412MS	0.4 0.8 1.2																			● ● ●	● ● ●										● ● ●	● ● ●	● ● ●			● ● ●		D16 D17 D18 F66 F76 F77	
	Medium - Roughing	TNMG 160404MU 160408MU	0.4 0.8																			● ●	● ●										● ●	● ●	● ●			● ●			
Stainless Steel	Medium - Roughing	TNMG 160404R-ST 160404L-ST 160408R-ST 160408L-ST	0.4 0.4 0.8 0.8	● ●	● ●	● ●		● ●	● ●				● ●	● ●	● ●	● ●	● ●		● ●	● ●		● ● ● ●	● ● ● ●												● ● ● ●					
Heat-resistant Alloys	Roughing	TNMG 160408SG 160412SG	0.8 1.2																														● ●	● ●	● ●			● ●			2
		TNMG 220408SG 220412SG	0.8 1.2																														● ●	● ●	● ●			● ●		D17 F76	

Applicable Chipbreaker Range

ap indicates radius

1





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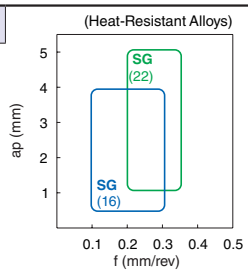


Heat-Resistant Alloys
Titanium Alloys
See Page **B8**

● : Std. Item

Inserts are sold in 10 piece boxes

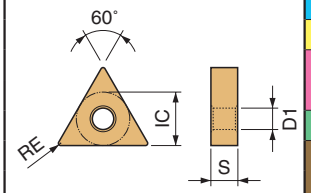
60° Triangle / Negative with Hole

(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



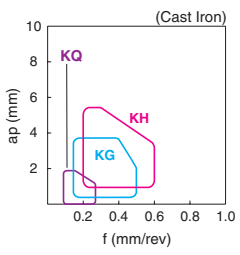
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Cast Iron	Sharp Cutting Oriented	TNMG 160404KQ	0.4																					●	●	●															
		160408KQ	0.8																					●	●	●															
Cast Iron	Roughing	TNMG 160404KG	0.4																					●	●	●															
		160408KG	0.8																					●	●	●															1
		160412KG	1.2																					●	●	●															
Cast Iron	Roughing	TNMG 160408KH	0.8																					●	●	●															
		160412KH	1.2																					●	●	●															
		160416KH	1.6																					●	●	●															D16 D17 D18
Cast Iron	Roughing	TNMG 160404C	0.4																					●	●	●	●	●													
		160408C	0.8															●						●	●	●	●	●													
		160412C	1.2																					●	●	●		●													F66 F76 F77
Cast Iron	Roughing	TNMG 160408ZS	0.8															●						●	●	●	●	●													
		160412ZS	1.2																					●	●	●		●													
Cast Iron	Roughing	TNMG 160408GC	0.8																					●	●	●	●	●													
		160412GC	1.2															●						●	●	●		●													2
Cast Iron	Without Chipbreaker	TNGA 110304	0.4																																		●		D17	
		TNGA 160404	0.4									●																									●			
		160408	0.8									●																									●		D16 D17 D18 F66 F76 F77	
Cast Iron	Without Chipbreaker	TNMA 160404	0.4		●	●	●		●			●												●	●	●	●	●													
		160408	0.8		●	●	●		●			●						●						●	●	●	●	●													
		160412	1.2																					●	●	●	●	●													
		160416	1.6																					●	●	●		●													
		160420	2.0																					●	●	●		●													

Applicable Chipbreaker Range

ap indicates radius

1



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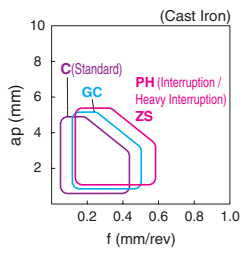


Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

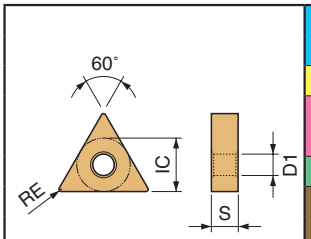
60° Triangle / Negative with Hole

(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

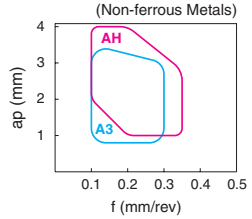


			Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide															PVD Coated Carbide							DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
Insert Handed Insert shows Right-hand		Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Non-ferrous Metals	 Finishing - Medium / Sharp Edge	TNGG 160404R-A3	0.4																															●	●	●		D16 D17 D18 F66 F76 F77	1
		160404L-A3	0.4																															●	●	●			
		160408R-A3	0.8																															●	●	●			
		160408L-A3	0.8																															●	●	●			
Non-ferrous Metals	 Medium - Roughing / Sharp Edge	TNGG 160404AH	0.4																															●	●	●			
		160408AH	0.8																															●	●	●			
Non-ferrous Metals	 Medium - Roughing	TNMG 160404AH	0.4																															●	●	●			
		160408AH	0.8																															●	●	●			

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

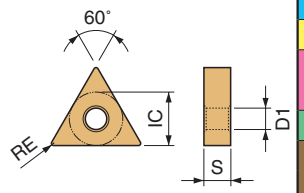
60° Triangle / Negative with Hole

(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



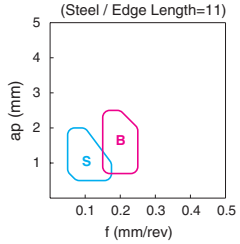
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

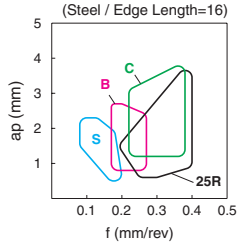
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing — Super Fine — Sharp Edge / Precision	TNEG 160402R-SSF	0.2	●	●	●		●	●	●																					●										D16	
	160402L-SSF	0.2	●	●	●		●	●	●																					●										D17	
	160404R-SSF	0.4	●	●	●		●	●	●																					●										D18	
	160404L-SSF	0.4	●	●	●		●	●	●																					●										F66	
																																								F76	
																																								F77	
Finishing — Sharp Edge / Precision	TNGG 110402R-S	0.2			●																																●			
	110402L-S	0.2			●																																●			
	110404R-S	0.4			●																																		D17	
	110404L-S	0.4			●																																		F77	
	110408R-S	0.8			●																																			
	110408L-S	0.8			●																																			
	TNGG 160401R-S	0.1		●				●	●																														D16	
	160401L-S	0.1		●				●	●																															
	160402R-S	0.2	●	●	●		●	●	●	▲	●																		●	●					●				D17	1
	160402L-S	0.2	●	●	●		●	●	●	▲	●																		●	●					●				D18	
	160404R-S	0.4	●	●	●		●	●	●	▲	●																		●	●					●				F66	
	160404L-S	0.4	●	●	●		●	●	●	▲	●																		●	●					●				F76	
	160408R-S	0.8	●	●	●		●	●	●																				●	●					●				F77	
	160408L-S	0.8	●	●	●		●	●	●																				●	●					●					
Finishing - Medium	TNGG 110302R-B	0.2	●	●	●		●	●																													●		D17	
	110302L-B	0.2	●	●	●		●	●																													●			
	110304R-B	0.4	●	●	●		●	●																													●			
	110304L-B	0.4	●	●	●		●	●																													●			
	TNGG 160304R-B	0.4			●																																		-	
	160304L-B	0.4			●																																			
	TNGG 160402R-B	0.2	●	●	●		●	●	●																						●						●		D16	
	160402L-B	0.2	●	●	●		●	●	●																						●						●		D17	
	160404R-B	0.4	●	●	●		●	●	●		●																				●								D18	
	160404L-B	0.4	●	●	●		●	●	●		●																				●								F66	
	160408R-B	0.8	●	●	●		●	●	●																														F76	
	160408L-B	0.8	●	●	●		●	●	●																														F77	

Applicable Chipbreaker Range

ap indicates radius

1





Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page **B15**

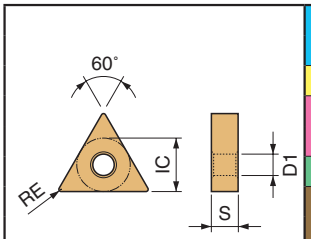
60° Triangle / Negative with Hole

(mm)

Description	IC	S	D1
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	IC	S	D1
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16



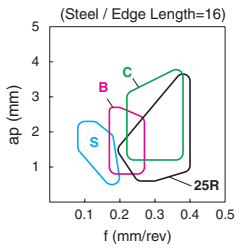
P	● ◕	Free-cutting steel
		Carbon Steel / Alloy Steel
M		Stainless Steel
K	● ○	Gray Cast Iron
		Nodular Cast Iron
N		Non-ferrous Metals
S		Heat-resistant Alloys
		Titanium Alloys
H		Hard Materials

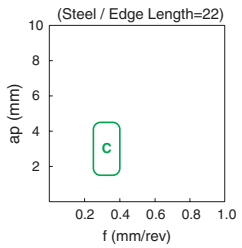
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium - Roughing	TNGG 160402R-C	0.2		●				●	●																														D16	1
	160402L-C	0.2		●				●	●																														D16	
	160404R-C	0.4	●	●	●		●	●	●	▲	●																		●								●		D17	
	160404L-C	0.4	●	●	●		●	●	●		●																		●								●		D18	
	160408R-C	0.8	●	●	●		●	●	●		●																		●								●		F66	
	160408L-C	0.8	●	●	●		●	●	●		●																		●								●		F76	
	160412R-C	1.2	●	●	●		●	●	●		●																												F77	
	160412L-C	1.2	●	●	●		●	●	●		●																													
	TNGG 220404R-C	0.4		●	●			●																															D17	
	220404L-C	0.4		●	●			●																																
	220408R-C	0.8		●	●			●																															F76	
	220408L-C	0.8		●	●			●																																
	TNGG 110402R	0.2			●																																		D17	
	110402L	0.2			●																																		F77	
	110404R	0.4			●																																			
	110404L	0.4			●																																			
	110408R	0.8			●																																			
	TNMG 160404R-C	0.4	●	●	●		●	●	●																														D16	
	160404L-C	0.4	●	●	●		●	●	●																														D17	
	160408R-C	0.8	●	●	●		●	●	●																														D18	
	160408L-C	0.8	●	●	●		●	●	●																														F66	
	160412R-C	1.2			●																																		F76	
																																							F77	
Medium - Roughing (Low cutting force)	TNGG 160404R-25R	0.4	●	●	●		●	●	●																				●					●			●		
	160404L-25R	0.4	●	●	●		●	●	●																				●					●			●		
	160408R-25R	0.8	●	●	●		●	●	●																				●					●			●		
	160408L-25R	0.8	●	●	●		●	●	●																				●					●			●		

Applicable Chipbreaker Range

ap indicates radius

1





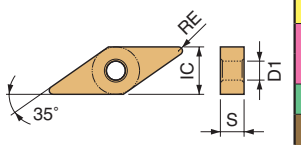
● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

35° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
VN_1604_	9.525	4.76	3.81



		Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		●	●		●	●	●	○	●	●
M				●						○
K					●	○	●	●	●	●
N								○		
S				●					●	●
H										

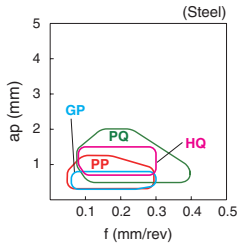
Insert	Description	Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet				CVD Coated Carbide														PVD Coated Carbide							DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
Handed Insert shows Right-hand		RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Finishing		VNMG 160402PP	0.2	●	●		●	●	●	●		●	●	●	●	●			●																		
		160404PP	0.4	●	●		●	●	●	●		●	●	●	●	●			●																		
		160408PP	0.8	●	●		●	●	●	●		●	●	●	●	●		●																		
		160412PP	1.2	●	●		●	●	●	●				●	●																					
Finishing		VNMG 160402GP	0.2	●	●	●		●	●	●	▲			●	●	●		●	●																	
		160404GP	0.4	●	●	●		●	●	●	▲		●	●	●	●		●	●																	
		160408GP	0.8	●	●	●		●	●	●	▲		●	●	●	●		●	●																	
Finishing - Medium		VNMG 160404R-VC	0.4	●	●		●	●	●	●			●	●	●	●	●																			
		160404L-VC	0.4	●	●		●	●	●	●			●	●	●	●	●																			
		160408R-VC	0.8	●	●		●	●	●	●			●	●	●	●	●																			
		160408L-VC	0.8	●	●		●	●	●	●			●	●	●	●	●																			
		160412R-VC	1.2	●	●		●	●	●	●			●	●	●	●	●																			
		160412L-VC	1.2	●	●		●	●	●	●			●	●	●	●	●																			
Finishing - Medium		VNMG 160404VF	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●																1
		160408VF	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●																
		160412VF	1.2		●				●	●				●	●	●	●		●	●																
Finishing - Medium		VNMG 160404PQ	0.4	●	●		●	●	●	●			●	●	●	●	●			●																D19 D20 D21 D22
		160408PQ	0.8	●	●		●	●	●	●			●	●	●	●	●			●																
		160412PQ	1.2	●	●		●	●	●	●			●	●	●	●	●			●																
Finishing - Medium		VNMG 160404HQ	0.4	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●															
		160408HQ	0.8	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●															
		160412HQ	1.2		●	●	●		●	●	▲		●	●	●	●	●	●	●	●	●															
Medium		VNMG 160404TN-V	0.4			●																														
		160408TN-V	0.8			●																														
		160412TN-V	1.2			●																														
Roughing		VNMG 160404	0.4	●	●	●		●	●	●	▲		●	●	●	●	●		●	●	●	●	●	●	●	●	●									
		160408	0.8	●	●	●	●	●	●	●	▲	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●									
Finishing - Medium	Sharp Edge / Polished	VNGG 160402MFP-SK	<0.2							●																		●	●		●		●				
		160404MFP-SK	<0.4							●																		●	●		●		●				2
Finishing - Medium		VNGG 160402M-SK	<0.2	●	●			●	●	●																										
		160404M-SK	<0.4	●	●			●	●	●																										

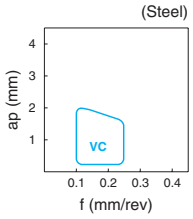
· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

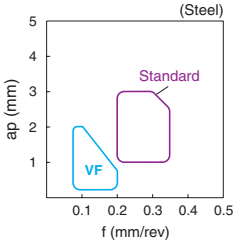
Applicable Chipbreaker Range

ap indicates radius

1







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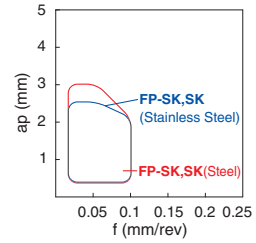


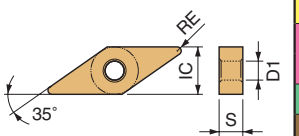
Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

35° Rhombic / Negative with Hole

(mm)

Description	IC	S	D1
VN_1604_	9.525	4.76	3.81



| | | |

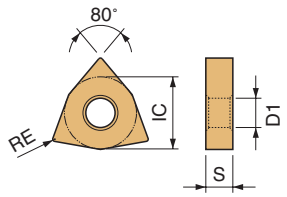
80° Trigon / Negative with Hole

(mm)

Description	IC	S	D1
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	IC	S	D1
WN_0804_	12.70	4.76	5.16



P: Free-cutting steel / Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron / Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys / Titanium Alloys
H: Hard Materials

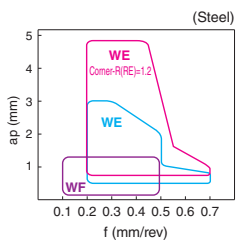
Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	Finishing	WNMG 080404WF	0.4	●	●			●	●				●	●	●	●	●																							1
		WNMG 080408WF	0.8	●	●			●	●				●	●	●	●	●																							
With Wiper Edge	Finishing	WNMG 080404WP	0.4	●	●			●	●				●	●	●	●		●	●	●																			2
		WNMG 080408WP	0.8	●	●			●	●				●	●	●	●	●	●	●	●																			
With Wiper Edge	Finishing - Medium	WNMG 080404WE	0.4	●	●			●	●				●	●	●	●	●																						D24 D25 F79 F80	1
		WNMG 080408WE	0.8	●	●			●	●				●	●	●	●	●																							
		WNMG 080412WE	1.2	●	●			●	●				●	●	●	●	●																							
With Wiper Edge	Finishing - Medium	WNMG 080404WQ	0.4	●	●			●	●		▲			●	●	●	●		●	●																			2
		WNMG 080408WQ	0.8	●	●			●	●				●	●	●	●	●	●	●	●																			
		WNMG 080412WQ	1.2		●				●				●	●	●	●	●	●	●	●																			
Finishing		WNMG 080402PP	0.2	●	●		●	●	●	●			●	●	●	●	●																						
		WNMG 080404PP	0.4	●	●		●	●	●	●			●	●	●	●	●																						
		WNMG 080408PP	0.8	●	●		●	●	●	●			●	●	●	●	●																						
		WNMG 080412PP	1.2	●	●		●	●	●	●				●	●	●	●																						
Finishing		WNMG 060404GP	0.4		●	●			●	●	▲																											D25 F78	
		WNMG 060408GP	0.8		●	●			●	●	▲																											
		WNMG 080404GP	0.4	●	●	●		●	●	●																											D24 D25 F79 F80	
		WNMG 080408GP	0.8	●	●	●		●	●	●	▲																											
Finishing - Medium		WNMG 080404PQ	0.4	●	●		●	●	●	●			●	●	●	●	●			●																			3
		WNMG 080408PQ	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●																			
		WNMG 080412PQ	1.2										●	●	●	●	●			●																			
Finishing - Medium		WNMG 06T304HQ	0.4		●	●			●	●					●	●	●			●																		-	
		WNMG 06T308HQ	0.8		●	●			●	●					●	●				●																			
		WNMG 060404HQ	0.4		●	●	●		●	●	▲		●	●	●	●	●		●	●																		D25 F78	
		WNMG 060408HQ	0.8		●	●	●		●	●	▲		●	●	●	●	●		●	●																			
		WNMG 080404HQ	0.4	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●	●	●													●			D24 D25 F79 F80	
		WNMG 080408HQ	0.8	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●	●	●													●			
		WNMG 080412HQ	1.2	●	●	●	●	●	●	●			●	●	●	●	●		●	●																			

See "Precautions when Using Wiper Inserts" in the **R34** and **R35** for WF/WE chipbreakers.

Applicable Chipbreaker Range

ap indicates radius

1



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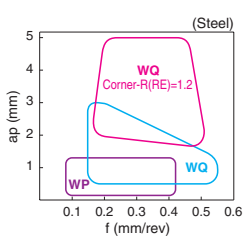

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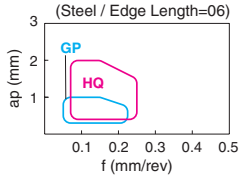
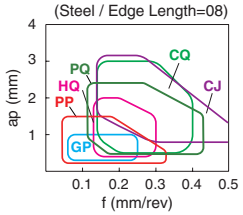




Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page **B15**

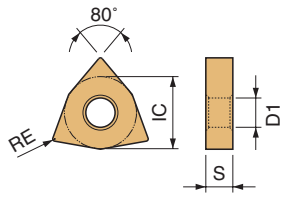
80° Trigon / Negative with Hole

(mm)

Description	IC	S	D1
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	IC	S	D1
WN_0804_	12.70	4.76	5.16



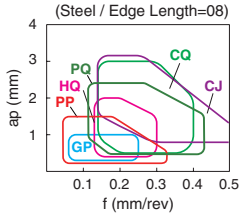
P: Free-cutting steel, Carbon Steel / Alloy Steel
M: Stainless Steel
K: Gray Cast Iron, Nodular Cast Iron
N: Non-ferrous Metals
S: Heat-resistant Alloys, Titanium Alloys
H: Hard Materials

Insert	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium / Up Facing	WNMG 080404CQ 080408CQ 080412CQ	0.4 0.8 1.2	● ● ●	● ● ●	 ● ●	 	● ● ●	● ● ●	● ● ●	 ▲ 	 	● ● ●	● ● ●	● ● ●	● ● ●	 ● ●	 ● 	● ● ●	● ● ●	 ● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	D24 D25 F79 F80	1
Finishing - Medium / Up Facing	WNMG 080408CJ 080412CJ	0.8 1.2	 	 	 	 	 	 	 	 	 	 ●	● ●	● ●	● ●	● 	 	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	
Medium - Roughing	WNMG 060404GS 060408GS	0.4 0.8	 	● ●	● ●	 	 	● ●	● ●	 	 	 ●	● ●	● ●	● ●	● ●	 	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	D25 F78	
Medium - Roughing	WNMG 080404GS 080408GS 080412GS	0.4 0.8 1.2	 ●	● ●	 	 	 	● ●	● ●	 	 	 ●	● ●	● ●	● ●	 ●	 	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	
Medium - Roughing	WNMG 080404PG 080408PG 080412PG 080416PG	0.4 0.8 1.2 1.6	● ●	● ●	 	 	● ●	● ●	● ●	 	 	● ●	● ●	● ●	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	● ●	 	 	 	 	
Medium - Roughing	WNMG 080404PS 080408PS 080412PS 080416PS	0.4 0.8 1.2 1.6	 ●	● ●	 	 	 	● ●	● ●	 	 	● ●	● ●	● ●	● ●	● ●	● 	● ●	● ●	● ●	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	D24 D25 F79 F80	2
Medium - Roughing / High Feed Rate	WNMG 080408PT 080412PT	0.8 1.2	 	 	 	 	 	 	 	 	 	● ●	● ●	● ●	● ●	● ●	● 	● ●	● ●	● ●	● ●	● 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	
Medium - Roughing / High Feed Rate	WNMG 080408GT 080412GT	0.8 1.2	 	 	 	 	 	 	 	▲ 	 	● ●	● ●	● ●	● ●	● ●	 	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	
Roughing	WNMG 080404 080408 080412	0.4 0.8 1.2	● ●	● ●	● ●	 ●	● ●	● ●	● ●	 	 ●	 ●	● ●	● ●	● ●	 ●	 	● ●	● ●	 ●	 ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	 	 	 	 	 	 	● ●	 	 	 	 	

Applicable Chipbreaker Range

ap indicates radius

1



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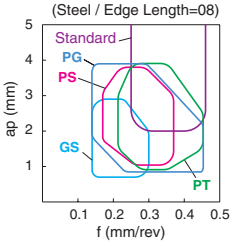

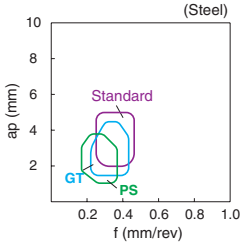

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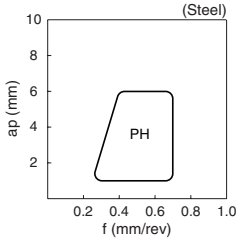


● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

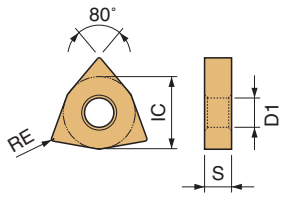
80° Trigon / Negative with Hole

(mm)

Description	IC	S	D1
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	IC	S	D1
WN_0804_	12.70	4.76	5.16



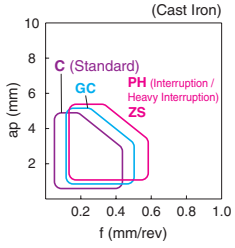
	Insert	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Roughing		WNMG 080408PH 080412PH	0.8 1.2										● ●	● ●	● ●	● ●	● ●							● ●	● ●	● ●	● ●	● ●													B47 3 1
Low Carbon Steel	Finishing	WNMG 080404XP 080408XP	0.4 0.8	● ●	● ●	● 	● ●	● ●	● ●	● ●	 ▲		● ●	● ●	● ●	● ●	 	 	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 		
Low Carbon Steel	Medium	WNMG 080404XQ 080408XQ	0.4 0.8	● ●	● ●	 ●	● ●	● ●	● ●	● ●	 	 	 ●	 ●	● ●	● ●	● ●	 	● ●	● ●	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 		2
Low Carbon Steel	Roughing	WNMG 080408XS	0.8		●				●	●	▲			●	●	●	●		●	●																					
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing / Sharp Edge	WNGG 080404TK 080408TK	0.4 0.8																																		● ●		D24 D25 F79 F80	
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	WNMG 080404TK 080408TK	0.4 0.8																			● ●	● ●											● ●						
Stainless Steel / Heat-Resistant Alloys	Finishing - Medium	WNMG 080404MQ 080408MQ	0.4 0.8																			● ●	● ●										● ●	● ●	● ●			● ●		3
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	WNMG 080404MS 080408MS 080412MS	0.4 0.8 1.2																			● ● ●	● ● ●										● ● ●	● ● ●	● ● ●			● ● ●		
Stainless Steel / Heat-Resistant Alloys	Medium - Roughing	WNMG 080404MU 080408MU	0.4 0.8																			● ●	● ●										● ●	● ●	● ●			● ●		
Heat-resistant Alloys	Roughing	WNMG 080408SG 080412SG	0.8 1.2																														● ●	● ●	● ●			● ●		4

Free-cutting steel
Carbon Steel / Alloy Steel
Stainless Steel
Gray Cast Iron
Nodular Cast Iron
Non-ferrous Metals
Heat-resistant Alloys
Titanium Alloys
Hard Materials

Applicable Chipbreaker Range

ap indicates radius

1



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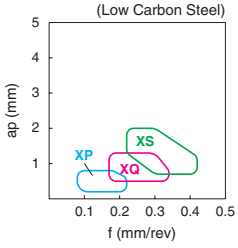

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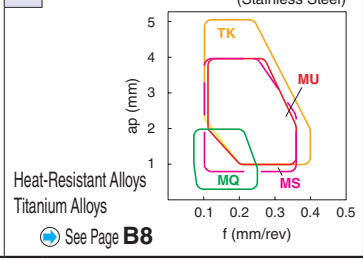
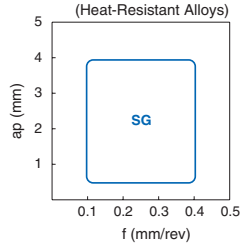


Heat-Resistant Alloys
Titanium Alloys
See Page B8

4



Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page B15

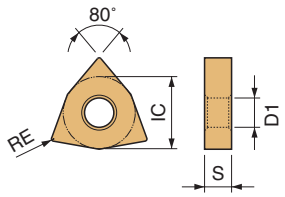
80° Trigon / Negative with Hole

(mm)

Description	IC	S	D1
WN_06T3_	9.525	3.97	3.81
WN_0604_	9.525	4.76	3.81

(mm)

Description	IC	S	D1
WN_0804_	12.70	4.76	5.16

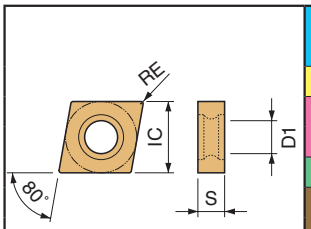


| | | |

Small Double Sided Tools / 80° Rhombic

(mm)

Description	IC	S	D1
CN_U0703_	7.5	3.18	3.6



	Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PV720	PV730	PV90	PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	PDL025	Carbide KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium	 Sharp Edge / Polished	CNGU 070301MFP-SK	<0.1																											●		●			●						E46	B52 1
		070302MFP-SK	<0.2																											●		●			●							
Medium - Roughing	 With Honing	CNMU 070302E-GK	0.2																											●		●			●							
		070304E-GK	0.4																											●		●			●							
Finishing	 Sharp Edge	CNGU 0703005MFR-F	<0.05																										●			●									
		070301MFR-F	<0.1																										●	●		●			●							
		070302MFR-F	<0.2																										●	●		●			●							
		070304MFR-F	<0.4																										●	●					●							
Low Feed	 Sharp Edge	CNGU 0703005MFR-U	<0.05																										●			●									
		070301MFR-U	<0.1																										●	●		●			●							
		070302MFR-U	<0.2																										●	●		●			●							
		070304MFR-U	<0.4																										●	●		●			●							

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Small Double Sided Tools Identification System

CNGU070301M F P - SK

- Minus tolerance on Corner-R(RE)
- Sharp edge
- Polished
- Chipbreakers

CNGU070301M F R - U

- Minus tolerance on Corner-R(RE)
- Sharp edge
- Insert Hand
- Chipbreakers

DNGU080301M E R - U

- Minus tolerance on Corner-R(RE)
- With Honing
- Insert Hand
- Chipbreakers

When a minus tolerance is specified for the corner-R(RE)

If a minus tolerance is specified for the corner-R(RE) as shown in the Fig. 1, using an insert with corner-R(RE)=0.2 mm may result in larger radius than specified.
Use an insert the corner of which R(RE) has a minus tolerance.

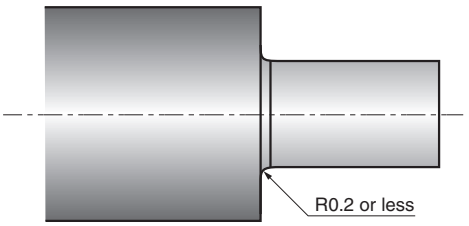


Fig. 1 Example of a specified corner-R in the drawing

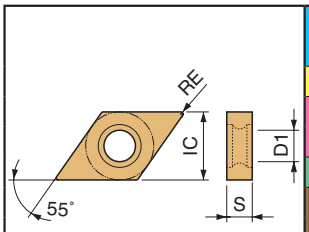
Inserts are sold in 10 piece boxes

● : Std. Item

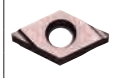
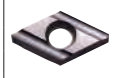
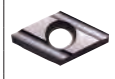
Small Double Sided Tools / 55° Rhombic

(mm)

Description	IC	S	D1
DN_U0803_	7.0	3.18	3.6

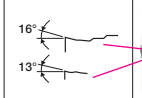
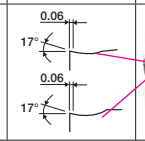
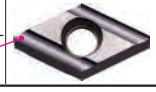


P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium	 Sharp Edge / Polished	**DNGU** 080301MFP-SK 080302MFP-SK 080304MFP-SK	<0.1 <0.2 <0.4																										● ● ●		● ● ●			● ● ●						
Medium - Roughing	 With Honing	**DNMU** 080302E-GK 080304E-GK	0.2 0.4																										● ●		● ●			● ●						
Finishing	 Sharp Edge	**DNGU** 080301MFR-F 080302MFR-F 080304MFR-F	<0.1 <0.2 <0.4																										● ● ●		● ● ●			● ● ●					E46	B52 2
Low Feed	 Sharp Edge	**DNGU** 080301MFR-U 080302MFR-U 080304MFR-U	<0.1 <0.2 <0.4																										● ● ●		● ● ●			● ● ●						
Low Feed	 With Honing	**DNGU** 080301MER-U 080302MER-U 080304MER-U	<0.1 <0.2 <0.4																										● ● ●		● ● ●									

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Chipbreaker Selection (Negative Inserts)

Cutting Range	Name	Cross-section		Advantages
Finishing - Medium	SK			A low cutting force chipbreaker designed for chip control in steel and stainless steel. Cutting performance is similar to comparable sized positive inserts.
Medium - Roughing	GK			Good chip evacuation at wide range by breaker dot and wide chip pocket.
Finishing	F			Good chip control at finishing with low cutting force.
Low Feed	U			Good chip control at low feed rate and varied ap with low cutting force.

● : Std. Item

Inserts are sold in 10 piece boxes

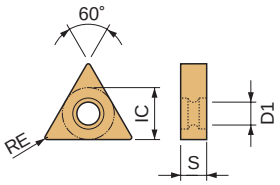
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

Small Double Sided Tools / 60° Triangle

(mm)

Description	IC	S	D1
TN_U0903_	5.56	3.18	3.0



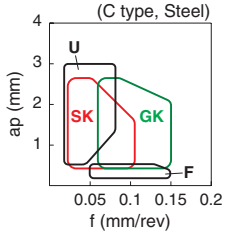
		Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	 Sharp Edge		**TNGU** 0903005MFR-F	<0.05																									●	●		●			●					E47	3
			090301MFR-F	<0.1																									●	●		●			●						
			090302MFR-F	<0.2																									●	●		●			●						
			090304MFR-F	<0.4																									●	●		●			●						
Low Feed	 Sharp Edge		**TNGU** 0903005MFR-U	<0.05																												●			●					E47	3
			090301MFR-U	<0.1																										●		●			●						
			090302MFR-U	<0.2																									●	●		●			●						
			090304MFR-U	<0.4																									●	●		●			●						
Low Feed	 With Honing		**TNGU** 090304MER-U	<0.4																									●	●											

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

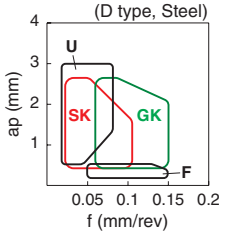
Applicable Chipbreaker Range

ap indicates radius

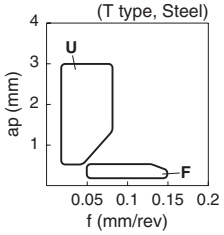
1



2



3



Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

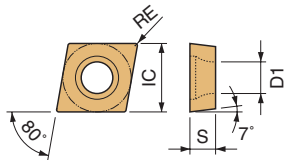
80° Rhombic / Positive with Hole

(mm)

*Thickness of CC_0301_ and CC_0401_ are different

Description	IC	S	D1
*CC_0301_	3.5	1.4	1.9
*CC_0401_	4.3	1.8	2.3

Description	IC	S	D1
CC_0602_	6.35	2.38	2.8
CC_09T3_	9.525	3.97	4.4
CC_1204_	12.7	4.76	5.5



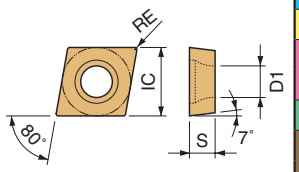
| | | |

How to read pages of "Turning Inserts" See Page **B15**

(mm)

Description	IC	S	D1
CC_0602_	6.35	2.38	2.8
CC_09T3_	9.525	3.97	4.4
CC_1204_	12.7	4.76	5.5

80° Rhombic / Positive with Hole



		Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		●	●			●	●	○		
M				●	●			●		
K					○	●	●	○		
N										
S				○				●	●	
H										●

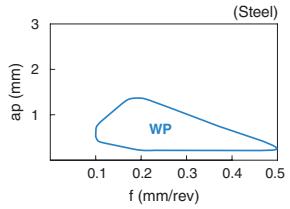
Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	Finishing	CCMT 060202WP	0.2	●	●			●	●				●	●	●	●	●												●		●								Ref. to the table below **B53**	1
		060204WP	0.4	●	●			●	●				●	●	●	●	●												●		●									
		060208WP	0.8	●	●			●	●				●	●	●	●	●												●		●									
		CCMT 09T302WP	0.2	●	●			●	●				●	●	●	●	●												●		●									
		09T304WP	0.4	●	●			●	●				●	●	●	●	●												●		●									
		09T308WP	0.8	●	●			●	●				●	●	●	●	●												●		●									
Finishing		CCMT 060202PP	0.2	●	●		●	●	●	●			●	●	●	●													●		●			●						
		060204PP	0.4	●	●		●	●	●	●			●	●	●	●	●												●		●			●						
		CCMT 09T302PP	0.2	●	●		●	●	●	●				●	●	●													●		●			●						
		09T304PP	0.4	●	●		●	●	●	●			●	●	●	●	●												●		●			●						
		09T308PP	0.8	●	●		●	●	●	●			●	●	●	●	●												●		●			●						
Finishing - Medium		CCMT 060202GK	0.2	●	●		●	●	●	●			●	●	●	●	●		●	●	●	●	●						●	●				●						
		060204GK	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	●		●		●	●				●						
		CCMT 09T302GK	0.2	●	●		●	●	●	●				●	●	●	●		●	●	●	●	●						●	●				●						
		09T304GK	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	●		●		●	●				●						
		CCMT 120404GK	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	●		●		●	●										
		120408GK	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	●		●		●	●								E27		
		120412GK	1.2				●						●	●	●	●			●			●							●	●									2	
Finishing - Medium		CCMT 060202HQ	0.2	●	●	●	●	●	●	●	▲		●	●	●	●	●		●	●		●	●						●	●								Ref. to the table below **B53**	
		060204HQ	0.4	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●						●	●									
		CCMT 09T302HQ	0.2	●	●	●	●	●	●	●				●	●	●	●		●	●	●	●	●						●	●									
		09T304HQ	0.4	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●						●	●									
		09T308HQ	0.8	●	●	●	●	●	●	●	▲		●	●	●	●	●		●	●	●	●	●						●	●									
Medium		CCGT 060201	0.1	●	●	●		●	●	●																				●									
		060202	0.2	●	●	●		●	●	●																				●									
		060204	0.4	●	●	●		●	●	●																				●									
		CCGT 09T301	0.1	●	●	●		●	●	●	▲																			●									
		09T302	0.2	●	●	●		●	●	●	▲																			●									
		09T304	0.4	●	●	●		●	●	●	▲																			●									
		CCMT 09T308	0.8	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●		●	●									

·See "Precautions when Using Wiper Inserts" in the **R36** and **R37** for WP chipbreaker.

Applicable Chipbreaker Range

ap indicates radius

1



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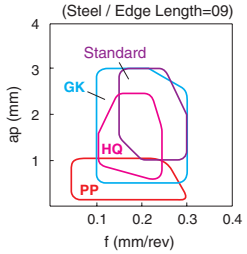


Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page B15

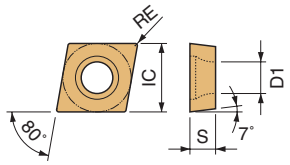
80° Rhombic / Positive with Hole

(mm)

*Thickness of CC_0301_ and CC_0401_ are different

Description	IC	S	D1
*CC_0301_	3.5	1.4	1.9
*CC_0401_	4.3	1.8	2.3

Description	IC	S	D1
CC_0602_	6.35	2.38	2.8
CC_09T3_	9.525	3.97	4.4
CC_1204_	12.7	4.76	5.5



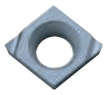
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Medium	CCGT 0602005MF	<0.05																										●	●	●	●	●		●					
	CCGT 060201MF	<0.1																										●	●	●	●	●		●					
	CCGT 060202MF	<0.2																										●	●	●	●	●		●					
	CCGT 060204MF	<0.4																										●	●	●	●	●		●					
	CCGT 09T3005MF	<0.05																											●	●	●	●		●					
	CCGT 09T301MF	<0.1																										●	●	●	●	●		●					
	CCGT 09T302MF	<0.2																										●	●	●	●	●		●					
	CCGT 09T304MF	<0.4																										●	●	●	●	●		●					
Stainless Steel / Heat-Resistant Alloys	CCMT 09T304MQ	0.4																			●	●											●	●	●			●		
	CCMT 09T308MQ	0.8																			●	●											●	●	●			●		
Finishing	*CCET 0301003R-FSF	0.03																													●								
	*CCET 0301003L-FSF	0.03																													●								
	030101R-FSF	0.1																													●								
	030101L-FSF	0.1			●																										●								
	030102R-FSF	0.2			●																										●								
	030102L-FSF	0.2			●																										●								
	030104R-FSF	0.4																													●								
	030104L-FSF	0.4			●																										●								
	*CCET 0401003L-FSF	0.03																													●								
	040101R-FSF	0.1																													●								
	040101L-FSF	0.1			●																										●								
	040102R-FSF	0.2			●																										●								
	040102L-FSF	0.2			●																										●								
	040104R-FSF	0.4																													●								
	040104L-FSF	0.4			●																										●								
	*CCET 0301005MR-FSF	<0.05																														●								
	0301005ML-FSF	<0.05																														●								
	030101MR-FSF	<0.1																														●								
	030101ML-FSF	<0.1																														●								
	030102MR-FSF	<0.2																														●								
	030102ML-FSF	<0.2																														●								
	030104MR-FSF	<0.4																														●								
	030104ML-FSF	<0.4																														●								
	*CCET 0401005ML-FSF	<0.05																														●								
	040101MR-FSF	<0.1																														●								
	040101ML-FSF	<0.1																														●								
	040102MR-FSF	<0.2																														●								
	040102ML-FSF	<0.2																														●								
	040104MR-FSF	<0.4																														●								
	040104ML-FSF	<0.4																														●								

Super Fine


Sharp Edge


Finishing - Medium


Sharp Edge / Precision

Ref. to the table below B53

B54 2

1

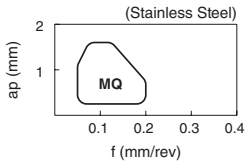
F23 F41 2

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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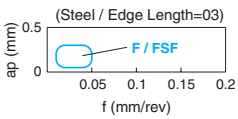
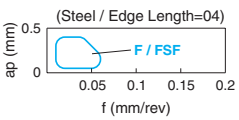




● : Std. Item

Inserts are sold in 10 piece boxes

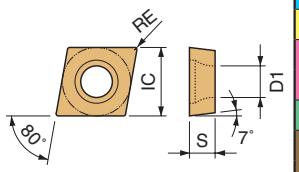
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

80° Rhombic / Positive with Hole

*Thickness of CC_0301_ and CC_0401_ are different (mm)

Description	IC	S	D1
*CC_0301_	3.5	1.4	1.9
*CC_0401_	4.3	1.8	2.3

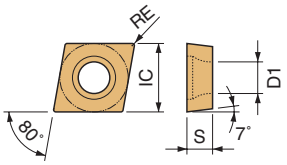


| | | |

How to read pages of "Turning Inserts" See Page **B15** (mm)

Description	IC	S	D1
CC_0602_	6.35	2.38	2.8
CC_09T3_	9.525	3.97	4.4
CC_1204_	12.7	4.76	5.5

80° Rhombic / Positive with Hole



| | | |

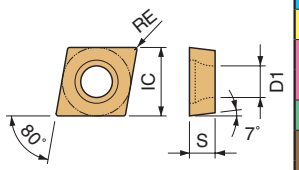
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

(mm)

Description	IC	S	D1
CC_0602_	6.35	2.38	2.8
CC_09T3_	9.525	3.97	4.4
CC_1204_	12.7	4.76	5.5

80° Rhombic / Positive with Hole



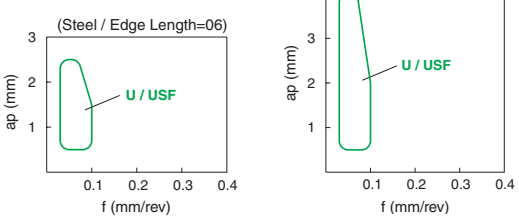
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed	CCGT 0602003FR-U	0.03			●																									●							●		Ref. to the table below **B53**	1
	CCGT 0602003FL-U	0.03			●																									●							●			
	CCGT 060201FR-U	0.1			●																									●							●			
	CCGT 060201FL-U	0.1			●																									●							●			
	CCGT 060202FR-U	0.2			●																									●							●			
	CCGT 060202FL-U	0.2			●																									●							●			
	CCGT 09T3003FR-U	0.03			●																									●							●			
	CCGT 09T3003FL-U	0.03			●																									●							●			
	CCGT 09T301FR-U	0.1			●																									●							●			
	CCGT 09T301FL-U	0.1			●																									●							●			
	CCGT 09T302FR-U	0.2			●																									●							●			
	CCGT 09T302FL-U	0.2			●																									●							●			
	CCGT 0602005MFR-U	<0.05																													●									1
	CCGT 0602005MFL-U	<0.05																													●									
	CCGT 060201MFR-U	<0.1																													●									
	CCGT 060201MFL-U	<0.1																													●									
	CCGT 060202MFR-U	<0.2																													●									
	CCGT 060202MFL-U	<0.2																													●									
	CCGT 060204MFR-U	<0.4																													●									
	CCGT 060204MFL-U	<0.4																													●									
	CCGT 09T3005MFR-U	<0.05																													●									
	CCGT 09T3005MFL-U	<0.05																													●									
	CCGT 09T301MFR-U	<0.1																													●									
	CCGT 09T301MFL-U	<0.1																													●									
	CCGT 09T302MFR-U	<0.2																													●									
	CCGT 09T302MFL-U	<0.2																													●									
	CCGT 09T304MFR-U	<0.4																													●									
Sharp Edge	CCGT 09T304MFL-U	<0.4																													●									

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range
ap indicates radius

1



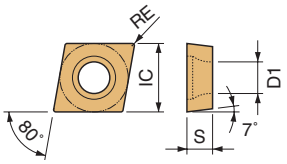
Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15** (mm)

Description	IC	S	D1
CC_0602_	6.35	2.38	2.8
CC_09T3_	9.525	3.97	4.4
CC_1204_	12.7	4.76	5.5

80° Rhombic / Positive with Hole



| | | |

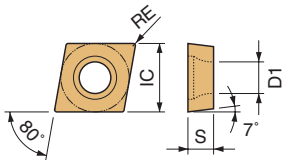
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

(mm)

Description	IC	S	D1
CC_0602_	6.35	2.38	2.8
CC_09T3_	9.525	3.97	4.4
CC_1204_	12.7	4.76	5.5

80° Rhombic / Positive with Hole



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys
H Titanium Alloys / Hard Materials

Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Non-ferrous Metals	CCGT 060202AP	0.2																																	●		●			
	CCGT 060204AP	0.4																																	●		●			
Finishing / Sharp Edge	CCGT 09T302AP	0.2																																	●		●			
	CCGT 09T304AP	0.4																																	●		●			
	CCGT 09T308AP	0.8																																	●		●			
Non-ferrous Metals	CCGT 09T302R-A3	0.2																																	●	●	●			
	CCGT 09T302L-A3	0.2																																	●	●	●			
	CCGT 09T304R-A3	0.4																																	●	●	●			
	CCGT 09T304L-A3	0.4																																	●	●	●			
	CCGT 09T308R-A3	0.8																																	●	●	●			
	CCGT 09T308L-A3	0.8																																	●	●	●			
Finishing - Medium / Sharp Edge	CCGT 120402R-A3	0.2																																		●	●			
	CCGT 120402L-A3	0.2																																		●	●			
	CCGT 120404R-A3	0.4																																		●	●			
	CCGT 120404L-A3	0.4																																		●	●			
	CCGT 120408R-A3	0.8																																		●	●			
	CCGT 120408L-A3	0.8																																		●	●			
Non-ferrous Metals	CCGT 09T304AH	0.4																																	●	●	●			
Finishing - Medium / Sharp Edge	CCGT 09T308AH	0.8																																	●	●	●			
Cast Iron	CCGW 060201	0.1																																				●			
	CCGW 060202	0.2																																				●			
Without Chipbreaker	CCGW 09T300	0.0																																				●			
	CCGW 09T301	0.1																																				●			
	CCGW 09T302	0.2																																				●			
	CCGW 09T304	0.4																																				●			

Ref. to the table below **B53** — 1

Ref. to the table below **B53** — 2

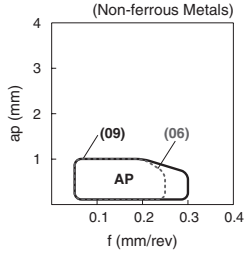
E27

Ref. to the table below **B53** — -

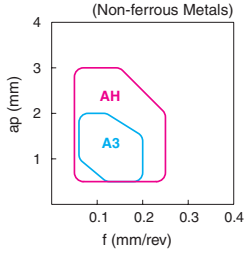
Applicable Chipbreaker Range

ap indicates radius

1



2



Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

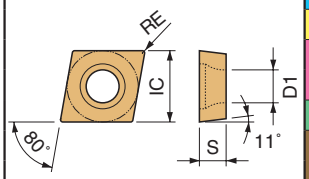
80° Rhombic / Positive with Hole

(mm)

Description	IC	S	D1
CPMT0802_	7.94	2.38	3.3
CPMT0903_	9.525	3.18	4.4

(mm)

Description	IC	S	D1
CP_0802_	7.94	2.38	3.5
CP_0903_	9.525	3.18	4.5



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Turning Indexable Inserts

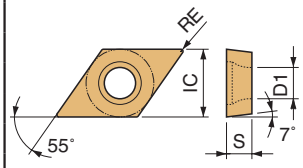
How to read pages of "Turning Inserts" See Page **B15**

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	E28,E29,E32,E33,E44,F45~F47
DC..11 type	E24,E28~E30,E32,E33,E44,F45~F47,F67

(mm)

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys
H Titanium Alloys / Hard Materials

Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	Sharp Edge / Polished	DCGT 070201MP-CF 070202MP-CF	<0.1 <0.2																									● ●	● ●		● ●			● ●	● ●	● ●			Ref. to the table above	1
		DCGT 11T301MP-CF 11T302MP-CF	<0.1 <0.2																									● ●	● ●		● ●			● ●	● ●	● ●				
Minute ap	Sharp Edge	DCGT 070202CF	0.2																											●									
		DCGT 11T302CF	0.2																											●									
Finishing	Sharp Edge / Polished	DCGT 070201MFP-GF 070202MFP-GF 070204MFP-GF	<0.1 <0.2 <0.4																									● ● ●	● ● ●		● ● ●			● ● ●						
		DCGT 11T301MFP-GF 11T302MFP-GF 11T304MFP-GF	<0.1 <0.2 <0.4																									● ● ●	● ● ●		● ● ●			● ● ●						
Finishing	NEW Sharp Edge / Polished	DCGT 0702005MFP-SKS 070201MFP-SKS 070202MFP-SKS	<0.05 <0.1 <0.2							● ● ●																		● ● ●	● ● ●					● ● ●						
		DCGT 11T3005MFP-SKS 11T301MFP-SKS 11T302MFP-SKS 11T304MFP-SKS	<0.05 <0.1 <0.2 <0.4							● ● ● ●																		● ● ● ●	● ● ● ●					● ● ● ●						
Finishing	Sharp Edge / Polished	DCGT 070201MFP-SK 070202MFP-SK 070204MFP-SK	<0.1 <0.2 <0.4							● ● ●																		● ● ●	● ● ●		● ● ●			● ● ●	● ● ●	● ● ●				
		DCGT 11T301MFP-SK 11T302MFP-SK 11T304MFP-SK	<0.1 <0.2 <0.4							● ● ●																		● ● ●	● ● ●		● ● ●			● ● ●	● ● ●	● ● ●				
Finishing	Sharp Edge / Polished	DCGT 070201MP-CK 070202MP-CK	<0.1 <0.2																									● ●	● ●		● ●			● ●	● ●	● ●				
		DCGT 11T301MP-CK 11T302MP-CK	<0.1 <0.2																									● ●	● ●		● ●			● ●	● ●	● ●	● ●			
Finishing		DCGT 070201CK 070202CK	0.1 0.2																											● ●									
		DCGT 11T301CK 11T302CK	0.1 0.2																											● ●									

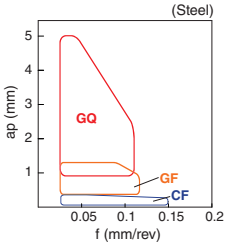
· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

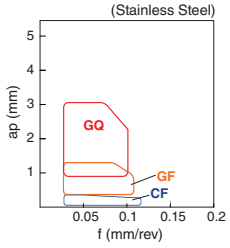
Applicable Chipbreaker Range

ap indicates radius

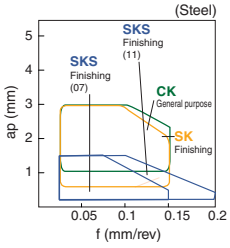
1

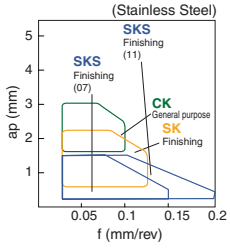
· Chip control oriented





· Low cutting force





Inserts are sold in 10 piece boxes

● : Std. Item

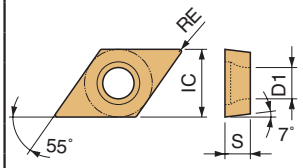
How to read pages of "Turning Inserts" See Page **B15**

(mm)

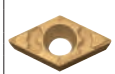
55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	E28,E29,E32,E33,E44,F45~F47
DC..11 type	E24,E28~E30,E32,E33,E44,F45~F47,F67

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium	 Sharp Edge / Polished	DCGT 070201MFP-GQ 070202MFP-GQ 070204MFP-GQ	<0.1 <0.2 <0.4																									● ● ●	● ● ●		● ● ●			● ● ●					Ref. to the table above	B62
		DCGT 11T301MFP-GQ 11T302MFP-GQ 11T304MFP-GQ	<0.1 <0.2 <0.4																									● ● ●	● ● ●		● ● ●			● ● ●						1
With Wiper Edge	 Finishing	DCMX 070202WP 070204WP 070208WP	0.2 0.4 0.8	● ● ●	● ● ●		● ● ●	● ● ●				● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●			● ● ●								
		DCMX 11T302WP 11T304WP 11T308WP	0.2 0.4 0.8	● ● ●	● ● ●		● ● ●	● ● ●				● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●			● ● ●								
With Wiper Edge	 Finishing	DCMX 070204R-WP 070204L-WP	0.4 0.4		● ●			● ●																			● ●											
		DCMX 11T304R-WP 11T304L-WP	0.4 0.4		● ●			● ●																			● ●											1
Finishing		DCMT 070202PP 070204PP	0.2 0.4	● ●	● ●		● ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●												● ●			● ●			● ●					
		DCMT 11T302PP 11T304PP 11T308PP	0.2 0.4 0.8	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●			● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●			● ● ●			● ● ●					
Finishing		DCMT 070202GP 070204GP	0.2 0.4	● ●	● ●	● ●		● ●	● ●	● ●	▲		● ●	● ●	● ●				● ●	● ●									● ●	● ●					● ●					
		DCMT 11T304GP 11T308GP	0.4 0.8	● ●	● ●	● ●		● ●	● ●	● ●	▲ ▲		● ●	● ●	● ●	● ●		● ●	● ●									● ●	● ●					● ●					

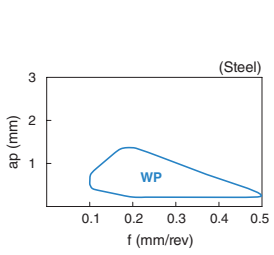
· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

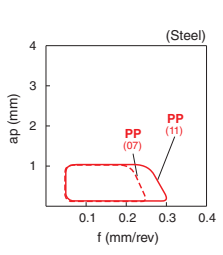
· See "Precautions when Using Wiper Inserts" in the **R36** and **R37** for WP chipbreaker.

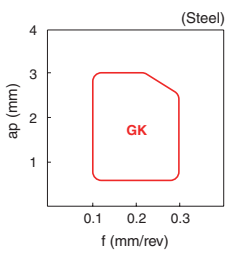
Applicable Chipbreaker Range

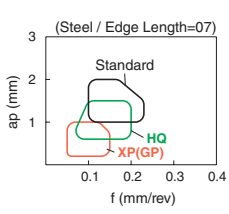
ap indicates radius

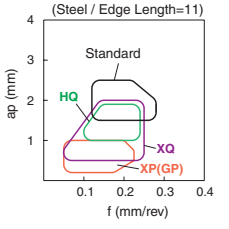
1











● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

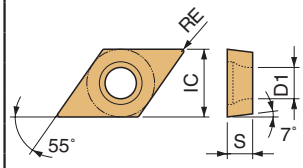
How to read pages of "Turning Inserts" See Page B15

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	E28,E29,E32,E33,E44,F45~F47
DC..11 type	E24,E28~E30,E32,E33,E44,F45~F47,F67

(mm)

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert	Description	Dimension (mm) RE	Cermet TN610	TN620	TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PV720	PV730	PV90	PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	PDL025	Carbide KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium	DCMT 070202GK	0.2	●	●		●	●	●	●				●	●	●	●		●	●		●	●							●	●				●						
	DCMT 070204GK	0.4	●	●		●	●	●	●				●	●	●	●		●	●		●	●							●	●				●						
	DCMT 070208GK	0.8	●	●		●	●	●	●				●	●	●	●		●	●		●	●	●	●	●		●		●	●				●						
	DCMT 11T302GK	0.2	●	●		●	●	●	●				●	●	●	●		●	●		●	●							●	●				●						
	DCMT 11T304GK	0.4	●	●		●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	●					●	●				●						
	DCMT 11T308GK	0.8	●	●		●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	●		●			●	●				●						B63
Finishing - Medium	DCMT 070202HQ	0.2	●	●	●	●	●	●	●				●	●	●	●		●	●										●	●				●						1
	DCMT 070204HQ	0.4	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●							●	●				●						
	DCMT 070208HQ	0.8	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●							●	●				●						
	DCMT 11T302HQ	0.2	●	●	●	●	●	●	●	▲		●	●	●	●	●		●	●	●	●	●							●	●				●						
	DCMT 11T304HQ	0.4	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●							●	●				●						
	DCMT 11T308HQ	0.8	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●							●	●				●						
Medium	DCGT 070201	0.1	●	●	●		●	●	●	▲																				●									
	DCGT 070202	0.2	●	●	●		●	●	●	▲																				●									
	DCGT 070204	0.4	●	●	●		●	●	●	▲																				●									
	DCGT 11T301	0.1	●	●	●		●	●	●	▲																				●									
	DCGT 11T302	0.2	●	●	●		●	●	●	▲																				●									
	DCGT 11T304	0.4	●	●	●		●	●	●	▲																				●									
	DCMT 11T308	0.8	●	●	●	●	●	●	●		●						●						●	●	●	●	●		●	●										Ref. to the table above
	DCGT 0702005M	<0.05																										●											1
	DCGT 070201M	<0.1																										●											
	DCGT 070202M	<0.2																										●											
	DCGT 070204M	<0.4																										●											
	DCGT 11T3005M	<0.05																										●											
	DCGT 11T301M	<0.1																										●											
	DCGT 11T302M	<0.2																										●											
	DCGT 11T304M	<0.4																										●											
Medium	DCGT 0702005MF	<0.05																										●	●		●			●					
	DCGT 070201MF	<0.1																										●	●		●			●					
	DCGT 070202MF	<0.2																										●	●		●			●					
	DCGT 070204MF	<0.4																										●	●		●			●					
	DCGT 11T3005MF	<0.05																										●	●		●			●					
	DCGT 11T301MF	<0.1																										●	●		●			●					
	DCGT 11T302MF	<0.2																										●	●		●			●					
	DCGT 11T304MF	<0.4																										●	●		●			●					

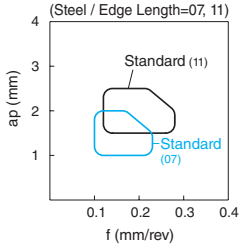
Sharp Edge

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



Inserts are sold in 10 piece boxes

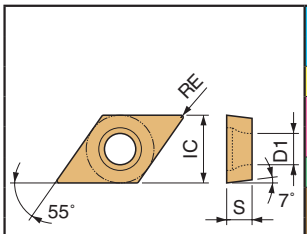
● : Std. Item ▲ :To be replaced by a new product

(mm)

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	E28,E29,E32,E33,E44,F45~F47
DC..11 type	E24,E28~E30,E32,E33,E44,F45~F47,F67

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



P ● ● ● ● ● ○ ● ● ● ● ●

Turning Indexable Inserts

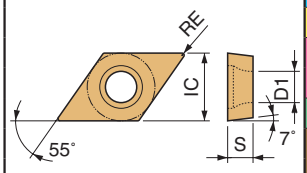
How to read pages of "Turning Inserts" See Page **B15**

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28~E30,E32,E33,E44,F45~F47,F67**

(mm)

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



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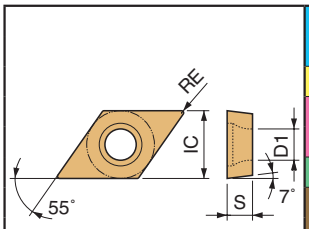
55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28~E30,E32,E33,E44,F45~F47,F67**

(mm)

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



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Turning Indexable Inserts

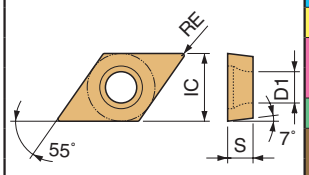
How to read pages of "Turning Inserts" See Page **B15**

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28~E30,E32,E33,E44,F45~F47,F67**

(mm)

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



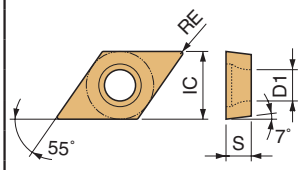
| | | |

(mm)

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28~E30,E32,E33,E44,F45~F47,F67**

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



| | | |

Turning Indexable Inserts

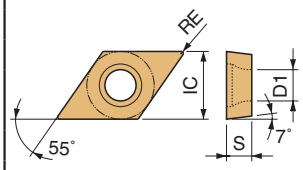
How to read pages of "Turning Inserts" See Page **B15**

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28~E30,E32,E33,E44,F45~F47,F67**

(mm)

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



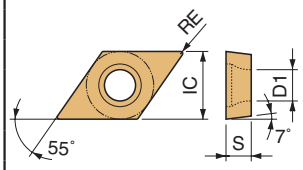
| | | |

55° Rhombic / Positive with Hole

Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28~E30,E32,E33,E44,F45~F47,F67**

(mm)

Description	IC	S	D1
DC_0702_	6.35	2.38	2.8
DC_11T3_	9.525	3.97	4.4



	Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P	●	●		●	●	○			
M						○	○		
K								◎	
N						●	●	○	
S								○	
H									

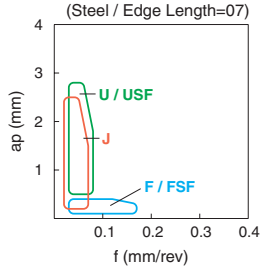
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed	DCGT 11T3003ER-J	0.03			●																								●										
	11T301ER-J	0.1	●	●	●		●	●	●																				●								●		
	11T301EL-J	0.1	●				●																																	
	11T302ER-J	0.2	●	●	●		●	●	●																				●								●		
	11T302EL-J	0.2	●		●		●																						●										
	11T304ER-J	0.4	●	●	●		●	●	●																				●								●		
	11T304EL-J	0.4	●	●	●		●	●	●																				●								●		
	DCGT 11T3005MER-J	<0.05																											●										
	11T301MER-J	<0.1																											●										
	11T302MER-J	<0.2																											●										
	11T304MER-J	<0.4																											●										
	11T304MEL-J	<0.4																											●										
With Honing																																							1
Non-ferrous Metals	DCGT 070202AP	0.2																																		●		●		
	070204AP	0.4																																		●		●		
	DCGT 11T302AP	0.2																																		●		●		
	11T304AP	0.4																																		●		●		
	11T308AP	0.8																																		●		●		
Finishing / Sharp Edge																																							2
Non-ferrous Metals	DCGT 11T302R-A3	0.2																																		●	●	●		
	11T302L-A3	0.2																																		●	●	●		
	11T304R-A3	0.4																																		●	●	●		
	11T304L-A3	0.4																																		●	●	●		
	11T308R-A3	0.8																																		●	●			
	11T308L-A3	0.8																																		●	●			
Finishing - Medium / Sharp Edge																																							3
Non-ferrous Metals	DCGT 11T304AH	0.4																																		●	●	●		
	11T308AH	0.8																																		●	●	●		
Finishing - Medium / Sharp Edge																																							
Cast Iron	DCGW 070201	0.1																																				●		
	070202	0.2																																				●		
	DCGW 11T301	0.1																																				●		
	11T302	0.2																																				●		
	11T304	0.4																																				●		
Without Chipbreaker																																							-

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

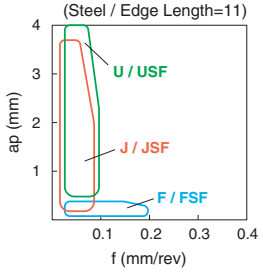
Applicable Chipbreaker Range

ap indicates radius

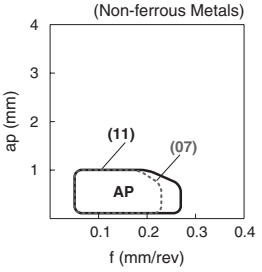
1 (Steel / Edge Length=07)



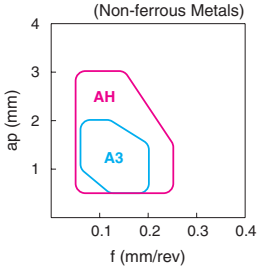
(Steel / Edge Length=11)



2 (Non-ferrous Metals)



3 (Non-ferrous Metals)



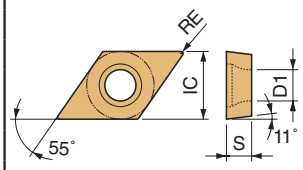
● : Std. Item

Inserts are sold in 10 piece boxes

55° Rhombic / Positive with Hole

(mm)

Description	IC	S	D1
DP_0702_	6.35	2.38	2.8
DP_11T3_	9.525	3.97	4.4



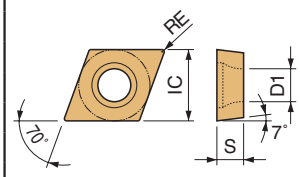
| | | |

How to read pages of "Turning Inserts" See Page **B15**

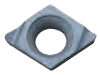
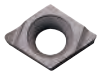
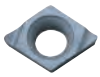
(mm)

Description	IC	S	D1
JC_0301_	3.5	1.4	1.9

70° Rhombic / Positive with Hole



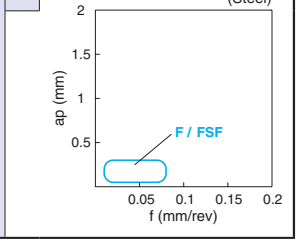
		Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		●	◔							
M		◔	◔	●						
K										
N							●			
S				●				●	◔	
H										

Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	Super Fine  Sharp Edge / Precision	JCET 030101R-FSF	0.1			●																								●									
		030101L-FSF	0.1			●																								●									
		030102R-FSF	0.2			●																								●									
		030102L-FSF	0.2			●																								●									
		030104L-FSF	0.4			●																								●									
		JCET 030101MR-FSF	<0.1																											●									
		030101ML-FSF	<0.1																											●									
Finishing	 Sharp Edge	JCET 030102MR-F	<0.2																											●					●				F48	1
		030102ML-F	<0.2																											●					●					
		030104MR-F	<0.4																											●					●					
		030104ML-F	<0.4																											●					●					
Finishing	 Sharp Edge	JCGT 030101R-F	0.1																												●								
		030101L-F	0.1			●																									●						●		
		030102R-F	0.2			●																									●						●		
		030102L-F	0.2			●																									●						●		
		030104R-F	0.4			●																									●								
		030104L-F	0.4			●																									●								

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range
ap indicates radius

1



● : Std. Item

Inserts are sold in 10 piece boxes

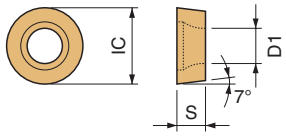
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

Round / Positive with Hole

(mm)

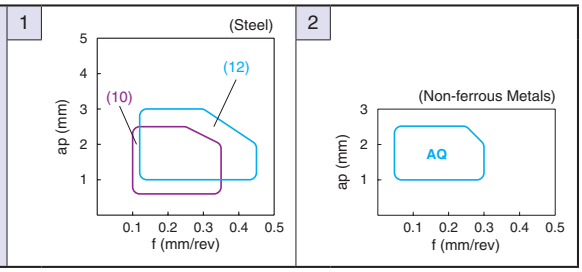
Description	IC	S	D1
RC_1003_	10.0	3.18	3.6
RC_1204_	12.0	4.76	4.2



		Insert	Description	Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide															PVD Coated Carbide							DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
				RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Medium			RCMX 1003M0	-		●	●			●	●			●	●	●	●	●		●	●			●																D23	1
			RCMX 1204M0	-		●	●			●	●			●	●	●	●	●			●			●	●	●	●	●														
Non-ferrous Metals	 Finishing - Medium		RCGX 1003M0-AQ	-																																		●			2

*Chipbreaker shape of RCMX... varies by grade (cermet / PVD coated cermet / CVD coated carbide)

Applicable Chipbreaker Range
ap indicates radius



Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

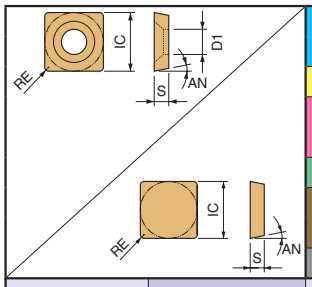
90° Square / Positive with Hole
90° Square / Positive without Hole

(mm)

Description	IC	S	D1	AN
SC_09T3_	9.525	3.97	4.4	7°
SP_0903_	9.525	3.18	4.5	11°

(mm)

Description	IC	S	D1	AN
SP_0903_	9.525	3.18	-	11°
SP_1203_	12.7	3.18	-	11°
SP_1204_	12.7	4.76	-	11°



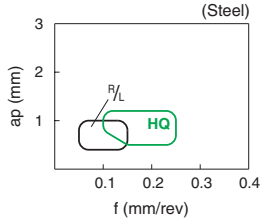
		Free-cutting steel	Carbon Steel / Alloy Steel	Stainless Steel	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		● ●	● ● ○	○ ● ● ○ ✖	○ ○	○ ○	○	○	○	
M				●					●	
K				✣ ○	● ✣	● ● ✣ ○ ● ✖			✣	
N							●			
S				○				●	●	
H										

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium	SCMT 09T304HQ	0.4	●	●	●		●	●	●			●	●	●	●	●		●	●	●																			-	1
	09T308HQ	0.8	●	●	●		●	●	●				●	●	●	●		●	●	●																				
Finishing	SPGH 090304L	0.4			●																																				
Medium	SPMR 090304G	0.4		●	●			●	●	▲																															
	090308G	0.8		●	●			●	●																															
	SPMR 120304G	0.4		●	●			●	●																															
	120308G	0.8		●	●			●	●																															
Medium	SPMR 090304	0.4											●	●	●			●	●				●											●						2
	090308	0.8											●	●	●			●	●				●											●						
	SPMR 120304	0.4											●	●	●	●		●	●				●											●						
	120308	0.8											●	●	●			●	●				●											●						
Finishing	SPGR 090304R	0.4	●	●	●		●	●																															
	090304L	0.4	●	●	●		●	●																															
	090308R	0.8	●	●	●		●	●																														F62	
	090308L	0.8	●	●	●		●	●																															
	SPGR 120304R	0.4	●	●	●		●	●																															
	120304L	0.4	●	●	●		●	●																															
	120308R	0.8	●	●	●		●	●																															
	120308L	0.8	●	●	●		●	●																															
Cast Iron	SPGN 090304	0.4																																			●		
	090308	0.8																																			●		
	SPGN 120304	0.4																																			●		
	120308	0.8									●																										●		-	
	SPMN 120304	0.4																						●	●	●		●												
	120308	0.8	●	●	●		●	●									●							●	●	●		●												
	120312	1.2	●	●	●	●	●	●																															
	SPMN 120408	0.8																						●	●	●		●												
Without Chipbreaker	120412	1.2																																						

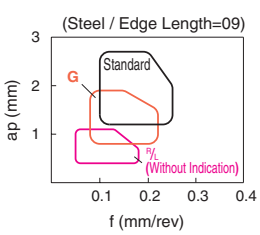
Applicable Chipbreaker Range

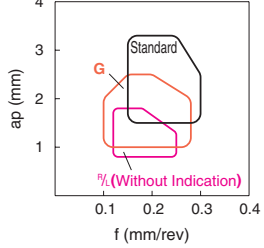
ap indicates radius

1



2





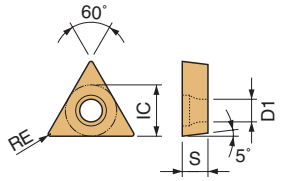
● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TB_0601_	3.97	1.59	2.3



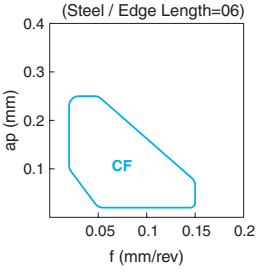
Insert (Handed Insert shows Left-hand)		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	Sharp Edge / Polished	TBGT 060101MP-CF	<0.1																										●		●			●						1
		TBGT 060102MP-CF	<0.2																										●		●			●						
Minute ap	Sharp Edge	TBGT 060102CF	0.2																												●									2
Finishing	Sharp Edge / Polished	TBGT 060101MFP-PF	<0.1																										●					●					
		060102MFP-PF	<0.2																										●					●					
		060104MFP-PF	<0.4																										●					●					
Finishing		TBMT 060102DP	0.2	●	●	●	●	●	●	●			●	●	●	●	●		●	●																			
		060104DP	0.4	●	●	●	●	●	●	●			●	●	●	●	●		●	●																			
Finishing		TBET 0601005MR	<0.05																											●					●				F24 F51 F53	3
		0601005ML	<0.05																											●					●					
		060101MR	<0.1																											●					●					
		060101ML	<0.1																											●					●					
		060102MR	<0.2																										●	●					●					
		060102ML	<0.2																										●	●					●					
		060104MR	<0.4																										●	●					●					
		060104ML	<0.4																										●	●					●					
		TBGT 0601003L	0.03																												●									
		060101R	0.1																												●							●		
		060101L	0.1			●																									●							●		
		060102R	0.2	●	●	●		●	●	●																					●							●		
		060102L	0.2	●	●	●		●	●	●																					●							●		
		060104R	0.4	●	●	●		●	●	●																					●							●		
		060104L	0.4	●	●	●		●	●	●																					●							●		
Cast Iron	Without Chipbreaker	TBGW 060102	0.2			●																															●		-
		060104	0.4			●																															●		

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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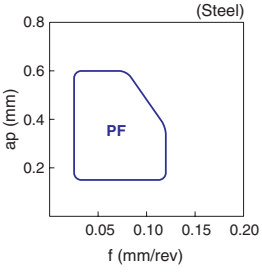

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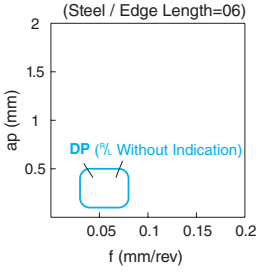


Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

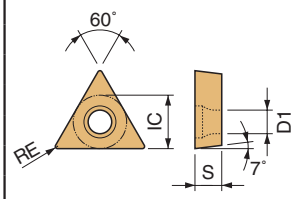
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TC_0802_	4.76	2.38	2.3
TC_0902_	5.56	2.38	2.5

(mm)

Description	IC	S	D1
TC_1102_	6.35	2.38	2.8
TC_1103_	6.35	3.18	2.8
TC_16T3_	9.525	3.97	4.4



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

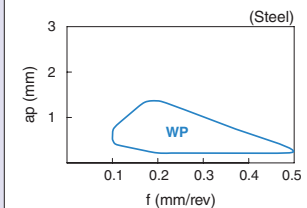
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
With Wiper Edge	TCMX 090204WP	0.4	●	●			●	●				●	●	●	●	●													●		●									1
Finishing	TCMX 110204WP	0.4	●	●			●	●				●	●	●	●	●													●		●									
Finishing - Medium	TCMT 090202HQ	0.2	●	●	●	●	●	●	●																													F49	
	090204HQ	0.4	●	●	●	●	●	●	●																														
	TCMT 110202HQ	0.2	●	●	●	●	●	●	●																														
	110204HQ	0.4	●	●	●	●	●	●	●			●	●	●	●	●		●	●	●				●	●	●		●											
	110208HQ	0.8	●	●	●	●	●	●	●				●	●	●	●		●	●	●				●	●	●		●											
	TCMT 16T304HQ	0.4		●		●		●	●																													-	
	16T308HQ	0.8		●		●		●	●															●	●	●		●											
	16T312HQ	1.2				●																		●	●	●		●											
Low Feed	Super Fine																																						
	TCET 0802003FR-USF	0.03																												●									2
	0802003FL-USF	0.03																												●									
	080201FR-USF	0.1																												●									
	080202FR-USF	0.2																												●									
	TCET 1103003FR-USF	0.03																												●									
	1103003FL-USF	0.03																												●									
	110301FR-USF	0.1			●																									●								E35	
	110301FL-USF	0.1			●																									●									
	110302FR-USF	0.2			●																									●									
	110302FL-USF	0.2			●																									●									
	TCET 1103005MFR-USF	<0.05																												●									
	110301MFR-USF	<0.1																												●									
Sharp Edge / Precision	110302MFR-USF	<0.2																												●									

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).
· See "Precautions when Using Wiper Inserts" in the **R36** and **R37** for WP chipbreaker.

Applicable Chipbreaker Range

ap indicates radius

1



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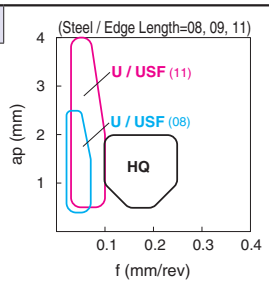


● : Std. Item

Inserts are sold in 10 piece boxes

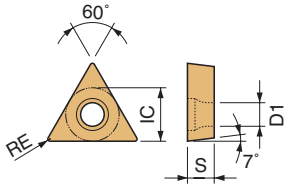
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TC_0802_	4.76	2.38	2.3
TC_1103_	6.35	3.18	2.8



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

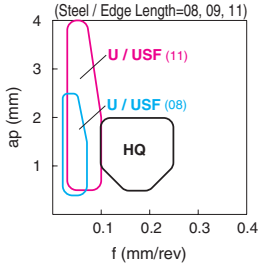
Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed  Sharp Edge	TCGT 080201FR-U	0.1			●																									●									
	080201FL-U	0.1			●																									●									
	080202FR-U	0.2			●																									●							●		
	080202FL-U	0.2			●																									●							●		
	TCGT 1103003FR-U	0.03																												●							●		
	110301FR-U	0.1			●																									●							●		
	110301FL-U	0.1			●																									●							●		
	110302FR-U	0.2			●																									●							●		
	110302FL-U	0.2			●																									●							●		
	TCGT 080201MFR-U	<0.1																														●								
	080202MFR-U	<0.2																														●								
	080202MFL-U	<0.2																														●								
	TCGT 1103005MFR-U	<0.05																														●								
	1103005MFL-U	<0.05																														●								
	110301MFR-U	<0.1																														●								
	110301MFL-U	<0.1																														●								
	110302MFR-U	<0.2																														●								
	110302MFL-U	<0.2																														●								
	110304MFR-U	<0.4																														●								
	110304MFL-U	<0.4																														●								
Low Feed  With Honing	TCGT 080202ER-U	0.2			●																									●									
	080202EL-U	0.2			●																									●									
	TCGT 110301ER-U	0.1			●																																		
	110302ER-U	0.2			●																									●									
	110302EL-U	0.2			●																									●									
	110304ER-U	0.4			●																									●									
	110304EL-U	0.4			●																									●									
	TCGT 080202MER-U	<0.2																													●									
	TCGT 110302MER-U	<0.2																													●									
	110302MEL-U	<0.2																													●									
	110304MER-U	<0.4																													●									

E35 | 1

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range
ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

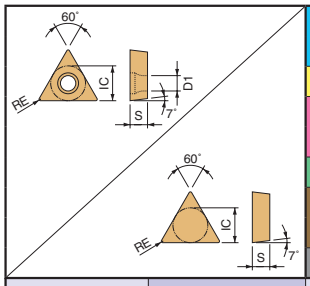
60° Triangle / Positive with Hole
60° Triangle / Positive without Hole

(mm)

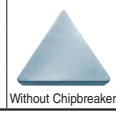
Description	IC	S	D1
TCG_0601_	3.97	1.59	-
TC_0802_	4.76	2.38	2.3

(mm)

Description	IC	S	D1
TC_1103_	6.35	3.18	2.8



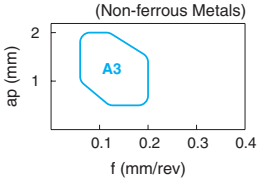
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert Handed Insert shows Left-hand		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Non-ferrous Metals	 Finishing - Medium / Sharp Edge	TCGT 110302R-A3	0.2																															●	●	●			
		TCGT 110302L-A3	0.2																															●	●	●			
		TCGT 110304R-A3	0.4																															●	●	●		1	
		TCGT 110304L-A3	0.4																															●	●	●			
		TCGT 110308R-A3	0.8																															●	●				
		TCGT 110308L-A3	0.8																															●	●				
Cast Iron	 Without Chipbreaker	TCGW 080201	0.1																																	●		E35	
		TCGW 080202	0.2																																	●			
		TCGW 110301	0.1																																	●			-
		TCGW 110302	0.2																																	●			
		TCGW 110304	0.4																																	●			
Finishing	 Sharp Edge	TCGR 060102L-F	0.2			●																															-	2
		TCGR 060104L-F	0.4			●																																	
Cast Iron	 Without Chipbreaker	TCGN 060104	0.4			●																															-	-

Applicable Chipbreaker Range

ap indicates radius

1



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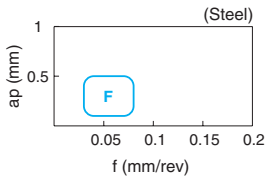


● : Std. Item

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

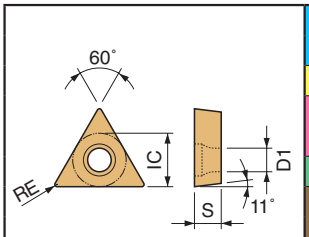
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TP_0802_	4.76	2.38	2.3
TP_T(X)0902_	5.56	2.38	2.8

(mm)

Description	IC	S	D1
TP_H0902_	5.56	2.38	3.2
TP_1103_	6.35	3.18	3.3
TPMT1603_	9.525	3.18	4.4



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert Handed Insert shows Left-hand		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	 Sharp Edge / Polished	TPGT 080201MP-CF TPGT 080202MP-CF	<0.1 <0.2																									● ●	● ●		● ●			● ●					
		TPGT 090201MP-CF TPGT 090202MP-CF	<0.1 <0.2																									● ●	● ●		● ●			● ●					
Minute ap	 Sharp Edge	TPGT 080202CF	0.2																											●								
		TPGT 090202CF	0.2																											●								
Finishing	 Sharp Edge / Polished	TPGT 090201MFP-PF 090202MFP-PF 090204MFP-PF	<0.1 <0.2 <0.4																										● ● ●						● ● ●					
With Wiper Edge	 Finishing	TPMX 090202WP 090204WP 090208WP	0.2 0.4 0.8	● ● ●	● ● ●			● ● ●	● ● ●				● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●		● ● ●									1
		TPMX 110302WP 110304WP 110308WP	0.2 0.4 0.8	● ● ●	● ● ●			● ● ●	● ● ●				● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●		● ● ●									
With Wiper Edge	 Finishing	TPMX 110304R-WP 110304L-WP	0.4 0.4		● ●				● ●																				● ●										
Finishing		TPMT 090202PP 090204PP	0.2 0.4	● ●	● ●		● ●	● ●	● ●	● ●			● ●	● ●	● ●	● ●	● ●												● ●		● ●				● ●					
		TPMT 110302PP 110304PP 110308PP	0.2 0.4 0.8	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●	● ● ●			● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●		● ● ●				● ● ●					

Ref. to the table below

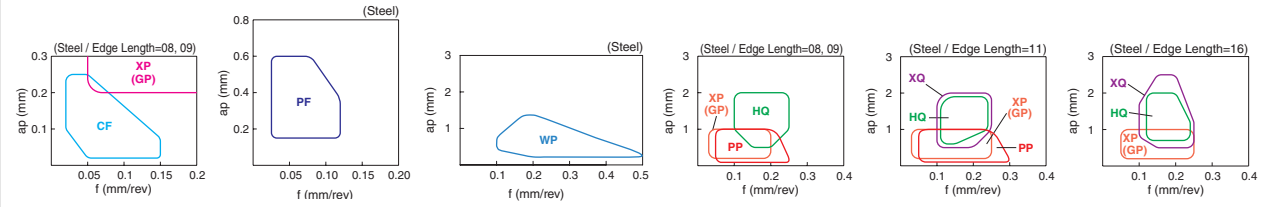
· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).
· See "Precautions when Using Wiper Inserts" in the **R36** and **R37** for WP chipbreaker.

Insert Description	See Page for Applicable Toolholders
TP..0802 type	**E35,F51,F53**
TP..0902 type	**F24,F51,F53**

Insert Description	See Page for Applicable Toolholders
TP..1103 type	**E35,F51,F52**
TP..1603 type	**F51,F52**

Applicable Chipbreaker Range
ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

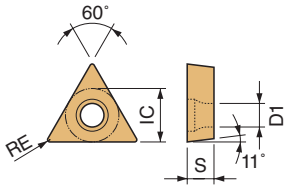
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TP_0802_	4.76	2.38	2.3
TP_T(X)0902_	5.56	2.38	2.8

(mm)

Description	IC	S	D1
TP_H0902_	5.56	2.38	3.2
TP_1103_	6.35	3.18	3.3
TPMT1603_	9.525	3.18	4.4



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing		TPMT 090202GP	0.2	●	●	●		●	●	●																			●	●					●					
		090204GP	0.4	●	●	●		●	●	●				●	●	●				●									●	●					●					
		TPMT 110304GP	0.4	●	●	●		●	●	●	▲		●	●	●	●			●	●									●	●					●					
		110308GP	0.8	●	●	●		●	●	●	▲			●	●	●			●	●									●	●					●					
		TPMT 160304GP	0.4	●	●	●		●	●	●	▲		●	●	●	●				●									●	●					●					
Finishing - Medium		TPMT 090202HQ	0.2	●	●	●	●	●	●	●			●	●	●	●			●	●									●	●					●					
		090204HQ	0.4	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●						●	●					●					
		TPMT 110302HQ	0.2	●	●	●	●	●	●	●			●	●	●	●			●	●									●	●					●					
		110304HQ	0.4	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●		●	●					●					
		110308HQ	0.8	●	●	●	●	●	●	●	▲	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●		●	●					●					
		TPMT 160302HQ	0.2	●	●	●	●	●	●	●				●	●	●			●	●									●	●					●					
		160304HQ	0.4	●	●	●	●	●	●	●				●	●	●	●		●	●	●	●	●	●	●	●		●	●	●					●					
		160308HQ	0.8	●	●	●	●	●	●	●	▲			●	●	●	●		●	●	●	●	●	●	●	●		●	●	●					●					
Low Carbon Steel	Finishing	TPMT 090204XP	0.4	●	●			●	●	●				●	●	●				●									●	●					●					
		TPMT 110304XP	0.4	●	●		●	●	●	●	▲		●	●	●	●	●		●	●									●	●					●					
		110308XP	0.8	●	●		●	●	●	●	▲		●	●	●	●			●	●									●	●					●					
		TPMT 160304XP	0.4	●	●		●	●	●	●				●	●	●	●			●									●	●					●					
		160308XP	0.8	●	●		●	●	●	●				●	●	●			●	●									●	●					●					
Low Carbon Steel	Finishing - Medium	TPMT 110304XQ	0.4	●	●		●	●	●	●	▲		●	●	●	●	●		●	●																				
		110308XQ	0.8	●	●		●	●	●	●	▲		●	●	●	●	●		●	●																				
		TPMT 160304XQ	0.4	●	●		●	●	●	●				●	●	●	●			●																				
		160308XQ	0.8	●	●		●	●	●	●	▲			●	●	●	●			●																				

Ref. to the table below **B80**

B80 1

● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

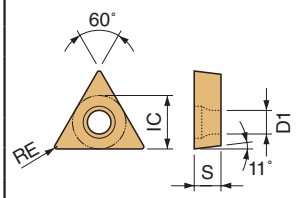
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TP_0802_	4.76	2.38	2.3
TP_H0902_	5.56	2.38	3.2
TP_1102_	6.35	2.38	3.7

(mm)

Description	IC	S	D1
TP_1103_	6.35	3.18	3.3
TP_1603_	9.525	3.18	4.7
TPGT1604_	9.525	4.76	4.5



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	PDL025	Carbide KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	TPGH 080201R	0.1			●																							●					●							
	080201L	0.1			●																							●	●				●				●			
	080202R	0.2		●	●			●	●																		●	●	●				●				●			
	080202L	0.2	●	●	●		●	●	●		●																●	●	●				●				●			
	080204R	0.4		●	●			●	●																		●	●	●				●				●			
	080204L	0.4	●	●	●		●	●	●	▲	●																●	●	●				●				●			
	TPGH 090201R	0.1																											●				●				●			
	090201L	0.1			●																								●				●				●			
	090202R	0.2		●	●			●	●																		●	●	●				●				●			
	090202L	0.2	●	●	●		●	●	●		●																●	●	●				●				●			
	090204R	0.4		●	●			●	●		●																●	●	●				●				●			
	090204L	0.4	●	●	●		●	●	●	▲	●																●	●	●				●				●			
	TPGH 110202R	0.2																											●				●				●			
	110202L	0.2	●	●	●		●	●	●																		●	●	●				●				●			
	110204R	0.4			●						●																		●				●				●	F52	1	
	110204L	0.4	●	●	●		●	●	●		●																●	●	●				●				●			
	TPGH 110302R	0.2		●	●			●	●																		●	●	●				●				●			
	110302L	0.2	●	●	●		●	●	●	▲	●																●	●	●				●				●			
	110304R	0.4		●	●			●	●		●																●	●	●				●				●			
	110304L	0.4	●	●	●		●	●	●	▲	●																●	●	●				●				●			
	110308R	0.8	●	●	●		●	●	●																		●	●	●				●				●			
	110308L	0.8	●	●	●		●	●	●																		●	●	●				●				●			
	TPGH 160302R	0.2	●	●	●		●	●	●																			●	●				●				●			
	160302L	0.2	●	●	●		●	●	●																			●	●				●				●			
	160304R	0.4	●	●	●		●	●	●																		●	●	●				●				●			
	160304L	0.4	●	●	●		●	●	●		●																●	●	●				●				●			
	160308R	0.8									●																		●				●				●			
	160308L	0.8	●	●	●		●	●	●		●																	●	●				●				●			

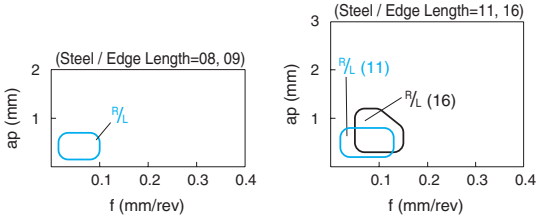
Ref. to the table below **B80**

Ref. to the table below **B80**

Applicable Chipbreaker Range

ap indicates radius

1



Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

How to read pages of "Turning Inserts" See Page **B15**

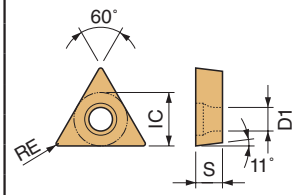
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TP_0802_	4.76	2.38	2.3
TP_H0902_	5.56	2.38	3.2
TP_1102_	6.35	2.38	3.7

(mm)

Description	IC	S	D1
TP_1103_	6.35	3.18	3.3
TP_1603_	9.525	3.18	4.7
TPGT1604_	9.525	4.76	4.5



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

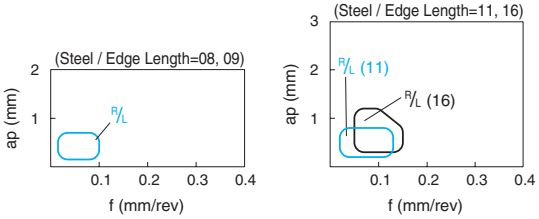
Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	TPGH 080201ML	<0.1																										●											Ref. to the table below **B80**	
	080202MR	<0.2																										●	●												
	080202ML	<0.2																										●	●												
	080204MR	<0.4																										●	●												
	080204ML	<0.4																										●	●												
	TPGH 090201ML	<0.1																											●												
	090202MR	<0.2																											●												
	090202ML	<0.2																										●	●												
	090204MR	<0.4																										●	●												
	090204ML	<0.4																										●	●												
	TPGH 110202ML	<0.2																										●											F52	1
	110204ML	<0.4																											●												
	TPGH 110302MR	<0.2																										●	●											Ref. to the table below **B80**	
	110302ML	<0.2																										●	●												
	110304MR	<0.4																										●	●												
	110304ML	<0.4																										●	●												
	110308ML	<0.8																										●	●												
	TPGH 160302ML	<0.2																											●												
	160304MR	<0.4																											●												
	160304ML	<0.4																										●	●												
	160308ML	<0.8																											●												

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

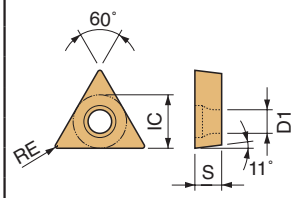
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TP_0802_	4.76	2.38	2.3
TP_H0902_	5.56	2.38	3.2
TP_1102_	6.35	2.38	3.7

(mm)

Description	IC	S	D1
TP_1103_	6.35	3.18	3.3
TP_1603_	9.525	3.18	4.7
TPGT1604_	9.525	4.76	4.5



| | | |

How to read pages of "Turning Inserts" See Page **B15**

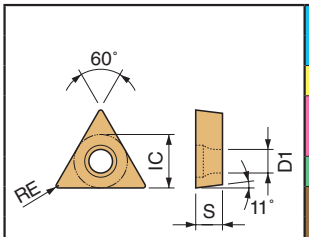
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TP_0802_	4.76	2.38	2.3
TP_H0902_	5.56	2.38	3.2
TP_1102_	6.35	2.38	3.7

(mm)

Description	IC	S	D1
TP_1103_	6.35	3.18	3.3
TP_1603_	9.525	3.18	4.7
TPGT1604_	9.525	4.76	4.5



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing Super Fine	TPET 0802003L-FSF	0.03																												●										
	080201R-FSF	0.1			●																									●										
	080201L-FSF	0.1			●																									●										
	080202R-FSF	0.2			●																									●										
	080202L-FSF	0.2			●																								●	●										
	TPET 1103003R-FSF	0.03																													●										
	1103003L-FSF	0.03																													●										
	1103005L-FSF	0.05																												●										
	110301R-FSF	0.1			●																									●	●									
	110301L-FSF	0.1			●																									●	●									
	110302R-FSF	0.2			●																									●	●									
	110302L-FSF	0.2			●																									●	●									
	TPET 080202ML-FSF	<0.2																												●										
	TPET 1103005ML-FSF	<0.05																												●										
	110301MR-FSF	<0.1																												●										
	110301ML-FSF	<0.1																												●										
	110302MR-FSF	<0.2																												●										
	110302ML-FSF	<0.2																												●										
Finishing Sharp Edge / Precision	TPEH 080201MR-P	<0.1																												●						●				
	080201ML-P	<0.1																												●						●				
	080202MR-P	<0.2																												●						●				
	080202ML-P	<0.2																												●						●				
	080204MR-P	<0.4																												●						●				
	080204ML-P	<0.4																												●						●				
	TPEH 090201MR-P	<0.1																												●						●				
	090201ML-P	<0.1																												●						●				
	090202MR-P	<0.2																												●						●				
	090202ML-P	<0.2																												●						●				
	090204MR-P	<0.4																												●						●				
	090204ML-P	<0.4																												●						●				
	TPEH 110301MR-P	<0.1																												●						●				
	110301ML-P	<0.1																												●						●				
	110302MR-P	<0.2																												●						●				
	110302ML-P	<0.2																												●						●				
	110304MR-P	<0.4																												●						●				
Sharp Edge	110304ML-P	<0.4																												●						●				

Ref. to the table below **B80**

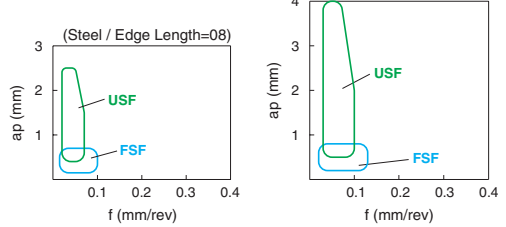
Applicable Chipbreaker Range: 1, 2

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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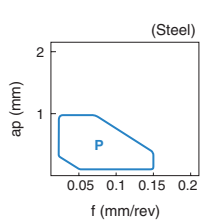

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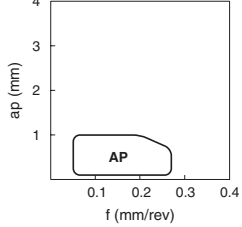


● : Std. Item

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

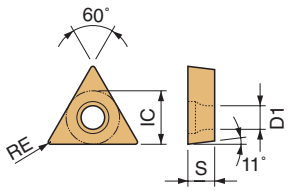
60° Triangle / Positive with Hole

(mm)

Description	IC	S	D1
TP_0802_	4.76	2.38	2.3
TP_0902_	5.56	2.38	2.8
TPGB0902_	5.56	2.38	3.2

(mm)

Description	IC	S	D1
TPGT1102_	6.35	2.38	3.7
TP_1103_	6.35	3.18	3.3
TP_1603_	9.525	3.18	4.7



P	● ◕	Free-cutting steel
		Carbon Steel / Alloy Steel
M		Stainless Steel
K	● ○	Gray Cast Iron
		Nodular Cast Iron
N		Non-ferrous Metals
S		Heat-resistant Alloys
		Titanium Alloys
H		Hard Materials

Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed / Super Fine	TPET 080201FL-USF	0.1			●																							●											
	080202FR-USF	0.2			●																							●	●										
	080202FL-USF	0.2			●																							●	●										
	TPET 1103003FL-USF	0.03																											●										
	110301FR-USF	0.1			●																								●										
	110301FL-USF	0.1			●																							●	●										
	110302FR-USF	0.2			●																							●	●										
	110302FL-USF	0.2			●																							●	●										
	TPET 080202MFR-USF	<0.2																										●											
	080202MFL-USF	<0.2																										●											
	TPET 110301MFL-USF	<0.1																										●											
	110302MFR-USF	<0.2																										●											
	110302MFL-USF	<0.2																										●											
Sharp Edge / Precision																																							
Non-ferrous Metals / Finishing / Sharp Edge	TPGT 090202AP	0.2																																	●	●	●		
	090204AP	0.4																																	●	●	●		
	090208AP	0.8																																	●	●	●		
	TPGT 110302AP	0.2																																	●	●	●		
	110304AP	0.4																																	●	●	●		
	110308AP	0.8																																	●	●	●		
Cast Iron / Without Chipbreaker	TPGB 080202	0.2			●																																●			
	080204	0.4		●	●			●	●		●																										●			
	080208	0.8			●																																			
	TPGB 090202	0.2			●																																●			
	090204	0.4		●	●			●	●		●																										●			
	TPGB 1102005	0.05			●																																●		F52	-
	110201	0.1			●																																●			
	110202	0.2			●																																●			
	110204	0.4	●	●	●		●	●	●																												●			
	TPGB 1103005	0.05			●																																●		Ref. to the table below B80	
	110301	0.1			●																																●			
	110302	0.2	●	●	●		●	●	●																												●			
	110304	0.4	●	●	●		●	●	●		●																										●			
	110308	0.8	●	●	●		●	●	●		●																										●			
	TPGB 160304	0.4	●	●	●		●	●	●		●																										●			
	160308	0.8	●	●	●		●	●	●																												●			

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Inserts are sold in 10 piece boxes

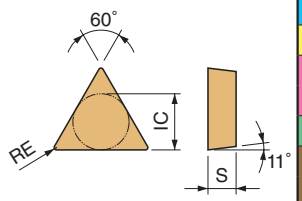
● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

(mm)

Description	IC	S	D1
TP_0902_	5.56	2.38	-
TP_1103_	6.35	3.18	-
TP_1603_	9.525	3.18	-

60° Triangle / Positive without Hole

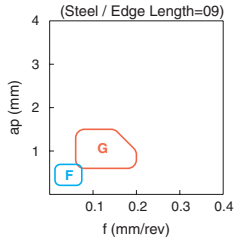


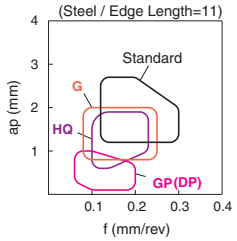
		Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
P	Free-cutting steel				●	●			●	●	◒			○	●	◒	◒	✖		◒	✲														●					
P	Carbon Steel / Alloy Steel				●	●			●	●	◒			○	●	◒	◒	✖		◒	✲														●					
M	Stainless Steel																						◒												●					
K	Gray Cast Iron												●					✲						●	◒	✲														
K	Nodular Cast Iron												○					◒						○	◒	✖														
N	Non-ferrous Metals																																							
S	Heat-resistant Alloys																						◒												●					
S	Titanium Alloys																																		●					
H	Hard Materials																																							
Finishing		TPMR 110304DP 110308DP	0.4 0.8			●																																		
Finishing		TPMR 160304DP 160308DP	0.4 0.8			●																																		
Finishing		TPMR 110304GP	0.4		●	●			●	●																															
Finishing		TPMR 160304GP	0.4		●	●			●	●				●	●	●	●			●	●																				
Finishing - Medium		TPMR 110304HQ 110308HQ	0.4 0.8		●	●			●	●				●	●	●	●			●	●			●											●					
Finishing - Medium		TPMR 160304HQ 160308HQ	0.4 0.8		●	●			●	●				●	●	●	●			●	●			●											●					
Medium		TPMR 090202G 090204G	0.2 0.4			●														●	●																		F63	1
Medium		TPMR 110304G 110308G	0.4 0.8		●	●			●	●																														
Medium		TPMR 160304G 160308G	0.4 0.8		●	●			●	●																														
Medium		TPMR 110304 110308	0.4 0.8		●	●			●	●				●	●	●				●	●			●	●	●	●		●							●					
Medium		TPMR 160304 160308	0.4 0.8		●	●			●	●				●	●	●	●	●		●	●			●	●	●	●	●	●							●					
Finishing	Sharp Edge	TPGR 090202L-F	0.2				●																																	
Finishing	Sharp Edge	090204R-F 090204L-F	0.4 0.4				●																																	

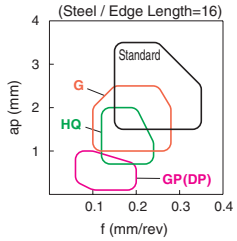
Applicable Chipbreaker Range

ap indicates radius

1







● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

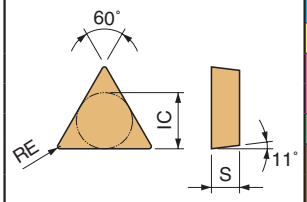
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page B15

60° Triangle / Positive without Hole

(mm)

Description	IC	S	D1
TP_0902_	5.56	2.38	-
TP_1103_	6.35	3.18	-
TP_1603_	9.525	3.18	-



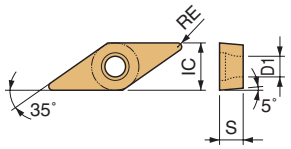
| | | |

How to read pages of "Turning Inserts" See Page **B15**

(mm)

Description	IC	S	D1
VB_1103_	6.35	3.18	2.8
VB_1604_	9.525	4.76	4.4

35° Rhombic / Positive with Hole



		Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide														PVD Coated Carbide						DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
Insert Handed Insert shows Left-hand	Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Finishing	VBMT 110302PP 110304PP 110308PP	0.2 0.4 0.8	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●	● ● ●			● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●			● ● ●			● ● ●						
	VBMT 160404PP 160408PP 160412PP	0.4 0.8 1.2	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●	● ●			● ● ●	● ● ●	● ● ●	● ● ●	● ● ●												● ● ●			● ● ●			● ● ●						
Finishing	VBMT 110304GP	0.4	●	●	●		●	●	●	▲		●	●	●	●	●		●	●									●	●					●						
	VBMT 160404GP 160408GP	0.4 0.8	● ●	● ●	● ●		● ●	● ●	● ●	▲ ▲		●	● ●	● ●	● ●	● ●		● ●	● ●									● ●	● ●											
Finishing	VBMT 110302VF 110304VF 110308VF	0.2 0.4 0.8	● ● ●	● ● ●		● ● ●	● ● ●	● ● ●	● ● ●			● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ●	● ● ●	● ● ●	●								● ● ●	● ● ●					● ● ●					1	
	VBMT 160402VF 160404VF 160408VF 160412VF	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●		● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	▲ ▲		● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ●	● ● ● ●	● ● ● ●	● ●								● ● ● ●	● ● ●										Ref. to the table below	
Finishing - Medium	VBMT 110304HQ 110308HQ	0.4 0.8	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	▲ ▲	● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ●	● ● ● ●	● ● ● ●	● ●	● ●	● ●						● ● ● ●	● ● ●					● ● ●						
	VBMT 160404HQ 160408HQ 160412HQ	0.4 0.8 1.2	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	▲ ▲ ▲	● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ●	● ●	● ● ● ●	● ● ● ●	● ●	● ●	● ●						● ● ● ●	● ● ●											
Finishing	Super Fine VBET 1103003R-FSF 1103003L-FSF	0.03 0.03			●																								●										
	110301R-FSF 110301L-FSF	0.1 0.1			●																								●										
	110302R-FSF 110302L-FSF	0.2 0.2			●																								●										2	
	VBET 1103005MR-FSF 1103005ML-FSF	<0.05 <0.05																												●									
	110301MR-FSF 110301ML-FSF	<0.1 <0.1																												●									
	110302MR-FSF 110302ML-FSF	<0.2 <0.2																												●									
	Sharp Edge / Precision																																						

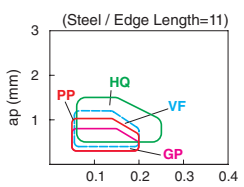
· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

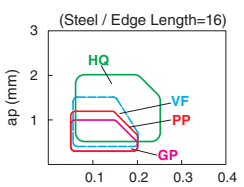
Insert Description	See Page for Applicable Toolholders
VB..1103 type	**E36,E37,E38,E45,F54,F56,F59**
VB..1604 type	**E37,E38,F54,F56,F59**

Applicable Chipbreaker Range

ap indicates radius

1





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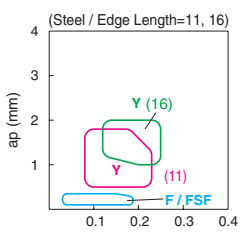


● : Std. Item ▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

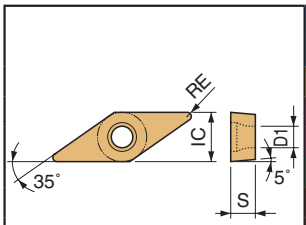
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

35° Rhombic / Positive with Hole

(mm)

Description	IC	S	D1
VB_1103_	6.35	3.18	2.8
VB_1604_	9.525	4.76	4.4



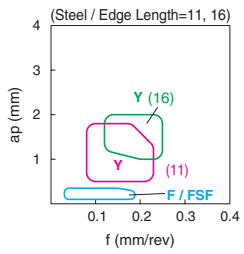
		Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet				CVD Coated Carbide															PVD Coated Carbide						DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
Insert Handed Insert shows Left-hand	Description	RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Finishing	VBET 1103005MR-F	<0.05																										●					●					
	1103005ML-F	<0.05																										●					●					
	110301MR-F	<0.1		●				●	●																		●	●					●					
	110301ML-F	<0.1		●				●	●																			●					●					
	110302MR-F	<0.2	●	●			●	●	●																			●	●					●					
	110302ML-F	<0.2	●	●			●	●	●																			●	●					●					
Sharp Edge																																							
Finishing	VBGT 1103003R-F	0.03																												●							●		
	1103003L-F	0.03																												●							●		
	110301R-F	0.1		●	●			●	●																					●							●		
	110301L-F	0.1			●																									●							●		
	110302R-F	0.2		●	●			●	●																					●							●		
	110302L-F	0.2			●																									●							●		
Sharp Edge																																							
Finishing	VBGT 1103005MR-F	<0.05																													●								Ref. to the table below	1
	1103005ML-F	<0.05																													●									
	110301MR-F	<0.1																													●									
	110301ML-F	<0.1																													●									
	110302MR-F	<0.2																													●									
	110302ML-F	<0.2																													●									
Sharp Edge																																							
Finishing - Medium	VBET 1103005MR-Y	<0.05																										●					●					
	1103005ML-Y	<0.05																										●					●					
	110301MR-Y	<0.1																										●					●					
	110301ML-Y	<0.1																										●					●					
	110302MR-Y	<0.2	●	●			●	●	●																			●					●					
	110302ML-Y	<0.2	●	●			●	●	●																			●					●					
	110304MR-Y	<0.4	●	●			●	●	●																			●					●					
	110304ML-Y	<0.4	●	●			●	●	●																			●					●					
Sharp Edge																																							

● Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Insert Description	See Page for Applicable Toolholders
VB..1103 type	**E36,E37,E38,E45,F54,F56,F59**
VB..1604 type	**E37,E38,F54,F56,F59**

Applicable Chipbreaker Range
ap indicates radius

1



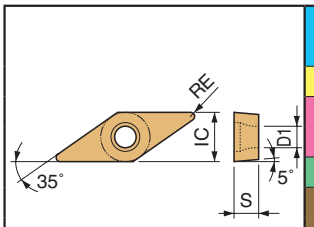
Inserts are sold in 10 piece boxes

● : Std. Item

35° Rhombic / Positive with Hole

(mm)

Description	IC	S	D1
VB_1103_	6.35	3.18	2.8
VB_1604_	9.525	4.76	4.4



		Cermet			CVD Coated Cermet	PVD Coated Cermet				CVD Coated Carbide															PVD Coated Carbide							DLC		Carbide			
Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing - Medium	VBGT 1103003R-Y	0.03																											●							●		Ref. to the table below	1
	1103003L-Y	0.03																											●							●			
	110301R-Y	0.1		●	●			●	●																				●							●			
	110301L-Y	0.1			●																								●							●			
	110302R-Y	0.2		●	●			●	●																				●							●			
	110302L-Y	0.2		●	●			●	●																				●							●			
	110304R-Y	0.4		●	●			●	●																				●							●			
	110304L-Y	0.4		●	●			●	●																				●							●			
	110308R-Y	0.8			●																								●							●			
	110308L-Y	0.8			●																								●							●			
	VBGT 160402R-Y	0.2	●	●	●		●	●	●																				●							●			
	160402L-Y	0.2	●	●	●		●	●	●																				●							●			
	160404R-Y	0.4	●	●	●		●	●	●																				●							●			
	160404L-Y	0.4	●	●	●		●	●	●																				●							●			
	160408R-Y	0.8			●																								●							●			
	160408L-Y	0.8			●																								●							●			
	VBGT 1103005MR-Y	<0.05																									●			●									
	1103005ML-Y	<0.05																												●									
	110301MR-Y	<0.1																									●			●									
	110301ML-Y	<0.1																												●									
	110302MR-Y	<0.2																									●			●									
	110302ML-Y	<0.2																												●									
	110304MR-Y	<0.4																									●			●									
	110304ML-Y	<0.4																												●									
	110308MR-Y	<0.8																									●			●									
	110308ML-Y	<0.8																												●									
	VBGT 160402MR-Y	<0.2																									●			●									
	160402ML-Y	<0.2																												●									
	160404MR-Y	<0.4																									●			●									
	160404ML-Y	<0.4																												●									
	160408MR-Y	<0.8																												●									
	160408ML-Y	<0.8																												●									

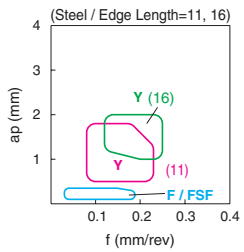
· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Insert Description	See Page for Applicable Toolholders
VB..1103 type	**E36,E37,E38,E45,F54,F56,F59**
VB..1604 type	**E37,E38,F54,F56,F59**

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item

Inserts are sold in 10 piece boxes

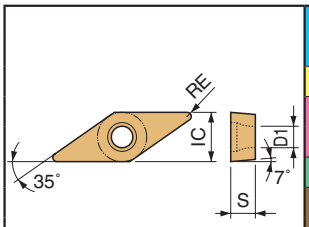
35° Rhombic / Positive with Hole

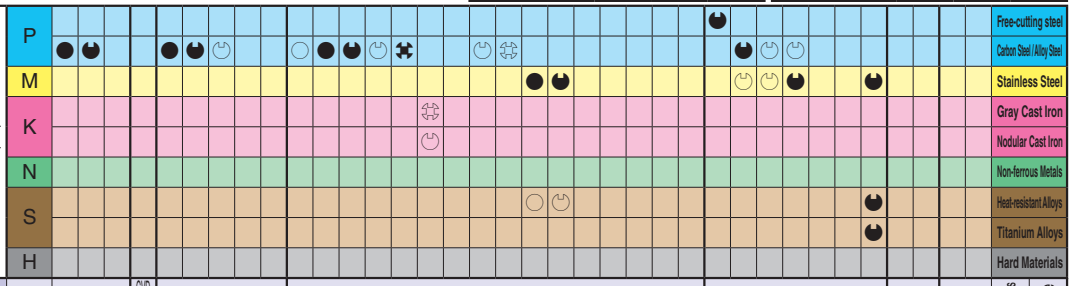
(mm)

Description	IC	S	D1
VC_0802_	4.76	2.38	2.3

(mm)

Description	IC	S	D1
VC_1103_	6.35	3.18	2.8
VC_1604_	9.525	4.76	4.4





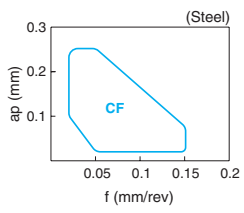
Insert		Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	 Sharp Edge / Polished	VCGT 110301MP-CF	<0.1																										●					●						1
		VCGT 110302MP-CF	<0.2																										●					●						
Finishing	 Sharp Edge / Polished	VCGT 110301MFP-GF	<0.1																										●	●				●				E39 E40 E45		2
		VCGT 110302MFP-GF	<0.2																										●	●				●						
Finishing	NEW  Sharp Edge / Polished	VCGT 110301MFP-SKS	<0.1																										●	●				●						3
		VCGT 110302MFP-SKS	<0.2																										●	●				●						
		VCGT 110304MFP-SKS	<0.4																										●	●				●						
Finishing		VCMT 080202PP	0.2	●	●		●	●	●	●			●	●	●	●	●													●		●			●				E45 F54 F56 F59		
		VCMT 080204PP	0.4	●	●		●	●	●	●			●	●	●	●	●													●		●			●						
		VCMT 160404PP	0.4	●	●		●	●	●	●			●	●	●	●	●													●		●			●				-		4
		VCMT 160408PP	0.8	●	●		●	●	●	●			●	●	●	●	●													●		●			●						
Finishing		VCMT 080202VF	0.2	●	●		●	●	●	●				●	●	●		●	●											●	●				●				E45 F54		
		VCMT 080204VF	0.4	●	●		●	●	●	●			●	●	●	●	●	●	●	●										●	●				●						
Finishing - Medium		VCMT 080202HQ	0.2	●	●	●	●	●	●	●				●	●	●		●	●											●	●				●				E56 F59		
		VCMT 080204HQ	0.4	●	●	●	●	●	●	●	▲		●	●	●	●	●	●	●	●	●	●								●	●				●						

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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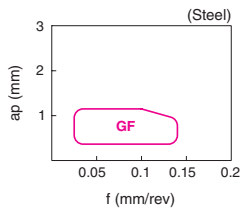

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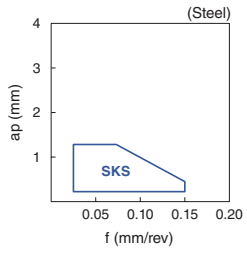

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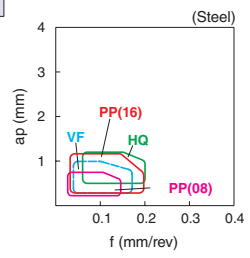


Inserts are sold in 10 piece boxes

● : Std. Item ▲ :To be replaced by a new product

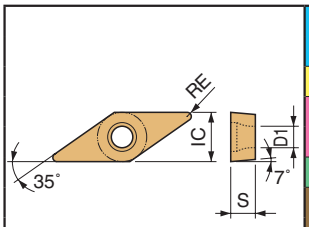
35° Rhombic / Positive with Hole

(mm)

Description	IC	S	D1
VC_0802_	4.76	2.38	2.3

(mm)

Description	IC	S	D1
VC_1103_	6.35	3.18	2.8
VC_1604_	9.525	4.76	4.4



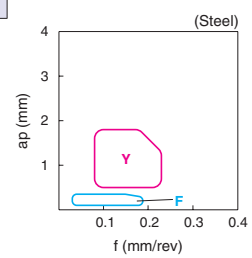
		Insert	Description	Dimension (mm)	Cermet			CVD Coated Cermet	PVD Coated Cermet					CVD Coated Carbide															PVD Coated Carbide						DLC		Carbide		See Page for Applicable Toolholders	Applicable Chipbreaker Range
		Handed Insert shows Left-hand		RE	TN610	TN620	TN60	CCX	PV710	PV720	PV730	PV90	PV7005	CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	PDL010	PDL025	KW10	SW05		
Finishing	Sharp Edge		VCET 110301MR-F	<0.1																									●					●						
			110301ML-F	<0.1																									●					●						
			110302MR-F	<0.2																									●					●						
			110302ML-F	<0.2																									●					●						
			110304MR-F	<0.4																									●					●						
			110304ML-F	<0.4																									●					●						
Finishing - Medium	Sharp Edge		VCET 1103005MR-Y	<0.05																									●					●				E39 E40 E45	1
			1103005ML-Y	<0.05																									●					●						
			110301MR-Y	<0.1																									●					●						
			110301ML-Y	<0.1																									●					●						
			110302MR-Y	<0.2																									●					●						
			110302ML-Y	<0.2																									●					●						
			110304MR-Y	<0.4																									●					●						
			110304ML-Y	<0.4																									●					●						
Non-ferrous Metals	Finishing / Sharp Edge		VCGT 160404AP	0.4																														●			●		2
Non-ferrous Metals	Finishing - Medium / Sharp Edge		VCGT 160404R-A3	0.4																														●	●	●		E37 E38 F54 F56 F59	3
			160404L-A3	0.4																														●	●	●			
			160408R-A3	0.8																														●	●	●			
			160408L-A3	0.8																														●	●	●			
Non-ferrous Metals	Finishing - Medium / Sharp Edge		VCGT 160404AH	0.4																														●	●	●			

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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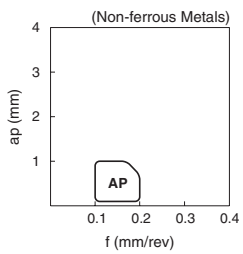

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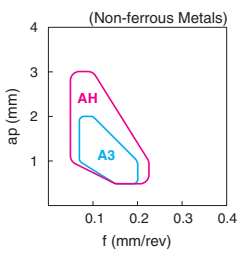


● : Std. Item

Inserts are sold in 10 piece boxes

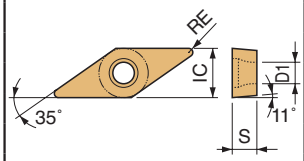
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

35° Rhombic / Positive with Hole

(mm)

Description	IC	S	D1
VP_0802_	4.76	2.38	2.3
VP_1103_	6.35	3.18	2.8



		Insert	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
P																																								
M																																								
K																																								
N																																								
S																																								
H																																								
Free-cutting steel																																								
Carbon Steel / Alloy Steel																																								
Stainless Steel																																								
Gray Cast Iron																																								
Nodular Cast Iron																																								
Non-ferrous Metals																																								
Heat-resistant Alloys																																								
Titanium Alloys																																								
Hard Materials																																								
Minute ap	Sharp Edge / Polished	VPGT 110301MP-CF	<0.1																									●	●		●			●	●	●			1	
		VPGT 110302MP-CF	<0.2																									●	●		●			●	●	●				
Minute ap	Sharp Edge	VPGT 110302CF	0.2																											●										
Finishing	Sharp Edge / Polished	VPGT 110301MFP-GF	<0.1																									●	●		●			●				2	
		VPGT 110302MFP-GF	<0.2																									●	●		●			●					
Finishing	NEW Sharp Edge / Polished	VPGT 110301MFP-SKS	<0.1																									●	●					●				3	
		VPGT 110302MFP-SKS	<0.2																									●	●					●					
		VPGT 110304MFP-SKS	<0.4																									●	●					●					
Finishing	Sharp Edge / Polished	VPGT 080201MP-CK	<0.1																									●	●		●			●	●	●				
		VPGT 080202MP-CK	<0.2																									●	●		●			●	●	●				
Finishing	Sharp Edge / Polished	VPGT 110301MP-CK	<0.1																									●	●		●			●	●	●				4
		VPGT 110302MP-CK	<0.2																									●	●		●			●	●	●				
Finishing		VPGT 080201CK	0.1																											●										
		VPGT 080202CK	0.2																											●										
Finishing		VPGT 110301CK	0.1																											●										
		VPGT 110302CK	0.2																											●										

Ref. to the table below

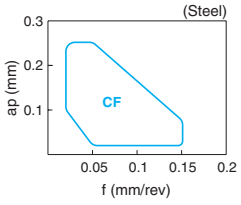
· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Insert Description	See Page for Applicable Toolholders
VP..0802 type	**E41,E42,F54**
VP..1103 type	**E25,E41,E42**

Applicable Chipbreaker Range

ap indicates radius

1



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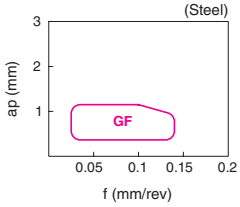

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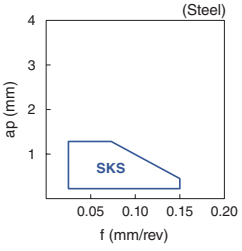

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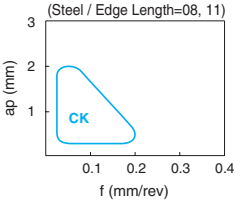


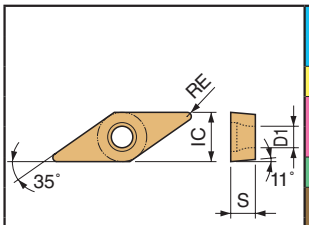
Inserts are sold in 10 piece boxes

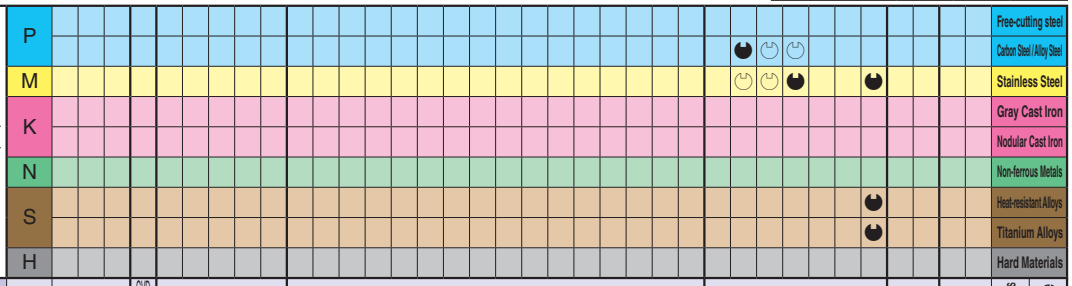
● : Std. Item

(mm)

Description	IC	S	D1
VP_0802_	4.76	2.38	2.3
VP_1103_	6.35	3.18	2.8

35° Rhombic / Positive with Hole





Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing Super Fine	VPET 080201R-FSF	0.1			●																									●									
	080201L-FSF	0.1			●																									●									
	080202R-FSF	0.2			●																									●									
	080202L-FSF	0.2			●																									●									
	VPET 1103003R-FSF	0.03																												●									
	110301R-FSF	0.1			●																									●									
	110301L-FSF	0.1			●																									●									
	110302R-FSF	0.2			●																									●									
	110302L-FSF	0.2			●																									●									
	VPET 080201MR-FSF	<0.1																														●								
	080201ML-FSF	<0.1																														●								
	080202MR-FSF	<0.2																														●								
	080202ML-FSF	<0.2																														●								
	VPET 1103005MR-FSF	<0.05																														●								
	1103005ML-FSF	<0.05																														●								
	110301MR-FSF	<0.1																														●								
	110301ML-FSF	<0.1																														●								
	110302MR-FSF	<0.2																														●								
Sharp Edge / Precision	110302ML-FSF	<0.2																														●								
Finishing	VPET 080201MR-F	<0.1																											●						●					
	080201ML-F	<0.1																											●						●					
	080202MR-F	<0.2																											●						●					
	080202ML-F	<0.2																											●						●					
Sharp Edge	VPET 1103005MR-F	<0.05																											●						●					
	110301MR-F	<0.1																											●						●					
	110302MR-F	<0.2																											●						●					
	110302ML-F	<0.2																											●						●					

Ref. to the table below **B94**

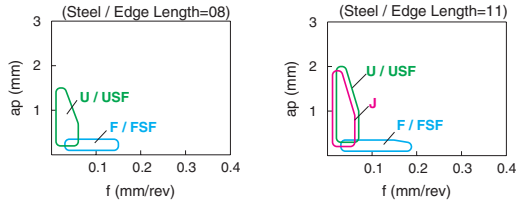
1

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



● : Std. Item

Inserts are sold in 10 piece boxes

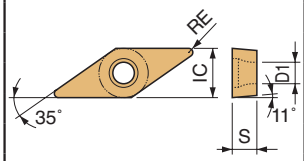
Turning Indexable Inserts

How to read pages of "Turning Inserts" See Page **B15**

35° Rhombic / Positive with Hole

(mm)

Description	IC	S	D1
VP_0802_	4.76	2.38	2.3
VP_1103_	6.35	3.18	2.8



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert Handed Insert shows Left-hand	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CA515	CA025P	CA525	CA530	CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA310	CA315	CA320	CA4505	CA4515	PVD Coated Carbide PR1705	PR1725	PR930	PR1225	PR005S	PR015S	PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Low Feed Super Fine Sharp Edge / Precision	VPET 080201FR-USF	0.1																												●											
	080201FL-USF	0.1																												●											
	080202FR-USF	0.2			●																									●											
	080202FL-USF	0.2			●																									●											
	VPET 1103003FR-USF	0.03																												●											
	1103003FL-USF	0.03																												●											
	110301FR-USF	0.1			●																									●											
	110301FL-USF	0.1			●																									●											
	110302FR-USF	0.2			●																									●											
	110302FL-USF	0.2			●																									●											
	VPET 080201MFR-USF	<0.1																														●										
	080202MFR-USF	<0.2																														●										
	080202MFL-USF	<0.2																														●										
	VPET 1103005MFR-USF	<0.05																														●										
	1103005MFL-USF	<0.05																														●										
	110301MFR-USF	<0.1																														●										
	110301MFL-USF	<0.1																														●										
	110302MFR-USF	<0.2																														●										
	110302MFL-USF	<0.2																														●										
Low Feed Sharp Edge	VPET 080201MFR-U	<0.1																											●						●						
	080201MFL-U	<0.1																											●						●						
	080202MFR-U	<0.2																											●						●						
	080202MFL-U	<0.2																											●						●						
	VPET 1103005MFR-U	<0.05																											●						●						
	1103005MFL-U	<0.05																											●						●						
	110301MFR-U	<0.1																											●						●						
	110301MFL-U	<0.1																											●						●						
	110302MFR-U	<0.2																											●						●						
	110302MFL-U	<0.2																											●						●						
Low Feed Sharp Edge	VPET 1103005MFR-J	<0.05																											●			●			●						
	110301MFR-J	<0.1																											●			●			●						
	110301MFL-J	<0.1																											●			●			●						
	110302MFR-J	<0.2																											●			●			●						
	110302MFL-J	<0.2																											●			●			●						

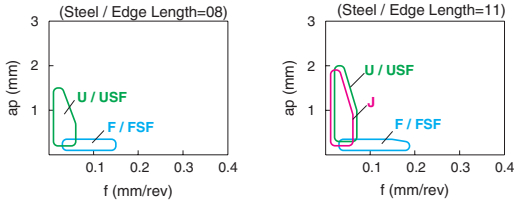
Ref. to the table below **B94**

1

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range
ap indicates radius

1



Inserts are sold in 10 piece boxes

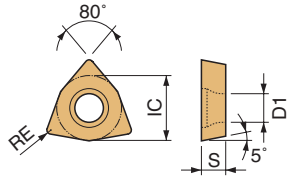
● : Std. Item

How to read pages of "Turning Inserts" See Page **B15**

80° Trigon / Positive with Hole

(mm)

Description	IC	S	D1
WB_0601_	3.97	1.59	2.3
WB_0802_	4.76	2.38	2.3



P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

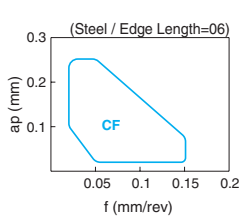
Insert (Handed Insert shows Left-hand)	Description	RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Minute ap	WBGT 060101MPR-CF	<0.1																											●					●						
	060101MPL-CF	<0.1																											●		●			●						
	060102MPR-CF	<0.2																											●		●			●						1
Sharp Edge / Polished	060102MPL-CF	<0.2																											●		●			●						
Finishing	WBGT 060101MFPR-PF	<0.1																												●					●					
	060101MFPL-PF	<0.1																												●					●					
	060102MFPR-PF	<0.2																												●					●					
	060102MFPL-PF	<0.2																												●					●					
	WBGT 080201MFPR-PF	<0.1																												●					●					2
	080201MFPL-PF	<0.1																												●					●					
	080202MFPR-PF	<0.2																												●					●					
	080202MFPL-PF	<0.2																												●					●					
Finishing	WBMT 060102R-DP	0.2		●	●	●		●	●																					●	●				●					
	060102L-DP	0.2	●	●	●	●	●	●	●			●	●	●	●			●	●											●	●				●					
	060104R-DP	0.4		●	●	●		●	●																					●	●				●					
	060104L-DP	0.4	●	●	●	●	●	●	●				●	●	●				●	●										●	●				●					
	WBMT 080202R-DP	0.2		●	●	●		●	●											●										●	●				●					F25 F61
	080202L-DP	0.2	●	●	●	●	●	●	●				●	●	●	●				●										●	●				●					
	080204R-DP	0.4		●	●	●		●	●										●	●										●	●				●					
	080204L-DP	0.4	●	●	●	●	●	●	●			●	●	●	●	●			●	●										●	●				●					
Finishing	WBET 0601005ML-F	<0.05																												●					●					
	060101MR-F	<0.1																												●					●					
	060101ML-F	<0.1																											●	●					●					3
	060102MR-F	<0.2	●				●																							●					●					
	060102ML-F	<0.2	●	●			●	●	●																				●	●					●					
	060104MR-F	<0.4	●				●																							●					●					
	060104ML-F	<0.4	●	●			●	●	●																				●	●					●					
	WBET 080201MR-F	<0.1	●				●																																	
	080201ML-F	<0.1	●				●																							●					●					
	080202MR-F	<0.2	●				●																																	
	080202ML-F	<0.2	●	●			●	●	●																					●					●					
	080204MR-F	<0.4	●				●																							●					●					
Sharp Edge	080204ML-F	<0.4	●	●			●	●	●																					●					●					

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range

ap indicates radius

1



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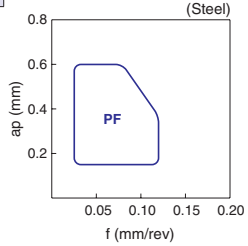

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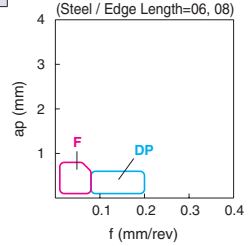


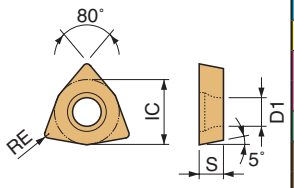
● : Std. Item

Inserts are sold in 10 piece boxes

80° Trigon / Positive with Hole

(mm)

Description	IC	S	D1
WB_0601_	3.97	1.59	2.3
WB_0802_	4.76	2.38	2.3



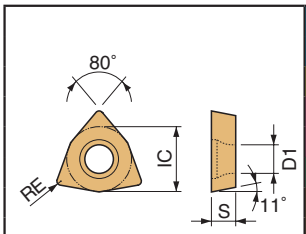
| | | |

How to read pages of "Turning Inserts" See Page **B15**

80° Trigon / Positive with Hole

(mm)

Description	IC	S	D1
WP_1102_	6.35	2.38	2.8
WP_1603_	9.525	3.18	4.4



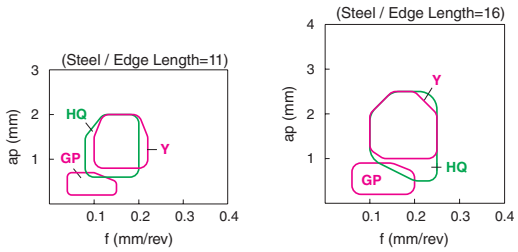
P Free-cutting steel / Carbon Steel / Alloy Steel
M Stainless Steel
K Gray Cast Iron / Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant Alloys / Titanium Alloys
H Hard Materials

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) RE	Cermet TN610	Cermet TN620	Cermet TN60	CVD Coated Cermet CCX	PVD Coated Cermet PV710	PVD Coated Cermet PV720	PVD Coated Cermet PV730	PVD Coated Cermet PV90	PVD Coated Cermet PV7005	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA025P	CVD Coated Carbide CA525	CVD Coated Carbide CA530	CVD Coated Carbide CA5505	CVD Coated Carbide CA5515	CVD Coated Carbide CA5525	CVD Coated Carbide CA5535	CVD Coated Carbide CA6515	CVD Coated Carbide CA6525	CVD Coated Carbide CA310	CVD Coated Carbide CA315	CVD Coated Carbide CA320	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR1705	PVD Coated Carbide PR1725	PVD Coated Carbide PR930	PVD Coated Carbide PR1225	PVD Coated Carbide PR005S	PVD Coated Carbide PR015S	PVD Coated Carbide PR1535	DLC PDL010	DLC PDL025	Carbide KW10	Carbide SW05	See Page for Applicable Toolholders	Applicable Chipbreaker Range
Finishing	WPMT 110204GP	0.4		●	●			●	●					●	●				●										●	●										
Finishing	WPMT 160304GP	0.4		●	●			●	●				●	●	●			●	●										●										
Finishing - Medium	WPMT 110202HQ	0.2		●	●	●		●	●				●	●	●				●										●	●										
	110204HQ	0.4	●	●	●	●	●	●	●				●	●	●			●	●		●	●							●	●									
Finishing - Medium	WPMT 160304HQ	0.4	●	●	●	●	●	●	●				●	●	●			●	●		●	●							●	●									
	160308HQ	0.8	●	●	●	●	●	●	●				●	●	●	●		●	●	●	●	●							●	●									1
Finishing - Medium	WPGT 110202L-Y	0.2			●																									●						●			
	110204R-Y	0.4																												●									
	110204L-Y	0.4			●																									●						●		F61	
Finishing - Medium	WPGT 160304R-Y	0.4			●																																		
	160304L-Y	0.4			●																									●						●			
	160308L-Y	0.8																												●						●			
	WPGT 110204MR-Y	<0.4																											●										
	110204ML-Y	<0.4																											●	●									
Cast Iron	WPGW 110202	0.2																																			●			
	110204	0.4																																			●			
Cast Iron	WPGW 160304	0.4																																			●			
Without Chipbreaker	160308	0.8																																			●			

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **< 0.05, < 0.1, < 0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Applicable Chipbreaker Range
ap indicates radius

1



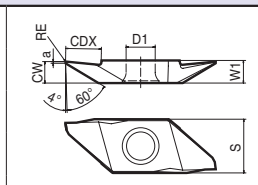
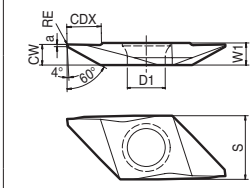
● : Std. Item

Inserts are sold in 10 piece boxes

Inserts for Back Turning (Small Parts Machining)

P	Free-cutting steel					See Page for Applicable Toolholders
	Carbon Steel / Alloy Steel	●	○	○		
M	Stainless Steel	○	●	○		
K	Gray Cast Iron				●	
	Nodular Cast Iron				○	
N	Non-ferrous Metals				●	
S	Heat-resistant Alloys	○	●	○		
	Titanium Alloys		●		○	
H	Hard Materials					

For KTKF toolholder

Insert (Photo shows Right-hand)	Description		Dimension (mm) CW	a	CDX	RE	W1	S	D1	MEGACOAT NANO PLUS PR1725	MEGACOAT MEGACOAT NANO PR1535	MEGACOAT MEGACOAT NANO PR1225	Carbide KW10	
  ●Right-hand shown	TKFB	12R15005M	1.5	0.25	2.6	<0.05	3.0	8.7	5.2	●	●	●	●	E13
		12R28005M	2.8	0.3	4.6	<0.05				●	●	●	●	
		12R28010M				<0.1				●	●	●	●	
	TKFB	16R38005M	3.8	0.3	6.3	<0.05	4.0	9.5	5.2	●	●	●	●	
		16R38010M				<0.1				●	●	●	●	
 ●Left-hand shown	TKFB	12L28005MR	2.8	0.3	4.6	<0.05	3.0	8.7	5.2		●	●		
		12L28010MR				<0.1					●	●		
	TKFB	16L38005MR	3.8	0.3	6.3	<0.05	4.0	9.5	5.2		●	●		
		16L38010MR				<0.1					●	●		

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **< 0.05, < 0.1, < 0.2** etc.) indicate models with minus tolerance on corner-R(RE).

Inserts Identification System (Ref. to Tables 1 and 2)

TKFB 12 R 15 005 M R

- TKFB — Insert Type
- 12 — Insert Size
- R — Insert Hand (R : Right-hand, L : Left-hand)
- 15 — Insert width
- 005 — Corner-R(RE)
- M — Indicates the corner-R(RE) has a minus tolerance
- R — Hand of Cutting Lead Angle (R : Right-hand)

Table 1

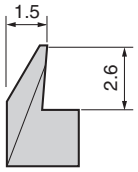
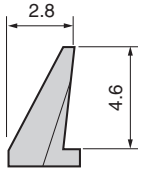
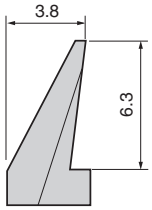
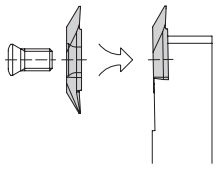
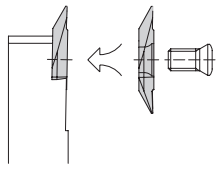
Small machining	General purpose	Large machining
		
TKFB12R15..	TKFB12R28..	TKFB16R38..

Table 2

Toolholder	Right-hand	Toolholder	Left-hand
Insert	Right-hand	Insert	Left-hand
Lead angle	Right-hand	Lead angle	Right-hand
			

Inserts are sold in 10 piece boxes

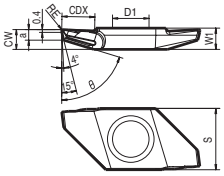
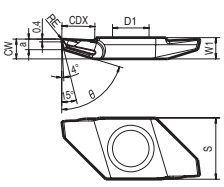
● : Std. Item

How to read pages of "Turning Inserts" See Page B15

P	Free-cutting steel			
	Carbon Steel / Alloy Steel	●	○	○
M	Stainless Steel	○	●	○
K	Gray Cast Iron			
	Nodular Cast Iron			
N	Non-ferrous Metals			
S	Heat-resistant Alloys	○	●	○
	Titanium Alloys		●	
H	Hard Materials			

See Page for Applicable Toolholders

For KTKF toolholder (GQ Chipbreaker)

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) CW	a	CDX	RE	W1	S	D1	θ	MEGACOAT NANO PLUS PR1725	MEGACOAT MEGACOAT NANO PR1535	PR1225	See Page for Applicable Toolholders
 Polished		TKFB 12R28005P-GQ	2.8	1.5	4.6	0.05	3.0	8.7	5.2	74°	●	●	●	E13
		12R28015P-GQ				0.15					●	●	●	
		TKFB 16R38005P-GQ	3.8	1.8	6.3	0.05	4.0	9.5	5.2	72°	●	●	●	
		16R38015P-GQ				0.15					●	●	●	
		TKFB 12R28005-GQ	2.8	1.5	4.6	0.05	3.0	8.7	5.2	74°	●	●	●	
		12R28015-GQ				0.15					●	●	●	
		TKFB 16R38005-GQ	3.8	1.8	6.3	0.05	4.0	9.5	5.2	72°	●	●	●	
		16R38015-GQ				0.15					●	●	●	

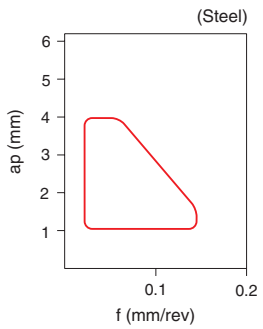
Inserts Identification System

TKFB 12 R 28 005 P -GQ

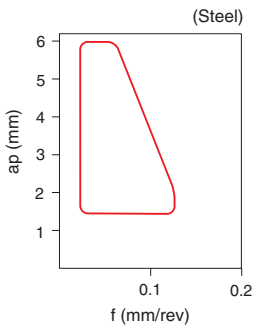
- TKFB — Insert Type
- 12 — Insert Size
- R — Insert Hand (R : Right-hand)
- 28 — Insert width
- 005 — Corner-R(RE)
- P — Polished
- -GQ — GQ Chipbreaker

Applicable Chipbreaker Range

TKFB12R28...GQ



TKFB16R38...GQ



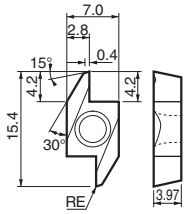
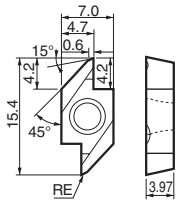
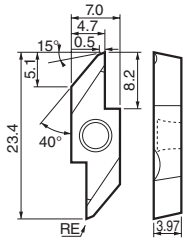
● : Std. Item

Inserts are sold in 10 piece boxes

Inserts for Back Turning (Small Parts Machining)

P	Free-cutting steel	●
	Carbon Steel / Alloy Steel	● ◔ ◔
M	Stainless Steel	◔ ● ◔
K	Gray Cast Iron	●
	Nodular Cast Iron	◔
N	Non-ferrous Metals	●
S	Heat-resistant Alloys	◔ ●
	Titanium Alloys	●
H	Hard Materials	

● For AABS / SABS / AABW / SABW toolholders

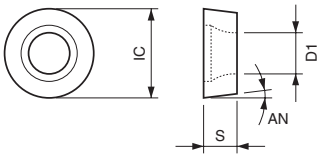
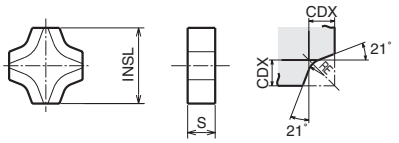
Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) RE	Cermet TC60M	MEGACOAT NANO PLUS PR1705	MEGACOAT NANO PLUS PR1725	MEGACOAT PR1225	PVD Coated Carbide PR930	Carbide KW10	See Page for Applicable Toolholders
		**ABS**	**15R4005** **15R4015**	0.05 0.15	● ●				● ●	● ●	**E21**
		ABS	**15R4005M** **15R4015M**	<0.05 <0.15		● ●	● ●	● ●			
		**ABW**	**15R4005** **15R4015**	0.05 0.15	● ●				● ●	● ●	**E22**
		ABW	**15R4005M** **15R4015M**	<0.05 <0.15		● ●	● ●	● ●			
		**ABW**	**23R5005** **23R5015**	0.05 0.15	● ●				● ●	● ●	**E23**
		ABW	**23R5005M** **23R5015M**	<0.05 <0.15		● ●	● ●	● ●			

· Insert whose corner-R(RE) dimension expressed with less than sign (e.g. **< 0.05, < 0.1, < 0.2** etc.) indicate models with minus tolerance on corner-R(RE).

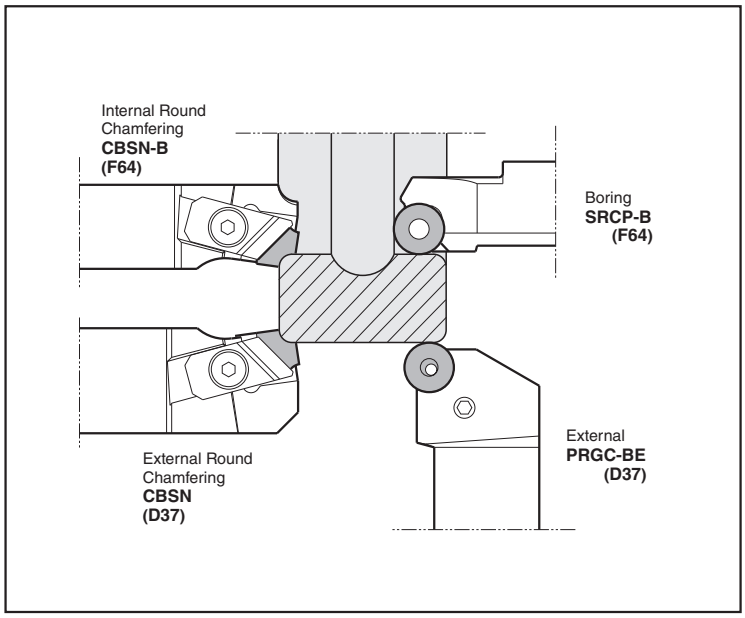
Inserts are sold in 10 piece boxes

● : Std. Item

Bearing Machining

Insert		Description		Dimension (mm) IC	S	D1	RE	Relief Angle AN	Cermet TN90	See Page for Applicable Toolholders
External/Boring/Facing	 	**RCMT**	**1204M0-BB**	12.0	4.76	4.2	-	7°	●	**D37**
			1606M0-BB	16.0	6.35	5.5			●	
		RPMT	**1203M0-BB**	12.0	3.18	4.4	-	11°	●	**F64**
			1604M0-BB	16.0	4.76	5.5			●	
Round Chamfering	 			INSL	S	CDX	RE			
		SNMF	**120406-21**	12.70	4.76	1.5	0.6	-	●	**D37** **F64**
			120410-21			3.0	1.0		●	
			120416-21			3.1	1.6		●	
			120421-21			3.2	2.1		●	
			120426-21			3.3	2.6		●	

Tooling for Bearing Machining



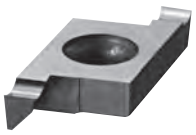
● : Std. Item

Inserts are sold in 10 piece boxes

Turning Indexable Inserts

Micro Boring

● Twin-Bars

Micro Boring	Micro Face Grooving
TWB Twin-Bars ➡ **F38**	TWFG Twin-Bars ➡ **G82**
	
TWBT Twin-Bars ➡ **F39**	TWFGT Twin-Bars ➡ **G83**
	

● EZ Bars / System Tip-Bars

Micro Boring		Micro Back Boring
EZB EZ Bars ➡ **F14**	EZVB EZ Bars ➡ **F20**	EZBT EZ Bars ➡ **F22**
		
VNB-S / VNB System Tip-Bars ➡ **F32**	VNBX-S System Tip-Bars ➡ **F36**	VNBT System Tip-Bars ➡ **F33**
		

Micro Boring（90°Lead Angle）
EZBF EZ Bars ➡ **F19**


Solid Tip-Bars [Grooving / Threading]

Micro Grooving	Micro Face Grooving	Micro Internal Threading
EZG EZ Bars ➡ **G51**	EZFG EZ Bars ➡ **G78**	EZT EZ Bars ➡ **J32**
		
VNG System Tip-Bars ➡ **G53**	VNFG System Tip-Bars ➡ **G80**	VNT System Tip-Bars ➡ **J36**
		

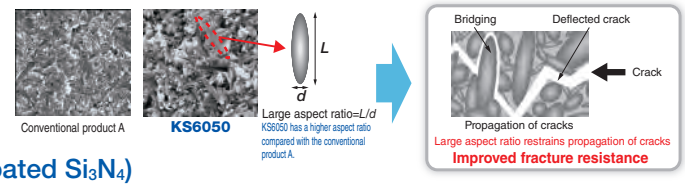
High Speed Machining for Cast Iron KS6015/KS6050/CS7050

KS6015

Crystallization of Grain Boundary Phase Improves Thermal Conductivity
Excellent Wear Resistance with Reduced Heat at the Cutting Edge

- Improved fracture resistance by high aspect ratio constituents
- Anti-chipping in scale processing and interrupted machining

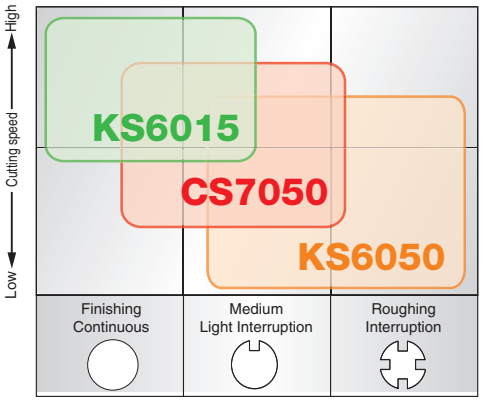
KS6050



CS7050 (Coated Si_3N_4)

Superior wear resistance attained with strong coating adherence
Applicable to high speed machining

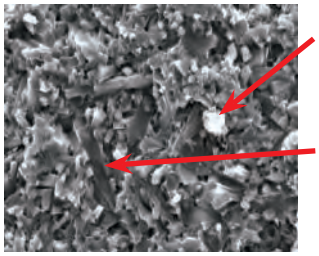
Application Map



Heat-Resistant Alloys Machining SiAlON Ceramic KS6030/KS6040

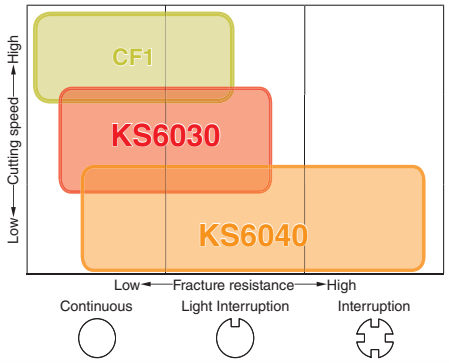
- Improved wear and fracture resistance due to the mixture of the hard and acicular particles

Superior balance in heat resistant alloys machining achieves optimum balance between wear and fracture resistance



Application Map

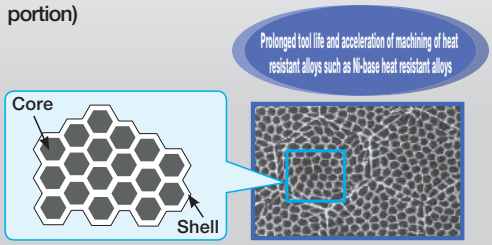
・Heat-Resistant Alloys Machining



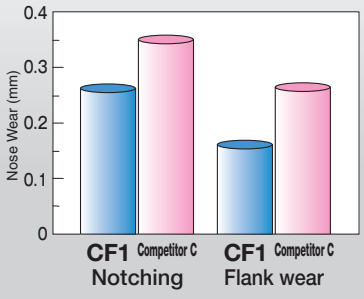
Heat-Resistant Alloys Machining Honeycomb structure Ceramic CF1

What is Honeycomb structure Ceramic?

Honeycomb structure Ceramic is a composite material consisting of a core (gray portion) and shell (white portion)



Wear Resistance Comparison(Internal evaluation)





<Cutting Conditions>
Workpiece Material Ni-base heat-resistant alloys
Tool geometry : RNGN120400
Vc =150m/min, ap =1mm
f =0.15mm/rev Wet

Ceramic Inserts Identification System

Identification System

C	N	G	A	12	04	04	S01525

"Turning Indexable Inserts Identification System" See Page B2

Edge Prep.
(Ref. to the Table 1)

Edge Preparation Identification System

Table 1

Edge Prep.	Symbol	Cutting Edge Spec.	Example		Shape
	S	Chamfered and Honed Cutting Edge	S01525	0.15mm x 25° Chamfered and Honed Cutting Edge	
	T	Chamfered Cutting Edge	T02025	0.20mm x 25° Chamfered Cutting Edge	

See Page B3 for insert color

80° Rhombic / Negative

(mm)

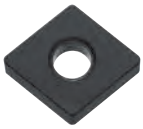
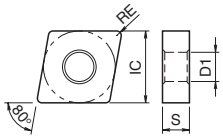
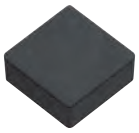
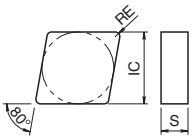
Description	IC	S	D1
CN_A 1204_	12.70	4.76	5.16
CN_N 1204_	12.70	4.76	-
1207_		7.94	

(mm)

Description	IC	S	D1
CNGN1607_	15.875	7.94	-
CNGX1207_	12.70	7.94	-

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm x 25° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	● ◔ ◔ ◔ ◔ ● ✱ ◔
	Gray Cast Iron (Without Scale)	● ◔ ◔ ◔ ◔ ● ◔ ◕
	Nodular Cast Iron (With Scale)	◔
	Nodular Cast Iron (Without Scale)	◔
S	Heat-resistant Alloys	✱ ◕
H	Hard Materials	○ ● ◔

Insert	Description		Edge Prep.	Dimension (mm) RE	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6015	KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	See Page for Applicable Toolholders
 	CNGA	120412S01025	S01025	1.2	●											D8 D9 F65 F69 F70
	CNGA	120404S01525	S01525	0.4				●								
		120408S01525		0.8				●								
		120412S01525		1.2				●								
	CNGA	120404S02025	S02025	0.4					●							
		120408S02025		0.8					●							
		120412S02025		1.2					●							
	CNGA	120404S03030	S03030	0.4				●								
		120408S03030		0.8				●								
		120412S03030		1.2				●								
	CNGA	120404T02025	T02025	0.4			▲		●							
		120408T02025		0.8		●	▲		●	●	●	●				
		120412T02025		1.2		●	▲		●	●	●	●				
	CNMA	120408S01525	S01525	0.8				●								
	CNMA	120408S03030	S03030	0.8				●								
		120412S03030		1.2				●								
 	CNGN	120408S01025	S01025	0.8	●											D26
		120412S01025		1.2	●											
	CNGN	120408T01020	T01020	0.8										●	▲	
		120412T01020		1.2											▲	
	CNGN	120408T02025	T02025	0.8					●	●				●		
		120412T02025		1.2					●	●	●					
		120416T02025		1.6							●					
	CNGN	120708S01525	S01525	0.8				●								
		120712S01525		1.2				●								
	CNGN	120708T01020	T01020	0.8											▲	
		120712T01020		1.2											▲	
	CNGN	120704T02025	T02025	0.4		●										
		120708T02025		0.8		●										
		120712T02025		1.2		●										
		120716T02025		1.6		●										
	CNGN	160708T02025	T02025	0.8		●										
		160712T02025		1.2		●										
		160716T02025		1.6		●										
	CNMN	120708T02025	T02025	0.8		●										
		120712T02025		1.2		●										

Inserts are sold in 10 piece boxes

● : Std. Item ▲ : To be replaced by a new product

How to read pages of "Turning Inserts" See Page **B15**

55˚ Rhombic / 75˚ Rhombic / Negative

(mm)

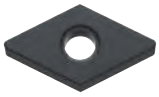
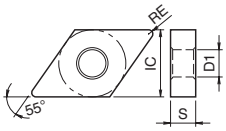
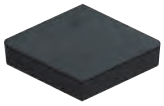
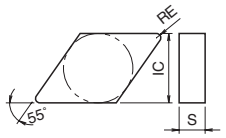
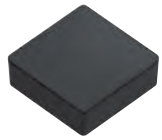
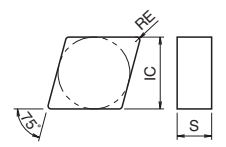
Description	IC	S	D1
DNGA 1504_	12.70	4.76	5.16
1506_		6.35	
DNGN 1504_	12.70	4.76	-
1507_		7.94	

(mm)

Description	IC	S	D1
DNGX 1207_	10.00	7.94	-
DNGX 1507_	12.70	7.94	-
ENGN 1307_	12.70	7.94	-

Edge Prep.		
Symbol	Cutting Edge Spec.	Example
S	Chamfered and Honed Cutting Edge	S01225 0.12mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215 0.12mm x 15° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	●
	Gray Cast Iron (Without Scale)	●
	Nodular Cast Iron (With Scale)	○
	Nodular Cast Iron (Without Scale)	○
S	Heat-resistant Alloys	○
H	Hard Materials	●

Insert	Description		Edge Prep.	Dimension (mm) RE	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6015	KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SIAION Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	See Page for Applicable Toolholders
		DNGA 150408S01025	S01025	0.8	●											
		DNGA 150404S01525	S01525	0.4				●								D12
		DNGA 150408S01525		0.8				●								D12
		DNGA 150404S02025	S02025	0.4					●							D13
		DNGA 150408S02025		0.8					●							F66
		DNGA 150408S03030	S03030	0.8				●								F72
		DNGA 150404T02025	T02025	0.4		●			●							F73
		DNGA 150408T02025		0.8		●	▲		●							F73
		DNGA 150412T02025		1.2			▲		●							F73
		DNGA 150604T02025	T02025	0.4					●							D12
		DNGA 150608T02025		0.8			▲		●							D13
		DNGA 150612T02025		1.2					●							F66
		DNGN 150704S01525	S01525	0.4				●								D27
		DNGN 150708S01525		0.8				●								D27
		DNGN 150712S01525		1.2				●								D27
		DNGN 150708S02025	S02025	0.8					●							D27
		DNGN 150704T02025	T02025	0.4		●										D27
		DNGN 150708T02025		0.8		●										D27
		DNGN 150712T02025		1.2		●										D27
		DNGN 150716T02025		1.6		●										D27
		ENGN 130708S01525	S01525	0.8				●								D27
		ENGN 130712S01525		1.2				●								D27
		ENGN 130704T02025	T02025	0.4		●										F81
		ENGN 130708T02025		0.8		●										F81
		ENGN 130712T02025		1.2		●			●							F81
		ENGN 130716T02025		1.6		●										F81
		ENGN 130720T02025		2.0		●										F81

● : Std. Item ▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

Round / Negative

(mm)

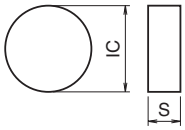
Description	IC	S	D1
RNGN 0903_	9.525	3.18	-
0904_		4.76	
0907_		7.94	
1204_	12.70	4.76	

(mm)

Description	IC	S	D1
RNGN 1207_	12.70	7.94	-
1507_	15.875		
1907_	19.05		
2507_	25.40		

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01225	0.12mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	●
	Gray Cast Iron (Without Scale)	◔ ◔ ◔ ●
	Nodular Cast Iron (With Scale)	◔
	Nodular Cast Iron (Without Scale)	◔
S	Heat-resistant Alloys	● ◔
H	Hard Materials	○ ●

Insert	Description		*Edge Prep.	Dimension (mm) RE	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6015	KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SIALON Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	See Page for Applicable Toolholders
 	RNGN	090300E003	E003	-									●			
		090300T01020	T01020	-									●			
	RNGN	090400S01525	S01525	-				●								D33
		090400S02025	S02025	-					●							
		090400T01020	T01020	-											▲	
		090400T02025	T02025	-		●			●							
	RNGN	090700T01020	T01020	-											▲	-
	RNGN	120400E003	E003	-									●			
		120400S01525	S01525	-				●								
		120400S02025	S02025	-					●							
		120400T01020	T01020	-									●		▲	
		120400T02025	T02025	-		●	▲		●	●	●	●				
	RNGN	120700E003	E003	-									●			D31
		120700E005	E005	-										●		D33
		120700K15015	K15015	-					●							
		120700S01525	S01525	-				●								
		120700S02025	S02025	-					●							
		120700T01020	T01020	-									●	●	▲	
		120700T02025	T02025	-		●	▲		●	●	●					
	RNGN	150700S01525	S01525	-				●								
		150700S02025	S02025	-					●							D31
		150700T02025	T02025	-		●										
	RNGN	190700E003	E003	-									●			-
		190700T01020	T01020	-									●	●		

*For cutting edge "E" and "K", please refer to the table below.

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R-honed Cutting Edge	E005	R0.05mm Honed
K	Double Chamfered Cutting Edges	K15015	1.5mm x 15°Chamfered Cutting Edge

· Note : Symbol "K" describe only the largest chamfer width and its angle.

Inserts are sold in 10 piece boxes

● : Std. Item ▲ : To be replaced by a new product

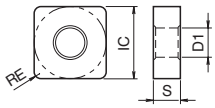
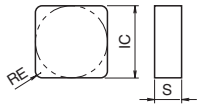
90° Square / Negative

(mm)

Description	IC	S	D1
SN_A1204_	12.70	4.76	5.16
SNGN1204_			-
SNGN1207_		7.94	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01225	0.12mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	✖
	Gray Cast Iron (Without Scale)	●
	Nodular Cast Iron (With Scale)	◔
	Nodular Cast Iron (Without Scale)	◔
S	Heat-resistant Alloys	✖
H	Hard Materials	○

Insert		Description		Edge Prep.	Dimension (mm) RE	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6015	KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	See Page for Applicable Toolholders
		SNGA	120408S01525	S01525	0.8				●								D14 D15 F75
			120412S01525		1.2				●								
		SNGA	120408S02025	S02025	0.8					●							
			120412S02025		1.2					●							
		SNGA	120408T02025	T02025	0.8		●			●	●	●					
			120412T02025		1.2		●			●	●	●					
			120416T02025		1.6					●	●	●	●				
		SNMA	120408S03030	S03030	0.8				●								
		SNGN	120408S01025	S01025	0.8	●											D29 D34 D35
			120412S01025		1.2	●											
			120416S01025		1.6	●											
			120420S01025		2.0	●											
		SNGN	120408S01525	S01525	0.8				●								
			120412S01525		1.2				●								
			120416S01525		1.6				●								
		SNGN	120408S02025	S02025	0.8					●							
			120412S02025		1.2					●							
			120416S02025		1.6					●							
		SNGN	120416S03030	S03030	1.6				●								
		SNGN	120408T00520	T00520	0.8		●										
		SNGN	120408T01020	T01020	0.8										▲		
			120412T01020		1.2										●	▲	
			120416T01020		1.6											▲	
			120420T01020		2.0											▲	
		SNGN	120404T02025	T02025	0.4		●			●							
			120408T02025		0.8		●	▲		●	●						
			120412T02025		1.2		●	▲		●	●	●	●				
			120416T02025		1.6		●			●	●	●					
			120420T02025		2.0		●				●	●					
		SNGN	120708S01025	S01025	0.8	●											
			120712S01025		1.2	●											
			120716S01025		1.6	●											
		SNGN	120704S01525	S01525	0.4				●								
			120708S01525		0.8				●								
			120712S01525		1.2				●								
			120716S01525		1.6				●								
			120720S01525		2.0				●								
		SNGN	120708S02025	S02025	0.8					●							
			120712S02025		1.2					●							
			120716S02025		1.6					●							
			120720S02025		2.0					●							
		SNGN	120708T01020	T01020	0.8											▲	
			120712T01020		1.2											▲	
			120716T01020		1.6											▲	
			120720T01020		2.0											▲	

● : Std. Item ▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

90° Square / Negative

(mm)

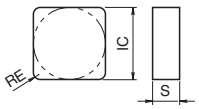
Description	IC	S	D1
SN_N1207_	12.70	7.94	-
SNGN1507_	15.875	7.94	

(mm)

Description	IC	S	D1
SNGX1207_	12.70	7.94	-
SNGX1507_	15.875	7.94	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01225	0.12mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15° Chamfered Cutting Edge

		Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		CVD Coated Silicon Nitride Ceramic	SIALON Ceramic		Honeycomb structure Ceramic	
		KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1	
K	Gray Cast Iron (With Scale)						●	✱					
	Gray Cast Iron (Without Scale)		◔			◔		◔					
	Nodular Cast Iron (With Scale)												
	Nodular Cast Iron (Without Scale)												
S	Heat-resistant Alloys												
H	Hard Materials					●							

Insert	Description		Edge Prep.	Dimension (mm) RE	KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1	See Page for Applicable Toolholders
		SNGN	120704T02025	T02025	0.4		●									D29 D34 D35 F81
			120708T02025		0.8		●			●						
			120712T02025		1.2		●			●						
			120716T02025		1.6		●			●	●	●				
			120720T02025		2.0		●			●						
		SNMN	120716T02025	T02025	1.6		●									
		SNGN	150712T02025	T02025	1.2		●			●						D29
			150716T02025		1.6		●									

Inserts are sold in 10 piece boxes

● : Std. Item

60° Triangle / Negative

(mm)

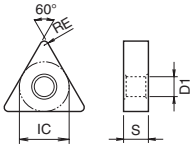
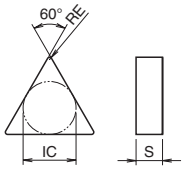
Description	IC	S	D1
TNGA 1604_	9.525	4.76	3.81
TNGN 1103_	6.35	3.18	-

(mm)

Description	IC	S	D1
TNGN 1604_	9.525	4.76	-
1607_		7.94	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm x 25° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	●
	Gray Cast Iron (Without Scale)	●
	Nodular Cast Iron (With Scale)	
	Nodular Cast Iron (Without Scale)	
S	Heat-resistant Alloys	
H	Hard Materials	○

Insert		Description		Edge Prep.	Dimension (mm)	Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	SIAION Ceramic		Honeycomb structure Ceramic	See Page for Applicable Toolholders
					RE	KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1	
		TNGA	160408S01025	S01025	0.8	●											D16 D17 D18 F66 F76 F77
		TNGA	160404S01525 160408S01525 160412S01525	S01525	0.4 0.8 1.2				● ● ●								
		TNGA	160404S02025 160408S02025 160412S02025	S02025	0.4 0.8 1.2					● ● ●							
		TNGA	160408S03030	S03030	0.8				●								
		TNGA	160408T00520	T00520	0.8	●											
		TNGA	160404T02025 160408T02025 160412T02025	T02025	0.4 0.8 1.2		● ●	▲ ▲ ▲		● ● ●	● ●	● ● ●	● ●				
		TNGN	110304T00520 110308T00520 110312T00520	T00520	0.4 0.8 1.2		● ● ●			● ●							D36 F81
		TNGN	160404S01025 160408S01025 160412S01025 160416S01025 160420S01025	S01025	0.4 0.8 1.2 1.6 2.0	● ● ● ● ●											D30
		TNGN	160404S01525 160408S01525 160412S01525	S01525	0.4 0.8 1.2				● ● ●								
		TNGN	160404S02025 160408S02025 160412S02025	S02025	0.4 0.8 1.2					● ● ●							
		TNGN	160404T00520 160408T00520 160412T00520	T00520	0.4 0.8 1.2	●	● ●										
		TNGN	160404T02025 160408T02025 160412T02025	T02025	0.4 0.8 1.2		● ●			● ●	● ●	●					
		TNGN	160704T02025 160708T02025 160712T02025 160716T02025 160720T02025	T02025	0.4 0.8 1.2 1.6 2.0		● ● ● ● ●			● ●							

● : Std. Item ▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

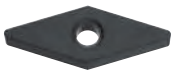
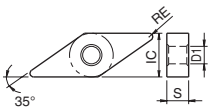
35° Rhombic / Negative

(mm)

Description	IC	S	D1
VN_A1604_	9.525	4.76	3.81

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm x 25° Chamfered Cutting Edge

K	Gray Cast Iron (With Scale)	○
	Gray Cast Iron (Without Scale)	○
	Nodular Cast Iron (With Scale)	○
	Nodular Cast Iron (Without Scale)	●
S	Heat-resistant Alloys	○
H	Hard Materials	●

Insert	Description	Edge Prep.	Dimension (mm) RE	Aluminum Oxide Ceramic KA30	A65	KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6015	KS6050	CVD Coated Silicon Nitride Ceramic CS7050	SiAlON Ceramic KS6030	KS6040	Honeycomb structure Ceramic CF1	See Page for Applicable Toolholders
	VNGA 160404S01525	S01525	0.4				●								D19 D20 D21 D22
	VNGA 160408S01525		0.8				●								
	VNGA 160404S02025	S02025	0.4					●							
	VNGA 160408S02025		0.8					●							
	VNGA 160404T02025	T02025	0.4		●	▲		●							
	VNGA 160408T02025		0.8		●	▲		●							
	VNGA 160412T02025		1.2					●							
	VNMA 160408S01525	S01525	0.8				●								

Inserts are sold in 10 piece boxes

● : Std. Item ▲ : To be replaced by a new product

Positive

(mm)

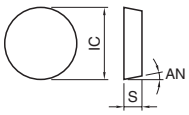
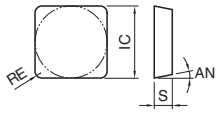
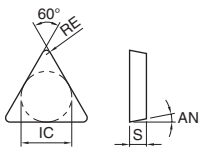
Description	IC	S	AN
RPGN 0903_	9.525	3.18	11°
RPGN 1204_	12.70	4.76	
SPGN 0903_	9.525	3.18	
SPGN 1203_	12.70	3.18	

(mm)

Description	IC	S	AN
TBGN 0601_	3.97	1.59	5°
TCGN 1604_	9.525	4.76	7°
TPGN 0902_	5.56	2.38	11°
1103_	6.35	3.18	
1603_	9.525		

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm x 25° Chamfered Cutting Edge

		Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	SIAlON Ceramic		Honeycomb structure Ceramic	
		KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1
K	Gray Cast Iron (With Scale)		○	○		●						
	Gray Cast Iron (Without Scale)		○	○		●						
	Nodular Cast Iron (With Scale)											
	Nodular Cast Iron (Without Scale)											
S	Heat-resistant Alloys									◕	✱	
H	Hard Materials				○	●						

Insert		Description		*Edge Prep.	Dimension (mm) RE	KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1	See Page for Applicable Toolholders
		RPGN	090300E003	E003	-					●				●			-
			090300T01020	T01020	-					●				●			
		RPGN	120400E003	E003	-					●				●			
			120400T01020	T01020	-					●				●	●		
		SPGN	090308T00820	T00820	0.8		●			●							F62
		SPGN	120308S00820	S00820	0.8				●	●							
		SPGN	120308T00820 120312T00820	T00820	0.8 1.2		● ●										
		TBGN	060104S00820 060108S00820	S00820	0.4 0.8				● ●	● ●							-
		TCGN	160408T00820	T00820	0.8		●										
		TPGN	090204T00820 090208T00820	T00820	0.4 0.8			▲		● ●							F63
		TPGN	110304S00820 110308S00820	S00820	0.4 0.8				● ●	● ●							
		TPGN	110304T00820 110308T00820	T00820	0.4 0.8		● ●			● ●							
		TPGN	160304S00820 160308S00820 160312S00820	S00820	0.4 0.8 1.2				● ● ●	● ●							
		TPGN	160304T00820 160308T00820 160312T00820	T00820	0.4 0.8 1.2		● ● ●			● ●							

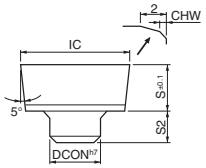
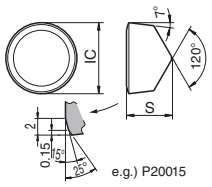
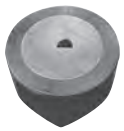
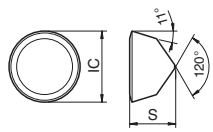
*For cutting edge "E", please refer to the table below.

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R-honed Cutting Edge	E005	R0.05mm Honed

Inserts for Hardened Roll

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered and Honed Cutting Edge	S01525	0.15mm x 25° Chamfered and Honed Cutting Edge
T	Chamfered Cutting Edge	T01525	0.15mm x 25° Chamfered Cutting Edge

		KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1
K	Gray Cast Iron (With Scale)					✱						
	Gray Cast Iron (Without Scale)											
	Nodular Cast Iron (With Scale)											
	Nodular Cast Iron (Without Scale)											
S	Heat-resistant Alloys									●	✱	◔
H	Hard Materials			◔		●						

Insert	Description		*Edge Prep.	Dimension (mm) IC	DCON	S	S2	CHW	See Page for Applicable Toolholders
		RBG 16K20003	K20003	16	8	8	5	0.2	-
		RCGX 060600E003	E003	6.35	-	6.35	-	-	-
		060600E005	E005						
		060600T01020	T01020						
		090700E003	E003	9.525	-	8	-	-	
		090700P20015	P20015						
		090700S01020	S01020						
		090700T01020	T01020						
		120700E003	E003	12.7	-	8	-	-	
		120700P20015	P20015						
		120700S01020	S01020						
		120700T01020	T01020						
		RPGX 060600E003	E003	6.35	-	6.35	-	-	-
		060600T01020	T01020						
		090700E003	E003	9.525	-	8	-	-	
		090700T01020	T01020						
		120700E003	E003	12.7	-	8	-	-	
		120700T01020	T01020						

*For cutting edge "E", "K" and "P" please refer to the table below.

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R-honed Cutting Edge	E005	R0.05mm Honed
K	Double Chamfered Cutting Edges	K20003	2.00mm x 3°Chamfered Cutting Edge
P	Double Chamfered and Honed Cutting Edge	P20015	2.00mm x 15°Chamfered and Honed Cutting Edge

· Note : Symbol "K" and "P" describe only the largest chamfer width and its angle.

RBG Inserts are sold in 1 piece boxes

Inserts are sold in 10 piece boxes

● : Std. Item ▲ : To be replaced by a new product

Grooving Inserts

Edge Prep.					
Symbol	Cutting Edge Spec.	Example			
S	Chamfered and Honed Cutting Edge	S01525	0.15mm x 25° Chamfered and Honed Cutting Edge		
T	Chamfered Cutting Edge	T01525	0.15mm x 25° Chamfered Cutting Edge		

		Aluminum Oxide Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		CVD Coated Silicon Nitride Ceramic	SIALON Ceramic		Honeycomb structure Ceramic	
		KA30	A65	KT66	A66N	PT600M	KS6015	KS6050	CS7050	KS6030	KS6040	CF1	
K	Gray Cast Iron (With Scale)					●							
	Gray Cast Iron (Without Scale)		○			●							
	Nodular Cast Iron (With Scale)												
	Nodular Cast Iron (Without Scale)												
S	Heat-resistant Alloys												
H	Hard Materials				○	●							

Insert	Description	Edge Prep.	Dimension (mm) CW	RE	INSL	S	See Page for Applicable Toolholders
	GH 4020-05	S01020	4.0	0.5	20	7.5	G46 G70
	4020-05	T01020					
	5020-05	S01020	5.0				
	5020-05	T01020					
	6020-05	T01020	6.0				
	7020-05	T01020	7.0				

● : Std. Item

Inserts are sold in 10 piece boxes



CBN & PCD Tools

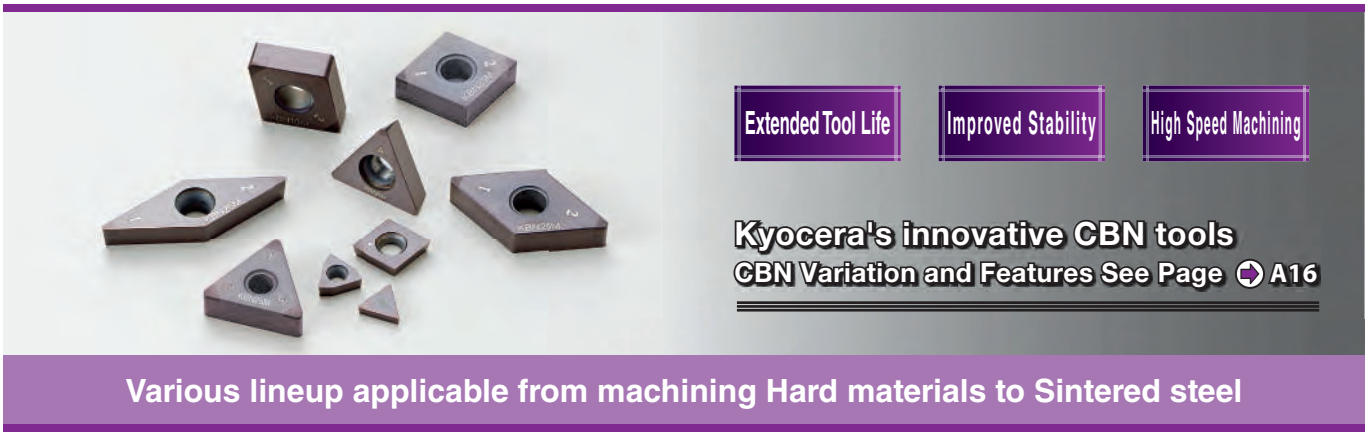
C1~C36

C

CBN Tools		C2~C21
Identification System		C2
Edge Preparation Identification System		C2
MEGACOAT CBN		C3
Application Map		C4
Recommended Cutting Conditions		C4
Case Studies		C5
Turning Negative Inserts		C6~C13
Turning Positive Inserts		C14~C18
Turning Negative Inserts (Solid)		C19
Grooving Inserts		C20
Solid Tip-Bars for Micro Boring	EZ Bars	C21

PCD Tools		C22~C36
PCD Grades and Features		C22
Identification System		C22
Recommended Cutting Conditions		C22
Turning Negative Inserts		C23
Turning Positive Inserts		C24~C29
Grooving Inserts		C30~C31
For Aluminum Wheel		C31
Turning / Grooving		C32~C33
Solid Tip-Bars for Micro Boring	EZ Bars / System Tip-Bars	C34~C35
Milling Inserts		C36

CBN Tools



Various lineup applicable from machining Hard materials to Sintered steel

Identification System (Turning Insert)

C	N	G	A	12	04	04	S01225	ME

"Turning Indexable Inserts Identification System" See Page B2

Insert Type	Description	Edge Prep.	Manufacture's Option	Edge Length	No. of Edges	Regrinding
Negative	CNGA120404MEF	F	MEF	Short (Small Edge)	2	Not Recommended
	CNGA120404ME4	S01225	ME4		4(Double-sided)	
	CNGA120404S01225ME		ME		2	
	CNGA120404S00545MEP	S00545	MEP		2	
	CNGA120404S01225SE	S01225	SE		1	
	CNMN120404S02020	S02020	Without Indication (Only KBN900)	Long	Plural edge	Possible
Positive	CCMW09T304MEF	F	MEF	Short (Small Edge)	2	Not Recommended
	CCMW09T304T00815ME	T00815	ME		2	
	CCMW09T304S01225MES	S01225	MES		2	
	CCMW09T304T00815SE	T00815	SE		1	

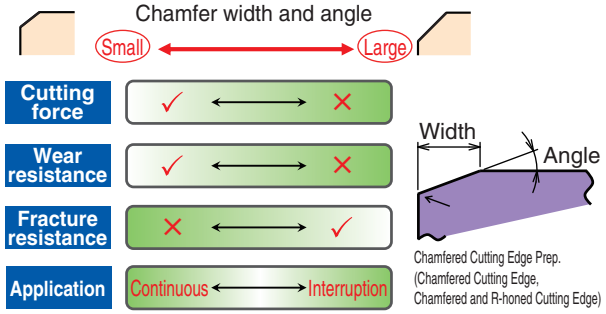
● About Regrinding
1) Regrinding is possible for inserts without any indication in manufacturer's option. Regrinding cannot be available depending on the edge condition.
2) Regrinding is not recommended for inserts with manufacturer's symbol like "ME" or "SE".

Note) 1. See Page **B3** for insert color.

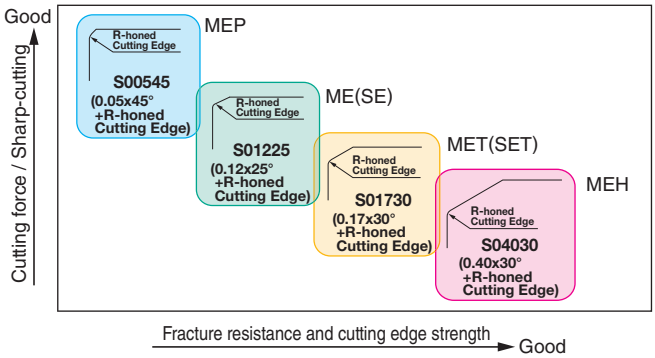
● Edge Preparation Identification System

Edge Prep.				
Symbol	Cutting Edge Spec.	Example		Shape
F	Sharp Edge	F	Sharp Edge	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge	R-honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15˚Chamfered Cutting Edge	0.12, 15°
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25˚Chamfered and R-honed Cutting Edge	0.12, 25°, Honed

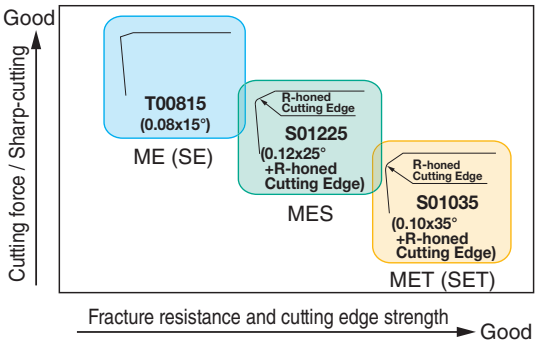
● Features of chamfer width and angle



(1) Standard cutting edge prep. of negative inserts (Machining of hard materials)



(2) Standard cutting edge prep. of positive inserts (Machining of hard materials)



Manufacture's Option	Edge Prep.		Application and Features
MEP	S00545	0.05mm x 45˚+R-honed Cutting Edge	High speed, Continuous Excellent crater wear resistance
ME	S01225	0.12mm x 25˚+R-honed Cutting Edge	General purpose
MET	S01730	0.17mm x 30˚+R-honed Cutting Edge	Superior fracture resistance
MEH	S04030	0.40mm x 30˚+R-honed Cutting Edge	Interrupted high feed machining Prevention of flaking

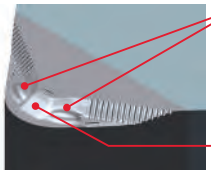
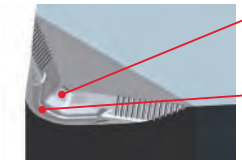
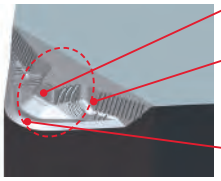
Manufacture's Option	Edge Prep.		Application and Features
ME	T00815	0.08mm x 15˚	Chamfered Sharp-cutting oriented, less burring
MES	S01225	0.12mm x 25˚+R-honed Cutting Edge	General purpose
MET	S01035	0.10mm x 35˚+R-honed Cutting Edge	Interrupted machining Stable machining oriented

CBN Inserts for Machining Hard Materials

H Chipbreaker Series

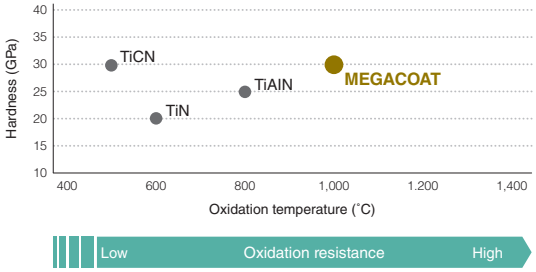
Unique Molded Chipbreaker Provides Excellent Chip Control when Machining Hard Materials

3 Chipbreaker Styles for a Wide Range of Machining Applications

Chipbreaker	Applications	Recommended Cutting Range
HH 1st Choice  Twin Dots: Breaks chips into small pieces. Wide Bump: Provides stable chip curls	Hardened Steel Finishing 55HRC or more	Small D.O.C. (ap = 0.1~0.3 mm)
HL  Wide Bump; Rake Surface: Stable chip control for softer interior of hard materials	Hardened Steel Finishing 55HRC or less	
HD  Wide Bump; Multi-step Structure: Good for a wide range of conditions; Rake Surface: Stable chip control for softer interior of hard materials	Removing the Carburized Layer (From Carburized Layer to Unhardened Layer)	Large D.O.C. (ap = 0.3~0.7 mm)

MEGACOAT CBN

Properties of PVD Coating

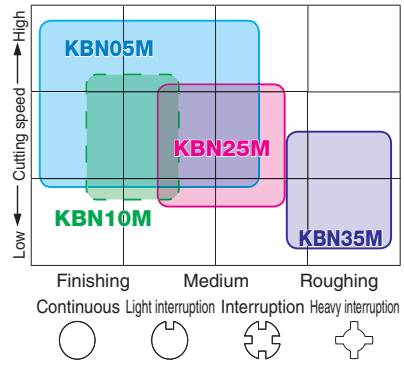


Advantages of MEGACOAT

- Long tool life and stable machining due to superior heat-resistance and hardness
- Stability improvement through prevention of crater wear (oxidation, diffusional wear)
- High thermal stability and surface smoothness provide excellent surface finish

Application Map

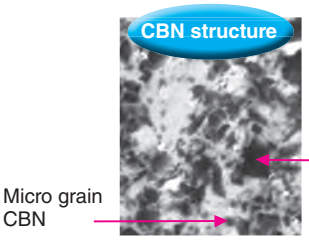
Hard Materials



Hybrid Grain Structure (KBN05M)

Mixed structure of micro grain CBN and coarse grain CBN

CBN that possess high hardness, toughness and thermal resistance characteristics





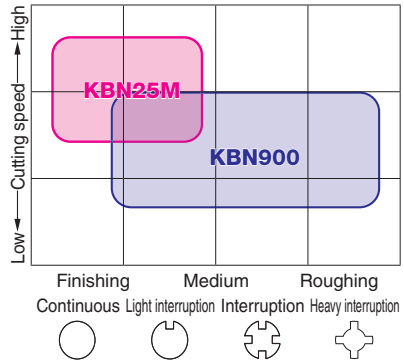
Heat diffusion is promoted by coarse grain CBN
⇒ High thermal conductivity

KBN05M is 1st recommended grade for a wide range of applications from continuous (high speed finishing) to interrupted machining.

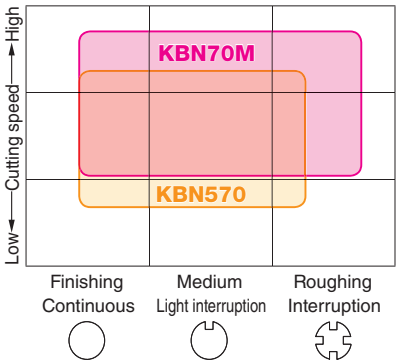
KBN25M : High stability for general machining

KBN35M : Honeycomb structure CBN
Superior fracture resistance in heavy interrupted machining

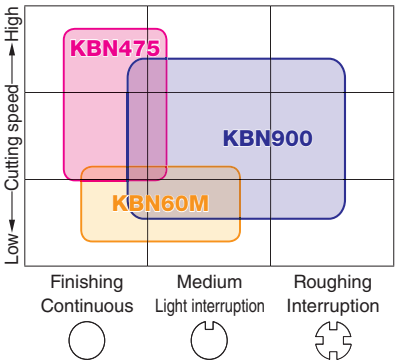
Roll Materials (Chilled Cast Iron)



Sintered Steel



Cast Iron



Recommended Cutting Conditions

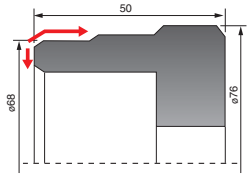
Workpiece Material	Hardness	Applications		Recommended Insert Grade	Cutting Conditions		
					Vc (m/min)	ap (mm)	f (mm/rev)
Hard Materials	55HRC or more	General Finishing	Continuous~Interruption	KBN05M	100 - **150** - 200	0.05 - **0.3** - 0.5	0.05 - **0.08** - 0.1
		HH Chipbreaker for Hardened Steel Finishing	Continuous~Interruption	KBN05M	100 - **150** - 200	0.1 - **0.2** - 0.3	0.1 - **0.15** - 0.25
		High Efficient Stable Machining	Light interruption~Interruption	KBN25M	80 - **120** - 160	0.05 - **0.3** - 0.5	0.05 - **0.08** - 0.1
		Interruption (Small ap)	Interruption~Heavy interruption	KBN35M	60 - **100** - 150	0.05 - **0.2** - 0.4	0.05 - **0.08** - 0.1
		Heavy Machining	Continuous~Interruption	KBN900	70 - **90** - 110	0.5 - **1.0** - 2.0	0.05 - **0.1** - 0.2
	55HRC or less	HL Chipbreaker for Hardened Steel Finishing	Continuous~Interruption	KBN05M	100 - **150** - 200	0.1 - **0.2** - 0.3	0.1 - **0.15** - 0.25
		Finishing	Continuous	*PT600M	60 - **80** - 120	0.2 - **0.5** - 0.7	0.05 - **0.1** - 0.15
	Removing the Carburized Layer	HD Chipbreaker for Removing the Carburized Layer	Continuous~Interruption	KBN05M	100 - **150** - 200	0.3 - **0.5** - 0.7	0.1 - **0.15** - 0.25
Gray Cast Iron	250HB or less	Finishing	Continuous~Light interruption	KBN475	400 - **800** - 1,200	0.05 - **0.2** - 0.5	0.1 - **0.2** - 0.3
		Finishing	Continuous~Light interruption	KBN60M	300 - **500** - 700	0.05 - **0.2** - 0.5	0.1 - **0.2** - 0.3
		High Efficient Finishing	Continuous~Light interruption	KBN900	500 - **900** - 1,200	0.1 - **0.5** - 1.0	0.05 - **0.1** - 0.2
		Heavy Machining	Continuous~Interruption	KBN900	500 - **700** - 900	0.5 - **1.5** - 3.0	0.1 - **0.3** - 0.5
Roll Materials (Chilled Cast Iron)	55HRC or more	Finishing	Continuous~Interruption	KBN25M	80 - **120** - 160	0.05 - **0.3** - 0.5	0.05 - **0.08** - 0.1
		Heavy Machining	Continuous~Interruption	KBN900	70 - **90** - 110	0.3 - **0.7** - 1.0	0.05 - **0.1** - 0.15
Sintered Steel	-	Finishing	Continuous~Light interruption	KBN570	50 - **150** - 250	0.05 - **0.15** - 0.25	0.03 - **0.1** - 0.2
	-	Finishing	Continuous~Interruption	KBN70M	100 - **200** - 250	0.05 - **0.2** - 0.3	0.05 - **0.15** - 0.25

***PT600M : MEGACOAT on Al_2O_3+TiC ceramic**

Case Studies

SCr420H(58HRC)

· Gear
· External , Facing and Chamfering
· Vc=130 m/min
· ap=0.6 mm
· f=0.12 mm/rev
· Wet
· CNGA120408S01225ME (KBN05M)



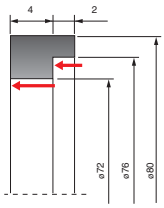
KBN05M	300 pcs/edge
Competitor C	200 pcs/edge

· KBN05M achieved 1.5 times longer tool life than competitor C.
⇒ Its longer tool life contributes to cost-cutting.

(User Evaluation)

SCM415(55HRC)

· Stator
· Boring
· Vc=170 m/min
· ap=0.4 mm
· f=0.1 mm/rev
· Wet
· CNGA120408S01225ME (KBN05M)



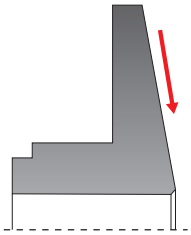
KBN05M	600 pcs/edge
Competitor D	300 pcs/edge

· KBN05M achieved twice longer tool life than competitor D.
⇒ Its longer tool life contributes to cost-cutting.

(User Evaluation)

SCr420H(58HRC)

· Pulley
· Facing (Continuous)
· Vc=120 m/min
· ap=0.15~0.2 mm
· f=0.24 mm/rev
· Wet
· DNGA120408S00545MEP (KBN05M)



KBN05M-MEP (Edge Prep. : 0.05 x 45°)	150 pcs/edge
KBN05M-ME (Edge Prep. : 0.12 x 25°)	100 pcs/edge
Competitor E	100 pcs/edge

· Tool life of KBN05M-ME type (Edge prep. : 0.12 x 25˚Chamfered + R-honed) is the same as competitor E's.
· KBN05M-MEP type (Edge prep. : 0.05 x 45˚Chamfered + R-honed) achieved 1.5 times longer tool life, preventing crater wear.

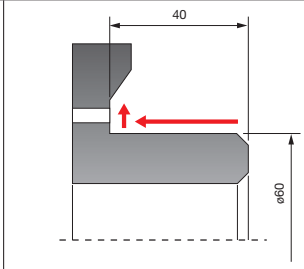


KBN05M-MEP **KBN05M-ME** Competitor E

(User Evaluation)

SCr20(61~65HRC)

· Gear
· External and Facing (Interrupted)
· Vc=120 m/min
· ap=0.15 mm
· f=0.1~0.15mm/rev (External)
· Wet
· CNGA120408S04030MEH (KBN05M)



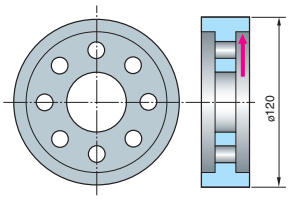
KBN05M-MEH (Edge Prep. : 0.40 x 30°)	150 pcs/edge
Competitor F	100 pcs/edge

· Compared to competitor F, KBN05M-MEH type (Edge prep.: 0.40 x 30˚Chamfered + R-honed) achieved 1.5 times longer tool life.
· No chipping in interrupted machining, and improved productivity. (Competitor F's cutting edge got many chipping)
· Feed rate could be increased from 0.15 to 0.25 mm/rev in facing.
⇒ Achieved cycle time and cost reduction.

(User Evaluation)

SCM420(60HRC)

· Gear
· Facing (Interrupted)
· Vc=90 m/min
· ap=0.5 mm
· f=0.12 mm/rev
· Wet⇒Dry
· CNGA120412S01225ME (KBN25M)



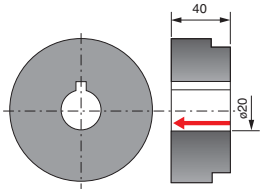
KBN25M	70 pcs/edge
Competitor G	30 pcs/edge (Unstable)

KBN25M improved tool life up to 70 pcs/edge that is two times more than competitor G (CBN tool). Also, KBN25M has increased its tool life up to 250 pcs/edge by changing from wet machining to dry machining.

(User Evaluation)

SCM420(58HRC)

· Sleeve
· Boring (Heavy interruption)
· Vc=100 m/min
· ap=0.5 mm
· f=0.1 mm/rev
· Wet
· TPGB110308S01035MET (KBN35M)



KBN35M	115 pcs/edge
Competitor H	100 pcs/edge

· KBN35M achieved 15% Longer tool life in heavy interrupted machining compared with competitor H.
· Furthermore, it still keeps the insert in a good condition and provides stable machining result.
⇒ Its longer tool life and capability of providing stable result can contribute to cost-cutting and improved efficiency in machining.

(User Evaluation)

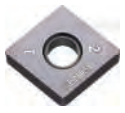
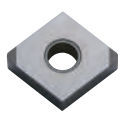
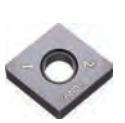
80° Rhombic / Negative

(mm)

Description	IC	S	D1
CNGA 1204_ CNGM 1204_	12.70	4.76	5.16

Edge Prep.		
Symbol	Cutting Edge Spec.	Example
F	Sharp Edge	F Sharp Edge
E	R-honed Cutting Edge	E R-honed Cutting Edge
T	Chamfered Cutting Edge	T01215 0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225 0.12mm x 25° Chamfered and R-honed Cutting Edge

		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570
K	Gray Cast Iron (With Scale)										
K	Gray Cast Iron (Without Scale)					◕				●	
K	Nodular Cast Iron (With Scale)										
H	Hard Materials (Roughing)				✖						
H	Hard Materials (Finishing)	●	○	◕				○	◔		
H	Hard Materials (Chip Control)		●	◕							
	Sintered Steel						✖				◕

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570
 Multi Edge / With Wiper Edge	CNGA 120404S01215MEW	S01215	0.4	2.6	2	●		●				●	●		
	CNGA 120408S01215MEW	S01215	0.8	2.5	2	●	▲	●	●			●	●		
	CNGA 120412S01215MEW	S01215	1.2	2.5	2	●	▲	●							
 Multi Edge / Finishing	CNGA 120404S00545MEP	S00545	0.4	2.6	2	●									
	CNGA 120408S00545MEP	S00545	0.8	2.6	2	●									
	CNGA 120412S00545MEP	S00545	1.2	2.5	2	●									
	CNGA 120416S00545MEP	S00545	1.6	3.4	2	●									
	CNGA 120420S00545MEP	S00545	2.0	3.4	2	●									
	CNGA 120424S00545MEP	S00545	2.4	3.3	2	●									
 Multi Edge / Sharp Edge	CNGA 120404MEF	F	0.4	2.6	2									●	●
	CNGA 120408MEF	F	0.8	2.6	2									●	●
	CNGA 120412MEF	F	1.2	2.5	2									●	
 Multi Edge (Double-sided)	CNGA 120404ME4	S01225	0.4	2.6	4	●									
	CNGA 120408ME4	S01225	0.8	2.6	4	●									
	CNGA 120412ME4	S01225	1.2	2.5	4	●									
 Multi Edge	CNGA 120402S01225ME	S01225	0.2	2.6	2	●		●		●			●		
	CNGA 120404S01225ME	S01225	0.4	2.6	2	●	▲	●	●	●		●	●	●	
	CNGA 120408S01225ME	S01225	0.8	2.6	2	●	▲	●	●	●		●	●	●	
	CNGA 120412S01225ME	S01225	1.2	2.5	2	●	▲	●	●	●			●	●	
	CNGA 120416S01225ME	S01225	1.6	3.4	2	●									
	CNGA 120420S01225ME	S01225	2.0	3.4	2	●									
	CNGA 120424S01225ME	S01225	2.4	3.3	2	●									
	CNGA 120404T01215ME	T01215	0.4	2.6	2						●			●	
	CNGA 120408T01215ME	T01215	0.8	2.6	2						●			●	
	CNGA 120412T01215ME	T01215	1.2	2.5	2						●			●	
 Multi Edge / Tough	CNGA 120404S01730MET	S01730	0.4	2.6	2	●		●	●				●		
	CNGA 120408S01730MET	S01730	0.8	2.6	2	●	▲	●	●				●		
	CNGA 120412S01730MET	S01730	1.2	2.5	2	●		●	●						
	CNGA 120416S01730MET	S01730	1.6	3.4	2	●									
	CNGA 120420S01730MET	S01730	2.0	3.4	2	●									
	CNGA 120424S01730MET	S01730	2.4	3.3	2	●									
 Multi Edge / Interruption	CNGA 120404S04030MEH	S04030	0.4	2.6	2	●									
	CNGA 120408S04030MEH	S04030	0.8	2.6	2	●									
	CNGA 120412S04030MEH	S04030	1.2	2.5	2	●									
	CNGA 120416S04030MEH	S04030	1.6	3.4	2	●									
	CNGA 120420S04030MEH	S04030	2.0	3.4	2	●									
	CNGA 120424S04030MEH	S04030	2.4	3.3	2	●									

See Page for Applicable Toolholders: D8 D9 F65 F69 F70

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

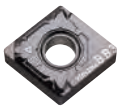
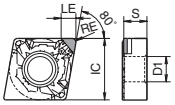
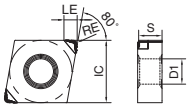
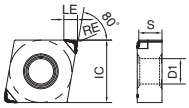
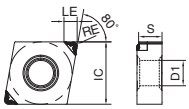
80° Rhombic / Negative

(mm)

Description	IC	S	D1
CNGA 1204_	12.70	4.76	5.16
CNGM 1204_			

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E	R-honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		MEGACOAT CBN						CBN				
		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	
K	Gray Cast Iron (With Scale)											See Page for Applicable Toolholders
	Gray Cast Iron (Without Scale)											
	Nodular Cast Iron (With Scale)											
H	Hard Materials (Roughing)											
	Hard Materials (Finishing)	●		●								
	Hard Materials (Chip Control)	●		●								
	Sintered Steel											

Insert		Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
 Chip Control		**CNGM 120408S00825BB1**	**S00825**	0.8	2.0	1			●								D8 D9 F65 F69 F70
		CNGM 120412S00825BB1		1.2	2.2				●								
		CNGM 120404S01225BB2	**S01225**	0.4	2.2	1			●								
		CNGM 120408S01225BB2		0.8	2.4				●								
		CNGM 120404S01625BB3		0.4	2.6				●								
		CNGM 120408S01625BB3	**S01625**	0.8	2.8	1			●								
		CNGM 120412S01625BB3		1.2	3.0				●								
NEW  Hardened Steel Finishing (55HRC or more)		**CNGM 120404ME-HH**	**E**	0.4	2.6	2	●										
		CNGM 120408ME-HH		0.8	2.6		●										
		CNGM 120412ME-HH		1.2	2.5		●										
NEW  Hardened Steel Finishing (55HRC or less)		**CNGM 120404ME-HL**	**E**	0.4	2.6	2	●										
		CNGM 120408ME-HL		0.8	2.6		●										
		CNGM 120412ME-HL		1.2	2.5		●										
NEW  Removing the Carburized Layer		**CNGM 120404ME-HD**	**S01235**	0.4	2.6	2	●										
		CNGM 120408ME-HD		0.8	2.6		●										
		CNGM 120412ME-HD		1.2	2.5		●										

● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

55° Rhombic / Negative

(mm)

Description	IC	S	D1
DNGA 1504_	12.70	4.76	5.16
1506_		6.35	
DNGM 1504_	12.70	4.76	5.16

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E	R-honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		MEGACOAT CBN						CBN				
		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	
K	Gray Cast Iron (With Scale)											
	Gray Cast Iron (Without Scale)					◕				●		
	Nodular Cast Iron (With Scale)											
H	Hard Materials (Roughing)				✠							
	Hard Materials (Finishing)	●	○	◕				○	◔			
	Hard Materials (Chip Control)		●	◕								
	Sintered Steel						✠				◕	

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
Multi Edge / Finishing	DNGA 150404S00545MEP	S00545	0.4	2.6	2	●										D12 D13 F66 F72 F73
	DNGA 150408S00545MEP		0.8	2.2		●										
	DNGA 150412S00545MEP		1.2	1.9		●										
	DNGA 150416S00545MEP		1.6	3.8		●										
	DNGA 150420S00545MEP		2.0	3.5		●										
	DNGA 150424S00545MEP		2.4	3.1		●										
Multi Edge / Sharp Edge	DNGA 150404MEF	F	0.4	2.6	2									●	●	
	DNGA 150408MEF		0.8	2.2										●	●	
	DNGA 150412MEF		1.2	1.9										●		
Multi Edge (Double-sided)	DNGA 150404ME4	S01225	0.4	2.6	4	●										
	DNGA 150408ME4		0.8	2.2		●										
	DNGA 150412ME4		1.2	1.9		●										
Multi Edge	DNGA 150401S01225ME	S01225	0.1	2.8	2	●		●								
	DNGA 150402S01225ME		0.2	2.7		●		●		●		●	●			
	DNGA 150404S01225ME		0.4	2.6		●	▲	●	●	●		●	●	●		
	DNGA 150408S01225ME		0.8	2.2		●		●	●	●		●	●	●		
	DNGA 150412S01225ME		1.2	1.9		●		●						●		
	DNGA 150416S01225ME		1.6	3.8		●										
	DNGA 150420S01225ME		2.0	3.5		●										
	DNGA 150424S01225ME		2.4	3.1		●										
	DNGA 150404T01215ME	T01215	0.4	2.6	2						●			●		
	DNGA 150408T01215ME		0.8	2.2							●			●		
	DNGA 150412T01215ME		1.2	1.9										●		
	DNGA 150604S01225ME	S01225	0.4	2.6	2	●		●					●			
	DNGA 150608S01225ME		0.8	2.2		●		●	●	●			●			D12
	DNGA 150612S01225ME		1.2	1.9		●			●							D13
	DNGA 150604T01215ME	T01215	0.4	2.6	2						●					F66
	DNGA 150608T01215ME		0.8	2.2							●					
Multi Edge / Tough	DNGA 150404S01730MET	S01730	0.4	2.6	2	●		●	●				●			D12
	DNGA 150408S01730MET		0.8	2.2		●		●	●				●			D13
	DNGA 150412S01730MET		1.2	1.9		●		●	●				●			F66
	DNGA 150416S01730MET		1.6	3.8		●										F72
	DNGA 150420S01730MET		2.0	3.5		●										F73
	DNGA 150424S01730MET		2.4	3.1		●										
	DNGA 150604S01730MET	S01730	0.4	2.6	2	●	▲	●	●							D12
	DNGA 150608S01730MET		0.8	1.9		●	▲	●	●				●			D13
	DNGA 150612S01730MET		1.2	1.9		●			●							F66
Multi Edge / Interruption	DNGA 150404S04030MEH	S04030	0.4	2.6	2	●										D12
	DNGA 150408S04030MEH		0.8	2.2		●										D13
	DNGA 150412S04030MEH		1.2	1.9		●										F66
	DNGA 150416S04030MEH		1.6	3.8		●										F72
	DNGA 150420S04030MEH		2.0	3.5		●										F73
	DNGA 150424S04030MEH		2.4	3.1		●										

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

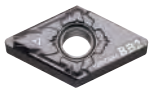
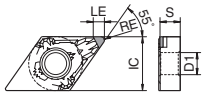
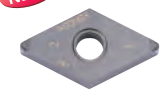
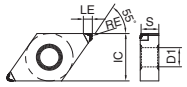
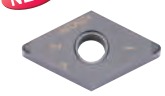
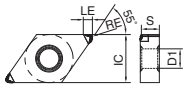
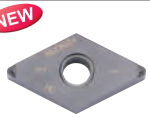
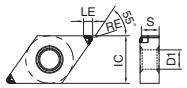
55° Rhombic / Negative

(mm)

Description	IC	S	D1
DNGA 1504_	12.70	4.76	5.16
1506_		6.35	
DNGM 1504_	12.70	4.76	5.16

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E	R-honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		MEGACOAT CBN						CBN				
		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	
K	Gray Cast Iron (With Scale)											See Page for Applicable Toolholders
	Gray Cast Iron (Without Scale)											
	Nodular Cast Iron (With Scale)											
H	Hard Materials (Roughing)											
	Hard Materials (Finishing)	●		●								
	Hard Materials (Chip Control)	●		●								
	Sintered Steel											

Insert		Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
 Chip Control		**DNGM 150408S00825BB1**	**S00825**	0.8	1.6	1			●								
		DNGM 150412S01225BB2	**S01225**	1.2	2.1	1			●								
NEW  Hardened Steel Finishing (55HRC or more)		**DNGM 150404ME-HH**		0.4	2.6		●										**D12 D13 F66 F72 F73**
		150408ME-HH	**E**	0.8	2.2	2	●										
		150412ME-HH		1.2	1.9		●										
NEW  Hardened Steel Finishing (55HRC or less)		**DNGM 150404ME-HL**		0.4	2.6		●										
		150408ME-HL	**E**	0.8	2.2	2	●										
		150412ME-HL		1.2	1.9		●										
NEW  Removing the Carburized Layer		**DNGM 150404ME-HD**		0.4	2.6		●										
		150408ME-HD	**S01235**	0.8	2.2	2	●										
		150412ME-HD		1.2	1.9		●										

● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

How to read pages of "Turning Inserts" See Page **B15**

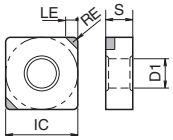
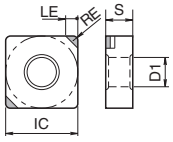
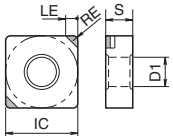
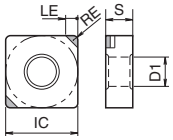
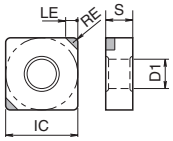
90° Square / Negative

(mm)

Description	IC	S	D1
SNGA 1204_	12.70	4.76	5.16
TNGA 1604_	9.525	4.76	3.81

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570
K	Gray Cast Iron (With Scale)										
K	Gray Cast Iron (Without Scale)									●	
K	Nodular Cast Iron (With Scale)										
H	Hard Materials (Roughing)				✱						
H	Hard Materials (Finishing)	●		◕					◔		
H	Hard Materials (Chip Control)			◕							
	Sintered Steel										

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
 Multi Edge / Finishing		**SNGA 120408S00545MEP**	**S00545**	0.8	1.8	2	●									
		SNGA 120412S00545MEP		1.2	2.2		●									
 Multi Edge / Sharp Edge		**SNGA 120408MEF**	**F**	0.8	1.8	2								●		
		SNGA 120412MEF		1.2	2.2									●		
 Multi Edge		**SNGA 120404S01225ME**	**S01225**	0.4	1.8	2	●		●					●		D14
		SNGA 120408S01225ME		0.8	1.8		●		●				●	●		D15
		SNGA 120412S01225ME		1.2	1.8									●		F75
		SNGA 120408T01215ME	**T01215**	0.8	1.8	2								●		
		SNGA 120412T01215ME		1.2	1.8									●		
 Multi Edge / Tough		**SNGA 120404S01730MET**	**S01730**	0.4	1.8	2	●		●							
		SNGA 120408S01730MET		0.8	1.8		●		●	●			●			
		SNGA 120412S01730MET		1.2	2.2		●		●	●						
 Multi Edge / Interruption		**SNGA 120408S04030MEH**	**S04030**	0.8	1.8	2	●									
		SNGA 120412S04030MEH		1.2	2.2		●									

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes)

(mm)

Description	IC	S	D1
TNGA 1604_ TNGM 1604_	9.525	4.76	3.81

60° Triangle / Negative

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		Gray Cast Iron (With Scale)									
K		Gray Cast Iron (Without Scale)				●				●	
		Nodular Cast Iron (With Scale)									
		Hard Materials (Roughing)			✱						
H		Hard Materials (Finishing)	●	○	◕				○	◔	
		Hard Materials (Chip Control)		●	◕						
		Sintered Steel					✱				◕

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
 Multi Edge / Finishing	TNGA 160404S00545MEP	S00545	0.4	2.7	3	●										D16 D17 D18 F66 F76 F77
	TNGA 160408S00545MEP		0.8	2.4		●										
	TNGA 160412S00545MEP		1.2	2.1		●										
 Multi Edge / Sharp Edge	TNGA 160404MEF	F	0.4	2.7	3									●	●	
	TNGA 160408MEF		0.8	2.4										●	●	
	TNGA 160412MEF		1.2	2.1										●		
 Multi Edge (Double-sided)	TNGA 160404ME6	S01225	0.4	2.7	6	●										
	TNGA 160408ME6		0.8	2.4		●										
	TNGA 160412ME6		1.2	2.1		●										
 Multi Edge	TNGA 160401S01225ME	S01225	0.1	2.9	3	●		●								
	TNGA 160402S01225ME		0.2	2.8		●	▲	●	●	●		●	●			
	TNGA 160404S01225ME		0.4	2.7		●	▲	●	●	●		●	●	●		
	TNGA 160408S01225ME		0.8	2.4		●	▲	●	●	●		●	●	●		
	TNGA 160412S01225ME		1.2	2.1		●		●		●			●	●		
	TNGA 160404T01215ME	T01215	0.4	2.7	3						●			●		
	TNGA 160408T01215ME		0.8	2.4							●			●		
	TNGA 160412T01215ME		1.2	2.1							●			●		
 Multi Edge / Tough	TNGA 160404S01730MET	S01730	0.4	2.7	3	●		●	●				●			
	TNGA 160408S01730MET		0.8	2.4		●		●	●				●			
	TNGA 160412S01730MET		1.2	2.1		●		●	●				●			
 Multi Edge / Interruption	TNGA 160404S04030MEH	S04030	0.4	2.7	3	●										
	TNGA 160408S04030MEH		0.8	2.4		●										
	TNGA 160412S04030MEH		1.2	2.1		●										
 Chip Control	TNGM 160408S00825BB1	S00825	0.8	1.7	1			●								
	TNGM 160408S01225BB2	S01225	0.8	2.1	1			●								

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

CBN & PCD Inserts are sold in 1 piece boxes

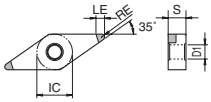
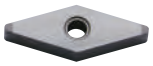
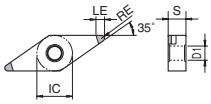
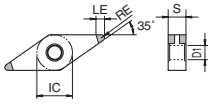
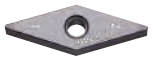
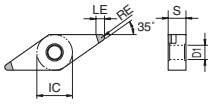
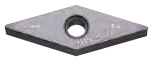
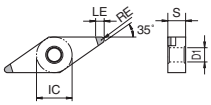
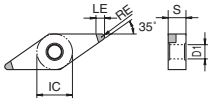
35° Rhombic / Negative

(mm)

Description	IC	S	D1
VNGA 1604_	9.525	4.76	3.81

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570
K	Gray Cast Iron (With Scale)										
	Gray Cast Iron (Without Scale)					◕				●	
	Nodular Cast Iron (With Scale)										
H	Hard Materials (Roughing)				✠						
	Hard Materials (Finishing)	●	○	◕				○	◔		
	Hard Materials (Chip Control)										
	Sintered Steel						✠				◕

Insert		Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
 Multi Edge / Finishing		VNGA 160404S00545MEP	S00545	0.4	2.0	2	●										D19 D20 D21 D22
		VNGA 160408S00545MEP		0.8	1.8		●										
 Multi Edge / Sharp Edge		VNGA 160404MEF	F	0.4	2.0	2									●	●	
		VNGA 160408MEF		0.8	1.8										●		
 Multi Edge (Double-sided)		VNGA 160404ME4	S01225	0.4	2.0	4	●										
		VNGA 160408ME4		0.8	1.8		●										
 Multi Edge		VNGA 160401S01225ME	S01225	0.1	2.6	2		▲	●								
		VNGA 160402S01225ME		0.2	2.3		●	▲	●	●	●		●	●			
		VNGA 160404S01225ME		0.4	2.0		●	▲	●	●	●		●	●	●		
		VNGA 160408S01225ME		0.8	1.8		●		●	●	●				●		
		VNGA 160404T01215ME	T01215	0.4	2.0	2						●			●		
		VNGA 160408T01215ME		0.8	1.8							●			●		
 Multi Edge / Tough		VNGA 160404S01730MET	S01730	0.4	2.0	2	●		●	●				●			
		VNGA 160408S01730MET		0.8	1.8		●		●	●				●			
 Multi Edge / Interruption		VNGA 160404S04030MEH	S04030	0.4	2.0	2	●										
		VNGA 160408S04030MEH		0.8	1.8		●										

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

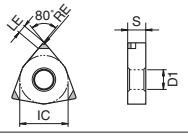
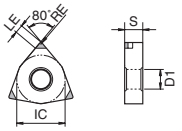
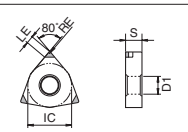
80° Trigon / Negative

(mm)

Description	IC	S	D1
WNGA 0804_	12.70	4.76	5.16

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570
K	Gray Cast Iron (With Scale)										
K	Gray Cast Iron (Without Scale)					◕				●	
K	Nodular Cast Iron (With Scale)										
H	Hard Materials (Roughing)				✠						
H	Hard Materials (Finishing)	●		◕					◔		
H	Hard Materials (Chip Control)										
	Sintered Steel						✠				

Insert		Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN						CBN				See Page for Applicable Toolholders
 Multi Edge / Sharp Edge		**WNGA 080404MEF**	**F**	0.4	2.0	3									●		
		080408MEF		0.8	2.6										●		
 Multi Edge		**WNGA 080404S01225ME**	**S01225**	0.4	2.0	3	●		●	●	●			●	●		**D24** **D25** **F79** **F80**
		080408S01225ME		0.8	2.6		●		●	●	●			●	●		
		080412S01225ME		1.2	2.5		●			●							
		WNGA 080404T01215ME	**T01215**	0.4	2.0	3									●		
		080408T01215ME		0.8	2.6							●			●		
 Multi Edge / Tough		**WNGA 080404S01730MET**	**S01730**	0.4	2.0	3			●	●							
		080408S01730MET		0.8	2.6				●	●							
		080412S01730MET		1.2	2.5					●							

● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

80° Rhombic / Positive

*Thickness of CC_0301_ and CC_0401_ are different (mm)

Description	IC	S	D1
CCMW *0301_	3.5	1.4	1.9
*0401_	4.3	1.8	2.3
0602_	6.35	2.38	2.8
09T3_	9.525	3.97	4.4

(mm)

Description	IC	S	D1
CPGB 0802_	7.94	2.38	3.5
0903_	9.525	3.18	4.5

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

K	Gray Cast Iron (With Scale)	
	Gray Cast Iron (Without Scale)	●
	Nodular Cast Iron (With Scale)	
H	Hard Materials (Roughing)	✖
	Hard Materials (Finishing)	● ○ ◕ ○ ◔
	Hard Materials (Chip Control)	
	Sintered Steel	✖ ◕

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
Multi Edge / Sharp Edge	CCMW 09T304MEF	F	0.4	1.9	2									●	●	Ref. to the table below C15
	09T308MEF		0.8	1.8										●		
Multi Edge	CCMW 060202T00815ME	T00815	0.2	2.0	2	●	▲	●	●			●	●			
	060204T00815ME		0.4	1.9		●	▲	●	●	●		●	●	●		
	060208T00815ME		0.8	1.8		●	▲	●	●	●		●		●		
	CCMW 09T302T00815ME	T00815	0.2	2.0	2	●		●	●	●			●			
	09T304T00815ME		0.4	1.9		●	▲	●	●	●	●	●	●	●		
	09T308T00815ME		0.8	1.8		●	▲	●	●	●	●	●	●	●		
Multi Edge / General Purpose	CCMW 060204S01225MES	S01225	0.4	1.9	2	●										
	060208S01225MES		0.8	1.8		●										
	CCMW 09T304S01225MES	S01225	0.4	1.9	2	●								●		
	09T308S01225MES		0.8	1.8		●								●		
Multi Edge / Tough	CCMW 09T304S01035MET	S01035	0.4	1.9	2	●	▲	●	●				●			
	09T308S01035MET		0.8	1.8		●	▲	●	●							
Small Edge	*CCMW 030102T00815SE	T00815	0.2	1.4	1		▲	●				●	●			F23
	030104T00815SE		0.4	1.4			▲	●				●	●			
	*CCMW 040102T00815SE	T00815	0.2	1.4	1		▲	●				●	●			F41
	040104T00815SE		0.4	1.4			▲	●				●	●			
	CCMW 060202T00815SE	T00815	0.2	2.0	1							●	●			Ref. to the table below C15
	060204T00815SE		0.4	1.9				●				●	●			
	CCMW 09T302T00815SE	T00815	0.2	2.0	1							●	●			
	09T304T00815SE		0.4	1.9			▲					●	●			
Small Edge / Tough	*CCMW 030102S01035SET	S01035	0.2	1.4	1		▲	●								F23
	030104S01035SET		0.4	1.4			▲	●					●			
	*CCMW 040102S01035SET	S01035	0.2	1.4	1		▲	●								F41
	040104S01035SET		0.4	1.4			▲	●					●			
	CCMW 060204S01035SET	S01035	0.4	1.9	1								●			Ref. to the table below C15
	CCMW 09T304S01035SET	S01035	0.4	1.9	1								●			
Multi Edge	CPGB 080204T00815ME	T00815	0.4	1.9	2	●		●				●	●	●		
	CPGB 090302T00815ME	T00815	0.2	1.9	2	●		●				●				
	090304T00815ME		0.4	1.9		●		●	●	●		●	●	●		
	090308T00815ME		0.8	2.5										●		
Multi Edge / General Purpose	CPGB 090304S01225MES	S01225	0.4	1.9	2	●										
	090308S01225MES		0.8	2.5		●										
Multi Edge / Tough	CPGB 080204S01035MET	S01035	0.4	1.9	2			●					●			F43
	080208S01035MET		0.8	2.2				●								
	CPGB 090304S01035MET	S01035	0.4	1.9	2	●	▲	●					●			
	090308S01035MET		0.8	2.5		●		●	●							
Small Edge	CPGB 080202T00815SE	T00815	0.2	1.9	1							●	●			
	080204T00815SE		0.4	1.9								●	●			
	CPGB 090302T00815SE	T00815	0.2	1.9	1							●	●			
	090304T00815SE		0.4	1.9								●	●			
Small Edge / Tough	CPGB 090304S01035SET	S01035	0.4	1.9	1								●			

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

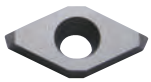
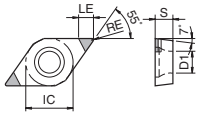
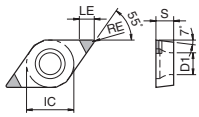
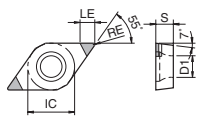
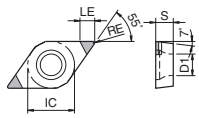
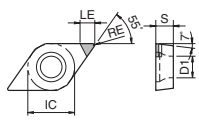
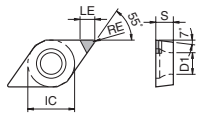
55° Rhombic / Positive

(mm)

Description	IC	S	D1
DCMW 0702_	6.35	2.38	2.8
11T3_	9.525	3.97	4.4

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		MEGACOAT CBN						CBN				
		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	
K	Gray Cast Iron (With Scale)											See Page for Applicable Toolholders
K	Gray Cast Iron (Without Scale)					◕				●		
K	Nodular Cast Iron (With Scale)											
H	Hard Materials (Roughing)				✖							
H	Hard Materials (Finishing)	●	○	◕				○	◔			
H	Hard Materials (Chip Control)											
	Sintered Steel						✖				◕	

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	
 Multi Edge / Sharp Edge		**DCMW 11T304MEF**	**F**	0.4	1.7	2								●	●	Ref. to the table below
		DCMW 11T308MEF		0.8	1.9									●	●	
 Multi Edge		**DCMW 070202T00815ME**	**T00815**	0.2	1.9	2	●	▲	●	●	●	●	●	●		
		070204T00815ME		0.4	1.7		●	▲	●	●	●	●	●	●		
		070208T00815ME		0.8	1.9		●		●	●			●			
		DCMW 11T302T00815ME	**T00815**	0.2	1.9	2	●	▲	●	●	●	●	●			
		11T304T00815ME		0.4	1.7		●	▲	●	●	●	●	●	●		
		11T308T00815ME		0.8	1.9		●	▲	●	●	●	●	●	●		
		11T312T00815ME		1.2	1.9		●		●							
 Multi Edge / General Purpose		**DCMW 11T302S01225MES**	**S01225**	0.2	1.9	2	●									
		11T304S01225MES		0.4	1.7		●							●		
		11T308S01225MES		0.8	1.9		●							●		
 Multi Edge / Tough		**DCMW 070202S01035MET**	**S01035**	0.2	1.9	2			●	●						
		070204S01035MET		0.4	1.7				●	●						
		070208S01035MET		0.8	1.9				●							
		DCMW 11T302S01035MET	**S01035**	0.2	1.9	2	●		●	●			●			
		11T304S01035MET		0.4	1.7		●	▲	●	●			●			
		11T308S01035MET		0.8	1.9			▲	●	●			●			
		11T312S01035MET		1.2	1.9			▲		●						
 Small Edge		**DCMW 070202T00815SE**	**T00815**	0.2	1.9	1			●			●	●			
		070204T00815SE		0.4	1.7				●			●	●			
		DCMW 11T302T00815SE	**T00815**	0.2	1.9	1						●	●			
		11T304T00815SE		0.4	1.7							●	●			
		11T308T00815SE		0.8	1.9				●				●			
 Small Edge / Tough		**DCMW 070204S01035SET**	**S01035**	0.4	1.7	1							●			
		DCMW 11T302S01035SET	**S01035**	0.2	1.9	1							●			
		11T304S01035SET		0.4	1.7								●			
		11T308S01035SET		0.8	1.9								●			

Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28,E29,E30,E32,E33,E44,F45~F47,F67**

● CC type / TP type

Insert Description	See Page for Applicable Toolholders
CC..0602 type	**E26,E27,E43,F23,F41**
CC..09T3 type	**E26,E27,E43,F41,F67**

Insert Description	See Page for Applicable Toolholders
TP..0802 type	**E35,F51,F53**
TP..0902 type	**F24,F51,F53**

Insert Description	See Page for Applicable Toolholders
TP..1103 type	**E35,F51,F52**
TP..1603 type	**F51,F52**

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

CBN & PCD Inserts are sold in 1 piece boxes

How to read pages of "Turning Inserts" See Page B15

60° Triangle / Positive

(mm)

Description	IC	S	D1
TPGB 0802_	4.76	2.38	2.5
0902_	5.56		3.0

Description	IC	S	D1
TPGB 1103_	6.35	3.18	3.5
1603_	9.525		4.5
TPGW 1604_	9.525	4.76	4.4

Edge Prep.		
Symbol	Cutting Edge Spec.	Example
F	Sharp Edge	F Sharp Edge
E	R-honed Cutting Edge	E008 R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215 0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225 0.12mm x 25° Chamfered and R-honed Cutting Edge

		Multi Edge / Sharp Edge	Multi Edge	Multi Edge / General Purpose	Multi Edge / Tough	Small Edge	Small Edge / Tough	Multi Edge	Multi Edge / Tough	Small Edge
K	Gray Cast Iron (With Scale)									
	Gray Cast Iron (Without Scale)									
	Nodular Cast Iron (With Scale)									
H	Hard Materials (Roughing)									
	Hard Materials (Finishing)	●	○	●				○	◔	
	Hard Materials (Chip Control)									
	Sintered Steel									◕

See Page for Applicable Toolholders

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570
Multi Edge / Sharp Edge	TPGB 110304MEF	F	0.4	2.1	3									●	●
	TPGB 110308MEF		0.8	1.8										●	●
Multi Edge	TPGB 110302T00815ME	T00815	0.2	2.3	3	●		●		●		●	●	●	
	TPGB 110304T00815ME		0.4	2.1		●	▲	●	●	●		●	●	●	
	TPGB 110308T00815ME		0.8	1.8		●		●	●	●			●	●	
	TPGB 160304T00815ME	T00815	0.4	1.8	3	●		●	●	●				●	
	TPGB 160308T00815ME		0.8	1.5		●		●		●				●	
Multi Edge / General Purpose	TPGB 110304S01225MES	S01225	0.4	2.1	3	●								●	
	TPGB 110308S01225MES		0.8	1.8		●								●	
Multi Edge / Tough	TPGB 110302S01035MET	S01035	0.2	2.3	3		▲	●	●						
	TPGB 110304S01035MET		0.4	2.1		●	▲	●	●						
	TPGB 110308S01035MET		0.8	1.8		●	▲	●	●						
	TPGB 160304S01035MET	S01035	0.4	1.8	3			●					●		
	TPGB 160308S01035MET		0.8	1.5				●					●		
Small Edge	TPGB 080202T00815SE	T00815	0.2	1.8	1			●				●	●		
	TPGB 080204T00815SE		0.4	1.6			▲	●				●	●		
	TPGB 090202T00815SE	T00815	0.2	1.8	1		▲	●				●	●		
	TPGB 090204T00815SE		0.4	1.6			▲	●				●	●		
	TPGB 110302T00815SE	T00815	0.2	1.9	1		▲					●	●		
	TPGB 110304T00815SE		0.4	1.8			▲					●	●		
	TPGB 110308T00815SE		0.8	1.5									●		
	TPGB 160302T00815SE	T00815	0.2	1.9	1							●	●		
	TPGB 160304T00815SE		0.4	1.8								●	●		
Small Edge / Tough	TPGB 080202S01035SET	S01035	0.2	1.8	1			●							
	TPGB 080204S01035SET		0.4	1.6				●					●		
	TPGB 090202S01035SET	S01035	0.2	1.8	1			●							
	TPGB 090204S01035SET		0.4	1.6				●					●		
	TPGB 110304S01035SET	S01035	0.4	1.8	1								●		
	TPGB 110308S01035SET		0.8	1.5									●		
	TPGB 160304S01035SET	S01035	0.4	1.8	1								●		
Multi Edge	TPGW 160404T00815ME	T00815	0.4	1.8	3			●							
	TPGW 160408T00815ME		0.8	1.5			▲	●							
Multi Edge / Tough	TPGW 160404S01035MET	S01035	0.4	1.8	3			●					●		
	TPGW 160408S01035MET		0.8	1.5				●							
Small Edge	TPGW 160404T00815SE	T00815	0.4	1.8	1								●		

Ref. to the table below C15

-

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

35° Rhombic / Positive

(mm)

Description	IC	S	D1
VBGW 1103_	6.35	3.18	2.8
1604_	9.525	4.76	4.4
VCGW 0802_	4.76	2.38	2.3

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mm Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		Gray Cast Iron (With Scale)	Gray Cast Iron (Without Scale)	Nodular Cast Iron (With Scale)	Hard Materials (Roughing)	Hard Materials (Finishing)	Hard Materials (Chip Control)	Sintered Steel
K			●					
H					✱	●	○	✱

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
Multi Edge / Sharp Edge	VBGW 110304MEF	F	0.4	2.0	2									●	●	Ref. to the table below
	VBGW 110308MEF		0.8	1.7										●	●	
	VBGW 160404MEF	F	0.4	2.0	2									●	●	
	VBGW 160408MEF		0.8	1.7										●	●	
Multi Edge	VBGW 110302T00815ME	T00815	0.2	2.4	2	●	▲	●	●	●		●	●	●		
	VBGW 110304T00815ME		0.4	2.0		●	▲	●	●		●	●	●	●		
	VBGW 110308T00815ME		0.8	1.7		●		●					●	●		
	VBGW 160402T00815ME	T00815	0.2	2.4	2	●	▲	●	●			●	●			
	VBGW 160404T00815ME		0.4	2.0		●	▲	●	●	●	●	●	●	●		
	VBGW 160408T00815ME		0.8	1.7		●	▲	●	●	●			●	●		
Multi Edge / General Purpose	VBGW 110304S01225MES	S01225	0.4	2.0	2	●								●		
	VBGW 110308S01225MES		0.8	1.7										●		
	VBGW 160404S01225MES	S01225	0.4	2.0	2	●								●		
	VBGW 160408S01225MES		0.8	1.7										●		
Multi Edge / Tough	VBGW 110302S01035MET	S01035	0.2	2.4	2			●	●							
	VBGW 110304S01035MET		0.4	2.0		●	▲	●	●				●			
	VBGW 110308S01035MET		0.8	1.7				●	●							
	VBGW 160402S01035MET	S01035	0.2	2.4	2		▲	●	●							
	VBGW 160404S01035MET		0.4	2.0		●	▲	●	●				●			
	VBGW 160408S01035MET		0.8	1.7			▲	●	●							
Small Edge	VBGW 110302T00815SE	T00815	0.2	2.8	1		▲	●				●	●			
	VBGW 110304T00815SE		0.4	2.4			▲	●				●	●			
	VBGW 160402T00815SE	T00815	0.2	2.4	1							●	●			
	VBGW 160404T00815SE		0.4	2.0			▲					●	●			
	VBGW 160408T00815SE		0.8	1.7								●	●			
Small Edge / Tough	VBGW 110304S01035SET	S01035	0.4	2.0	1								●			
	VBGW 110308S01035SET		0.8	1.7				●								
	VBGW 160404S01035SET	S01035	0.4	2.0	1								●			
	VBGW 160408S01035SET		0.8	1.7									●			
Multi Edge	VCGW 080202T00815ME	T00815	0.2	2.0	2	●		●	●			●	●	●		E45 F54 F56 F59
	VCGW 080204T00815ME		0.4	2.0		●		●		●		●	●	●		
	VCGW 080208T00815ME		0.8	1.7		●								●		
Multi Edge / Tough	VCGW 080202S01035MET	S01035	0.2	2.0	2			●								
	VCGW 080204S01035MET		0.4	2.0				●								
	VCGW 080208S01035MET		0.8	1.7				●								
Small Edge	VCGW 080202T00815SE	T00815	0.2	2.4	1		▲	●				●	●			
	VCGW 080204T00815SE		0.4	2.0			▲					●	●			
Small Edge / Tough	VCGW 080204S01035SET	S01035	0.4	2.0	1								●			
	VCGW 080208S01035SET		0.8	1.8									●			

Insert Description	See Page for Applicable Toolholders
VB..1103 type	E36,E37,E38,E45,F54,F56,F59
VB..1604 type	E37,E38,F54,F56,F59

● : Std. Item (1 pc boxes) ▲ : To be replaced by a new product

CBN & PCD Inserts are sold in 1 piece boxes

(mm)

80° Trigon / Positive

Description		IC	S	D1
WBGW	0601_	3.97	1.59	2.3
	0802_	4.76	2.38	

Edge Prep. Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mmHoned Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		MEGACOAT CBN						CBN				
		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
K	Gray Cast Iron (With Scale)											
K	Gray Cast Iron (Without Scale)											
K	Nodular Cast Iron (With Scale)											
H	Hard Materials (Roughing)											
H	Hard Materials (Finishing)		●	◕				○	◔			
H	Hard Materials (Chip Control)											
	Sintered Steel											

Insert (Left-hand Shown)	*Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
 Small Edge	WBGW 060102T00815L-SE	T00815	0.2	1.9	1		▲	●				●	●			F25 F61
	060104T00815L-SE		0.4	1.9			▲	●				●	●			
	WBGW 080202T00815L-SE	T00815	0.2	2.3	1		▲	●				●	●			
	080204T00815L-SE		0.4	2.3			▲	●				●	●			
 Small Edge / Tough	WBGW 060102S01035LSET	S01035	0.2	1.9	1			●								
	060104S01035LSET		0.4	1.9				●					●			
	WBGW 080202S01035LSET	S01035	0.2	2.3	1			●								
	080204S01035LSET		0.4	2.3			▲	●					●			

* Left-hand (L) Only

(mm)

60° Triangle / Positive without Hole

Description		IC	S	D1
TBGN	0601_	3.97	1.59	-
TPGN	1103_	6.35	3.18	
	1603_	9.525		

Edge Prep. Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mmHoned Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

		MEGACOAT CBN						CBN				
		KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
K	Gray Cast Iron (With Scale)											
K	Gray Cast Iron (Without Scale)											
K	Nodular Cast Iron (With Scale)											
H	Hard Materials (Roughing)											
H	Hard Materials (Finishing)		●					○	◔			
H	Hard Materials (Chip Control)											
	Sintered Steel											

Insert	Description	Edge Prep.	Dimension (mm) RE	Dimension (mm) LE	No. of Edges	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN35M	KBN60M	KBN70M	CBN KBN510	KBN525	KBN475	KBN570	See Page for Applicable Toolholders
 CBN surface type	TBGN 060102T00815	T00815	0.2	-	3								●			-
	060104T00815		0.4	-								●	●			
	060108T00815		0.8	-			▲					●				
 Multi Edge	TPGN 110302T00815ME	T00815	0.2	2.6	3								●			F63
	110304T00815ME		0.4	2.5									●			
 Small Edge	TPGN 110304T00815SE	T00815	0.4	2.5	1								●			
	TPGN 160302T00815SE	T00815	0.2	2.6	1								●			
	160304T00815SE		0.4	2.4								●	●			
	160308T00815SE		0.8	2.1									●			
 Small Edge / Tough	TPGN 110304S01035SET	S01035	0.4	2.5	1								●			
	TPGN 160304S01035SET	S01035	0.4	2.4	1								●			

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ :To be replaced by a new product

Negative (Solid)

(mm)

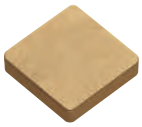
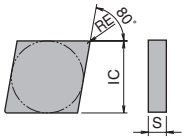
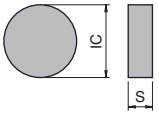
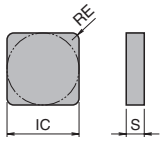
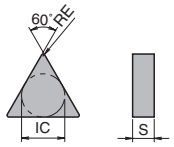
Description	IC	S
CNMN 0903_	9.525	3.18
1204_	12.70	4.76
RNMN 0903_	9.525	3.18
1203_	12.70	3.18
1204_		4.76

(mm)

Description	IC	S
SNMN 0903_	9.525	3.18
1203_	12.70	3.18
1204_		4.76
TNMN 1103_	6.35	3.18
1604_	9.525	4.76

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
F	Sharp Edge	F	Sharp Edge
E	R-honed Cutting Edge	E008	R0.08mmHoned Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge

K	Gray Cast Iron (With Scale)	✖
	Gray Cast Iron (Without Scale)	✖
	Nodular Cast Iron (With Scale)	
H	Hard Materials (Roughing)	
	Hard Materials (Finishing)	●
	Hard Materials (Chip Control)	
	Sintered Steel	

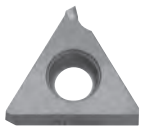
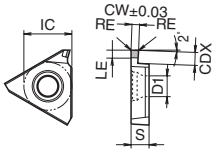
Insert		Description		Edge Prep.	Dimension (mm) RE	No. of Edges	PVD Coated CBN KBN900	See Page for Applicable Toolholders
 Solid		CNMN	090308S02020	S02020	0.8	4	●	D32
			090312S02020		1.2		●	
		CNMN	120412S02020	S02020	1.2		●	D26
			120416S02020		1.6		●	
 Solid		RNMN	090300S02020	S02020	-	Depends on ap	●	D33
		RNMN	120300S02020	S02020			●	
		RNMN	120400S02020	S02020			●	D31 D33
 Solid		SNMN	090308S02020	S02020	0.8	8	●	D34 D35
			090312S02020		1.2		●	
		SNMN	120308S02020	S02020	0.8		●	
			120312S02020		1.2		●	
		SNMN	120408S02020	S02020	0.8		●	D29 D34 D35
			120412S02020		1.2		●	
			120416S02020		1.6		●	
			120420S02020		2.0		●	
 Solid		TNMN	110308S02020	S02020	0.8	6	●	D36 F81
		TNMN	160408S02020	S02020	0.8		●	D30
			160412S02020		1.2		●	

● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

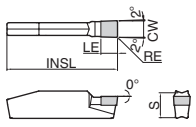
Grooving Inserts (1-edge)

Edge Prep.				Workpiece	
Symbol	Cutting Edge Spec.	Example			
F	Sharp Edge	F	Sharp Edge	K	Gray Cast Iron (With Scale)
E	R-honed Cutting Edge	E008	R0.08mmHoned Cutting Edge	K	Gray Cast Iron (Without Scale)
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge	K	Nodular Cast Iron (With Scale)
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge	H	Hard Materials (Roughing)
				H	Hard Materials (Finishing) ○ ●
				H	Hard Materials (Chip Control)
					Sintered Steel

Insert (Handed Insert shows Right-hand)		Description		Edge Prep.	Dimension (mm) CW	CDX	RE	IC	S	D1	LE	No. of Edges	CBN KBN510 R	KBN510 L	KBN525 R	KBN525 L	See Page for Applicable Toolholders
 External / Internal Grooving		GBA43R/L	125-020	E008	1.25	2.0	0.2	12.70	4.76	5.5	1.9	1	●		●	●	G9 ~ G11 G66
			150-020	E008	1.50	3.5							●	●	●	●	
			200-020	E008	2.00	3.5							●	●	●	●	
			250-020	E008	2.50	4.0							●		●	●	
			300-020	E008	3.00	4.0							●		●	●	

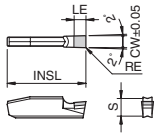
Deep Grooving Inserts (1-edge)

Edge Prep.				Workpiece	
Symbol	Cutting Edge Spec.	Example			
F	Sharp Edge	F	Sharp Edge	K	Gray Cast Iron (With Scale)
E	R-honed Cutting Edge	E008	R0.08mmHoned Cutting Edge	K	Gray Cast Iron (Without Scale)
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge	K	Nodular Cast Iron (With Scale)
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge	H	Hard Materials (Roughing)
				H	Hard Materials (Finishing) ●
				H	Hard Materials (Chip Control)
					Sintered Steel ●

Insert		Description		Edge Prep.	Dimension (mm) CW	CW Tolerance	RE	INSL	S	LE	No. of Edges	MEGA COAT CBN KBN05M	CBN KBN570	See Page for Applicable Toolholders
 External Deep Grooving		GDGS	2020N-020NB	E008	2.0	±0.03	0.2	20	4.3	2.9	1	●		G24 ~ G31
				E002									●	
			3020N-040NB	E008	3.0		0.4					●		
				E002									●	
			4020N-040NB	E008	4.0							●		
				E002									●	
			5020N-040NB	E008	5.0							●		G24 G30 G31
				E002									●	
			6020N-040NB	E008	6.0							●		

Deep Grooving Inserts (1-edge)

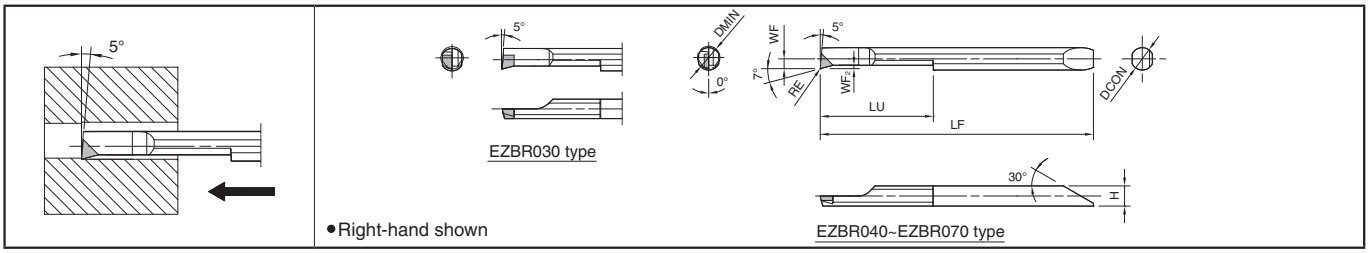
Edge Prep.				Workpiece	
Symbol	Cutting Edge Spec.	Example			
F	Sharp Edge	F	Sharp Edge	K	Gray Cast Iron (With Scale)
E	R-honed Cutting Edge	E008	R0.08mmHoned Cutting Edge	K	Gray Cast Iron (Without Scale)
T	Chamfered Cutting Edge	T01215	0.12mm x 15°Chamfered Cutting Edge	K	Nodular Cast Iron (With Scale)
S	Chamfered and R-honed Cutting Edge	S01225	0.12mm x 25° Chamfered and R-honed Cutting Edge	H	Hard Materials (Roughing)
				H	Hard Materials (Finishing) ○ ●
				H	Hard Materials (Chip Control)
					Sintered Steel

Insert		Description		Edge Prep.	Dimension (mm) CW	RE	INSL	S	LE	No. of Edges	CBN KBN510	CBN KBN525	See Page for Applicable Toolholders
 External Deep Grooving		GMN	2	E008	2.0	0.2	20	4.3	2.9	1	▲	▲	G42,G43
			3	E008	3.0	0.4					▲	▲	G42
			4	E008	4.0						▲	▲	G43
			5	E008	5.0						▲	▲	G44
			6	E008	6.0						▲	▲	G42,G43

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ :To be replaced by a new product

EZ Bars (EZB-NB · CBN)

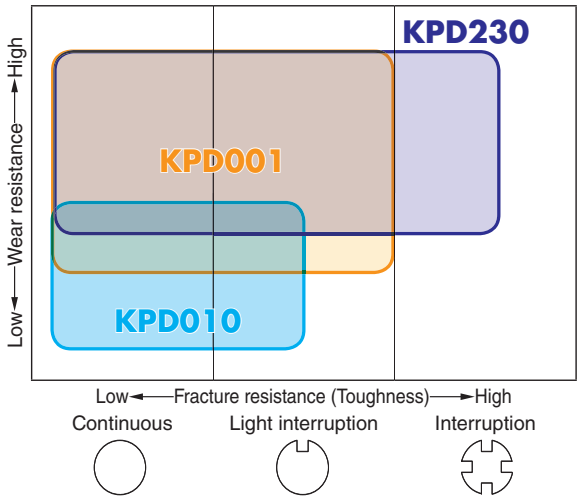


●Right-hand shown

EZ Bars Dimensions

| Edge Prep. | | |

Application Map



About Insert Grades

Grades	Applications	Features
KPD001 (Ave. Grain Size under 0.5μm)	●High speed machining of non-ferrous metals and brass ●High speed machining of plastics ●Machining of carbide	●The world highest level micro-grain diamond ●High edge strength, and superior to wear resistance, fracture resistance and edge sharpening performance
KPD010 (Ave. Grain Size 10μm)	●High speed machining of non-ferrous metals and brass ●High speed machining of plastics ●Machining of carbide	●Good balance of wear resistance and flexural strength ●General purpose
KPD230 (Mixture of fine grain with the Ave. grain size 2-30 μm and rough grain)	●High speed machining of non-ferrous metals and brass ●High speed machining of plastics	●High density PCD with mixture of coarse and fine grains features excellent abrasive wear resistance and fracture resistance
KPD250 (Ave. Grain Size 25μm) (Made to order)	●High speed machining of high silicon aluminum alloy ●Machining of carbide	●Coarse grain PCD (Ave. Grain Size 25μm) ●Superior to wear resistance

Identification System (Turning Insert)

C	N	M	M	12	04	02	M	- SE
C	C	G	W	04	01	01		SE

"Turning Indexable Inserts Identification System" See Page **B2**

Insert Type	Description	Manufacture's Option 1	Manufacture's Option 2	Series Name	Edge Length	No. of Edges	Regrinding
Negative	CNMM120402M-SE	M (Indicates the tool is for negative toolholders)	SE	Small Edge	Short (Small Edge)	1	Not Recommended
	CNMM120402M-NE		NE	New Value Edge	Long (85% length compared with no Indication's cutting edge)	1	Possible
	CNMM120402M		No Indication	-	Long	1	
Positive	CCGW040101SE	-	SE	Small Edge	Short (Small Edge)	1	Not Recommended
	CCGW040101NE		NE	New Value Edge	Long (85% length compared with no Indication's cutting edge)	1	Possible
	CCGW040101		No Indication	-	Long	1	

Note) 1. No edge preparation symbols for PCD inserts. Most of the PCD inserts' edge prep. are sharp edge.
2. "M" in manufacturer's option 1 indicates the inserts are applicable to negative toolholders.
3. See page **B3** for insert color.

● About Regrinding
1) Regrinding is possible with the inserts with "NE" and no symbol in manufacturer's option 2.
Regrinding cannot be available depending on the edge condition.
2) Regrinding is not recommended for inserts with "SE" in manufacturer's option 2.

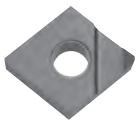
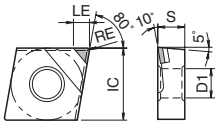
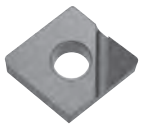
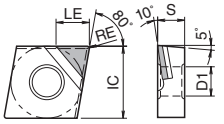
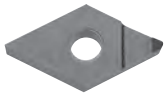
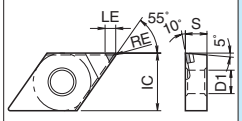
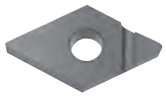
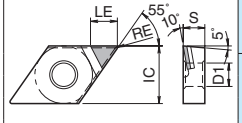
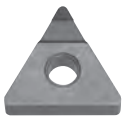
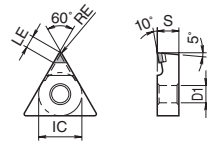
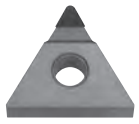
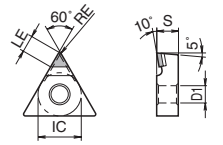
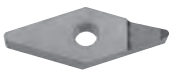
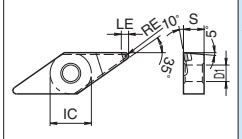
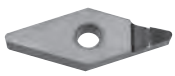
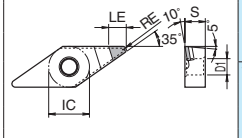
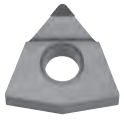
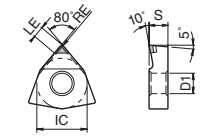
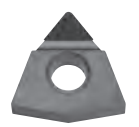
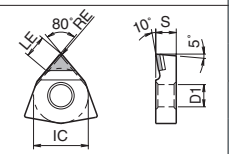
Recommended Cutting Conditions (Turning)

Workpiece Material	Insert Grades		Cutting Conditions				Remarks
	KPD001	KPD010	Vc (m/min)	ap(mm) Small Edge and Positive (Inserts)	ap(mm) Negative (Inserts)	f (mm/rev)	
Aluminum alloys Zinc alloys	★	☆	300~1,500	~1.0	~2.0	0.03~0.5	Both Dry and Coolant
Copper, Brass, Bronze	★	☆	300~1,000	~1.0	~2.0	0.03~0.5	
Magnesium Alloys	★	☆	400~1,200	~1.0	~2.0	0.03~0.5	
Carbide	★	☆	10~30	~0.3	~0.3	0.03~0.1	
Titanium Alloys	★	☆	100~200	~1.0	~2.0	0.05~0.2	Coolant
Glass fiber reinforced plastics Carbon fiber	★	☆	100~600	~1.0	~2.0	0.05~0.5	Dry
Silica Filling Plastic Particle Board	★	☆	400~800	~1.0	~2.0	0.05~0.5	

★: 1st Recommendation ☆: 2nd Recommendation

Negative

N	Non-ferrous Metals (With interruption)	●												
	Non-ferrous Metals (Without interruption)	●												
S	Titanium Alloys (With interruption)	●												
	Titanium Alloys (Without interruption)	●												

Edge Prep.				Dimension (mm)					No. of Edges	PCD				See Page for Applicable Toolholders
PCD all items		Sharp Edge								KPD001	KPD010	KPD230	KPD250	
Insert		Description		IC	S	D1	RE	LE						
 Small Edge		CNMM	120402M-SE	12.70	4.76	5.16	0.2	2.8	1	●	●			D8 D9 F65 F69 F70
			120404M-SE				0.4	2.8		●	●			
			120408M-SE				0.8	2.7		●	●			
		CNMM	120402M-NE				0.2	5.1		●				
			120404M-NE				0.4	5.0		●				
			120408M-NE				0.8	4.9		●				
		CNMM	120402M	12.70	4.76	5.16	0.2	5.8	1	●	●			
			120404M				0.4	5.8		●	●			
			120408M				0.8	5.7		●	●			
			120412M				1.2	5.6		●	●			
 Small Edge		DNMM	150402M-SE	12.70	4.76	5.16	0.2	2.8	1	●	●			D12 D13
			150404M-SE				0.4	2.6		●	●			
			150408M-SE				0.8	2.2		●	●			
		DNMM	150402M-NE				0.2	5.2		●				F66 F72 F73
			150404M-NE				0.4	5.0		●				
			150408M-NE				0.8	4.6		●				
		DNMM	150402M	12.70	4.76	5.16	0.2	5.9	1	●	●			
			150404M				0.4	5.8		●	●			
			150408M				0.8	5.4		●	●			
 Small Edge		TNMM	160402M-SE	9.525	4.76	3.81	0.2	2.7	1	●	●			D16 D17
			160404M-SE				0.4	2.6		●	●			
			160408M-SE				0.8	2.3		●	●			
		TNMM	160402M-NE				0.2	3.2		●				D18 F66 F76 F77
			160404M-NE				0.4	3.1		●				
			160408M-NE				0.8	2.8		●				
		TNMM	160402M	9.525	4.76	3.81	0.2	3.8	1	●	●			
			160404M				0.4	3.6		●	●			
			160408M				0.8	3.3		●	●			
			160412M				1.2	3.0			●			
 Small Edge		VNMM	160402M-SE	9.525	4.76	3.81	0.2	2.9	1	●	●			D19 D20 D21 D22
			160404M-SE				0.4	2.5		●	●			
			160408M-SE				0.8	1.6		●	●			
		VNMM	160402M-NE				0.2	4.7		●				
			160404M-NE				0.4	4.2		●				
			160408M-NE				0.8	3.4		●				
		VNMM	160402M	9.525	4.76	3.81	0.2	5.3	1	●	●			
			160404M				0.4	4.8		●	●			
			160408M				0.8	4.0		●	●			
 Small Edge		WNMM	080402M-SE	12.70	4.76	5.16	0.2	2.8	1	●	●			D24 D25
			080404M-SE				0.4	2.8		●	●			
			080408M-SE				0.8	2.7			●			
		WNMM	080402M-NE				0.2	5.0		●				F79 F80
			080404M-NE				0.4	5.0		●				
		WNMM	080404M	12.70	4.76	5.16	0.4	5.8	1		●			

· **SE** : Small Edge / **NE** : New Value Edge

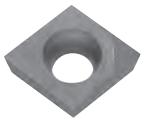
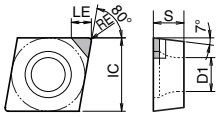
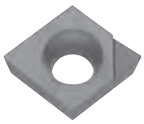
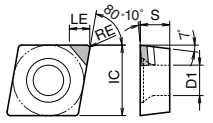
● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

Positive

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.: PCD all items / Sharp Edge

Insert	Description	Dimension (mm) IC	S	D1	RE	LE	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	See Page for Applicable Toolholders
 	CCGW 040101SE	4.3	1.8	2.3	0.1	1.3	1	●				F23 F41
	CCGW 040102SE				0.2	1.3		●				
	CCGW 040104SE				0.4	1.3		●				
	CCGW 060201SE	6.35	2.38	2.8	0.1	2.3		●				Ref. to the table below
	CCGW 060202SE				0.2	2.3		●				
	CCGW 060204SE				0.4	2.3		●				
	CCGW 09T302SE	9.525	3.97	4.4	0.2	2.7		●				
	CCGW 09T304SE				0.4	2.7		●				
	CCGW 09T308SE				0.8	2.7		●				
	CCGW 040101NE	4.3	1.8	2.3	0.1	1.7	1	●				F23 F41
	CCGW 040102NE				0.2	1.6		●				
	CCGW 040104NE				0.4	1.6		●				
	CCGW 060201NE	6.35	2.38	2.8	0.1	3.1		●				Ref. to the table below
	CCGW 060202NE				0.2	3.0		●				
	CCGW 060204NE				0.4	3.0		●				
	CCGW 09T301NE	9.525	3.97	4.4	0.1	3.4		●				
	CCGW 09T302NE				0.2	3.4		●				
	CCGW 09T304NE				0.4	3.4		●				
	CCGW 09T308NE				0.8	3.3		●				
	CCGW 040101	4.3	1.8	2.3	0.1	1.9	1	●				F23 F41
	CCGW 040102				0.2	1.9		●	●			
	CCGW 040104				0.4	1.9		●	●			
	CCGW 060201	6.35	2.38	2.8	0.1	3.5			●			Ref. to the table below
	CCGW 060202				0.2	3.5			●			
	CCGW 060204				0.4	3.5			●			
	CCGW 09T301	9.525	3.97	4.4	0.1	3.8		●				
	CCGW 09T302				0.2	3.8		●	●			
	CCGW 09T304				0.4	3.7		●	●			
	CCGW 09T308				0.8	3.6			●			
 	CCMT 060202SE	6.35	2.38	2.8	0.2	2.2	1	●				
	CCMT 060204SE				0.4	2.2		●				
	CCMT 09T301SE	9.525	3.97	4.4	0.1	2.7		●				
	CCMT 09T302SE				0.2	2.7		●				
	CCMT 09T304SE				0.4	2.7		●				
	CCMT 09T308SE				0.8	2.7		●				
	CCMT 060201NE	6.35	2.38	2.8	0.1	2.8	1	●				
	CCMT 060202NE				0.2	2.8		●				
	CCMT 060204NE				0.4	2.8		●				
	CCMT 09T301NE	9.525	3.97	4.4	0.1	3.4		●				
	CCMT 09T302NE				0.2	3.4		●				
	CCMT 09T304NE				0.4	3.4		●				
	CCMT 09T308NE				0.8	3.3		●				
	CCMT 060201	6.35	2.38	2.8	0.1	3.3		●	●			Ref. to the table below
	CCMT 060202				0.2	3.3		●	●			
	CCMT 060204				0.4	3.2		●	●			
	CCMT 09T301	9.525	3.97	4.4	0.1	3.9		●	●			
	CCMT 09T302				0.2	3.9		●	●			
	CCMT 09T304				0.4	3.9		●	●			
	CCMT 09T308				0.8	3.8			●			

· **SE** : Small Edge / **NE** : New Value Edge

Insert Description	See Page for Applicable Toolholders
CC..0602 type	**E26,E27,E43,F23,F41**
CC..09T3 type	**E26,E27,E43,F41,F67**

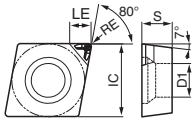
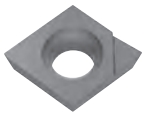
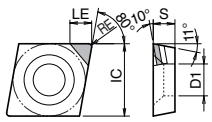
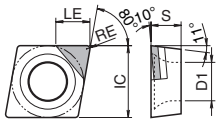
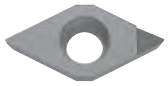
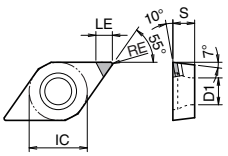
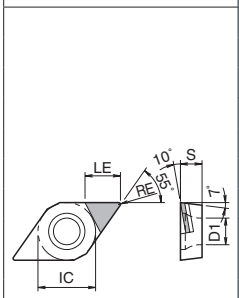
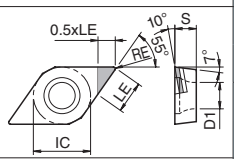
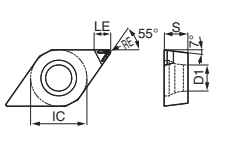
CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes)

Positive

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert (Handed Insert shows Left-hand)		Description		Dimension (mm) IC	S	D1	RE	LE	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	See Page for Applicable Toolholders
NEW 		CCMT	09T302APD	9.525	3.97	4.4	0.2	2.7	1	●				Ref. to the table below C24
			09T304APD				0.4	2.7		●				
			09T308APD				0.8	2.7		●				
		CPMH	090302SE	9.525	3.18	4.5	0.2	2.7	1	●				F43
			090304SE				0.4	2.7		●				
		CPMH	080202NE	7.94	2.38	3.5	0.2	3.2	1	●				
			080204NE				0.4	3.2		●				
		CPMH	090301NE	9.525	3.18	4.5	0.1	3.4		●				
			090302NE				0.2	3.4		●				
			090304NE				0.4	3.4		●				
			090308NE				0.8	3.3		●				
		CPMH	080201	7.94	2.38	3.5	0.1	3.7	1	●				
			080202				0.2	3.7		●	●			
			080204				0.4	3.7		●	●			
		CPMH	090301	9.525	3.18	4.5	0.1	4.0			●			
			090302				0.2	3.9		●	●			
			090304				0.4	3.9		●	●			
			090308				0.8	3.8			●			
		DCMT	070201SE	6.35	2.38	2.8	0.1	2.7	1	●				Ref. to the table below
			070202SE				0.2	2.7		●				
			070204SE				0.4	2.7		●				
		DCMT	11T301SE	9.525	3.97	4.4	0.1	2.7		●				
			11T302SE				0.2	2.7		●				
			11T304SE				0.4	2.7		●				
			11T308SE				0.8	2.7		●				
		DCMT	070201NE	6.35	2.38	2.8	0.1	3.4	1	●				
			070202NE				0.2	3.4		●				
			070204NE				0.4	3.2		●				
		DCMT	11T301NE	9.525	3.97	4.4	0.1	3.4		●				
			11T302NE				0.2	3.3		●				
			11T304NE				0.4	3.2		●				
			11T308NE				0.8	2.8		●				
		DCMT	070201	6.35	2.38	2.8	0.1	4.0		●	●			
			070202				0.2	3.9		●	●			
			070204				0.4	3.7		●	●			
		DCMT	11T301	9.525	3.97	4.4	0.1	4.0	1	●	●			
			11T302				0.2	3.9		●	●			
			11T304				0.4	3.7		●	●			
			11T308				0.8	3.3		●	●			
		DCMT	070202R/L-NE	6.35	2.38	2.8	0.2	3.3	1	●				
			070204R/L-NE				0.4	3.2		●				
		DCMT	11T302R/L-NE	9.525	3.97	4.4	0.2	3.3		●				
			11T304R/L-NE				0.4	3.2		●				
NEW 		DCMT	11T302APD	9.525	3.97	4.4	0.2	2.7	1	●				
			11T304APD				0.4	2.7		●				
			11T308APD				0.8	2.7		●				

· **SE** : Small Edge / **NE** : New Value Edge

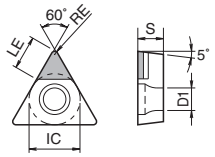
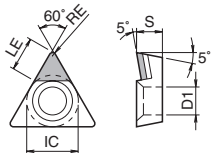
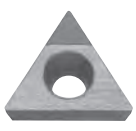
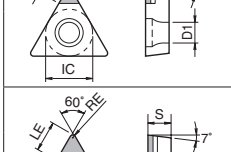
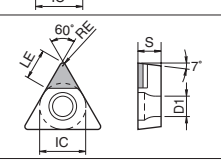
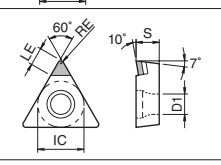
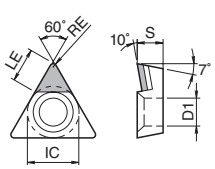
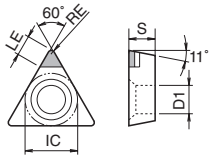
Insert Description	See Page for Applicable Toolholders
DC..07 type	**E28,E29,E32,E33,E44,F45~F47**
DC..11 type	**E24,E28,E29,E30,E32,E33,E44,F45~F47,F67**

● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

Positive

N	Non-ferrous Metals (With interruption)	KPD001	KPD010	KPD230	KPD250
	Non-ferrous Metals (With interruption)	●			
	Non-ferrous Metals (Without interruption)	●			
S	Titanium Alloys (With interruption)	●			
	Titanium Alloys (Without interruption)	●			

Edge Prep.				Dimension (mm)					No. of Edges	PCD				See Page for Applicable Toolholders
PCD all items	Sharp Edge	Insert	Description	IC	S	D1	RE	LE		KPD001	KPD010	KPD230	KPD250	
●		 	TBGW 060102NE	3.97	1.59	2.4	0.2	2.1	1	●				F24 F51 F53
			TBGW 060104NE				0.4	1.9		●				
			TBGW 060102				0.2	2.4		●	●			
			TBGW 060104				0.4	2.2		●				
●		 	TBMT 060101NE	3.97	1.59	2.4	0.1	2.2	1	●				
			TBMT 060102NE				0.2	2.1		●				
			TBMT 060104NE				0.4	2.0		●				
			TBMT 060108NE				0.8	1.7		●				
			TBMT 060102				0.2	2.5		●	●			
			TBMT 060104				0.4	2.3			●			
			TBMT 060108				0.8	2.0		●				
●		 	TCGW 110302SE	6.35	3.18	2.8	0.2	2.5	1		●			E35
			TCGW 110304SE				0.4	2.4			●			
		 	TCGW 110302NE				0.2	3.3	1	●				
			TCGW 110304NE				0.4	3.2		●				
			TCGW 110302				0.2	3.9	1		●			
●		 	TCMT 110301SE	6.35	3.18	2.8	0.1	2.6	1		●			
			TCMT 110302SE				0.2	2.5			●			
			TCMT 110304SE				0.4	2.4			●			
		 	TCMT 080202NE	4.76	2.38	2.5	0.2	2.1	1	●				
			TCMT 110302NE	6.35	3.18	2.8	0.2	3.4		●				
			TCMT 110304NE				0.4	3.3		●				
			TCMT 080202	4.76	2.38	2.5	0.2	2.4	1		●			
			TCMT 080204				0.4	2.2			●			
			TCMT 110302	6.35	3.18	2.8	0.2	3.9	1		●			
●		 	TPGB 090202SE	5.56	2.38	3.2	0.2	2.1	1	●				Ref. to the table below
			TPGB 090204SE				0.4	2.1		●				
			TPGB 090208SE				0.8	2.1		●				
			TPGB 110301SE	6.35	3.18	3.3	0.1	2.7		●	●			
			TPGB 110302SE				0.2	2.6		●	●			
			TPGB 110304SE				0.4	2.5		●	●			
			TPGB 160302SE	9.525	3.18	4.7	0.2	2.6		●	●			
			TPGB 160304SE				0.4	2.4		●	●			

· **SE** : Small Edge / **NE** : New Value Edge

Insert Description	See Page for Applicable Toolholders
TP..0802 type	**E35,F51,F53**
TP..0902 type	**F24,F51,F53**

Insert Description	See Page for Applicable Toolholders
TP..1103 type	**E35,F51,F52**
TP..1603 type	**F51,F52**

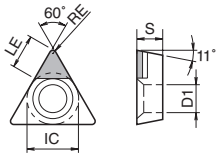
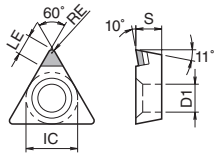
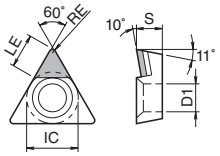
CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes)

Positive

N	Non-ferrous Metals (With interruption)	●			
	Non-ferrous Metals (Without interruption)	●			
S	Titanium Alloys (With interruption)	●			
	Titanium Alloys (Without interruption)	●			

Edge Prep.	
PCD all items	Sharp Edge

Insert		Description		Dimension (mm)					No. of Edges	PCD				See Page for Applicable Toolholders
				IC	S	D1	RE	LE		KPD001	KPD010	KPD230	KPD250	
		TPGB	080202NE	4.76	2.38	2.3	0.2	2.2	1	●				Ref. to the table below **C26**
			080204NE				0.4	2.1		●				
			080208NE				0.8	1.8		●				
		TPGB	090202NE	5.56	2.38	3.2	0.2	2.7		●				
			090204NE				0.4	2.6		●				
			090208NE				0.8	2.3		●				
		TPGB	110302NE	6.35	3.18	3.3	0.2	3.4		●				
			110304NE				0.4	3.3		●				
			110308NE				0.8	3.0		●				
		TPGB	160304NE	9.525	3.18	4.7	0.4	3.2		●				
			160308NE				0.8	2.9		●				
		TPGB	080202	4.76	2.38	2.3	0.2	2.6		●	●			
			080204				0.4	2.4		●	●			
		TPGB	090202	5.56	2.38	3.2	0.2	3.2		●	●			
			090204				0.4	3.0	1	●	●			
		TPGB	110302	6.35	3.18	3.3	0.2	3.9		●	●			
			110304				0.4	3.7		●	●			
			110308				0.8	3.4			●			
		TPMH	080202SE	4.76	2.38	2.3	0.2	2.0		●				
			080204SE				0.4	1.8	1	●				
		TPMH	090202SE	5.56	2.38	3.2	0.2	2.4		●				
			090204SE				0.4	2.2		●				
		TPMH	110301SE	6.35	3.18	3.3	0.1	2.7			●			
			110302SE				0.2	2.6		●	●			
			110304SE				0.4	2.5	1	●	●			
		TPMH	160302SE	9.525	3.18	4.7	0.2	2.6		●				
			160304SE				0.4	2.4		●	●			
		TPMH	080201NE	4.76	2.38	2.3	0.1	2.3		●				
			080202NE				0.2	2.2		●				
			080204NE				0.4	2.1		●				
		TPMH	090201NE	5.56	2.38	3.2	0.1	2.7		●				
			090202NE				0.2	2.6		●				
			090204NE				0.4	2.5		●				
			090208NE				0.8	2.2	1	●				
		TPMH	110301NE	6.35	3.18	3.3	0.1	3.4		●				
			110302NE				0.2	3.3		●				
			110304NE				0.4	3.2		●				
			110308NE				0.8	2.9		●				
		TPMH	160304NE	9.525	3.18	4.7	0.4	3.3		●				
			160308NE				0.8	3.0		●				
		TPMH	080202	4.76	2.38	2.3	0.2	2.5		●	●			
			080204				0.4	2.3		●	●			
		TPMH	090201	5.56	2.38	3.2	0.1	3.0		●	●			
			090202				0.2	2.9		●	●			
			090204				0.4	2.8		●	●			
			090208				0.8	2.5			●			
		TPMH	110301	6.35	3.18	3.3	0.1	3.9	1	●	●			
			110302				0.2	3.9		●	●			
			110304				0.4	3.7		●	●			
			110308				0.8	3.4			●			
		TPMH	160302	9.525	3.18	4.7	0.2	4.0		●	●			
			160304				0.4	3.8		●	●			
			160308				0.8	3.6			●			

· **SE** : Small Edge / **NE** : New Value Edge

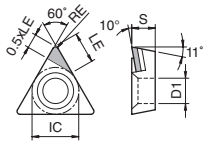
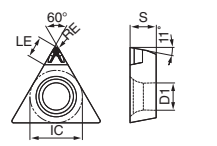
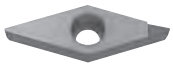
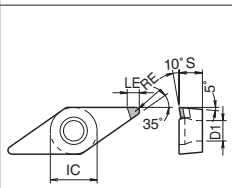
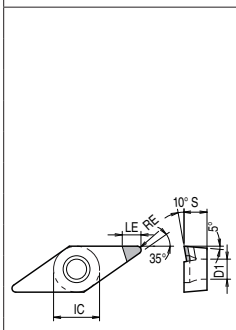
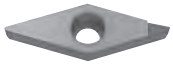
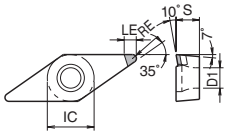
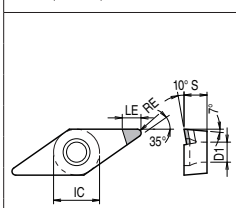
● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

Positive

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert (Handed Insert shows Left-hand)		Description		Dimension (mm) IC	S	D1	RE	LE	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	See Page for Applicable Toolholders
		TPMH	110302L-NE	6.35	3.18	3.3	0.2	3.8	1	●				Ref. to the table below C26
			110304L-NE				0.4	3.6		●				
		TPMT	110302APD	6.35	3.18	3.3	0.2	2.6	1	●				
			110304APD				0.4	2.5		●				
			110308APD				0.8	2.5		●				
		VBMT	110301SE	6.35	3.18	2.8	0.1	2.5	1	●				Ref. to the table below
			110302SE				0.2	2.3		●				
			110304SE				0.4	1.9		●				
			110308SE				0.8	1.9		●				
		VBMT	160401SE	9.525	4.76	4.4	0.1	2.7		●				
			160402SE				0.2	2.5		●				
			160404SE				0.4	2.1		●				
			160408SE				0.8	2.0		●				
		VBMT	110301NE	6.35	3.18	2.8	0.1	2.6	1	●				
			110302NE				0.2	2.4		●				
			110304NE				0.4	2.0		●				
			110308NE				0.8	3.1		●				
		VBMT	160401NE	9.525	4.76	4.4	0.1	2.8		●				
			160402NE				0.2	2.6		●				
			160404NE				0.4	2.2		●				
			160408NE				0.8	3.0		●				
		VBMT	110301	6.35	3.18	2.8	0.1	3.0	1	●	●			
			110302				0.2	2.8		●	●			
			110304				0.4	2.4		●	●			
			110308				0.8	3.5		●	●			
		VBMT	160401	9.525	4.76	4.4	0.1	3.2		●				
			160402				0.2	3.0		●	●			
			160404				0.4	2.6		●	●			
			160408				0.8	3.5		●	●			
		VCMT	080202SE	4.76	2.38	2.3	0.2	1.4	1	●				E45 F54 F56 F59
			080204SE				0.4	1.4		●				
			080208SE				0.8	1.4		●				
		VCMT	080201NE				0.1	1.7	1	●				
			080202NE				0.2	1.7		●				
			080204NE				0.4	1.8		●				
			080208NE				0.8	1.9		●				
		VCMT	080201				0.1	2.0	1		●			
			080202				0.2	2.0		●	●			
			080204				0.4	2.1		●	●			
			080208				0.8	2.2		●	●			

· **SE** : Small Edge / **NE** : New Value Edge

Insert Description	See Page for Applicable Toolholders
VB..1103 type	**E36,E37,E38,E45,F54,F56,F59**
VB..1604 type	**E37,E38,F54,F56,F59**

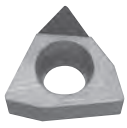
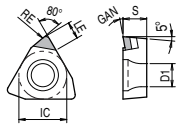
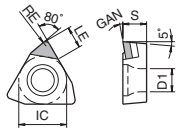
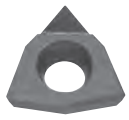
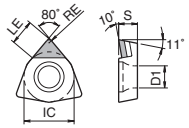
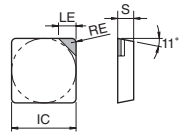
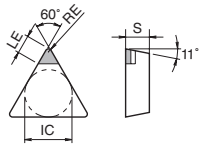
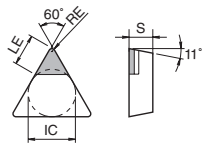
CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes)

Positive

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert (Handed Insert shows Left-hand)		Description		Dimension (mm) IC	S	D1	RE	LE	Angle GAN	No. of Edges	PCD KPD001	KPD010	KPD230	KPD250	See Page for Applicable Toolholders
		**WBMT**	**060102L-SE**	3.97	1.59	2.3	0.2	1.3	5°	1	●				F25 F61
		WBMT	**080202L-SE**	4.76	2.38	2.3	0.2	1.6	10°	1	●				
		**WBMT**	**060101L-NE**	3.97	1.59	2.3	0.1	1.7	5°	1	●				
		WBMT	**060102L-NE**				0.2	1.6			●				
		WBMT	**060104L-NE**				0.4	1.6			●				
		WBMT	**080202L-NE**	4.76	2.38	2.3	0.2	2.1	10°	1	●				
		WBMT	**080204L-NE**				0.4	2.1			●				
		WBMT	**060101L**	3.97	1.59	2.3	0.1	1.9	5°	1	●				
		WBMT	**060102L**				0.2	1.9			●	●			
		WBMT	**060104L**				0.4	1.9			●	●			
		WBMT	**080202L**	4.76	2.38	2.3	0.2	2.4	10°	1	●	●			
		WBMT	**080204L**				0.4	2.3			●	●			
		**WPMT**	**110202SE**	6.35	2.38	2.8	0.2	2.1	-	1	●				
		WPMT	**110202NE**				0.2	2.7			●				
		WPMT	**110202**				0.2	3.1				●			
		**SPGN**	**120304NE**	12.70	3.18	-	0.4	3.6	-	1	●				F62
		SPGN	**120304**					4.2				●			
		**TPGN**	**110301SE**	6.35	3.18	-	0.1	2.6	-	1	●				F63
		TPGN	**110302SE**				0.2	2.5			●	●			
		TPGN	**110304SE**				0.4	2.4			●	●			
		TPGN	**160301SE**	9.525	3.18		0.1	2.6				●			
		TPGN	**160302SE**				0.2	2.6			●	●			
		TPGN	**160304SE**				0.4	2.4			●	●			
		**TPGN**	**160304NE**	9.525	3.18	-	0.4	3.2	-	1	●				
		TPGN	**160308NE**				0.8	2.9			●				
		TPGN	**110302**	6.35	3.18		0.2	3.9			●	●			
		TPGN	**110304**				0.4	3.7			●	●			
		TPGN	**110308**				0.8	3.4				●			
		TPGN	**160304**	9.525	3.18		0.4	3.7			●	●			
		TPGN	**160308**				0.8	3.4				●			

· **SE** : Small Edge / **NE** : New Value Edge

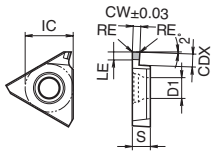
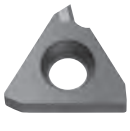
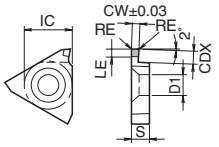
● : Std. Item (1 pc boxes)

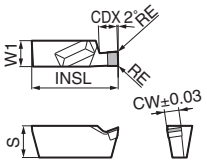
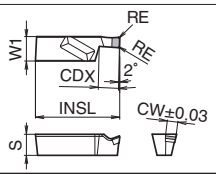
CBN & PCD Inserts are sold in 1 piece boxes

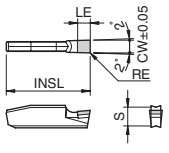
Grooving Inserts (1-edge)

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.: PCD all items / Sharp Edge

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) CW	CDX	RE	IC	S	D1	LE	No. of Edges	PCD KPD001 R	KPD001 L	KPD010 R	KPD010 L	See Page for Applicable Toolholders
 External / Internal Grooving		**GBA32R**	**125-010**	1.25	2.0	0.1	9.525	3.18	4.4	1.7	1			●		**G9 ~ G11 G66**
			150-010	1.50								●		●		
		GBA43R/L	**125-010**	1.25	2.0	0.1	12.70	4.76	5.5	1.9				●	●	
			150-010	1.50	3.5							●	●	●	●	
			200-010	2.00								●	●	●	●	
			250-010	2.50	4.0							●	●	●	●	
			300-010	3.00								●	●	●	●	
 External Grooving		**TGF32R**	**125-010**	1.25	2.0	0.1	9.525	3.18	4.5	1.7	1	●				**G18 G19**
			150-010	1.50								●				
			200-010	2.00	2.5					1.9		●				

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) CW	CDX	RE	W1	INSL	S	No. of Edges	PCD KPD001 R	KPD001 L	KPD010 R	KPD010 L	See Page for Applicable Toolholders
 Internal Grooving		**GVR/L**	**145-020A**	1.45	2.3	0.2	4.0	12	5.0	1			●		**G65**
			200-020A	2.00									●		
		GVR/L	**200-020B**	2.00	3.2	0.2	4.5	15	5.5				●		
			250-020B	2.50									●		
 Face Grooving		**GVFR/L**	**250-020B**	2.50	4.8	0.2	5.8	20	5.0	1			●	●	**G100 ~ G103 G110**
			300-020B	3.00	4.8								●	●	
			400-020B	4.00	5.3								MTO	MTO	
		GVFR/L	**350-040C**	3.50	6.8	0.4	7.0	27	7.0				MTO		

Insert		Description		Dimension (mm) CW	RE	INSL	S	LE	No. of Edges	PCD KPD001	KPD010	See Page for Applicable Toolholders
 External Deep Grooving		**GMN**	**2**	2.0	0.2	20	4.3	2.9	1	▲	▲	G42,G43
			3	3.0						▲	▲	G42
			4	4.0						▲	▲	G43
			5	5.0						▲	▲	G44
			6	6.0							▲	G42,G43

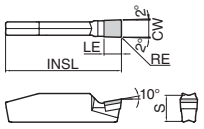
CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ :To be replaced by a new product MTO : Made to order

Deep Grooving Inserts (1-edge)

N	Non-ferrous Metals (With interruption)	●	
	Non-ferrous Metals (Without interruption)	●	
S	Titanium Alloys (With interruption)	◕	
	Titanium Alloys (Without interruption)	●	

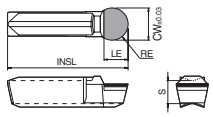
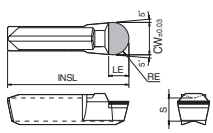
Edge Prep.	
PCD all items	Sharp Edge

Insert		Description		Dimension (mm) CW	Tolerance	RE	INSL	S	LE	No. of Edges	PCD KPD001		See Page for Applicable Toolholders
 External Deep Grooving		GDGS	2020N-020NB	2.0	±0.03	0.2	20	4.3	2.9	1	●		G24 ~ G31
			3020N-020NB	3.0							●		
			4020N-020NB	4.0							●		
			5020N-020NB	5.0							●		G24 G30 G31
			6020N-020NB	6.0							●		

For Aluminum Wheel (1-edge)

N	Non-ferrous Metals (With interruption)	●	
	Non-ferrous Metals (Without interruption)	●	
S	Titanium Alloys (With interruption)	◕	
	Titanium Alloys (Without interruption)	●	

Edge Prep.	
GMGW	R-honed Cutting Edge

Insert		Description		CW	RE	INSL	S	LE		No. of Edges	PCD KPD001		See Page for Applicable Toolholders
		GMGW	6030-30R	6	3	30	5.5	4.5		1	●		G48
			8030-40R	8	4			6			●		
		GMGW	8030-40R-HR	8	4	30	5.5	5			●		

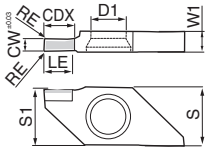
● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

How to read pages of "Turning Inserts" ➡ See Page **B15**

Turning / Grooving (1-edge)

N	Non-ferrous Metals (With interruption)	◐
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	◐
	Titanium Alloys (Without interruption)	●

Edge Prep.																
PCD all items		Sharp Edge														
Insert Handed Insert shows Right-hand		Description		Dimension (mm)								Angle	No. of Edges	PCD KPD001		See Page for Applicable Toolholders
				CW	CDX	RE	W1	S	S1	D1	LE	PSIRR		R	L	
NEW 		TKF12R	200-AGT	2.0	4.8	$^{+0}_{-0.05}$ 0.1	3.0	8.7	8.3	5.0	4.2	0°	1	●		E13
			250-AGT	2.5	4.8									●		

* Lead angle (Front cutting edge angle: **PSIRR**) shows the angle when installed in toolholder.
* PCD Inserts of TKF type only for Turning and Grooving.
* When using in cut-off machining, maximum cut-off diameter is **ø8**.Set the feed rate less than **0.08mm/rev**.
* **CDX** shows available grooving depth.

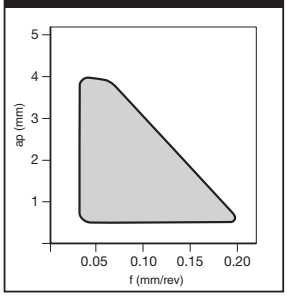
◆ Inserts Identification System

TKF	12	R	200	-	AGT
TKF	12	R	250	-	AGT

- Insert Type
- Insert Size
- Insert Hand: R : Right-hand
- Width (Edge Width)
- Name of Chipbreaker: AGT : AGT Chipbreaker

● Applicable Range

TKF-AGT



C
CBN & PCD Tools
CBN
PCD
Positive
C
D
S
T
V
W
Solid
Grooving

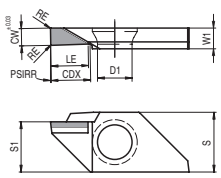
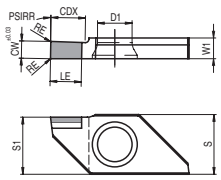
CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes)

Turning / Grooving (1-edge)

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.	
PCD all items	Sharp Edge

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) CW	CDX	RE	W1	S	S1	D1	LE	Angle PSIR R/L	No. of Edges	PCD KPD001 R	PCD KPD001 L	See Page for Applicable Toolholders
	TKF12R/L	200-AS	2.0	5	+0 -0.05 0.1	3	8.7	7.3	5	5.3	0°	1	●	●	E13
		250-AS	2.5	5									●		
	TKF16R/L	250-AS	2.5	8		4	9.5	8.0		6.3			●	●	
	TKF16L	250-ASR	2.5	8	+0 -0.05 0.1	4	9.5	8.0	5	6.3	0°	1		●	
Turning / Grooving ● Insert hand : Left-hand / PCD edge hand: Right-hand															
	TKF12R/L	150-NB	1.5	3.5	+0 -0.05 0.1	3	8.7	8.3	5	2.0	0°	1	●	●	
		200-NB	2.0	4						3.0			●	●	
		250-NB	2.5	4									●		
External Grooving (Turning is possible)		250-NB4.5	2.5	5						4.5			●		

* Lead angle (Front cutting edge angle: **PSIR R/L**) shows the angle when installed in toolholder.
* PCD Inserts of TKF type only for Turning and Grooving.
* Cut-off is not recommended.
* **CDX** shows available grooving depth.

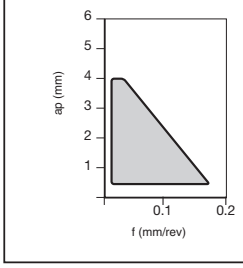
Inserts Identification System

TKF	12	R	200	-	AS	
TKF	12	L	200	-	AS	R

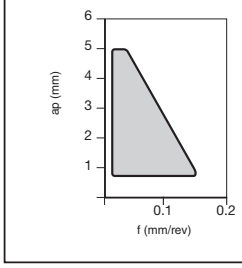
- Insert Type: TKF
- Insert Size: 12
- Insert Hand: R : Right-hand / L : Left-hand
- Width (Edge Width): 200
- Name of Chipbreaker: AS : AS Chipbreaker / NB : Without Chipbreaker
- PCD insert hand: Without Indication : The edge hand is same as the insert hand / R : Right-hand

Applicable Range

TKF12-AS



TKF16-AS/-ASR



* PCD Inserts of TKF only for Turning and Grooving.
* Cut-off is not recommended.

Note 1) The cutting edge of the TKF-AS/-ASR will be 1mm lower than the center line when attached to the KTKF toolholder (See Fig. 1). Adjust the height by making NC lathe parameter settings or inserting a plate.
2) If the 1mm adjustment is not possible on your automatic lathe, use the TKF-AGT or the TKF-NB (See Fig. 2).

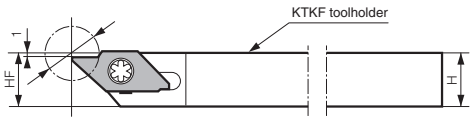


Fig. 1 When a TKF-AS/-ASR insert is attached (The cutting edge is 1mm lower than the center line)

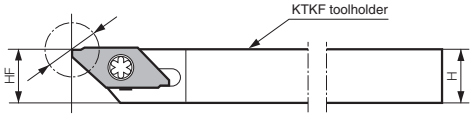
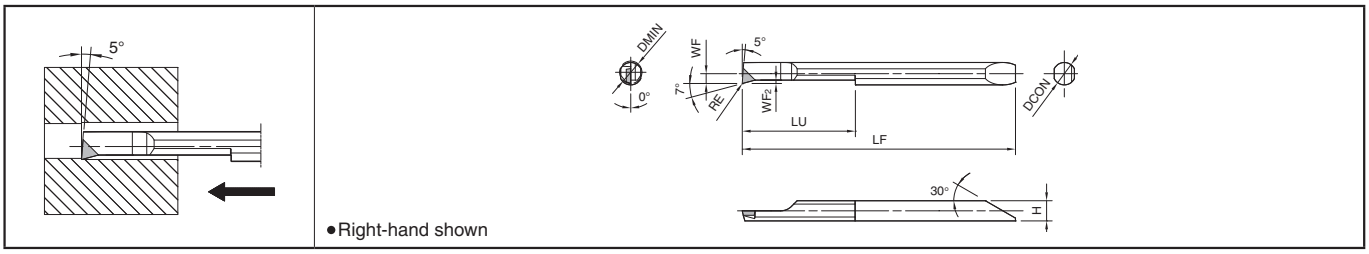


Fig. 2 When a TKF-AGT or a TKF-NB insert is attached

● : Std. Item (1 pc boxes)

CBN & PCD Inserts are sold in 1 piece boxes

EZ Bars (EZB-NB · PCD)



●Right-hand shown

EZ Bars Dimensions

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Edge Prep.: PCD all items — Sharp Edge

Description		Min. Bore Dia.	Dimension (mm)								No. of Edges	PCD		See Page for Applicable Sleeves
		DMIN	DCON	H	LF	LU	WF	WF_2	RE			KPD001		
EZBR	040040-003NB	4	4	3.6	48.8	20	1.75	0.5	$0.035^{\pm 0.015}$		1	●		F27 ~ F31
	050050-003NB	5	5	4.6	58.1	25	2.25					●		
	060060-003NB	6	6	5.6	66.1	30	2.75					●		
	070070-003NB	7	7	6.6	74.1	35	3.25					●		

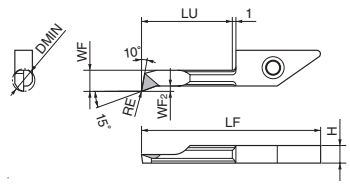
CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes)

System Tip-Bars

Edge Prep.	
PCD all items	Sharp Edge

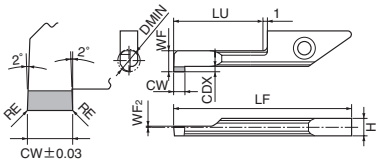
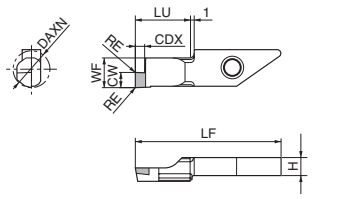
N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

Insert (Handed Insert shows Right-hand)	Description		Min. Bore Dia. DMIN	Dimension (mm) H	LF	LU	WF	WF_2	RE		No. of Edges	PCD KPD001	PCD KPD010	See Page for Applicable Toolholders
 Micro Boring	VNBR	0411-02NB	4	3.9	30.8	11	3.5	0.5	0.2		1	●	●	F34 F35
		0420-02NB			39.8	20						●	●	
	VNBR	0511-02NB	5	3.9	30.8	11	4.5	0.7	0.2			●	●	
		0520-02NB			39.8	20						●	●	
	VNBR	0620-02NB	6	3.9	39.8	20	5.3	1.0	0.2			●	●	
		0630-02NB			49.8	30						●	●	
	VNBR	0720-02NB	7	3.9	39.8	20	6.2	1.0	0.2			●	●	
		0730-02NB			49.8	30						●		

System Tip-Bars

Edge Prep.	
PCD all items	Sharp Edge

N	Non-ferrous Metals (With interruption)	●
	Non-ferrous Metals (Without interruption)	●
S	Titanium Alloys (With interruption)	●
	Titanium Alloys (Without interruption)	●

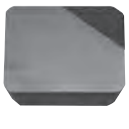
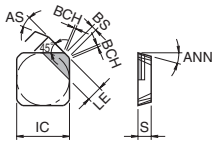
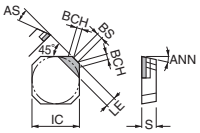
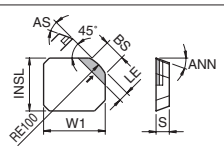
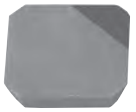
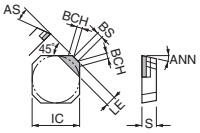
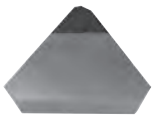
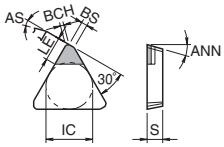
Insert (Handed Insert shows Right-hand)	Description		Min. Bore Dia. DMIN DAXN	Dimension (mm) CW	RE	H	LF	LU	WF	WF_2	CDX	No. of Edges	PCD KPD001	PCD KPD010	See Page for Applicable Toolholders
 Micro Grooving	VNGR	0410-11NB	4	1.0	0.05	3.9	30.8	11	3.5	0.1	0.8	1	MTO		F34 F35
		0420-11NB		2.0	0.10								MTO		
	VNGR	0510-11NB	5	1.0	0.05	3.9	30.8	11	4.4	0.1	1.0		MTO		
		0520-11NB		2.0	0.10								MTO		
	VNGR	0610-20NB	6	1.0	0.05	3.9	39.8	20	5.2	0.3	1.8		MTO		
		0620-20NB		2.0	0.10								MTO		
	VNGR	0710-20NB	7	1.0	0.05	3.9	39.8	20	6.2	0.3	2.0		MTO	MTO	
		0720-20NB		2.0	0.10								MTO		
 Micro Face Grooving	VNFGR	0820-10NB	8	2.0	0.05	3.9	39.8	10	7.3	-	2.0	1	MTO	MTO	
		0830-10NB	8	3.0							3.0		MTO		

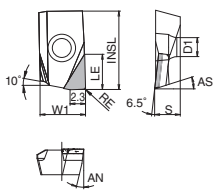
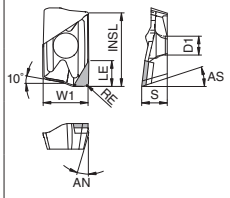
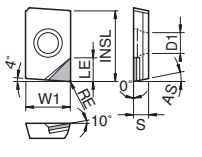
● : Std. Item (1 pc boxes) MTO : Made to order

CBN & PCD Inserts are sold in 1 piece boxes

Milling Inserts

Edge Prep.		N	Non-ferrous Metals (With interruption)														
PCD all items	Sharp Edge	S	Titanium Alloys (With interruption)														

Insert	Description		Dimension (mm)						Angle		No. of Edges	PCD			See Page for Applicable Toolholders
			IC INSL	S	BCH	BS	LE	W1	ANN	AS		KPD001	KPD010	KPD230	
 	SDKN	1203AUFN-NE	12.70	3.18	0.5	1.2	3.1	-	15°	23°	1	●			-
		1203AUFN					3.6					●	●		
 	SEEN	1203AFFN-NE	12.70	3.18	0.5	1.4	3.0	-	20°	25°	1	●			-
		1203AFFN					3.5					●	●		
 With Wiper Edge 	SEEN	1203AFFR-W	12.50	3.18	-	3.5	1.7	14.56	20°	25°	1	●			-
 	SOKN	13T3AXFN-NE	13.494	3.97	0.4	1.1	3.0	-	27°	32°	1			▲	-
 	TEEN	1603PTFR-NE	9.525	3.18	0.6	1.4	4.1	-	20°	22°	1	●		●	-
		1603PTFR					4.7					●	●		
	TEKN	2204PTFR-NE	12.70	4.76	0.7	1.8	4.2	-	20°	22°	1	●		●	-
		2204PTFR					4.8					●	●		

Insert	Description		Dimension (mm)						Angle		No. of Edges	PCD			See Page for Applicable Toolholders
			W1	S	D1	INSL	RE	LE	AS	AN		KPD001	KPD010	KPD230	
 	BDGT	11T302FR	6.7	3.8	2.8	11.5	0.2	3.8	18°	13°	1	●		●	M64 M65 M66 M67
		11T304FR					0.4					●		●	
		11T308FR					0.8					●		●	
	BDGT	11T302FR-LE					0.2	5.2			1	●		●	
		11T304FR-LE					0.4					●		●	
		11T308FR-LE					0.8					●		●	
 	BDMT	11T302FR	6.7	3.8	2.8	11.0	0.2	3.6	18°	13°	1	●		●	
		11T304FR					0.4					●		●	
	BDMT	170402FR	9.6	4.9	4.4	17.0	0.2	4.4	18°	13°	1	●		●	M65 M66 M67
		170404FR					0.4					●		●	
 	NDCW	150302FRX-NE	9.525	3.18	4.4	15.0	0.2	5.1	15°	-	1	●		●	M132
		150302FRX						5.7				●	●		

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item (1 pc boxes) ▲ :To be replaced by a new product

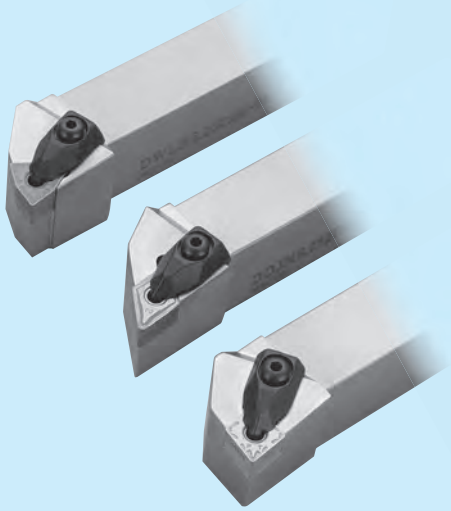


External

D

D1~D39

External Turning Toolholders Identification System		**D3**
Product Lineup		**D4~D5**
Clamping System		**D6~D7**
External Turning Toolholders		**D8~D25**
CN□□ Insert	DCLN / DCLN-JCT	**D8**
	PCLN	**D9**
DN□□ Insert	DDJN / DDJN-JCT / DDHN	**D12**
	PDJN / PDHN	**D13**
SN□□ Insert	DSBN / PSBN / PSKN	**D14**
	PSSN / PSDN	**D15**
TN□□ Insert	DTGN / DTGN-JCT	**D16**
	PTGN / PTFN	**D17**
	WTJN-N / WTKN-N / WTEN-N	**D18**
VN□□ Insert	DVLN / DVPN / DVVN	**D19**
	DVLN-JCT / DVPN-JCT / DVVN-JCT	**D20**
	MVLN / MVVN	**D21**
	PVLN / PVPN / PVVN	**D22**
RC□□ Insert	PRGC / PRXC	**D23**
RN□□ Insert	PRGN	**D23**
WN□□ Insert	DWLN / DWLN-JCT	**D24**
	PWLN / WWLN	**D25**
Toolholders for Ceramic Tools		**D26~D31**
CN□□ Insert	CCLN	**D26**
DN□□ Insert	CDJN	**D27**
EN□□ Insert	CELN	**D27**
SN□□ Insert	CSRN / CS-N / CSKN / CSYN / CSSN / CSDN	**D29**
TN□□ Insert	CTJN / CTUN	**D30**
RN□□ Insert	CRSN / CRDN	**D31**
Toolholders for Solid CBN Tools		**D32~D36**
CNMN Insert	CCRN-A / CCLN-A	**D32**
RNMN Insert	CRSN-A / CRDN-A	**D33**
SNMN Insert	CSRN-A / CSKN-A	**D34**
	CSSN-A / CSDN-A	**D35**
TNMN Insert	CTJN-A	**D36**
Toolholders for Bearing Machining		**D37**
RCMT Insert / SNMF Insert	PRGC-BE / CBSN	**D37**
Technical Information		**D38~D39**
Recommended Cutting Conditions		**D38**
Parts Compatibility of Lever Lock Toolholders		**R55**



Great for High Pressure Coolant Turning Toolholders

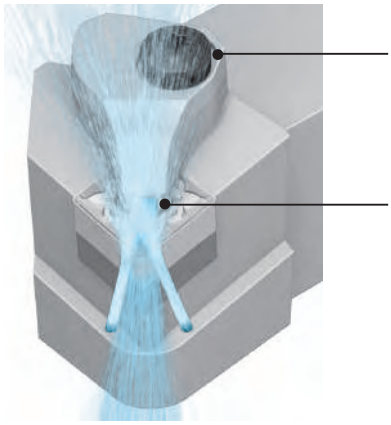
Double Clamp-JCT

Improved Chip Control and Longer Tool Life for a Wide Variety of Workpieces including Steel, Hardened Material and Difficult-to-Cut Material

Special Coolant Hole Design

○ : Coolant Hole

Special coolant-through structure designed by careful simulation and analysis technology

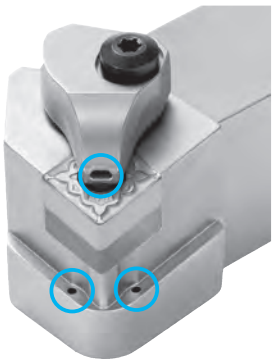


Double Clamp

Firm insert clamp and easy to use in single operations
High-density coolant supply close to the cutting edge

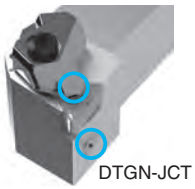
Unique Nozzle Shape

Provides coolant to a wide area of the insert surface



Discharges Coolant in Three Directions
The Cutting Edge Stays Cool

***The coolant supply system depends on the type**
DTGN-JCT,DVLN/DVPN-JCT : Two directions, DVVN-JCT : One direction



DTGN-JCT



DVVN-JCT

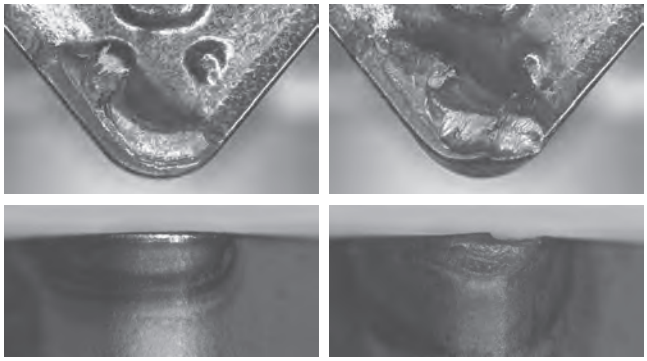
Internal Coolant Benefits

Discharges Coolant towards the Cutting Edge
Internal Coolant Provides Longer Tool Life and Excellent Chip Control

Longer Tool Life

Wear Resistance Comparison (Internal evaluation)

Internal coolant (7MPa) | External coolant (0.4MPa)

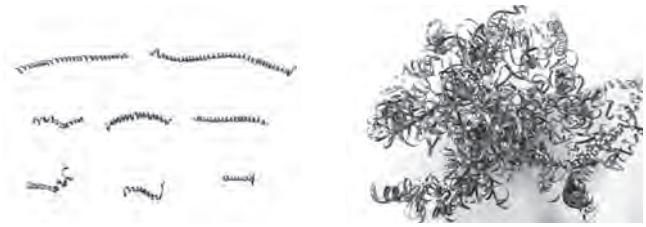


Cutting Conditions : Vc = 250 m/min, ap = 2 mm, f = 0.3 mm/rev, Wet
CNMG120408type Workpiece Material : SCM435
External After Machining 42.2 min

Improved Chip Control

Chip Control Comparison (Internal evaluation)

Internal coolant (7MPa) | External coolant (0.4MPa)



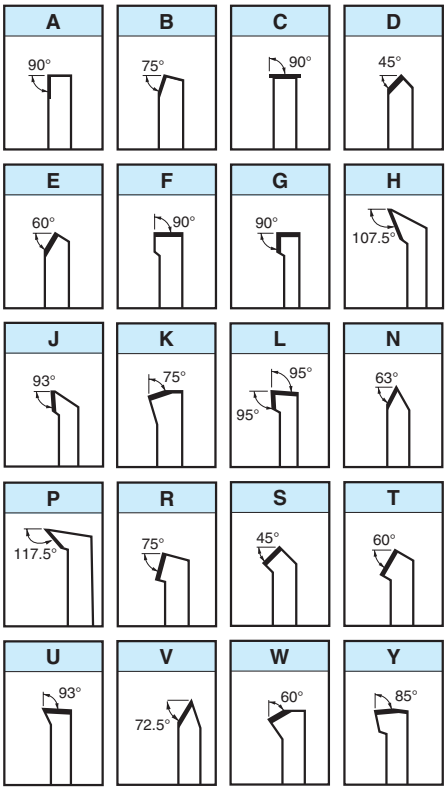
Cutting Conditions : Vc = 200 m/min, ap = 0.5 mm, f = 0.05 mm/rev, Wet
DNMG150408type Workpiece Material : SCM415 External

External Turning Toolholders Identification System (Square Shank)

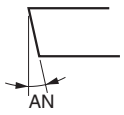
Clamping System	Insert Shape	Hand of Tool	Shank Height	Shank Width	Others
A : Back Clamp **C** : Top Clamp **D** : Double Clamp **M** : Multi Lock **P** : Pin Lock or Lever Lock **S** : Screw Clamp **W** : Wedge Lock	**C** : 80° Rhombic **D** : 55° Rhombic **R** : Round **S** : 90° Square **T** : 60° Triangle **V** : 35° Rhombic **W** : 80° Trigon	**R** : Right-hand **L** : Left-hand **N** : Neutral	Shank Height (mm)	Shank Width (mm)	Manufacture's Option Optional Mark or Number

D	C	L	N	R	20	20	K	—	12	

Cutting Edge Angle

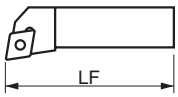


Insert Relief Angle



B : 5° Positive
C : 7° Positive
D : 15° Positive
E : 20° Positive
N : 0° Negative
P : 11°Positive

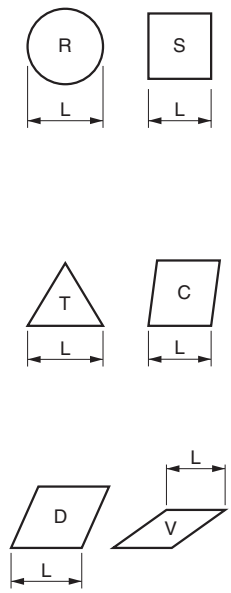
Toolholder Length



(mm)

A : 32	**J** : 110	**R** : 200
B : 40	**JX**: 120	**S** : 250
C : 50	**K** : 125	**T** : 300
D : 60	**L** : 140	**U** : 350
E : 70	**M** : 150	**V** : 400
F : 80	**N** : 160	**W** : 450
G : 90	**P** : 170	**Y** : 500
H : 100	**Q** : 180	**X** : Special

Insert Size



- Specification may change without any prior notice.
- Due to the installation size contrains on the machine, the toolholder length of some products may not match with the symbol.

External Turning Toolholders

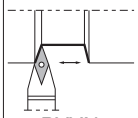
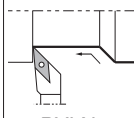
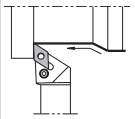
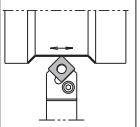
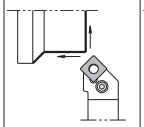
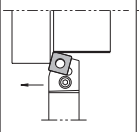
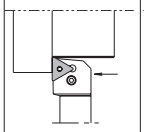
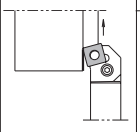
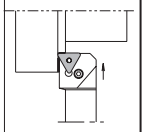
Applicable Insert Shape	CN..	WN..	TN..	DN..	RC..		RN..	VN..
Applications	External / Facing		External / Facing / Copying					External / Facing / Copying / Undercutting
Cutting Edge Angle	95°		105°	107.5°	Special			117.5°
Lever Lock (Pin Lock)	PCLN	PWLN		PDHN	PRGC	PRXC	PRGN	PVPN (Pin Lock)
See Page	**D9**	**D25**		**D13**	**D23**	**D23**	**D23**	**D22**
Wedge Lock Multi Lock		WWLN	WTKN-N					
See Page		**D25**	**D18**					
Double Clamp (Coolant-through Holders)	DCLN (-JCT)	DWLN (-JCT)		DDHN				DVPN (-JCT)
See Page	**D8**	**D24**		**D12**				**D19 / D20**

Toolholders for Ceramic Tools

Applications	External / Facing			External / Copying		External / Chamfering	External / Facing / Chamfering	
Cutting Edge Angle	95°	97.5°	Special	93°	Special	45°	45°	
Top Clamp	CCLN	CELN	CRSN	CDJN	CRDN	CSDN	CSSN	
See Page	**D26**	**D27**	**D31**	**D27**	**D31**	**D29**	**D29**	

Toolholders for Solid CBN Tools

Applications	External / Facing		External / Copying	External / Chamfering	External / Facing / Chamfering	External		
Cutting Edge Angle	95°	Special	Special	45°	45°	75°		93°
Top Clamp	CCLN-A	CRSN-A	CRDN-A	CSDN-A	CSSN-A	CCRN-A	CSRN-A	CTJN-A
See Page	**D32**	**D33**	**D33**	**D35**	**D35**	**D32**	**D34**	**D36**

	VN..		DN.. TN..	SN..	TN..	SN..	SN..	TN..	SN..	TN..
	External / Copying			External / Chamfering		External / Facing / Chamfering	External		Facing	
	72.5°	95°	93°	45°	60°	45°	75°	91°	15°	-1°
	 PVVN (Pin Lock)	 PVLN (Pin Lock)	 PDJN	 PSDN		 PSSN	 PSBN	 PTGN	 PSKN	 PTFN
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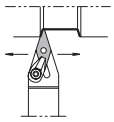
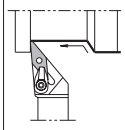
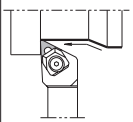
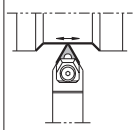
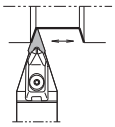
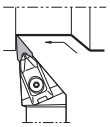
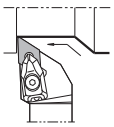
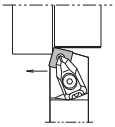
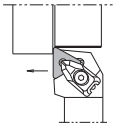
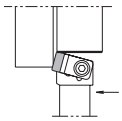
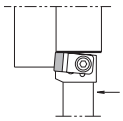
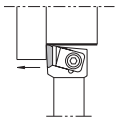
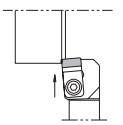
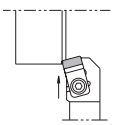
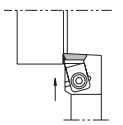
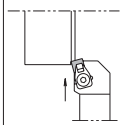
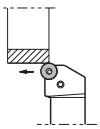
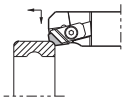
	 MVVN	 MVLN	 WTJN-N		 WTEN-N					
	D21	**D21**	**D18**		**D18**					
	 DVVN (-JCT)	 DVLN (-JCT)	 DDJN (-JCT)				 DSBN	 DTGN (-JCT)		
	D19 / D20	**D19 / D20**	**D12**				**D14**	**D16**		

	External			Facing		
	75°	85°	93°	5°	15°	-3°
	 CSRN	 CS-N	 CTJN	 CSYN	 CSKN	 CTUN
	D29	**D29**	**D30**	**D29**	**D29**	**D30**

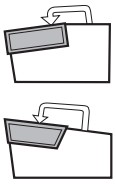
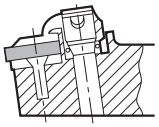
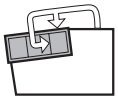
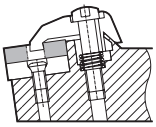
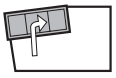
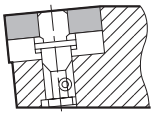
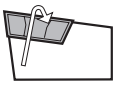
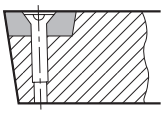
Toolholders for Bearing Machining

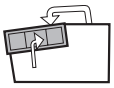
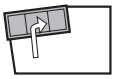
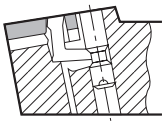
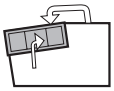
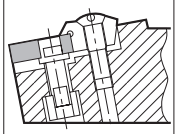
	Facing
	15°
	 CSKN-A
	D34

Applications	External
Cutting Edge Angle	Special
Lever Lock	 PRGC-BE
See Page	**D37**

Applications	Round Chamfering
Cutting Edge Angle	Special
Top Clamp	 CBSN
See Page	**D37**

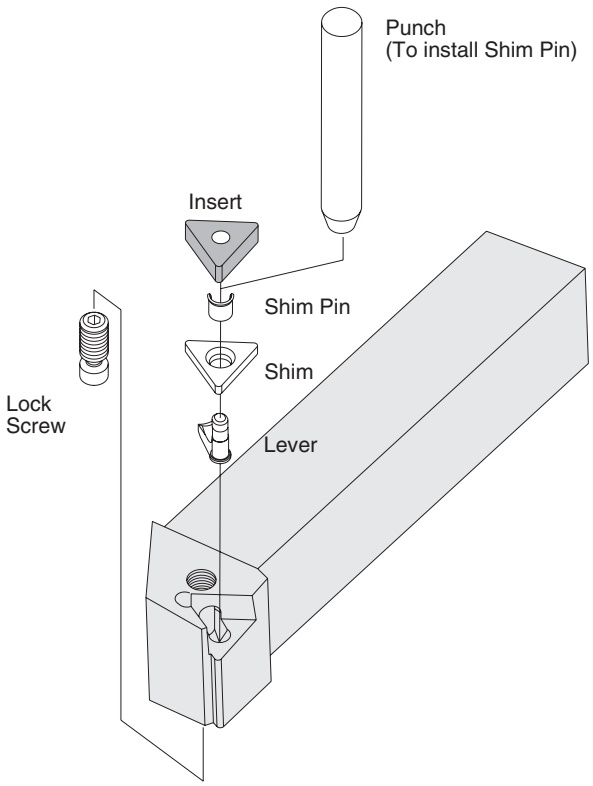
Clamping System

Series	Design		Features
Top Clamp (C)			· Rigid Clamping · Negative Insert : Medium to Heavy Machining (Mainly for Ceramic Insert) · Positive Insert : Low Cutting Force
Double Clamp (D)			· Firmly clamp the insert in two directions with one action
Pin Lock (P)			· Easy Insert Replacement
Screw Clamp (S)			· Simple Mechanism · Fewer Parts · Finishing to Medium Machining

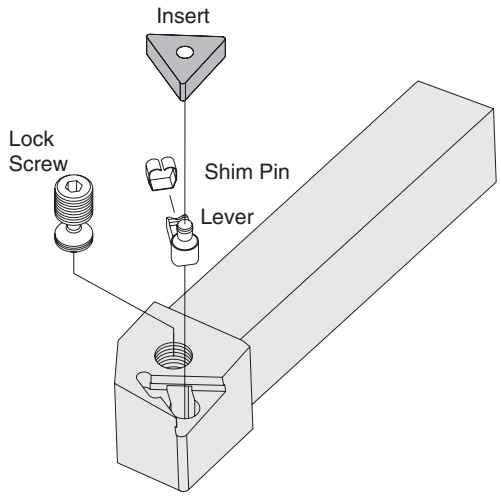
Series	Design		Features
Multi Lock (M)			· Combination of Top Clamp and Pin Lock · Rigid Clamping · Heavy Machining
Lever Lock (P)			· Easy Insert Replacement · General Use
Wedge Lock (W)			· Rigid Clamping · Heavy Machining

Lever Lock

PCLN
PWLN
PTGN / PTFN / PTLN
PDJN / PDHN
PSBN / PSKN / PSSN / PSDN
PRGN
PRGC / PRXC



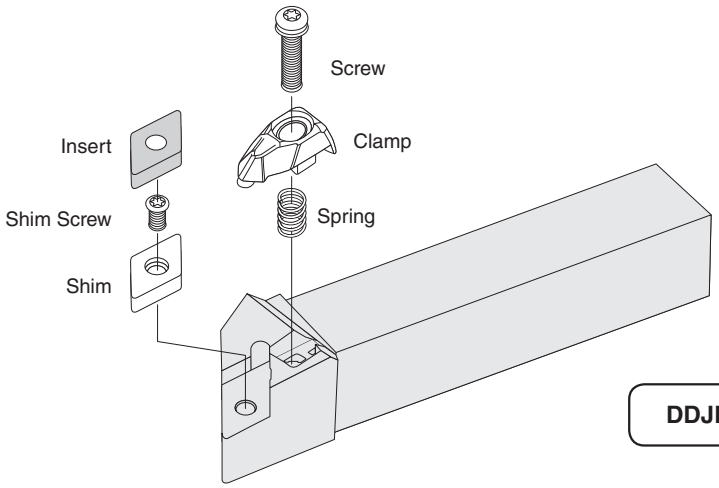
With Shim



Without Shim

PTGN-11 / PTFN-11

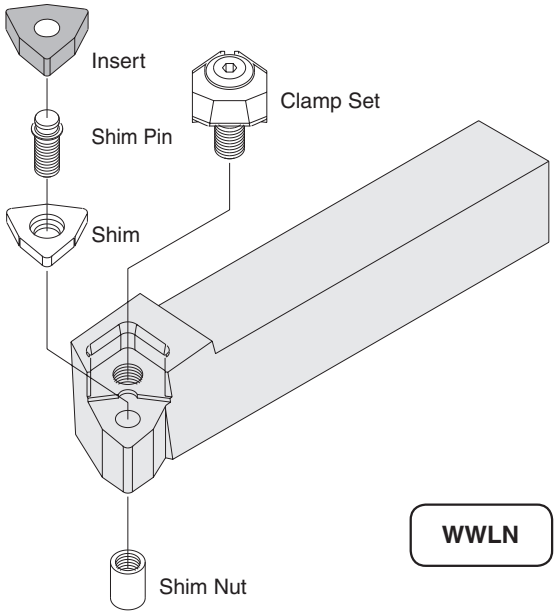
Double Clamp



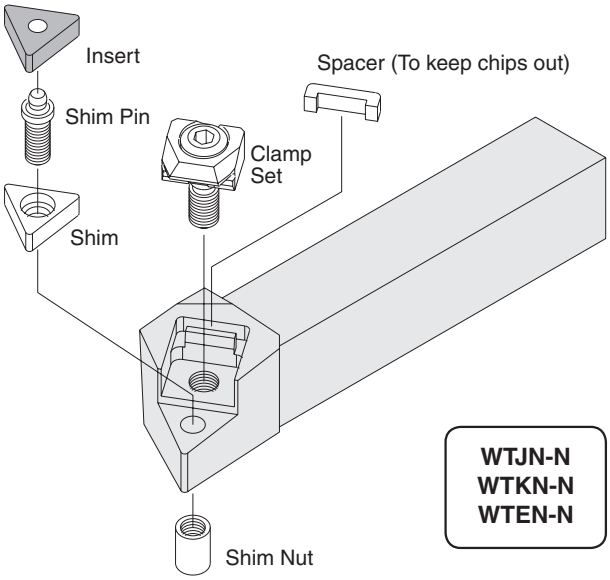
DCLN
DDJN / DDHN
DSBN
DTGN
DVLN / DVPN / DVVN
DWLN

DDJN

Wedge Lock

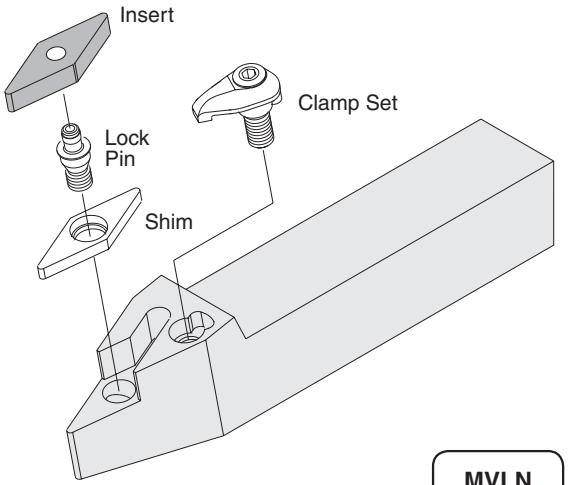


WWLN



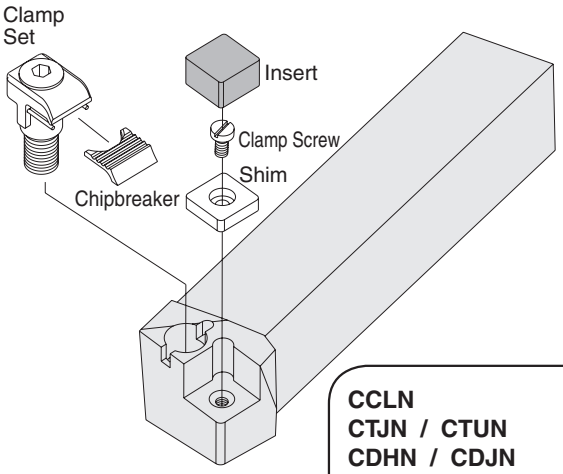
WTJN-N
WTKN-N
WTEN-N

Multi Lock



MVLN
MVVN

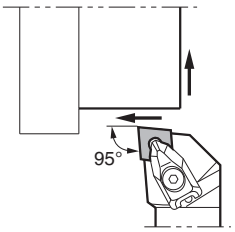
Top Clamp

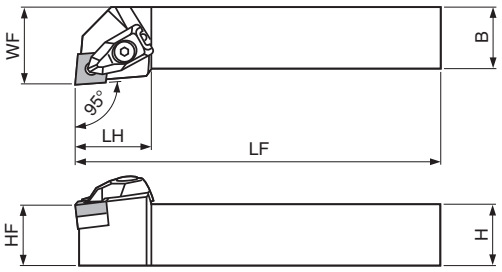


CCLN
CTJN / CTUN
CDHN / CDJN
CELN
CSRN / CS-N / CSKN
CSYN / CSSN / CSDN
***CRSN / *CRDN**

* A chipbreaker is not included with CRSN / CRDN.

DCLN (External / Facing)





• Right-hand shown

Side Rake Angle : -6°
Angle of Inclination : -6°

Applicable Inserts

Toolholder Description	Insert Description	
DCLN R/L...-12	CN□A CN□G CN□M	1204..

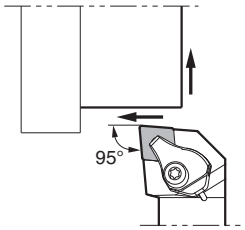
Toolholder Dimensions

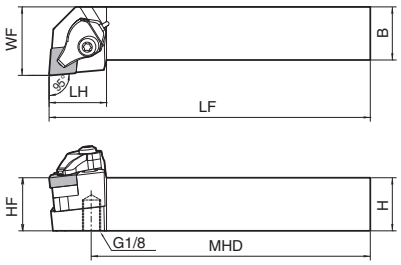
Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
																 For Clamp	 For Shim
DCLN R/L	2020K-12	●	●	20	20	20	125	33	25	0.8	CP-3D	CS-3D	SP-3D	*1DC-44 *2DC-44-C	SB-4085TR	LW-3	FT-15
	2525M-12	●	●	25	25	25	150	32	32								

*1. When using inserts whose corner-R(RE) is greater than 1.6mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.
*2. When using the inserts with SX chipbreaker, prepare a shim separately.
· Recommended tightening torque 3.9N·m

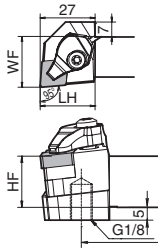
DCLN-JCT (External / Facing and Coolant-through Holders)

Pressure Resistance : ~30MPa





• Right-hand shown



2020K-12JCT

Side Rake Angle : -6°
Angle of Inclination : -6°
Coolant supply: 3 directions

Applicable Inserts

Toolholder Description	Insert Description	
DCLN R/L...-12	CN□A CN□G CN□M	1204..

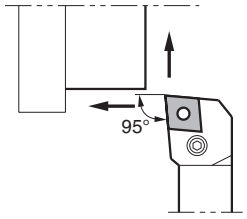
Toolholder Dimensions

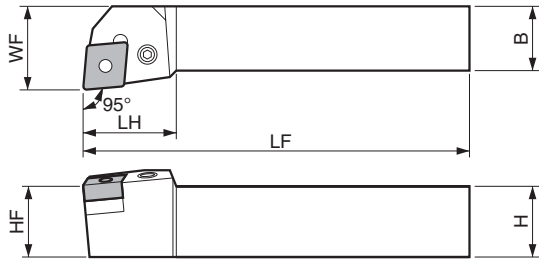
Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	MHD	Std. Corner-R(RE)	Spare Parts: Clamp	Pipe Connection (*1 with O-ring)	Screw	Spring	Shim	Shim Screw	Wrench
																		
DCLN R/L	2020K-12JCT	●	●	20	20	20	125	27	25	109	0.8	CP-3D-R/L-JCT	FP-12	CS-3D-TR	SP-3D	*2DC-44 *3DC-44-C	SB-4085TR	FT-15
	2525M-12JCT	●	●	25	25	25	150		32	134								

Please see page **D10** and **D11** for piping parts of coolant-through holders.
*1 It is possible to order just an O-ring **(SS-035)**.
*2. When using inserts whose corner-R(RE) is greater than 1.6mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.
*3. When using the inserts with SX chipbreaker, prepare a shim separately.
· Recommended tightening torque 3.9N·m

● : Std. Item

PCLN (External / Facing)





• Right-hand shown

Side Rake Angle : -6°
Angle of Inclination : -6°

Applicable Inserts

Toolholder Description	Insert Description	
PCLNR/L...-09	CN□G	0904..
PCLNR/L...-12	CN□A CN□G CN□M	1204..
PCLNR/L...-16		1606..
PCLNR/L...-19		1906..

Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PCLNR/L	1616H-09	●	●	16	16	16	100	22	20	0.8	LL-1N	LS-1N	LC-32N	LSP-1	PC-1	FH-2.5
	2020K-09	●	●	20	20	20	125		25							
	2525M-09	●	●	25	25	25	150		32							
	2020H-12*1	●		20	20	20	100	27	25	0.8	LL-2N	LS-2N	LC-42N *2LC-42N-20 *3LC-42N-C	LSP-2	PC-2	LW-3
	2020K-12	●	●				125									
	2525M-12	●	●	25	25	25	150		32							
	3225P-12	●	●	32	32		170									
	2525M-16	●	●	25	25	25	150	32	32	0.8	LL-5N	LS-4N	LC-53N *3LC-53N-C	LSP-3	-	LW-3
	3232P-16	●	●	32	32	32	170		40							
	3232P-19	●	●	32	32	32	170	40	40	1.6	LL-6	LS-5	LC-63 *3LC-63-C	LSP-4	-	LW-4

*1. Indicates short shank type
*2. When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim and use it in order to prevent workpiece and shim from interfering each other.
*3. When using the inserts with SX chipbreaker, prepare a shim separately.

Applicable Inserts

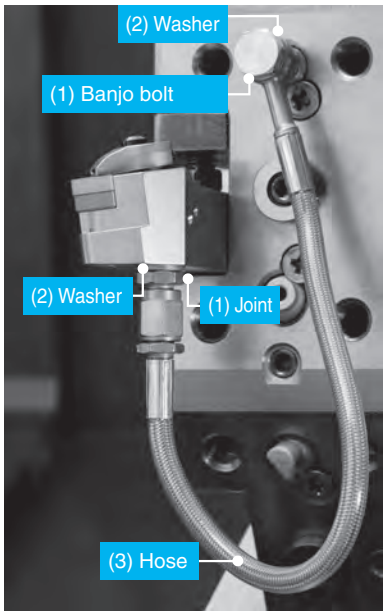
Applications	Finishing	Finishing - Medium	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing
Insert	WF(Wiper)	WE(Wiper)	PP	PQ	CQ	CJ	GS	PG	PS
Size	12	12	12	12	12,16	12,16	09,12	12	12,16
Page	B16	B16	B16	B16	B17	B17	B17	B17	B17
Applications	Medium - Roughing / High Feed Rate	Roughing	Roughing	Single-sided / Roughing / High Feed Rate	Finishing	Medium	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium
Insert	PT	Standard	PH	PX	R/L-S	R/L	XF	XP	XQ
Size	12,16	12,16,19	12,16,19	12,16,19	09	09,12	12	12	12
Page	B18	B18	B18	B19	B22	B22	B19	B19	B19
Applications	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Insert	XS	MQ	MS	MU	KQ	KG	KH	C	ZS
Size	12	12	12	12,16,19	12	12	12	12,16	12
Page	B19	B20	B20	B20	B21	B21	B21	B21	B21
Applications	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Heat-resistant Alloys	Hard Materials
Insert	GC	Without Chipbreaker	Ceramic	A3	AH	PCD	SQ	R/L-SX	CBN
Size	12	12	12	12	12	12	12,16,19	12,16,19	12
Page	B21	B21	B106	B22	B22	C23	B20	B21	C6, C7

Recommended Cutting Conditions ➔ D38~D39

● : Std. Item

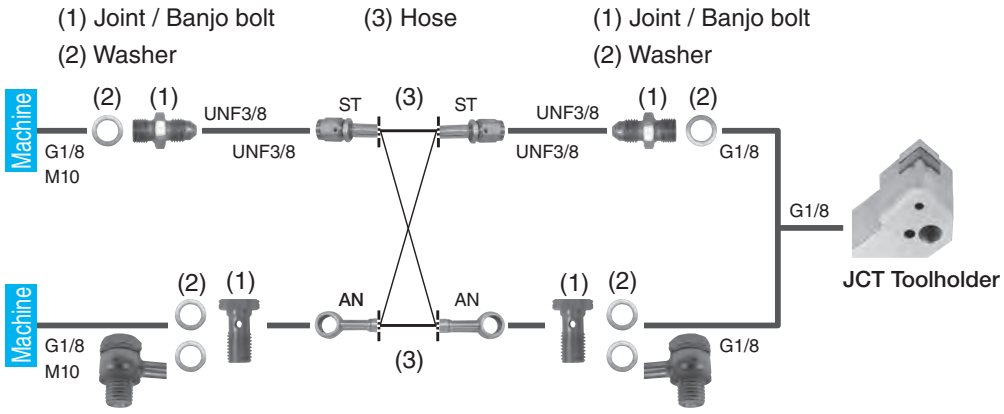
Easy Coolant Connections

Easy Connection with High Pressure Hose and Joint



- **Even without a high pressure pump, internal coolant can be used at a normal pressure.**
- **Banjo bolt available for angled hose connection. Can be used in a variety of machines.**

<Piping Installation Guide>



● Internal Coolant Benefits (Reference)

Coolant Pressure (MPa)	Tool Life	Chip Control	Remarks
~ 2 (Low Pressure)	○	-	Longer tool life under 1MPa
2 ~ 7 (Medium Pressure)	◎	○	Longer tool life and Improved chip control
7 ~ 15 (High Pressure)	◎	◎	Fine chip breaking
15 ~ 30 (Extra-high Pressure)	◎	◎	Fine chip breaking. High speed machining for heat-resistant alloys

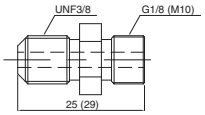
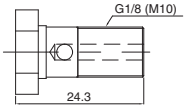
Internal coolant under low pressure provides improved performance and stable machining

Piping Parts

Optional Piping Parts Available (sold separately)
Choose among (1)(2)(3) based on the machine spec and piping configuration.
(1) Joint / Banjo bolt x 2 (2) Washer x 2-4 (3) Hose x 1

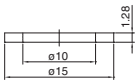
(1) Joint / Banjo bolt

Pressure Resistance : ~30MPa

Shape		Description	Stock	Thread Standard Thread connection to the machine
		J-G1/8-UNF3/8	●	G1/8
		J-M10X1.5-UNF3/8	●	M10X1.5
Banjo bolt (for angled hose) 		BB-G1/8	●	G1/8
		BB-M10X1.5	●	M10X1.5

(2) Washer

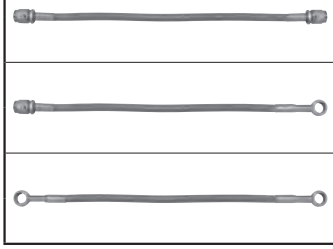
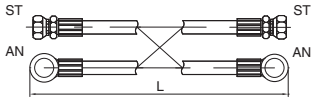
Pressure Resistance : ~30MPa

Shape		Description	Stock
		WS-10	●

*Use 2 washers for a banjo bolt

(3) Hose

Pressure Resistance : ~30MPa

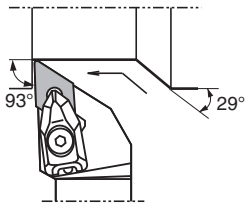
Shape		Description	Stock	Thread Standard		Dimension (mm) L
		HS-ST-ST-200	●	UNF3/8	UNF3/8	200
		HS-ST-ST-250	●			250
		HS-ST-AN-200	●	UNF3/8	- (Banjo bolt)	200
		HS-ST-AN-250	●			250
		HS-AN-AN-200	●	- (Banjo bolt)	- (Banjo bolt)	200
		HS-AN-AN-250	●			250

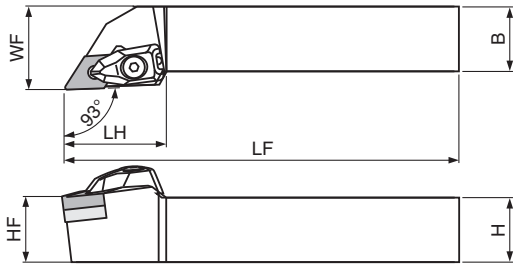
Cautions

1. Make sure machine door is completely closed before use of these parts.
2. Use appropriate seal for the male thread of the piping parts and make sure the connection is secure.
   Use plugs to seal off unused coolant holes.
3. Connect and fasten the coolant hose firmly.
4. The use of copper washers may cause leakage but will have no effect on the performance.
5. Commercial piping parts can be used if the thread standards are same. Check the pressure resistance before use.
6. Regularly changing the coolant filter is recommended.

● : Std. Item

DDJN (External / Copying)





• Right-hand shown

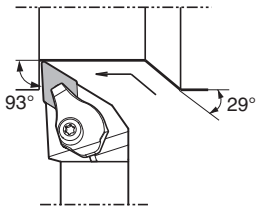
Side Rake Angle : -6°
Angle of Inclination : -6°

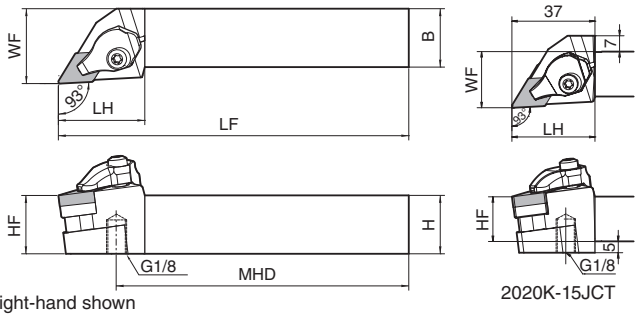
Applicable Inserts

Toolholder Description	Insert Description	
DDJN$^{R}_{L}$...-1504	DN□A DN□G	1504.. (1506..)
DDJN$^{R}_{L}$...-1506	DN□M DNMX	1506.. (1504..)

DDJN -JCT (External / Copying / Coolant-through Holders)

Pressure Resistance : ~30MPa





• Right-hand shown

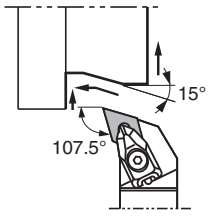
2020K-15JCT

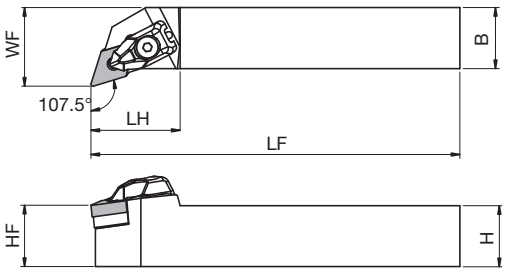
Side Rake Angle : -6°
Angle of Inclination : -7°
Coolant supply: 3 directions

Applicable Inserts

Toolholder Description	Insert Description	
DDJN$^{R}_{L}$...-15JCT	DN□A DN□G DN□M DNMX	1504.. (1506..)

DDHN (External / Facing / Copying)





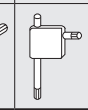
• Right-hand shown

Side Rake Angle : -6°
Angle of Inclination : -6°

Applicable Inserts

Toolholder Description	Insert Description	
DDHN$^{R}_{L}$...-1504	DN□A DN□G	1504.. (1506..)
DDHN$^{R}_{L}$...-1506	DN□M	1506.. (1504..)

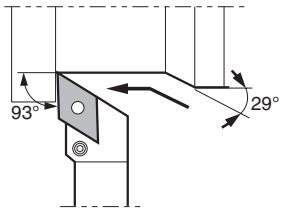
Toolholder Dimensions

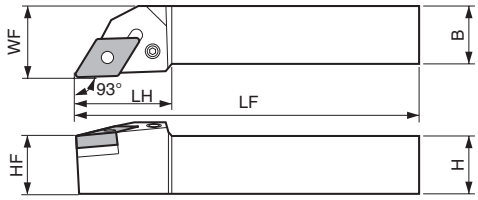
Description	Stock		Dimension (mm)							Std. Corner-R(RE)	Spare Parts							
											Clamp	Pipe Connection (*1 with O-ring)	Screw	Spring	Shim	Shim Screw	Wrench	Wrench
	R	L	H	HF	B	LF	LH	WF	MHD									
DDJN$^{R}_{L}$ 2020K-1504	●	●	20	20	20	125	39	25	-	0.8	CP-3D	-	CS-3D	SP-3D	*2DD-44 (DD-43)	SB-4085TR	LW-3 (For Clamp)	FT-15 (For Shim sold separately)
2525M-1504	●	●	25	25	25	150		32										
DDJN$^{R}_{L}$ 2020K-1506	●	●	20	20	20	125		25							DD-43 (*2DD-44)			
2525M-1506	●	●	25	25	25	150		32										
DDJN$^{R}_{L}$ 2020K-15JCT	●	●	20	20	20	125	37	25	101		CP-4D-$^{R}_{L}$-JCT	FP-12	CS-3D -TR		*2DD-44 (DD-43)		-	FT-15
2525M-15JCT	●	●	25	25	25	150		32	126									
DDHN$^{R}_{L}$ 2020K-1504	●	●	20	20	20	125	37	25	-		CP-3D	-	CS-3D		*2DD-44 (DD-43)		LW-3 (For Clamp)	FT-15 (For Shim sold separately)
2525M-1504	●	●	25	25	25	150		32										
DDHN$^{R}_{L}$ 2020K-1506	●	●	20	20	20	125		25							DD-43 (*2DD-44)			
2525M-1506	●	●	25	25	25	150		32										

Please see page **D10** and **D11** for piping parts of coolant-through holders.
Shims indicated within brackets ( ) are not included with the toolholder. To change insert thickness, please purchase it separately.
*1 It is possible to order just an O-ring (**SS-035**).
*2. When using inserts whose corner-R(RE) is greater than 1.6mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.
· Recommended tightening torque 3.9N·m

● : Std. Item

PDJN (External / Copying)





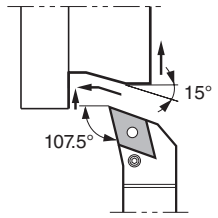
• Right-hand shown

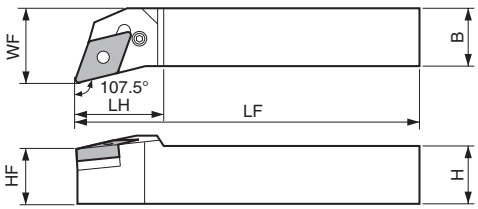
Side Rake Angle : -6°
Angle of Inclination : -7°

Applicable Inserts

Toolholder Description	Insert Description	
PDJN$^{R}_{L}$...-11	DN□A DN□G	1104..
PDJN$^{R}_{L}$...-15	DN□A DN□G	1504..
PDJN$^{R}_{L}$...-15U	DN□M DNMX	1506.. (1504..)

PDHN (External / Facing / Copying)





• Right-hand shown

Side Rake Angle : -6°
Angle of Inclination : -6°

Applicable Inserts

Toolholder Description	Insert Description	
PDHN$^{R}_{L}$...15	DN□A DN□G DN□M	1504.. (1506..)

Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PDJN$^{R}_{L}$	1616H -11	●	●	16	16	16	100	28	20	0.4	LL-1DN	LS-1N	LD-32N	LSP-1	PC-1	FH-2.5
	2020K -11	●	●	20	20	20	125		25							
	2525M -11	●	●	25	25	25	150		32							
	2020H -15*1	●		20	20	20	100	36	25	0.8	LL-3N	LS-2N	LD-42 *2LD-42-20	LSP-2	PC-2	LW-3
	2020K -15	●	●				125									
	2525M -15	●	●	25	25	25	150		32							
	3225P -15	●	●	32	32		170									
	2525M -15U	●	●	25	25	25	150	34	32	0.8	LL-4	LS-3	LD-42 *2LD-42-20 (LD-43) (*2LD-43-20)	LSP-2	PC-2	LW-3
	3232P -15U	●	●	32	32	32	170	36	40							
PDHN$^{R}_{L}$	2020K -15	●	●	20	20	20	125	35	25	0.8	LL-4	LS-3	LD-43 *2LD-43-20 (LD-42) (*2LD-42-20)	LSP-2	PC-2	LW-3
	2525M -15	●	●	25	25	25	150	34	32							

*1. Indicates short shank type
· Shim : PDJN$^{R}_{L}$-15U ···LD-42 is attached to PDJN$^{R}_{L}$-15U. When using DN□□1504 type insert, please purchase LD-43 separately.
PDHN ···LD-43 is attached to PDHN. When using DN□□1506 type Insert, please purchase LD-42 separately.
· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim*2 and use it in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

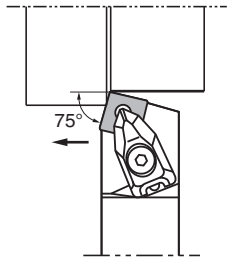
Applications	* Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Roughing	Roughing
Insert	WF(Wiper)	PP	PQ	CQ	CJ	GS	PG	PS	PT	Standard	PH
Size	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1104,1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506
Page	B23	B23	B23	B24	B24	B24	B25	B25	B25	B26	B26
Applications	Single-sided / Roughing / High Feed Rate	Finishing	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron
Insert	PX	$^{R}_{L}$-S	$^{R}_{L}$	XP	XQ	XS	MQ	MS	MU	TK	C
Size	1504,1506	1104	1104,1504	1504,1506	1504	1504	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506
Page	B26	B30	B30	B26	B26	B26	B27	B28	B28	B27	B29
Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Hard Materials
Insert	KQ	KG	KH	ZS	GC	Ceramic	$^{R}_{L}$-A3	AH	PCD	SQ	CBN
Size	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504	1504,1506	1504	1504,1506	1504,1506
Page	B29	B29	B29	B29	B29	B107	B30	B30	C23	B28	C8, C9

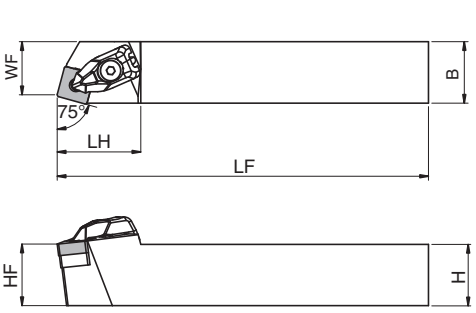
* When using the insert with WF chipbreaker, tool edge offset or program corrections are required. R35
The insert with WF chipbreaker is not applicable for DDHN type and PDHN type toolholder.

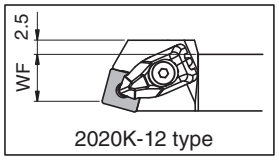
Recommended Cutting Conditions D38~D39

● : Std. Item

DSBN (External)







Side Rake Angle : -4°
Angle of Inclination : -7°

• Right-hand shown

Applicable Inserts

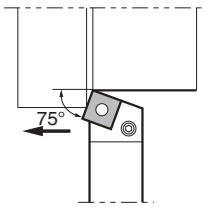
Toolholder Description	Insert Description	
DSBN R/L...-12	SN□A SN□G SN□M	1204..

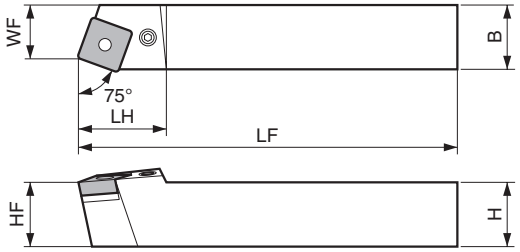
Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DSBN R/L	2020K -12	●	●	20	20	20	125	34	17	0.8	CP-3D	CS-3D	SP-3D	DS-44	SB-4085TR	LW-3	FT-15
	2525M -12	●	●	25	25	25	150		22								

· Recommended tightening torque 3.9N·m

PSBN (External)

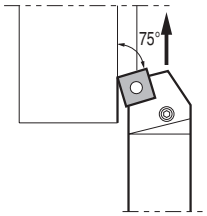


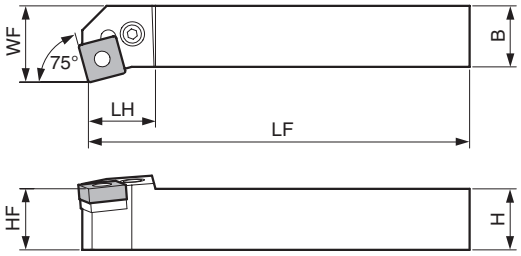


Side Rake Angle : -4°
Angle of Inclination : -7°

• Right-hand shown

PSKN (Facing)





Side Rake Angle : -4°
Angle of Inclination : -7°

• Right-hand shown

Toolholder Dimensions

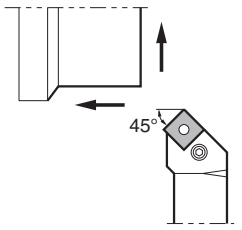
Description		Stock R	Stock L	H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PSBN R/L	1616H -09	●	●	16	16	16	100	21	13	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K -12	●	●	20	20	20	125	27	17	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M -12	●	●	25	25	25	150	24	22							
PSKN R/L	1616H -09	●	●	16	16	16	100	19	20	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K -12	●	●	20	20	20	125	22.5	25	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M -12	●	●	25	25	25	150		32							

· PSKN R/L : Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

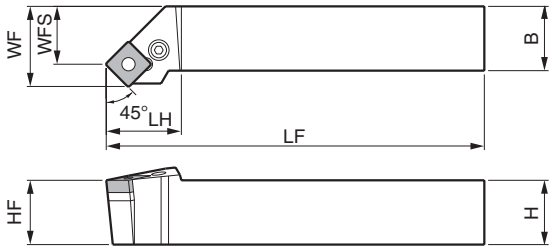
· When using inserts whose corner-R(RE) is greater than 1.6 mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.

● : Std. Item

PSSN (External / Facing / Chamfering)

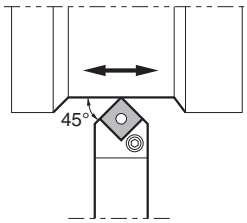


Side Rake Angle : -8°
Angle of Inclination : 0°

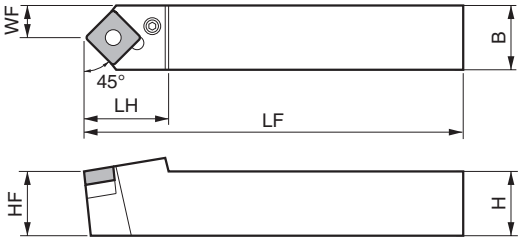


• Right-hand shown

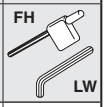
PSDN (External / Chamfering)



Back Rake Angle : -8.5°



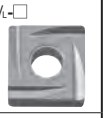
Toolholder Dimensions

Description		Stock			Dimension (mm)							Std. Corner-R(RE)	Spare Parts					
													Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
		R	N	L	H	HF	B	LF	LH	WF	WFS							
PSSN R/L	1616H-09	●		●	16	16	16	100	22	20	13.6	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K-12	●		●	20	20	20	125	29	25	16.4	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M-12	●		●	25	25	25	150		32	23.4							
PSDNN	1616H-09		●		16	16	16	100	21	8	-	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K-12		●		20	20	20	125	30	10	-	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M-12		●		25	25	25	150		12.5								

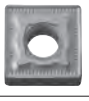
· When using inserts whose corner-R(RE) is greater than 1.6 mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

Toolholder Description	Insert Description	
PSBN R/L...-09	SN□G	0903..
PSKN R/L...-09		
PSSN R/L...-09		
PSDNN...-09		
PSBN R/L...-12	SN□A SN□G SN□M	1204..
PSKN R/L...-12		
PSSN R/L...-12		
PSDNN...-12		

Applications	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Roughing	Roughing	Single-sided / Roughing / High Feed Rate	Finishing - Roughing
Insert	PQ 	PG 	PS 	PT 	Standard 	PH 	PX 	R/L-□ 
Size	12	12	12	12	09, 12	12	12	09, 12
Page	B32	B32	B32	B32	B32	B33	B33	B35

Applications	Medium-Roughing / Low Cutting Force	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron
Insert	R/L-25R 	XP 	XQ 	XS 	MQ 	MS 	C 	KG 
Size	12	12	12	12	12	12	12	12
Page	B35	B33	B33	B33	B34	B34	B34	B34

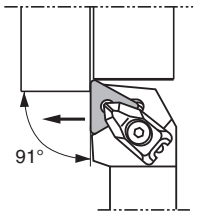
Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Hard Materials
Insert	KH 	ZS 	GC 	Without Chipbreaker 	Ceramic 	CBN 
Size	12	12	12	12	12	12
Page	B34	B34	B34	B35	B109	C10

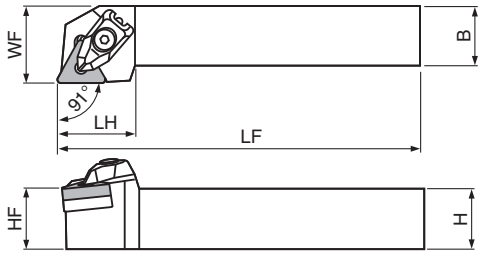
· PSSN R/L : When using handed inserts,
For External Turning, Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.
For Facing, Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Recommended Cutting Conditions
D38~D39

● : Std. Item

DTGN (External)





• Right-hand shown

Side Rake Angle : -6°
Angle of Inclination : -6°

Applicable Inserts

Toolholder Description	Insert Description	
DTGN$^{R}_{L}$...-16	TN□A TN□G TN□M TNMX	1604..

Toolholder Dimensions

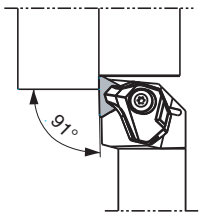
Description		Stock R	Stock L	H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DTGN$^{R}_{L}$	2020K -16	●	●	20	20	20	125	25	25	0.8	CP-2D	CS-2D	SP-2D	*DT-32	SB-3080TR	LW-2.5	FT-10
	2525M -16	●	●	25	25	25	150		32								

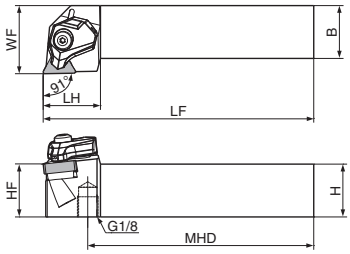
For Clamp / For Shim

· When using inserts whose corner-R(RE) is greater than 1.6mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.
· When using the insert with WF chipbreaker (wiper insert), tool edge offset or program corrections are required. ➡ **R35**
· Recommended tightening torque 1.7N·m

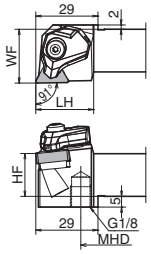
DTGN-JCT (External / Coolant-through Holders) NEW

Pressure Resistance : ~ 30MPa





• Right-hand shown



2020K-16JCT

Side Rake Angle : -6°
Angle of Inclination : -6°
Coolant supply: 2 directions

Applicable Inserts

Toolholder Description	Insert Description	
DTGN$^{R}_{L}$...-16JCT	TN□A TN□G TN□M TNMX	1604..

Toolholder Dimensions

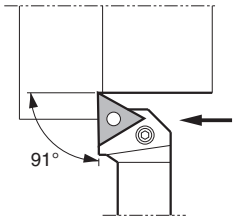
Description		Stock R	Stock L	H	HF	B	LF	LH	WF	MHD	Std. Corner-R(RE)	Clamp	Pipe Connection (with O-ring)	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DTGN$^{R}_{L}$	2020K-16JCT	●	●	20	20	20	125	27	25	104	0.8	CP-2D$^{R}_{L}$-JCT	FP-12	CS-3D-TR	SP-3D	DT-32	SB-3080TR	FT-15	FT-10
	2525M-16JCT	●	●	25	25	25	150		32	129									

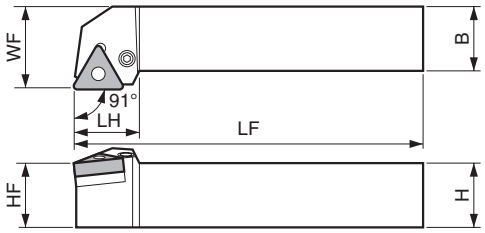
For Clamp / For Shim

· When using inserts whose corner-R(RE) is greater than 1.6mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.
· When using the insert with WF chipbreaker (wiper insert), tool edge offset or program corrections are required. ➡ **R35**
· Please see page **D10** and **D11** for piping parts of coolant-through holders.
· O-ring (**SS-035**) is available to order.
· Recommended tightening torque 3.9N·m

● : Std. Item

PTGN (External)

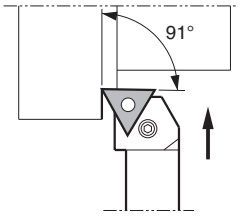


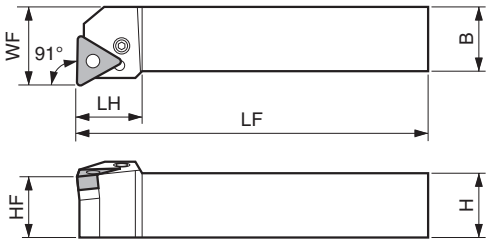


Side Rake Angle : -6˚
Angle of Inclination : -6˚

●Right-hand shown

PTFN (Facing)





Side Rake Angle : -6˚
Angle of Inclination : -6˚

● Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PTGN$^{R}_{L}$	1212F -11	●	●	12	12	12	80	18	16	0.8	LL-03N	LS-03N	-	P-03	-	FH-2
	1616H -11	●		16	16	16	100	22	20	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
	2020K -11	●	●	20	20	20	125		25							
	2525M -11	●	●	25	25	25	150		32							
	1616H -16	●	●	16	16	16	100	24	20	0.8	LL-1N	LS-1N	LT-32N *2LT-32N-20	LSP-1	PC-1	FH-2.5
	2020H -16*1	●		20	20	20			25							
	2020K -16	●	●				125									
	2525M -16	●	●	25	25	25	150		32							
	2525M -22	●	●	25	25	25	150	29	32	0.8	LL-2N	LS-2N	LT-42N *2LT-42N-20	LSP-2	PC-2	LW-3
PTFN$^{R}_{L}$	1212F -11	●	●	12	12	12	80	15	16	0.8	LL-03N	LS-03N	-	P-03	-	FH-2
	1616H -11	●	●	16	16	16	100	22.5	20	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
	2020K -11	●		20	20	20	125		25							
	2525M -11	●	●	25	25	25	150		32							
	2020K -16	●	●	20	20	20	125	22	25	0.8	LL-1N	LS-1N	LT-32N *2LT-32N-20	LSP-1	PC-1	FH-2.5
	2525M -16	●	●	25	25	25	150	23	32							
	2525M -22	●	●	25	25	25	150	28	32	0.8	LL-2N	LS-2N	LT-42N *2LT-42N-20	LSP-2	PC-2	LW-3

*1. Indicates short shank type
· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim*2 and use it in order to prevent workpiece and shim from interfering each other.
· When using the insert with WF chipbreaker (wiper insert), tool edge offset or program corrections are required. R35

Applicable Inserts

Toolholder Description	Insert Description		Toolholder Description	Insert Description	
PT□N$^{R}_{L}$12...-11	TN□□	1103..	PT□N$^{R}_{L}$...-16	TN□A TN□G TN□M *3TNMX	1604..
PT□N$^{R}_{L}$...-11		1104..	PT□N$^{R}_{L}$...-22		2204..

· PTFN$^{R}_{L}$: Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

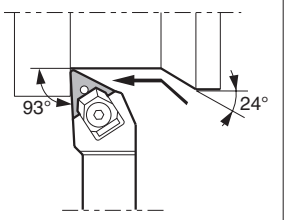
PTGN$^{R}_{L}$1212F-11
PTFN$^{R}_{L}$1212F-11
} Insert applicable for above TN□□1103 type Insert is applicable.

*3. TNMX type insert is not applicable for PT□N$^{R}_{L}$...-22 toolholder.

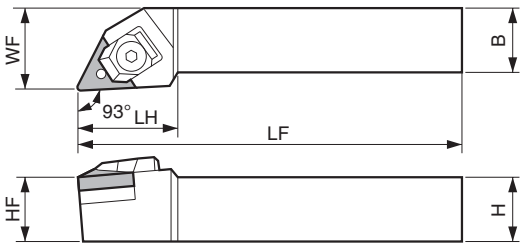
● : Std. Item

External Turning Toolholders [TN□□ Insert]

WTJN-N (External / Copying)

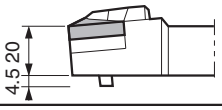


• Right-hand shown

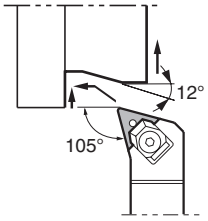


Side Rake Angle : -6°
Angle of Inclination : -6°

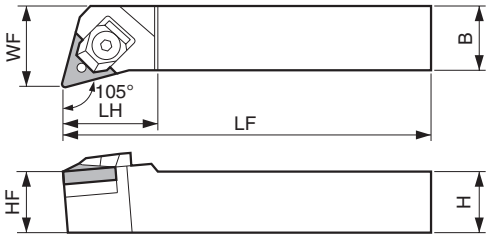
WTJN$^{R}_{L}$2020K types, Shim Nut sticks out as shown below.



WTKN-N (External / Facing / Copying)

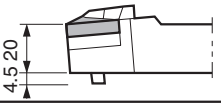


• Right-hand shown

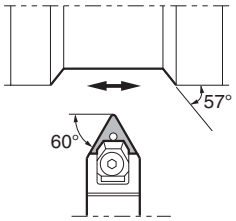


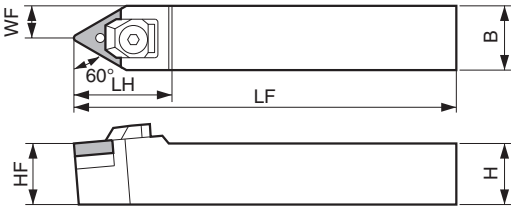
Side Rake Angle : -6°
Angle of Inclination : -6°

WTKN$^{R}_{L}$2020K types, Shim Nut sticks out as shown below.



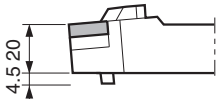
WTEN-N (External / Chamfering)





Back Rake Angle : -8.5°

WTENN2020K types, Shim Nut sticks out as shown below.



Toolholder Dimensions

Description		Stock			Dimension (mm)						Std. Corner-R(RE)	Spare Parts					
		R	N	L	H	HF	B	LF	LH	WF		Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Spacer
WTJN$^{R}_{L}$	2020K-16N	●		●	20	20	20	125	32	25	0.8	WCS-1N	WTN-33 *WTN -33-20	WP-1S	WN-1	LW-3	WSP-1
	2525M-16N	●		●	25	25	25	150		32							
WTKN$^{R}_{L}$	2020K-16N	●		●	20	20	20	125	32	25							
	2525M-16N	●		●	25	25	25	150		32							
WTENN	2020K-16N		●		20	20	20	125	32	10							
	2525M-16N		●		25	25	25	150		12.5							

· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim (WTN-33-20) with * mark and use it in order to prevent workpiece and shim from interfering with each other.

Applicable Inserts

Toolholder Description	Insert Description	
WTJN$^{R}_{L}$...-16N	TN□A TN□G TN□M	1604..
WTKN$^{R}_{L}$...-16N		
WTENN...-16N		

Applications	Finishing	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Medium - Roughing / High Feed Rate	Roughing
Insert	PP	PQ	CQ	GS	PG	PS	PT	GT	PH
Size	16	16	16,22	1104,16	16	16,22	16	16	16,22
Page	B36	B36	B36	B36	B36	B37	B37	B37	B37

Applications	Single-sided / Roughing / High Feed Rate	Roughing	Finishing	Finishing - Roughing	Medium-Roughing / Low Cutting Force	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing
Insert	PX	Standard	$^{R}_{L}$-S	$^{R}_{L}$-□	$^{R}_{L}$-25R	XF	XP	XQ	XS
Size	16,22	16,22	1104,16	1103,1104,16,22	16	16	16	16	16
Page	B38	B37	B42	B42,B43	B43	B38	B38	B38	B38

Applications	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	MQ	MS	MU	KQ	KG	KH	ZS	Ceramic	$^{R}_{L}$-A3	AH	PCD	CBN
Size	16	16	16	16	16	16	16	16	16	16	16	16
Page	B39	B39	B39	B40	B40	B40	B40	B111	B41	B41	C23	C11

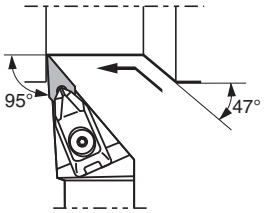
· In wedge lock, use of ceramic insert other than silicon nitride insert is not recommended due to strong restrain force.

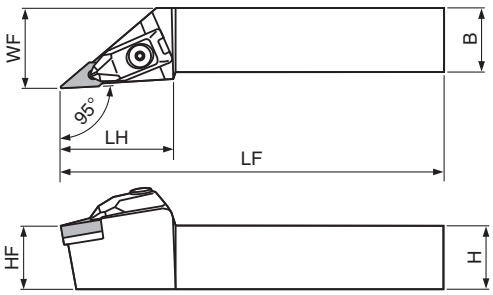
Recommended Cutting Conditions D38~D39

● : Std. Item

External Turning Toolholders [VN□□ Insert]

DVLN (External / Copying)





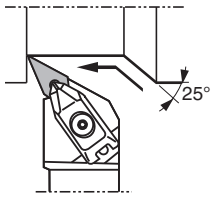
Side Rake Angle : -6°
Angle of Inclination : -9°

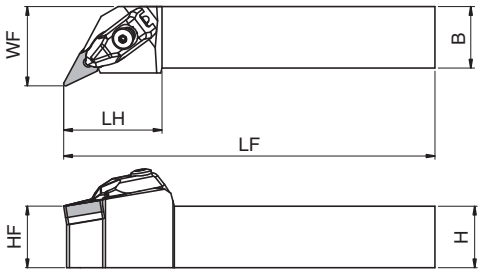
● Right-hand shown

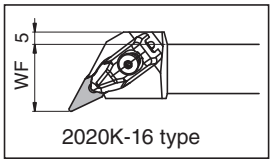
Applicable Inserts

Toolholder Description	Insert Description	
DVLN$^{R}_{L}$...-16	VN□A VN□G VN□M	1604..

DVPN (External / Facing / Copying / Undercutting)







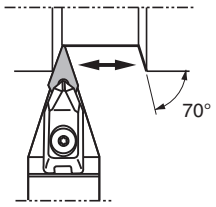
Side Rake Angle : -13°
Angle of Inclination : -10°

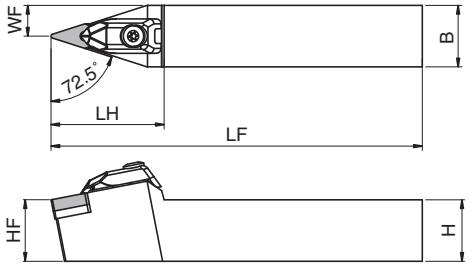
● Right-hand shown

Applicable Inserts

Toolholder Description	Insert Description	
DVPN$^{R}_{L}$...-16	VN□A VN□G VN□M	1604..

DVVN (External / Copying)





Back Rake Angle : -11°

Applicable Inserts

Toolholder Description	Insert Description	
DVVNN...-16	VN□A VN□G VN□M	1604..

Toolholder Dimensions

Description		Stock			Dimension (mm)						Std. Corner-R(RE)	Spare Parts						
		R	N	L	H	HF	B	LF	LH	WF		Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DVLN$^{R}_{L}$	2020K-16	●		●	20	20	20	125	45	25	0.8	CP-5D	CS-5D	SP-5D	DV-33	SB-4085TR	LW-3 For Clamp	FT-15 For Shim
	2525M-16	●		●	25	25	25	150		32								
DVPN$^{R}_{L}$	2020K-16	●		●	20	20	20	125	40	27								
	2525M-16	●		●	25	25	25	150		32								
DVVNN	2020K-16		●		20	20	20	125	46	10								
	2525M-16		●		25	25	25	150		12.5								

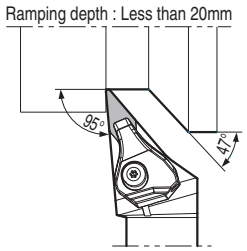
· When using inserts whose corner-R(RE) is greater than 1.2 mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.
· Recommended tightening torque 3.0N·m

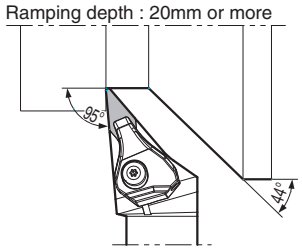
● : Std. Item

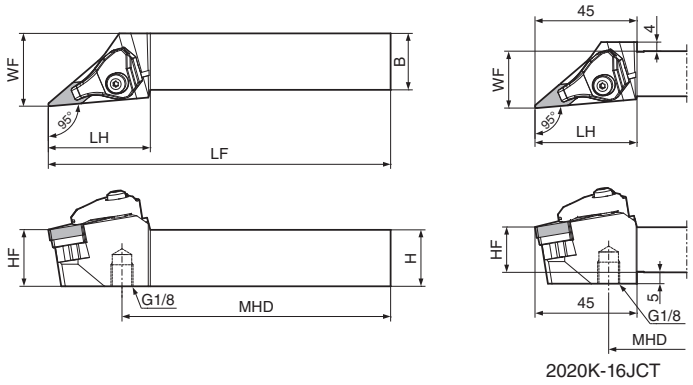
DVLN -JCT (External / Copying / Coolant-through Holders) NEW

Pressure Resistance : ~30MPa

Side Rake Angle : -6˚
Angle of Inclination : -9˚
Coolant supply: 2 directions







2020K-16JCT

● Right-hand shown

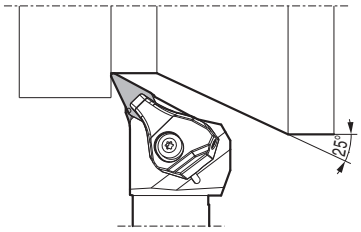
Applicable Inserts

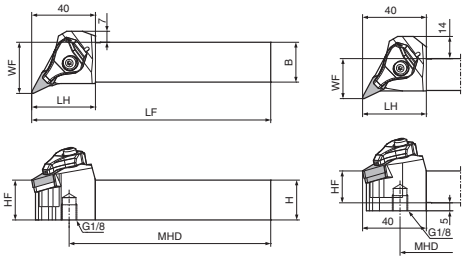
Toolholder Description	Insert Description	
DVLN R/L...-16JCT	VN□A VN□G VN□M	1604..

DVPN -JCT (External / Facing / Copying / Undercutting / Coolant-through Holders) NEW

Pressure Resistance : ~30MPa

Side Rake Angle : -13˚
Angle of Inclination : -10˚
Coolant supply: 2 directions





2020K-16JCT

● Right-hand shown

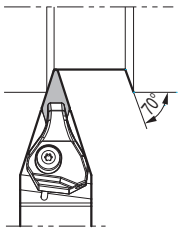
Applicable Inserts

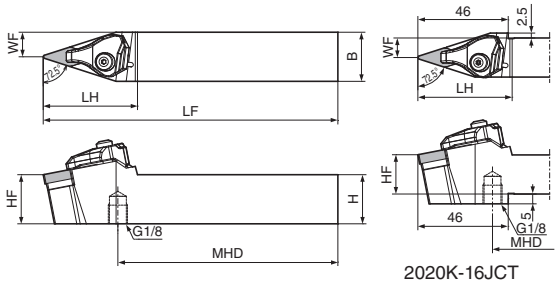
Toolholder Description	Insert Description	
DVPN R/L...-16JCT	VN□A VN□G VN□M	1604..

DVVN -JCT (External / Copying / Coolant-through Holders) NEW

Pressure Resistance : ~30MPa

Back Rake Angle : -11˚
Coolant supply: 1 direction





2020K-16JCT

Applicable Inserts

Toolholder Description	Insert Description	
DVVNN...-16JCT	VN□A VN□G VN□M	1604..

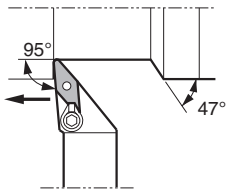
Toolholder Dimensions

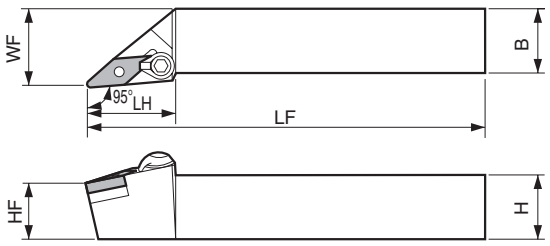
Description	Stock			Dimension (mm)							Std. Corner-R(RE)	Spare Parts						
												Clamp	Pipe Connection (with O-ring)	Screw	Spring	Shim	Shim Screw	Wrench
	R	N	L	H	HF	B	LF	LH	WF	MHD								
DVLNR 2020K-16JCT	●			20	20	20	125	45	25	92.5	0.8	CP-5D-JCT	FP-12	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
2525M-16JCT	●			25	25	25	150		32	117.5								
DVLNL 2020K-16JCT			●	20	20	20	125		25	88.5								
2525M-16JCT			●	25	25	25	150		32	113.5								
DVPNR 2020K-16JCT	●			20	20	20	125	40	25	101.5								
2525M-16JCT	●			25	25	25	150		32	126.5								
DVPNL 2020K-16JCT			●	20	20	20	125		25	93.5								
2525M-16JCT			●	25	25	25	150		32	118.5								
DVVNN 2020K-16JCT		●		20	20	20	125	48	10	87.0								
2525M-16JCT		●		25	25	25	150		12.5	112.0								

· When using inserts whose corner-R(RE) is greater than 1.2 mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.
· The washer may protrude from the holder. To prevent interference, additional modifications to the washer may be required.
· O-ring (**SS-035**) is available to order.
· Please see page **D10** and **D11** for piping parts of coolant-through holders.
· Recommended tightening torque 3.9N·m

● : Std. Item

MVLN (External / Copying)

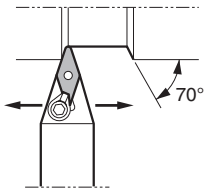


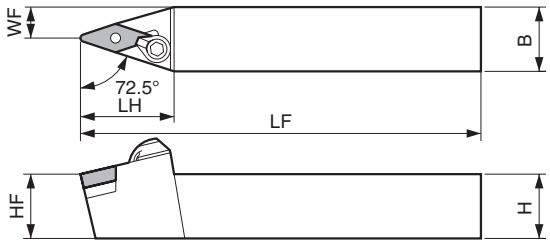


Side Rake Angle : -6°
Angle of Inclination : -9°

• Right-hand shown

MVVN (External / Copying)





Back Rake Angle : -11°

Toolholder Dimensions

Description		Stock			Dimension (mm)						Std. Corner-R(RE)	Spare Parts				
		R	N	L	H	HF	B	LF	LH	WF		Clamp Set	Wrench	Shim	Lock Pin	Wrench
MVLN$^{R}_{L}$	2020K-16	●		●	20	20	20	125	38	25	0.8	CPS-5$^{R}_{L}$	FH-2.5	MVN-32	TS-3S	FH-2
	2525M-16	●		●	25	25	25	150		32						
MVVNN	2020K-16		●		20	20	20	125	39	10	0.8	CPS-5R	FH-2.5	MVN-32	TS-3S	FH-2
	2525M-16		●		25	25	25	150		12.5						

· Clamp Set : CPS-5R for Right-hand Toolholder, CPS-5L for Left-hand Toolholder.
· When using inserts whose corner-R(RE) is greater than 1.2 mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

Toolholder Description	Insert Description	
MVLN$^{R}_{L}$...-16 MVVNN...-16	VN□A VN□G VN□M	1604..

Applications	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium	Roughing	Finishing - Medium	Stainless Steel / Finishing
Insert	PP	$^{R}_{L}$ -VC	VF	PQ	TN-V	Standard	$^{R}_{L}$	MQ
Size	16	16	16	16	16	16	16	16
Page	B44	B44	B44	B44	B44	B44	B45	B45
Applications	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials
Insert	MS	MU	KG	KH	Without Chipbreaker	Ceramic	PCD	CBN
Size	16	16	16	16	16	16	16	16
Page	B45	B45	B45	B45	B45	B112	C23	C12

Recommended Cutting Conditions D38~D39

Regarding rotation directions of the clamp set



MVVNN type
(Neutral)



MVLNR type
(Right-hand Toolholder)

Clamp set : (CPS-5R) has Right-hand thread.
When clamping the insert, turn the screw in the arrow direction (clockwise).
When removing the insert, turn the screw away from the arrow (counterclockwise).



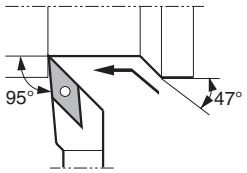
MVLNL type
(Left-hand Toolholder)

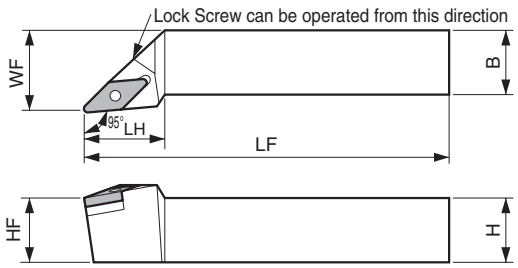
Clamp set : (CPS-5L) has Left-hand thread.
When clamping the insert, turn the screw in the arrow direction (counterclockwise).
When removing the insert, turn the screw away from the arrow (clockwise).

● : Std. Item

External Turning Toolholders [VN□□ Insert]

PVLN (External / Copying)

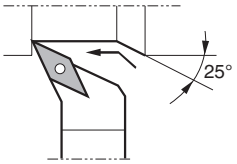


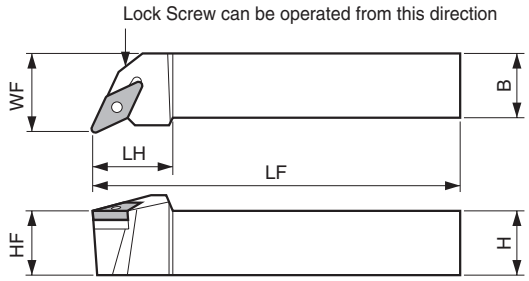


Side Rake Angle : -6°
Angle of Inclination : -9°

• Right-hand shown

PVPN (External / Facing / Copying / Undercutting)

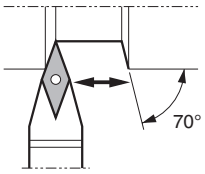


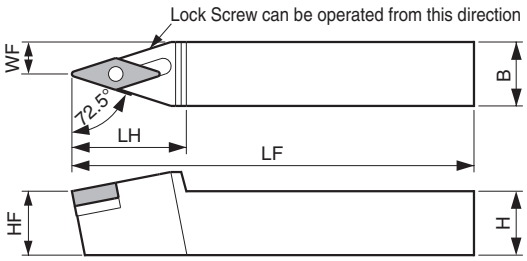


Side Rake Angle : -13°
Angle of Inclination : -10°

• Right-hand shown

PVVN (External / Copying)





Back Rake Angle : -11°

Toolholder Dimensions

Description		Stock			Dimension (mm)						Std. Corner-R(RE)	Spare Parts					
												Lock Pin	Lock Screw	Shim	Wrench		
		R	N	L	H	HF	B	LF	LH	WF							
PVLN R/L	2525M-16Q	●		●	25	25	25	150	37	32	0.8	LP-6S	LS-15	KVN-32	LW-3		
PVPN R/L	2020K-16Q	●		●	20	20	20	125	30	25	0.8	LP-2S	LS-11	KVN-32	LW-3		
	2525M-16Q	●		●	25	25	25	150		32		LP-6S					
PVVNN	2020K-16Q		●		20	20	20	125	35	10	0.8	LP-2S	LS-15	KVN-32	LW-3		
	2525M-16Q		●		25	25	25	150	40	12.5		LP-6S					

· When using inserts whose corner-R(RE) is greater than 1.2 mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

Toolholder Description	Insert Description	
PVLN R/L...-16Q	VN□A	1604..
PVPN R/L...-16Q	VN□G	
PVVNN...-16Q	VN□M	

Applications	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium	Roughing	Finishing - Medium	Stainless Steel / Finishing
Insert	PP	R/L -VC	VF	PQ	TN-V	Standard	R/L	MQ
Size	16	16	16	16	16	16	16	16
Page	B44	B44	B44	B44	B44	B44	B45	B45

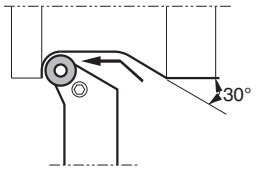
Applications	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials
Insert	MS	MU	KG	KH	Without Chipbreaker	Ceramic	PCD	CBN
Size	16	16	16	16	16	16	16	16
Page	B45	B45	B45	B45	B45	B112	C23	C12

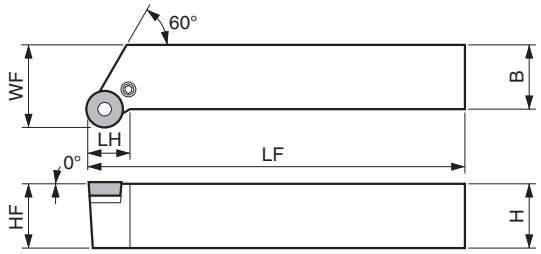
Recommended Cutting Conditions ➡ D38~D39

● : Std. Item

PRGC / PRXC / PRGN (External / Facing / Copying)

PRGC

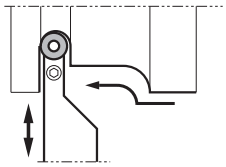


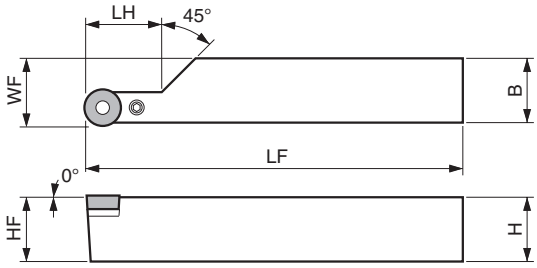


Side Rake Angle : 0°
Angle of Inclination : 0°

• Right-hand shown

PRXC

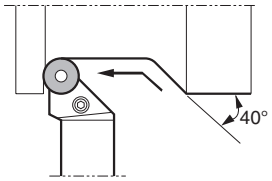


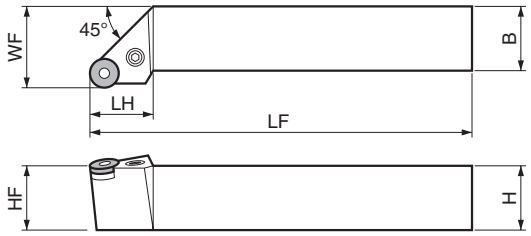


Side Rake Angle : 0°
Angle of Inclination : 0°

• Right-hand shown

PRGN





Side Rake Angle : -6°
Angle of Inclination : -6°

• Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	Std. Corner-R(RE)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PRGC R/L	2020K-10	●	●	20	20	20	125	15	25	-	LL-05C	LS-05	LR-10C	LSP-1	PC-1	FH-2
	2525M-10	●	●	25	25	25	150		32							
	2020K-12	●	●	20	20	20	125	14	25	-	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
	2525M-12	●	●	25	25	25	150	17	32							
PRXC R/L	2020K-10	●	●	20	20	20	125	25	20.5	-	LL-05C	LS-05	LR-10C	LSP-1	PC-1	FH-2
	2525M-10	●	●	25	25	25	150	30	25.5							
	2525Q-10	●	●				180									
	2525M-12	●	●	25	25	25	150	30	25.7	-	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
PRGN R/L	2020K-09	●	●	20	20	20	125	19	25	-	LL-1N	LS-1N	LR-80	LSP-1	PC-1	FH-2.5
	2525M-12	●	●	25	25	25	150	26	32	-	LL-2N	LS-2N	LR-81	LSP-2	PC-2	LW-3

Applicable Inserts

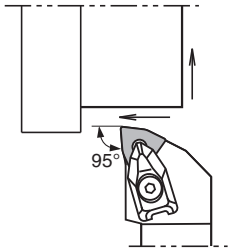
Toolholder Description	Insert Description	
PRGC R/L...-10	RCGX RCMX	1003M0
PRGC R/L...-12		1204M0
PRXC R/L...-10		1003M0
PRXC R/L...-12		1204M0
PRGN R/L...-09	RNMG	090300
PRGN R/L...-12		120400

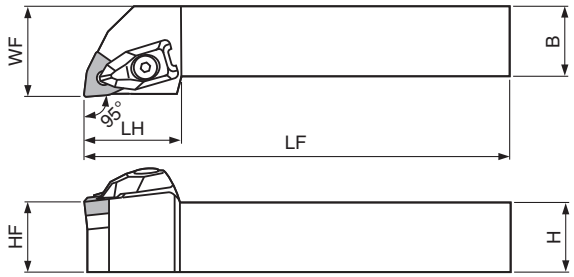
Applications	Medium	Non-ferrous Metals						
Insert	Standard 	AQ 						
Size	10, 12	10						
Page	B74	B74						
Applications	Medium - Roughing							
Insert	Standard 							
Size	09, 12							
Page	B31							

Recommended Cutting Conditions D38~D39

● : Std. Item

DWLN (External / Facing)



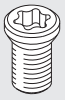
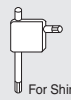


Side Rake Angle : -6°
Angle of Inclination : -6°

● Right-hand shown

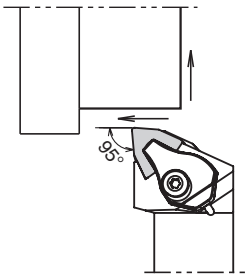
● Applicable Inserts

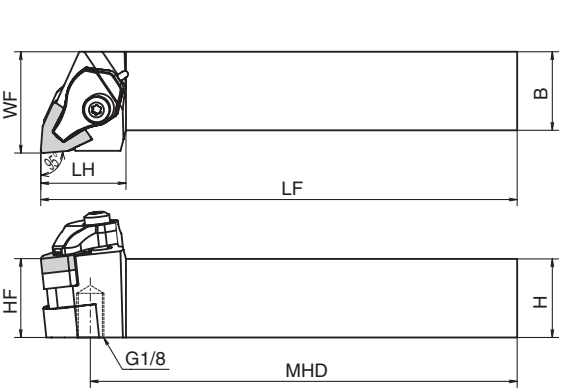
Toolholder Description	Insert Description	
DWLN$^{R}_{L}$...-08	WN□A WN□G WN□M	0804...

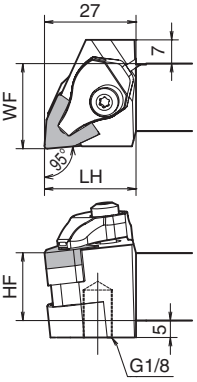
Description		Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts						
											Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
		R	L	H	HF	B	LF	LH	WF								
DWLN$^{R}_{L}$	2020K -08	●	●	20	20	20	125	34	25	0.8	CP-3D	CS-3D	SP-3D	DW-44	SB-4085TR	LW-3	FT-15
	2525M -08	●	●	25	25	25	150		32								

· Recommended tightening torque 3.9N·m

DWLN-JCT (External / Facing and Coolant-through Holders)







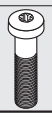
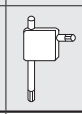
Side Rake Angle : -6°
Angle of Inclination : -6°
Coolant supply: 3 directions

2020K-08JCT

● Right-hand shown

● Applicable Inserts

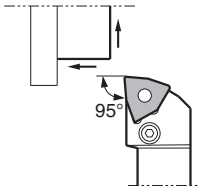
Toolholder Description	Insert Description	
DWLN$^{R}_{L}$...-08JCT	WN□A WN□G WN□M	0804...

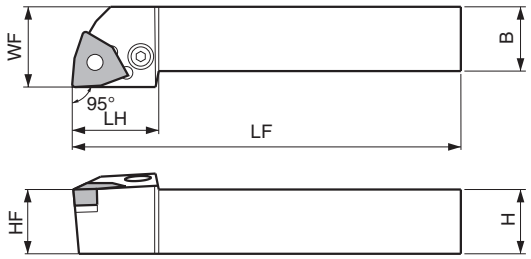
Description		Stock		Dimension (mm)							Std. Corner-R(RE)	Spare Parts						
												Clamp	Pipe Connection (*1 with O-ring)	Screw	Spring	Shim	Shim Screw	Wrench
		R	L	H	HF	B	LF	LH	WF	MHD								
DWLN$^{R}_{L}$	2020K -08JCT	●	●	20	20	20	125	27	25	109	0.8	CP-3D-$^{R}_{L}$-JCT	FP-12	CS-3D-TR	SP-3D	DW-44	SB-4085TR	FT-15
	2525M -08JCT	●	●	25	25	25	150		32	134								

Please see page **D10** and **D11** for piping parts of coolant-through holders.
*1 It is possible to order just an O-ring (**SS-035**).
· Recommended tightening torque 3.9N·m

● : Std. Item

PWLN (External / Facing)



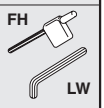


• Right-hand shown

Side Rake Angle : -6°
Angle of Inclination : -6°

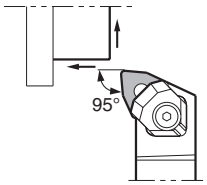
Applicable Inserts

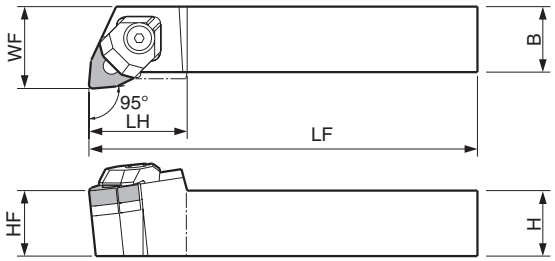
Toolholder Description	Insert Description	
PWLN$^{R}_{L}$...-06	WN□A WN□G WN□M	0604..
PWLN$^{R}_{L}$...-08		0804..

Description		Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts					
											Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
		R	L	H	HF	B	LF	LH	WF							
PWLN$^{R}_{L}$	1616H -06	●	●	16	16	16	100	22	20	0.8	LL-1N	LS-1N	LW-32N	LSP-1	PC-1	FH-2.5
	2020K -06	●	●	20	20	20	125		25							
	2525M -06	●	●	25	25	25	150		32							
	2020K -08	●	●	20	20	20	125	26	25	0.8	LL-2N	LS-2N	LW-42N	LSP-2	PC-2	LW-3
	2525M -08	●	●	25	25	25	150		32							

· When using inserts whose corner-R(RE) is greater than 1.6mm, additional modifications to the shim are necessary in order to prevent workpiece and shim from interfering each other.

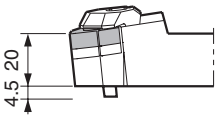
WWLN (External / Facing)





• Right-hand shown

WWLN$^{R}_{L}$2020K types,
Shim Nut sticks out as
shown below.



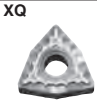
Side Rake Angle : -6°
Angle of Inclination : -6°

Applicable Inserts

Toolholder Description	Insert Description	
WWLN$^{R}_{L}$...-08	WN□A WN□G WN□M	0804..

Description		Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts				
											Clamp Set	Shim	Shim Pin	Shim Nut	Wrench
		R	L	H	HF	B	LF	LH	WF						
WWLN$^{R}_{L}$	2020K -08	●	●	20	20	20	125	30	25	1.2	WCS-8	WWN-42	WP5X15	WN-1	LW-3
	2525M -08	●	●	25	25	25	150		32						

Applicable Inserts

Applications	Finishing	Finishing - Medium	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing
Insert	WF(Wiper) 	WE(Wiper) 	PP 	PQ 	CQ 	CJ 	GS 	PG 	PS 
Size	08	08	08	08	08	08	06,08	08	08
Page	**B46**	**B46**	**B46**	**B46**	**B47**	**B47**	**B47**	**B47**	**B47**
Applications	Medium - Roughing / High Feed Rate	Roughing	Finishing	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing
Insert	PT 	Standard 	$^{R}_{L}$-S 	$^{R}_{L}$ 	XP 	XQ 	XS 	MQ 	MS 
Size	08	08	06	06	08	08	08	08	08
Page	**B47**	**B47**	**B49**	**B49**	**B48**	**B48**	**B48**	**B48**	**B48**
Applications	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	MU 	KQ 	KG 	KH 	ZS 	GC 	AH	PCD	CBN
Size	08	08	08	08	08	08	08	08	08
Page	**B48**	**B49**	**B49**	**B49**	**B49**	**B49**	**B49**	**C23**	**C13**

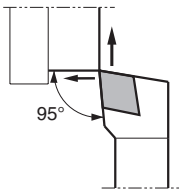
· In wedge lock, use of ceramic insert other than silicon nitride insert is not recommended due to strong restrain force.

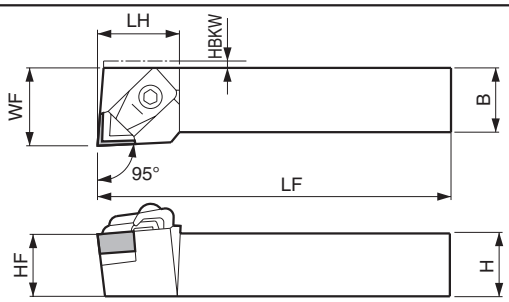
Recommended Cutting Conditions ➡ D38~D39

● : Std. Item

Toolholders for Ceramic Tools [CN□□Insert]

CCLN (External / Facing)





Side Rake Angle : -6°
Angle of Inclination : -6°

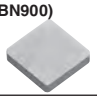
• Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)							Std. Corner-R(RE)	Spare Parts				
		R	L	H	HF	B	LF	LH	WF	HBKW		Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CCLN R/L	2020K-12	●	●	20	20	20	125	32	27	5	0.8	CB-16	CE-010	LW-4	SP-441 (SP-443)	M3X8 (M3X12)
	2525M-12	●	●	25	25	25	150		32	-						
	3225P-16	●	●	32	32	25	170	35	32	-	0.8	CB-17	CE-220	LW-4	SP-454	M4X10

· Shim & Shim Screw : When using CN□□1204 Insert, please purchase spare parts in ( ) separately.

Applicable Inserts

Applications	Cast Iron / Hard Materials	Hard Materials / Cast Iron
See Page	B106	C19
Insert / Toolholder Description	Ceramic 	CBN (KBN900) 
CCLN R/L...-12	CNGN1207..(CNGN1204..) CNMN1207	(CNMN1204)
CCLN R/L...-16	CNGN1607..	-

Recommended Cutting Conditions ➔ D38~D39

Selection of Ceramic Insert

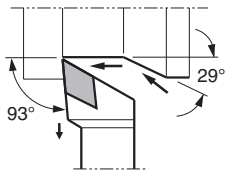
Select the suitable Ceramic Insert and Specifications (Corner-R(RE), Feed Rate, Chamfer, etc.) from the table below.

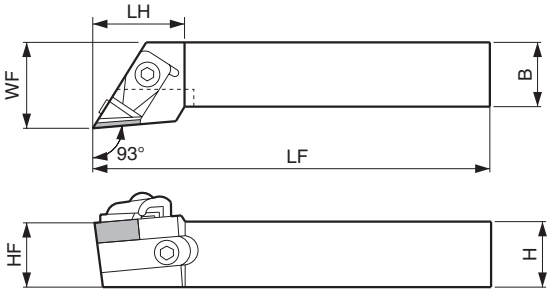
(FC250, Cutting Edge Angle: 0°~15°)

Insert Shape	Corner-R (RE)	f (mm/rev) 0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	ap (mm)
RN	-	→	→	→	→	→	→	→	→	→	→	0.3~4
SN	2.0	→	→	→	→	→	→	→	→	→	→	0.3~4
	1.6	→	→	→	→	→	→	→	→			
EN / CN	1.2	→	→	→	→	→	→					
	0.8	→	→	→	→							
	0.4	→	→									
TN	1.6	→	→	→	→	→						0.3~2
	1.2	→	→	→	→							
DN	0.8	→	→	→								
Chamfer		0.05mm x 20°		(0.1~0.2)mm x (20°~ 25°)				0.3mm x 30°				-
Insert Thickness		7.94mm										

● : Std. Item

CDJN (External / Copying / Back Turning)





Side Rake Angle : -5°
Angle of Inclination : -8°

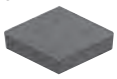
• Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts				
											Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
		R	L	H	HF	B	LF	LH	WF						
CDJN R/L	2525M-15	●	●	25	25	25	150	32	32	0.8	CB-14/15	CE-010	LW-4	556C R/L	HH5X16
	3225P -15	●	●	32	32		170								

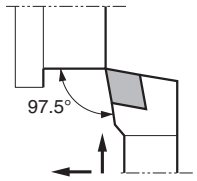
· Chipbreaker : CB-14 for Right-hand Toolholder, CB-15 for Left-hand Toolholder.
· Shim : 556CR for Right-hand Toolholder, 556CL for Left-hand Toolholder.

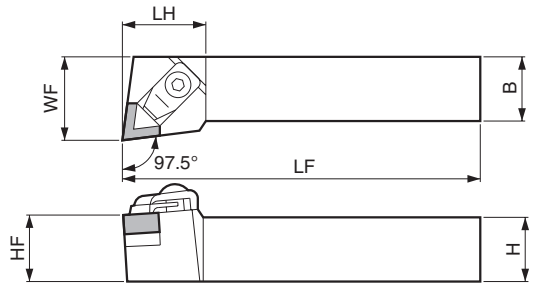
Applicable Inserts

Applications	Cast Iron / Hard Materials
See Page	B107
Insert / Toolholder Description	Ceramic 
CDJN R/L...-15	DNGN1507..

Recommended Cutting Conditions ➡ D38~D39

CELN (External / Facing)





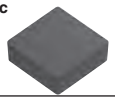
Side Rake Angle : -6°
Angle of Inclination : -6°

• Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts				
											Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
		R	L	H	HF	B	LF	LH	WF						
CELN R/L	2525M-13	●	●	25	25	25	150	32	32	0.8	CB-16	CE-010	LW-4	SP-342	M3X8

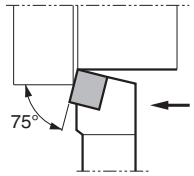
Applicable Inserts

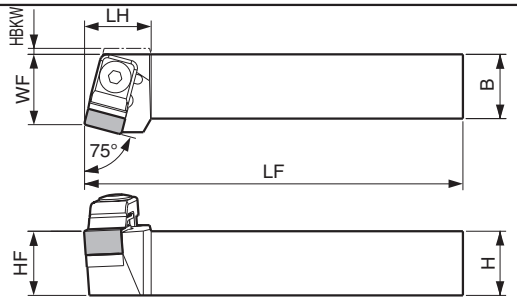
Applications	Cast Iron / Hard Materials
See Page	B107
Insert / Toolholder Description	Ceramic 
CELN R/L...-13	ENGN1307..

Recommended Cutting Conditions ➡ D38~D39

● : Std. Item

CSRN (External)

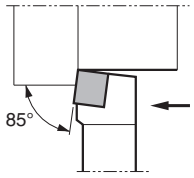


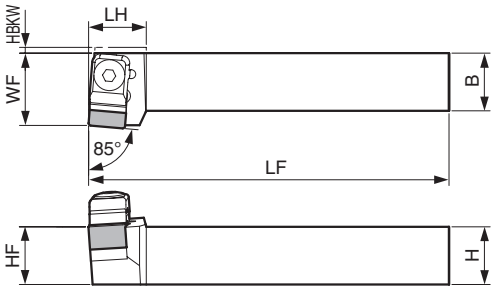


Side Rake Angle : -6°
Angle of Inclination : -4°

• Right-hand shown

CS-N (External)

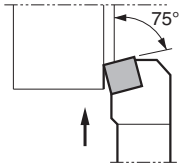


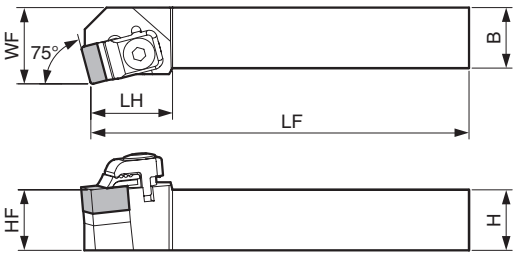


Side Rake Angle : -6°
Angle of Inclination : -4°

• Right-hand shown

CSKN (Facing)

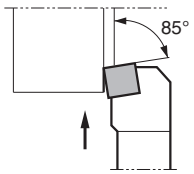


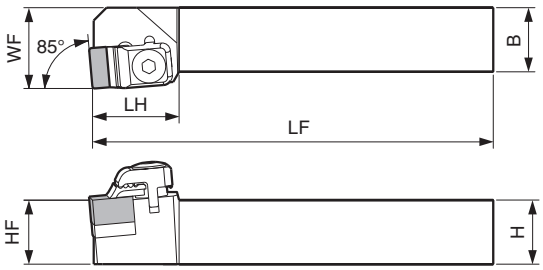


Side Rake Angle : -6°
Angle of Inclination : -4°

• Right-hand shown

CSYN (Facing)

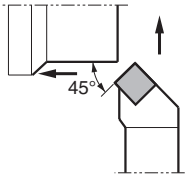


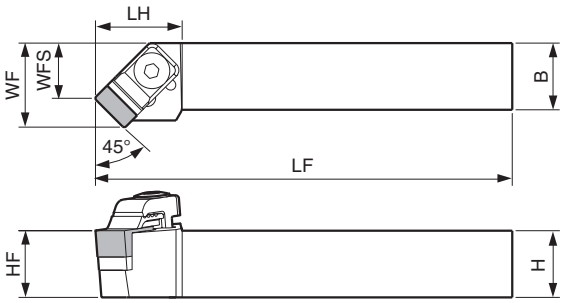


Side Rake Angle : -6°
Angle of Inclination : -4°

• Right-hand shown

CSSN (External / Facing / Chamfering)

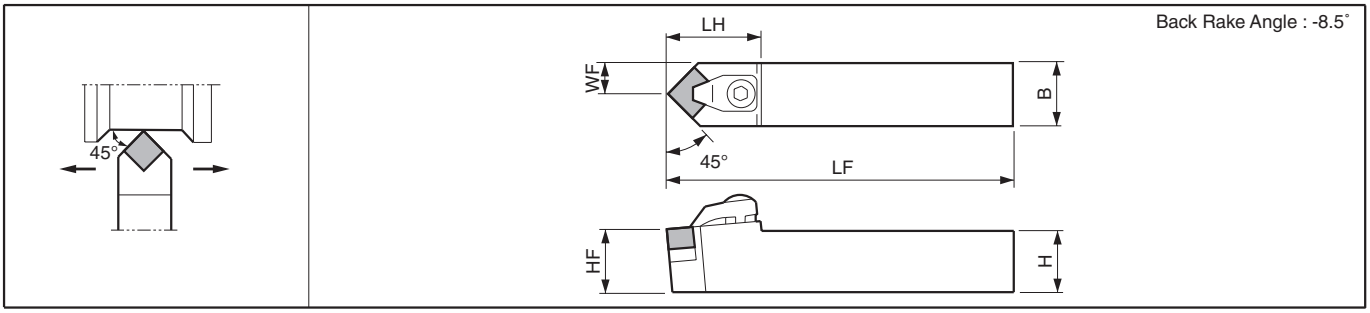




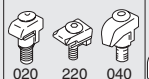
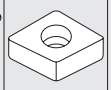
Side Rake Angle : -6°
Angle of Inclination : 0°

• Right-hand shown

CSDN (External / Chamfering)



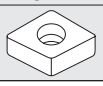
Toolholder Dimensions

Description		Stock			Dimension (mm)								Std. Corner-R(RE)	Spare Parts				
														Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
		R	N	L	H	HF	B	LF	LH	WF	HBKW	WFS			 020 220 040			
CSRN R/L	2020K-12	●		●	20	20	20	125	22	22	2	-	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12	●		●	25	25	25	150		27	-	-						
	3225P-12	●		●	32	32		170										
	3225P-15	●			32	32	25	170	30	32.4	-	-	1.2	CB-51	CE-220	LW-4	SP-162	M4X10
	4040R-15	●		●	40	40	40	200		43								
CS-N R/L	2525M-12	●		●	25	25	25	150	20	32	-	-	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
CSKN R/L	2020K-12	●			20	20	20	125	27	25	-	-	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12	●		●	25	25	25	150		32								
	3225P-15	●			32	32	25	170	37	32			1.2	CB-51	CE-220	LW-4	SP-162	M4X10
CSYN R/L	2525M-12	●		●	25	25	25	150	27	32	-	-	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
CSSN R/L	2020K-12	●			20	20	20	125	26	25	-	16	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12	●		●	25	25	25	150		32		23						
CSDNN	2020K-12		●		20	20	20	125	32	10	-	-	0.8	-	CE-040	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M-12		●		25	25	25	150		12.5								
	3225P-12		●		32	32		170										

· Shim & Shim Screw : When using SN□□1204 Insert, please purchase spare parts in ( ) separately.

Applicable Inserts

Applications	Cast Iron / Hard Materials	Cast Iron
See Page	B109,B110	B35
Insert / Toolholder Description	Ceramic 	Coated Carbide 
CSRN R/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSRN R/L ...-15	SNGN1507..	-
CS-N R/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSKN R/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSKN R/L ...-15	SNGN1507..	-
CSYN R/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSSN R/L ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)
CSDNN ...-12	SNGN1207..(SNGN1204..) SNMN1207..	(SNMN1204..)

Hard Materials / Cast Iron	When using as toolholder for CBN tools (KBN900), please purchase spare parts below separately.		
C19	Clamp Set	Shim	Shim Screw
CBN (KBN900) 			
(SNMN1204..)	CE-030A	SP-143	M3X12
-	-		
(SNMN1204..)	CE-030A	SP-143	M3X12
(SNMN1204..)	CE-030A	SP-143	M3X12
-	-		
(SNMN1204..)	CE-030A	SP-143	M3X12
(SNMN1204..)	CE-030A	SP-143	M3X12
(SNMN1204..)	* -	SP-143	M3X12

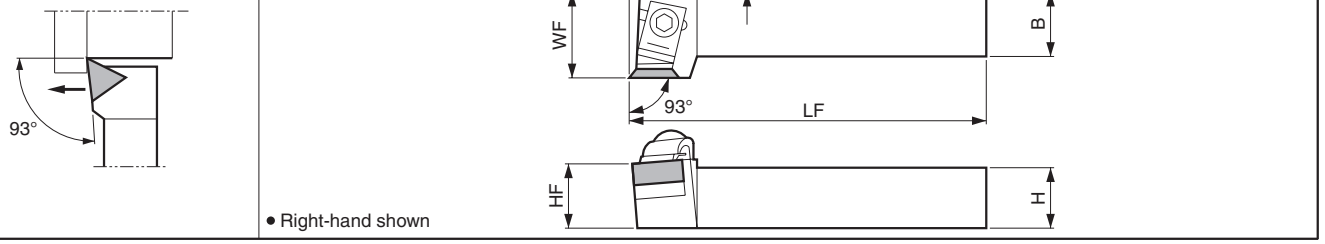
* CSDNN...-12 : Clamp Set CE-040 is used continuously.

Recommended Cutting Conditions ➡ D38~D39

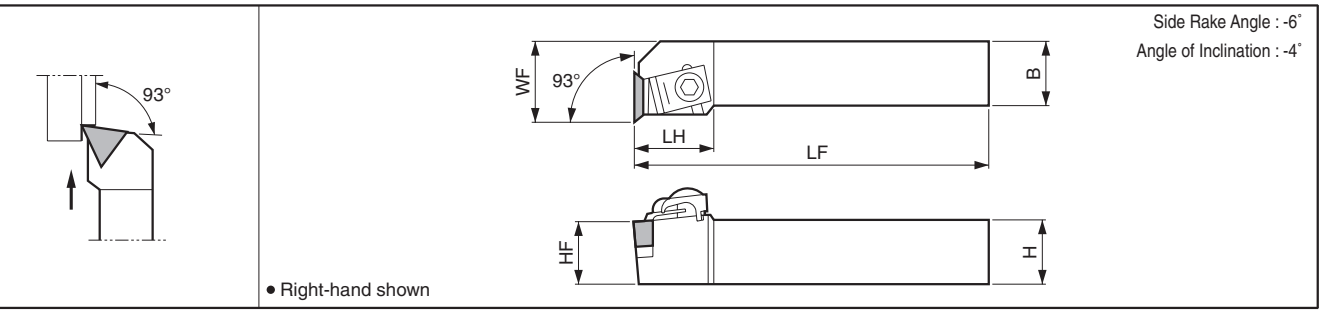
● : Std. Item

Toolholders for Ceramic Tools [TN□□Insert]

CTJN (External)



CTUN (Facing)



Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	HBKW	Std. Corner-R(RE)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CTJN R/L	2020K-16	●	●	20	20	20	125	21	25	2	0.8	CB-12/13	CE-020	LW-4	SP-221 (SP-223)	M3X8 (M3X12)
	2525M-16	●	●	25	25	25	150		32	-						
CTUN R/L	2020K-16	●	●	20	20	20	125	27	25	-	0.8	CB-13/12	CE-020	LW-4	SP-221 (SP-223)	M3X8 (M3X12)
	2525M-16	●	●	25	25	25	150		32							

· CTJN (Chipbreaker) : CB-12 for Right-hand Toolholder, CB-13 for Left-hand Toolholder.
· CTUN (Chipbreaker) : CB-13 for Right-hand Toolholder, CB-12 for Left-hand Toolholder.
· Shim & Shim Screw : When using TN□□1604 Insert, please purchase spare parts in ( ) separately.

Applicable Inserts

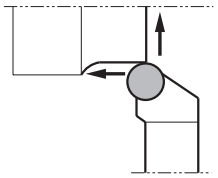
Applications	Cast Iron / Hard Materials	Hard Materials / Cast Iron
See Page	B111	C19
Insert / Toolholder Description	Ceramic	CBN (KBN900)
CTJN R/L...-16	TNGN1607.. (TNGN1604..) (TNMN1604..)	(TNMN1604..)
CTUN R/L...-16		

Recommended Cutting Conditions ➡ D38~D39

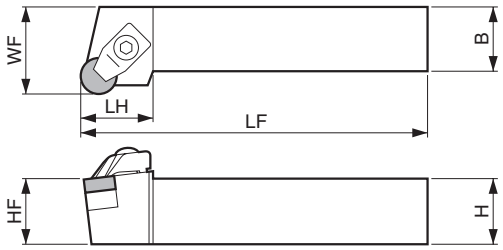
● : Std. Item

Toolholders for Ceramic Tools [RN□□Insert]

CRSN (External / Facing)

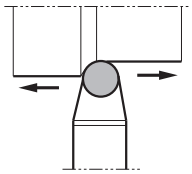


Side Rake Angle : -6˚
Angle of Inclination : -6˚

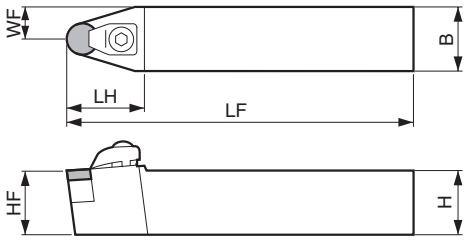


• Right-hand shown

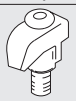
CRDN (External / Copying)



Back Rake Angle : -8.5˚



Toolholder Dimensions

Description		Stock			Dimension (mm)						Std. Corner-R(RE)	Spare Parts				
		R	N	L	H	HF	B	LF	LH	WF		Clamp Set	Wrench	Shim	Shim Screw	
																
CRSN R/L	2020K -12	●		●	20	20	20	125	26	25	-	CE-030	LW-4	SP-841 (SP-843)	M3X8 (M3X12)	
	2525M-12	●		●	25	25	25	150		32						
	3225P -12	●		●	32	32		170								
CRDNN	2020K -12		●		20	20	20	125	28	10	-	CE-030	LW-4	SP-841 (SP-843)	M3X8 (M3X12)	
	2525M-12		●		25	25	25	150		12.5						
	3225P -12		●		32	32		170								
	3232P -15		●		32	32	32	170	35	16	-	CE-040	LW-4	SP-861	M4X10	
	4040R -15		●		40	40	40	200		20						

· Shim & Shim Screw : When using RN□□1204 Insert, please purchase spare parts in ( ) separately.

Applicable Inserts

Applications	Cast Iron / Hard Materials
See Page	B108
Insert / Toolholder Description	Ceramic 
CRSN R/L ...-12	RNGN120700(RNGN120400)
CRDNN ...-12	RNGN120700(RNGN120400)
CRDNN ...-15	RNGN150700

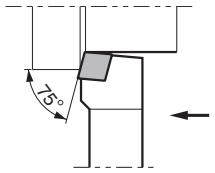
Hard Materials / Cast Iron	When using as toolholder for CBN tools (KBN900), please purchase spare parts below separately.		
C19	Clamp Set	Shim	Shim Screw
CBN (KBN900) 			
(RNMN120400)	CE-030A	SP-843	M3X12
(RNMN120400)	CE-030A	SP-843	M3X12
-	-		

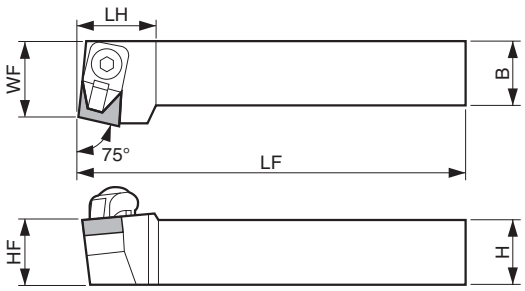
Recommended Cutting Conditions ➔ D38~D39

● : Std. Item

Toolholders for Solid CBN Tools [CNMN Insert]

CCRN-A (External)

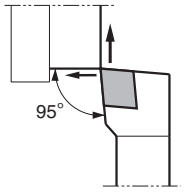


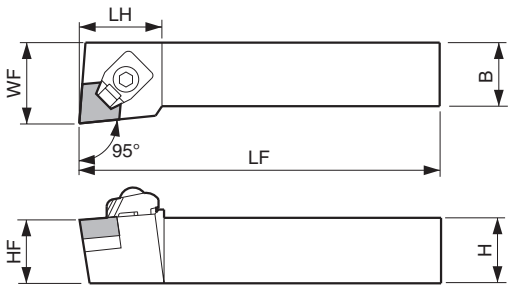


Side Rake Angle : -6°
Angle of Inclination : -6°

• Right-hand shown

CCLN-A (External / Facing)

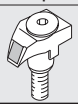




Side Rake Angle : -5°
Angle of Inclination : -5°

• Right-hand shown

Toolholder Dimensions

Description	Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts			
										Clamp Set	Wrench	Shim	Shim Screw
	R	L	H	HF	B	LF	LH	WF					
CCRN$^{R}/_{L}$ 2525M-09A	●	●	**25**	**25**	**25**	**150**	**27**	**27**	**0.8**	**CE-030A**	**LW-4**	**SP-429**	**HH3X12**
CCLN$^{R}/_{L}$ 2525M-09A	●	●	**25**	**25**	**25**	**150**	**28**	**32**	**0.8**	**CE-030A**	**LW-4**	**SP-429**	**HH3X12**

Applicable Inserts

Applications	Hard Materials / Cast Iron
See Page	**C19**
Insert / Toolholder Description	**CBN (KBN900)** 
CCRN$^{R}/_{L}$...-09A	CNMN0903..
CCLN$^{R}/_{L}$...-09A	

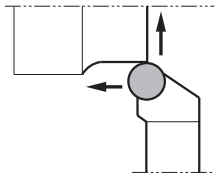
* For CNMN1204 Insert toolholder, see page **D26**

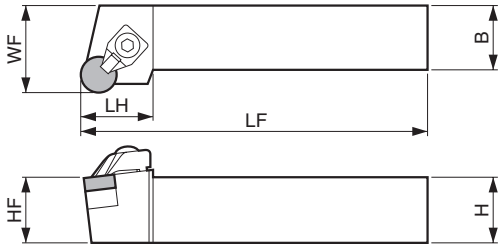
Recommended Cutting Conditions ➡ **D38~D39**

● : Std. Item

Toolholders for Solid CBN Tools [RNMN Insert]

CRSN-A (External / Facing)

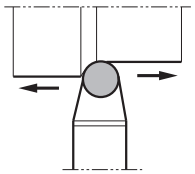


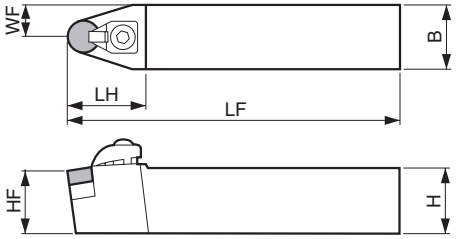


Side Rake Angle : -6˚
Angle of Inclination : -6˚

• Right-hand shown

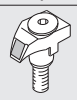
CRDN-A (External / Copying)





Back Rake Angle : -8.5˚

Toolholder Dimensions

Description		Stock			Dimension (mm)						Std. Corner-R(RE)	Spare Parts				
												Clamp Set	Wrench	Shim		Shim Screw
		R	N	L	H	HF	B	LF	LH	WF						HH  BH 
CRSN$^{R}_{L}$	2525M-09A	●		●	25	25	25	150	26	32	-	CE-030A	LW-4	SP-829	-	HH3X12
	3225P -09A	●		●	32	32		170								
	2525M-12A	●		●	25	25	25	150	26	32	-			-	SP-849 (SP-843)	BH3X12
	3225P -12A	●		●	32	32		170								
CRDNN	2525M-09A		●		25	25	25	150	29	12.5	-	CE-030A	LW-4	SP-829	-	HH3X12
	3225P -09A		●		32	32		170								
	2525M-12A		●		25	25	25	150	28	12.5	-			-	SP-849 (SP-843)	BH3X12
	3225P -12A		●		32	32		170								

· -12A toolholder Shim : When using RN□□1204 Insert, please purchase spare parts : SP-843 in ( ) separately.

Applicable Inserts

Applications	Hard Materials / Cast Iron
See Page	C19
Insert / Toolholder Description	CBN (KBN900) 
CRSN$^{R}_{L}$...-09A	RNMN090300
CRSN$^{R}_{L}$...-12A	RNMN120300 (RNMN120400)
CRDNN...-09A	RNMN090300
CRDNN...-12A	RNMN120300 (RNMN120400)

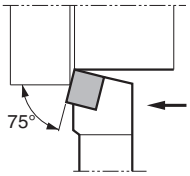
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, please purchase spare parts below separately.	
B108	Shim	Shim Screw
Ceramic 		
(RNGN090400)	SP-826	-
(RNGN120400)	SP-843	M3X12
(RNGN120700)	SP-841	M3X8
(RNGN090400)	SP-826	-
(RNGN120400)	SP-843	M3X12
(RNGN120700)	SP-841	M3X8

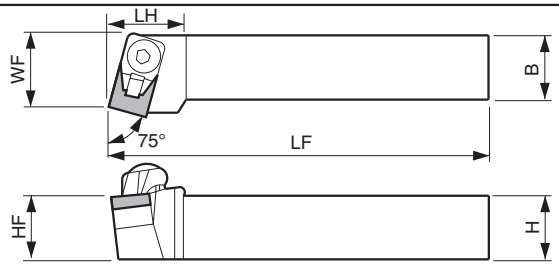
Recommended Cutting Conditions ➡ D38~D39

● : Std. Item

Toolholders for Solid CBN Tools [SNMN Insert]

CSRN-A (External)

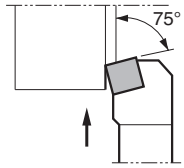


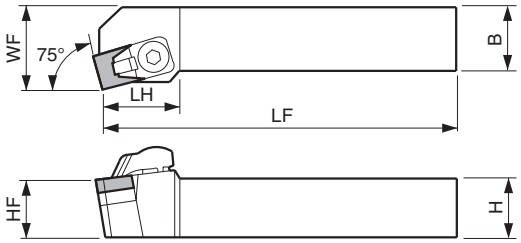


• Right-hand shown

Side Rake Angle : -6˚
Angle of Inclination : -4˚

CSKN-A (Facing)

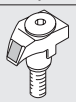
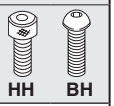




• Right-hand shown

Side Rake Angle : -6˚
Angle of Inclination : -4˚

Toolholder Dimensions

Description		Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts				
											Clamp Set	Wrench	Shim		Shim Screw
		R	L	H	HF	B	LF	LH	WF						 HH BH
CSRN R/L	2525M-12A	●	●	25	25	25	150	22	27	0.8	CE-030A	LW-4	-	SP-148 (SP-143)	BH3X12
CSKNR	2525M-09A	●		25	25	25	150	27	32	0.8	CE-030A	LW-4	SP-129	-	HH3X12

· -12A toolholder Shim : When using SN□□1204 Insert, please purchase spare parts : SP-143 in ( ) separately.

Applicable Inserts

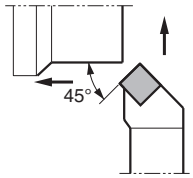
Applications	Hard Materials / Cast Iron	Cast Iron
See Page	C19	B35
Insert / Toolholder Description	CBN (KBN900) 	Coated Carbide 
CSRN R/L...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSKN R/L...-09A	SNMN0903..	-

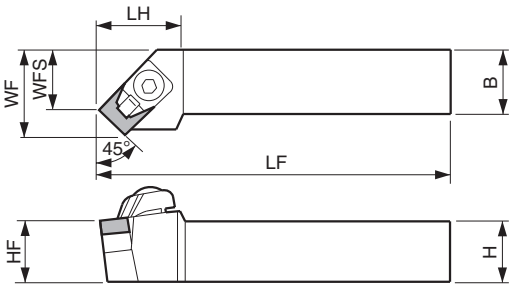
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, please purchase spare parts below separately.			
B109,B110	Chipbreaker	Clamp Set	Shim	Shim Screw
Ceramic 				
(SNGN1204..) (SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..) (SNMN1207..)			SP-141	M3X8
-	-			

Recommended Cutting Conditions D38~D39

● : Std. Item

CSSN-A (External / Facing / Chamfering)

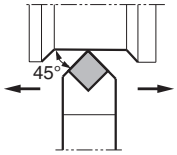


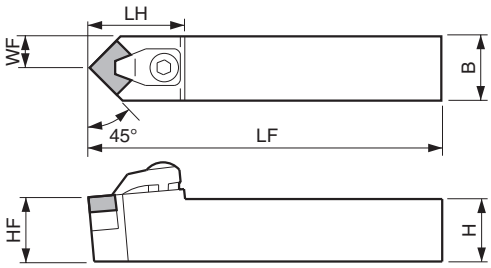


Side Rake Angle : -6°
Angle of Inclination : 0°

• Right-hand shown

CSDN-A (External / Chamfering)





Back Rake Angle : -8.5°

Toolholder Dimensions

Description		Stock			Dimension (mm)							Std. Corner-R(RE)	Spare Parts				
													Clamp Set	Wrench	Shim		Shim Screw
		R	N	L	H	HF	B	LF	LH	WF	WFS		030A 040				HH BH
CSSN$^{R}_{L}$	2525M-09A	●		●	25	25	25	150	26	32	25	0.8	CE-030A	LW-4	SP-129	-	HH3X12
	2525M-12A	●		●							23				-	SP-148 (SP-143)	BH3X12
CSDNN	2525M-09A		●		25	25	25	150	32	12.5	-	0.8	CE-040	LW-4	SP-129	-	HH3X12
	2525M-12A		●												-	SP-148 (SP-143)	BH3X12

· -12A toolholder Shim: When using SN□□1204 Insert, please purchase spare parts : SP-143 in ( ) separately.

Applicable Inserts

Applications	Hard Materials / Cast Iron	Cast Iron
See Page	C19	B35
Insert / Toolholder Description	CBN (KBN900)	Coated Carbide
CSSN$^{R}_{L}$...-09A	SNMN0903..	-
CSSN$^{R}_{L}$...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSDNN...-09A	SNMN0903..	-
CSDNN...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)

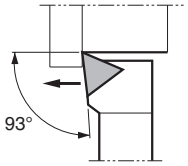
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, please purchase spare parts below separately.			
B109,B110	Chipbreaker	Clamp Set	Shim	Shim Screw
Ceramic				
-	-			
(SNGN1204..) (SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..) (SNMN1207..)			SP-141	M3X8
-	-			
(SNGN1204..) (SNMN1204..)	-	-	SP-143	M3X12
(SNGN1207..) (SNMN1207..)			SP-141	M3X8

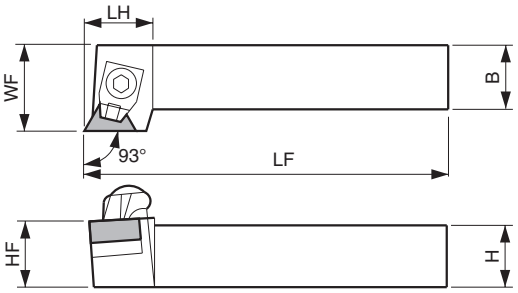
Recommended Cutting Conditions D38~D39

● : Std. Item

Toolholders for Solid CBN Tools [TNMN Insert]

CTJN-A (External)

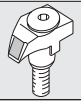




Side Rake Angle : -6˚
Angle of Inclination : -4˚

• Right-hand shown

Toolholder Dimensions

Description	Stock		Dimension (mm)						Std. Corner-R(RE)	Spare Parts			
	R	L	H	HF	B	LF	LH	WF		Clamp Set	Wrench	Shim	Shim Screw
													
CTJN$^{R}/_{L}$ 2525M-11A	●	●	**25**	**25**	**25**	**150**	**22**	**32**	**0.8**	**CE-030A**	**LW-4**	**SP-219**	**HH3X12**

Applicable Inserts

Applications	Hard Materials / Cast Iron	Cast Iron / Hard Materials
See Page	**C19**	**B111**
Insert / Toolholder Description	**CBN (KBN900)** 	**Ceramic** 
CTJN$^{R}/_{L}$...-11A	TNMN1103..	TNGN1103..

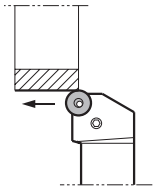
* TNMN1604 Insert toolholder is described in **D30**.

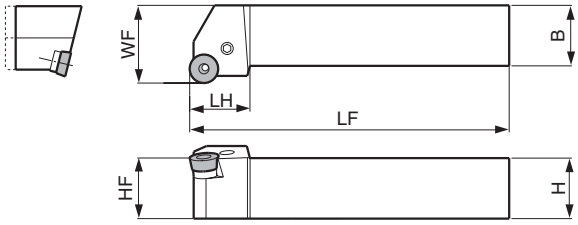
Recommended Cutting Conditions ➡ **D38~D39**

● : Std. Item

Toolholders for Bearing Machining

PRGC-BE (External)





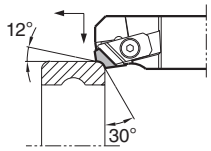
• Right-hand shown

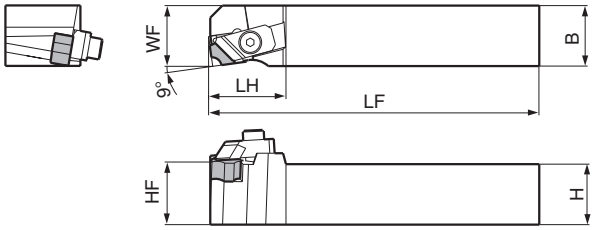
Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts						Applicable Inserts
									Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	
			H	HF	B	LF	LH	WF							
PRGCR	2525M-12BE	●	25	25	25	150	25	32	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5	RCMT 1204M0-BB

Recommended Cutting Conditions ➡ D38~D39

CBSN (External Round-Chamfering)





• Right-hand shown

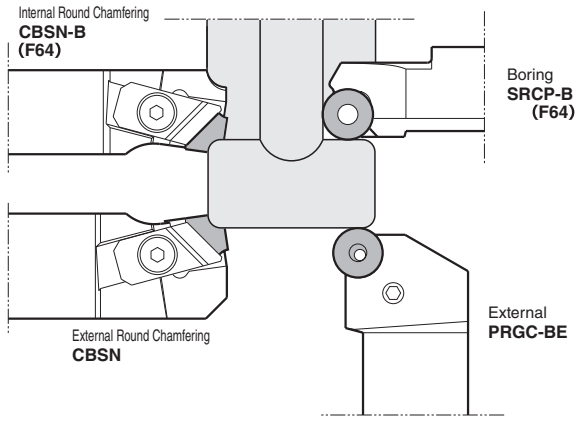
Toolholder Dimensions

Description		Stock		Dimension (mm)						Spare Parts				Applicable Inserts
										Clamp Set	Wrench	Shim	Shim Screw	
		R	L	H	HF	B	LF	LH	WF					
CBSN R/L	2020K-12	●	●	20	20	20	125	32	20	CP-RC R/L	LW-5	SP-RC	SP3X8	SNMF1204○○-21
	2525M-12	●	●	25	25	25	150		25					

· Clamp Set : CP-RCR for Right-hand Toolholder, CP-RCL for Left-hand Toolholder.

Recommended Cutting Conditions ➡ D38~D39

Tooling for Bearing Machining



● : Std. Item

Recommended Cutting Conditions - External Turning (Negative Insert) [ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grade	Corner-R (RE)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
P	Low Carbon Steel Low Carbon Alloy	HB ≤ 300	Finishing (High Speed Machining)	Continuous	XP	CCX	0.8	300 - 600 - 800	0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2
			Finishing (Small ap)	Continuous Interruption	XF	PV710 PV720	0.4 0.8	250 - 350 - 520 240 - 320 - 480	0.05 - 0.12 - 0.6 0.05 - 0.15 - 0.6	0.03 - 0.1 - 0.22 0.04 - 0.12 - 0.25
			Finishing (Gloss Oriented)	Continuous Interruption	XP	TN610 TN620	0.4 0.8	250 - 320 - 400 240 - 310 - 370	0.2 - 0.5 - 0.7 0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2 0.07 - 0.12 - 0.2
			Finishing (Tool Life Oriented)	Continuous Interruption	XP	PV710 PV720	0.4 0.8	250 - 300 - 370 240 - 290 - 340	0.2 - 0.5 - 0.7 0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2 0.07 - 0.12 - 0.2
			Finishing - Medium (Gloss Oriented)	Continuous Interruption	XQ	TN610 TN620	0.4 0.8	250 - 320 - 400 240 - 280 - 340	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3 0.17 - 0.25 - 0.3
			Finishing - Medium (Tool Life Oriented)	Continuous Interruption	XQ	PV710 PV720	0.8 0.8	250 - 300 - 370 240 - 280 - 340	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3 0.17 - 0.25 - 0.3
			Medium - Roughing	Continuous Interruption	XS	PV720 CA515	0.8 0.8	220 - 260 - 320 160 - 210 - 260	0.8 - 1.5 - 2.0 0.8 - 1.5 - 2.0	0.25 - 0.3 - 0.4 0.25 - 0.3 - 0.4
			Roughing	Continuous Interruption	PG	CA515 CA025P	0.8 1.2	180 - 220 - 260 150 - 200 - 240	1.0 - 2.5 - 3.5 1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Medium - Roughing High Feed Rate	Continuous Interruption	PT	CA515 CA025P	0.8 1.2	150 - 200 - 240 120 - 180 - 220	1.5 - 3.0 - 4.5 1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45 0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous Interruption	PH	CA515 CA025P	1.2 1.6	150 - 200 - 240 120 - 180 - 220	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous Interruption	PX (Single-sided)	CA515 CA025P	1.2 1.6	150 - 200 - 240 120 - 180 - 220	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
	Medium Carbon Steel Medium Carbon Alloy	HB ≤ 300	Finishing (Time Oriented)	Continuous Interruption	WF (Wiper)	PV710 CA515	0.8 0.8	200 - 250 - 320 160 - 220 - 280	0.3 - 0.5 - 1.0 0.3 - 0.5 - 1.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Finishing - Medium (Time Oriented)	Continuous Interruption	WE (Wiper)	PV710 CA025P	0.8 0.8	180 - 220 - 280 130 - 180 - 240	1.0 - 2.0 - 3.0 1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Finishing (High Speed Machining)	Continuous	PP	CCX	0.8	200 - 300 - 450	0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28
			Finishing (Gloss Oriented)	Continuous Interruption	PP	TN610	0.4 0.8	200 - 250 - 320 180 - 230 - 300	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing (Tool Life Oriented)	Continuous Interruption	PP	PV710 PV720	0.4 0.8	200 - 250 - 320 200 - 240 - 290	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing - Medium (Gloss Oriented)	Continuous Interruption	PQ	TN610 TN620	0.8 1.2	180 - 230 - 300 160 - 220 - 260	0.5 - 1.5 - 2.5 0.5 - 1.5 - 2.5	0.1 - 0.2 - 0.3 0.1 - 0.17 - 0.25
			Finishing - Medium (Tool Life Oriented)	Continuous Interruption	PQ	PV710 CA025P	0.8 0.8	160 - 210 - 280 140 - 200 - 240	0.5 - 1.5 - 2.5 0.5 - 1.5 - 2.5	0.1 - 0.2 - 0.3 0.1 - 0.17 - 0.25
			Medium - Roughing	Continuous Interruption	PG	CA515 CA025P	0.8 1.2	150 - 200 - 240 120 - 160 - 200	1.0 - 2.5 - 3.5 1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4 0.2 - 0.3 - 0.4
			Medium - Roughing High Feed Rate	Continuous Interruption	PT	CA515 CA025P	0.8 1.2	120 - 180 - 230 100 - 150 - 200	1.5 - 3.0 - 4.5 1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45 0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous Interruption	PH	CA515 CA025P	1.2 1.6	120 - 180 - 230 100 - 150 - 200	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous Interruption	PX (Single-sided)	CA515 CA025P	1.2 1.6	120 - 180 - 230 100 - 150 - 200	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
	High Carbon Alloy	HB ≤ 280	Finishing (High Speed Machining)	Continuous	PP	CCX	0.8	200 - 300 - 400	0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28
			Finishing (Gloss Oriented)	Continuous Interruption	PP	TN610 TN620	0.4 0.8	150 - 200 - 280 140 - 180 - 240	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing (Tool Life Oriented)	Continuous Interruption	PP	PV710 CA515	0.4 0.8	120 - 180 - 260 100 - 150 - 200	0.2 - 0.5 - 1.5 0.2 - 0.5 - 1.5	0.04 - 0.16 - 0.28 0.05 - 0.2 - 0.35
			Finishing - Medium	Continuous Interruption	PQ	CA515 CA025P	0.8 0.8	120 - 160 - 220 100 - 140 - 180	0.5 - 1.5 - 2.5 0.5 - 1.5 - 2.5	0.15 - 0.25 - 0.3 0.15 - 0.2 - 0.25
			Medium - Roughing	Continuous Interruption	PG	CA515 CA025P	0.8 0.8	120 - 150 - 200 100 - 130 - 180	1.0 - 2.0 - 3.0 1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.5 0.15 - 0.2 - 0.3
			Medium - Roughing High Feed Rate	Continuous Interruption	PT	CA515 CA025P	0.8 1.2	100 - 140 - 180 80 - 120 - 160	1.5 - 3.0 - 4.5 1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45 0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous Interruption	PH	CA515 CA025P	1.2 1.6	100 - 140 - 180 80 - 120 - 160	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous Interruption	PX (Single-sided)	CA515 CA025P	1.2 1.6	100 - 140 - 180 80 - 120 - 160	2.0 - 5.0 - 8.0 2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8 0.3 - 0.5 - 0.7

Recommended Cutting Conditions - External Turning (Negative Insert) [ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grade	Corner-R (RE)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
M	Stainless Steel (Austenitic related)	HB ≤ 220	Finishing (Gloss Oriented)	Continuous	PQ	TN620	0.8	120 - 160 - 200	0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2
				Interruption			0.8	100 - 120 - 150	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
			Finishing	Continuous	MQ	CA6515	0.4	120 - 180 - 240	0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2
				Interruption		CA6525	0.8	100 - 160 - 220	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
			Medium - Roughing (Chip Control Oriented)	Continuous	MS	CA6515	0.4	120 - 160 - 200	1.0 - 2.0 - 3.0	0.1 - 0.2 - 0.3
				Interruption		CA6525	0.8	80 - 140 - 180	1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.4
			Medium - Roughing (Sharpness Oriented)	Continuous	MU	CA6515	0.4	120 - 160 - 200	1.0 - 2.0 - 3.0	0.15 - 0.25 - 0.35
				Interruption		CA6525	0.8	80 - 140 - 180	1.0 - 2.0 - 3.0	0.15 - 0.25 - 0.3
			Roughing	Continuous	Standard	CA6515	0.8	100 - 140 - 180	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
				Interruption		CA6525	1.2	80 - 120 - 150	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
	Stainless Steel (Precipitation Hardening)	HB ≤ 300	Finishing (Gloss Oriented)	Continuous	PQ	TN620	0.8	100 - 120 - 150	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
				Interruption			0.8	80 - 100 - 120	0.5 - 1.0 - 1.5	0.05 - 0.08 - 0.1
			Finishing	Continuous	MQ	CA6515	0.4	100 - 120 - 150	0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2
				Interruption		CA6525	0.8	80 - 100 - 120	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
			Medium - Roughing (Chip Control Oriented)	Continuous	MS	CA6515	0.4	100 - 120 - 150	1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.25
				Interruption		CA6525	0.8	80 - 100 - 120	1.0 - 2.0 - 3.0	0.1 - 0.15 - 0.2
			Medium - Roughing (Sharpness Oriented)	Continuous	MU	CA6515	0.4	100 - 120 - 150	1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.25
				Interruption		CA6525	0.8	80 - 100 - 120	1.0 - 2.0 - 3.0	0.1 - 0.15 - 0.2
			Roughing	Continuous	Standard	CA6515	0.8	80 - 100 - 120	1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.4
				Interruption		CA6525	1.2	60 - 80 - 100	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
K	Gray Cast Iron	HB ≤ 250	High Speed Machining	Continuous	Without Chipbreaker	KBN475	0.8	400 - 800 - 1,200	0.05 - 0.2 - 0.5	0.1 - 0.2 - 0.3
				Continuous		KBN900	1.2	500 - 900 - 1,200	0.1 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		KBN900	1.2	500 - 700 - 900	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2
			Finishing (Gloss Oriented)	Continuous	Standard	PV7005	0.8	300 - 350 - 400	0.5 - 1.0 - 1.5	0.1 - 0.2 - 0.3
				Interruption		PV720	0.8	150 - 200 - 300	0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2
			Finishing (Ceramic)	Continuous	Without Chipbreaker	KA30	1.2	300 - 500 - 700	0.3 - 0.5 - 1.0	0.1 - 0.2 - 0.3
				Continuous		PT600M	0.8	300 - 450 - 600	0.3 - 0.5 - 1.0	0.1 - 0.2 - 0.3
			Medium (Ceramic)	Continuous		CS7050	1.2	300 - 450 - 550	1.0 - 2.0 - 3.0	0.15 - 0.25 - 0.35
				Interruption		KS6050	1.2	250 - 400 - 500	1.0 - 2.0 - 3.0	0.15 - 0.2 - 0.3
			Medium	Continuous	KH	CA310	0.8	200 - 250 - 300	0.5 - 2.0 - 2.5	0.1 - 0.2 - 0.3
				Interruption		CA315	1.2	150 - 200 - 250	0.5 - 2.0 - 2.5	0.08 - 0.15 - 0.2
			Roughing	Continuous	KH	CA310	0.8	200 - 250 - 300	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
				Interruption		CA315	1.2	150 - 200 - 250	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
	Nodular Cast Iron	HB ≤ 270	High Speed Machining	Continuous	Without Chipbreaker	KBN60M	0.4	200 - 300 - 400	0.1 - 0.3 - 0.5	0.1 - 0.15 - 0.2
				Continuous		PT600M	0.8	200 - 250 - 350	0.1 - 0.5 - 1.0	0.1 - 0.2 - 0.4
			Finishing (Gloss Oriented)	Continuous	Standard	PV7005	0.8	150 - 250 - 300	0.5 - 1.0 - 1.5	0.1 - 0.2 - 0.3
				Interruption		PV720	0.8	120 - 200 - 250	0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2
			Medium	Continuous	KG	CA310	0.8	150 - 200 - 250	0.5 - 2.0 - 2.5	0.1 - 0.2 - 0.3
				Interruption		CA315	1.2	120 - 180 - 220	0.5 - 2.0 - 2.5	0.08 - 0.15 - 0.2
			Roughing	Continuous	KG	CA315	0.8	150 - 200 - 250	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
				Interruption	KH	CA320	1.2	120 - 180 - 220	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys	HB ≤ 100	High Speed Machining (Rainbow Surface Gross)	Continuous	Without Chipbreaker	KPD001	0.4	300 - 800 - 2,000	0.05 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Finishing (Long Tool Life)	Continuous	A3	PDL025	0.4	400 - 500 - 700	0.5 - 1.0 - 2.0	0.1 - 0.2 - 0.25
				Interruption			0.8	400 - 500 - 700	0.5 - 1.0 - 2.0	0.1 - 0.2 - 0.25
			Finishing	Continuous	A3	KW10	0.8	400 - 500 - 700	0.5 - 1.0 - 2.0	0.1 - 0.2 - 0.25
				Interruption			0.8	400 - 500 - 700	0.5 - 1.0 - 2.0	0.1 - 0.2 - 0.25
			Medium	Continuous	AH	KW10	0.8	200 - 300 - 500	1.0 - 2.0 - 3.5	0.1 - 0.3 - 0.4
				Interruption			0.8	200 - 300 - 500	1.0 - 2.0 - 3.5	0.1 - 0.3 - 0.4
S	Titanium Alloys	HB ≤ 400	Precision Finishing (Rainbow Surface Gross)	Continuous	Without Chipbreaker	KPD001	0.4	100 - 150 - 180	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15
				Interruption			0.4	70 - 120 - 150	0.05 - 0.3 - 0.5	0.03 - 0.07 - 0.1
			Finishing	Continuous	MQ	SW05	0.4	40 - 70 - 100	0.2 - 0.5 - 1.0	0.05 - 0.2 - 0.3
				Interruption			0.4	40 - 70 - 100	0.2 - 0.5 - 1.0	0.05 - 0.15 - 0.2
			Medium	Continuous	MU	SW05	0.8	40 - 60 - 80	0.5 - 1.0 - 3.0	0.1 - 0.25 - 0.35
				Interruption			0.8	40 - 60 - 80	0.5 - 1.0 - 3.0	0.1 - 0.2 - 0.3
	Heat-resistant Alloys	HB ≤ 350	Finishing	Continuous	MQ	PR005S	0.4	30 - 55 - 90	0.2 - 0.3 - 1.0	0.05 - 0.08 - 0.15
				Interruption		PR015S	0.8	25 - 45 - 70	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Medium	Continuous	SQ	PR005S	0.8	30 - 55 - 90	0.3 - 0.5 - 1.5	0.1 - 0.17 - 0.35
				Interruption		PR015S	0.8	25 - 45 - 70	0.3 - 0.5 - 1.5	0.1 - 0.17 - 0.35
			Roughing	Continuous	SX	PR005S	-	30 - 55 - 90	0.5 - 2.0 - 4.0	0.15 - 0.3 - 0.45
				Interruption		PR015S		25 - 45 - 70	0.5 - 2.0 - 4.0	0.15 - 0.3 - 0.45
H	Hardened Steel Hard Materials	40~50 HRC	Finishing	Continuous	PQ Standard	CA515	0.8	60 - 100 - 120	0.1 - 0.3 - 0.5	0.05 - 0.08 - 0.1
				Interruption			0.8	30 - 50 - 70	0.1 - 0.3 - 0.5	0.05 - 0.08 - 0.1
		40~50 HRC	Finishing	Continuous	Without Chipbreaker	PT600M	0.8	60 - 80 - 100	0.2 - 0.5 - 0.7	0.05 - 0.1 - 0.15
		50~65 HRC		Continuous			1.2	30 - 40 - 60	0.2 - 0.5 - 0.7	0.05 - 0.1 - 0.15
		50~68 HRC	Finishing	Continuous	ME MET	KBN05M	0.8	100 - 150 - 200	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1
				Interruption			1.2	90 - 140 - 180	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1
			Medium	Continuous	Without Chipbreaker	KBN900	1.2 Radius	80 - 100 - 120	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.2
				Interruption				70 - 90 - 110	0.3 - 0.7 - 1.0	0.05 - 0.1 - 0.15



Small Parts Machining (External)

E1~E54

E

Summary of External Turning E2~E10

Small Parts Machining Identification System E11

Toolholders for Back Turning E12~E23

TKFB Insert	(Back Turning, Goose-neck Holder, Y-axis Toolholder)	E12
TKF-GTP		E18
TKF-AGT / TKF-AS		E20
ABS Insert	(Back Turning)	E21
ABW Insert	(Back Turning)	E22

Goose-neck Holder E24~E25

DC □□ Insert	(Goose-neck Holder)	E24
VP □□ Insert	(Goose-neck Holder)	E25

Toolholders for External Turning (Back Clamp / Screw Clamp) E26~E42

CC □□ Insert	(Without Offset, For High Pressure Coolant / With Offset)	E26
DC □□ Insert	(Without Offset, For High Pressure Coolant / With Offset / Y-axis Toolholder)	E28
DP □□ Insert	(Without Offset)	E34
TC / TP □□ Insert		E35
VB □□ Insert	(Without Offset, For High Pressure Coolant / With Offset)	E36
VC □□ Insert	(Without Offset)	E39
VP □□ Insert	(Without Offset, For High Pressure Coolant / With Offset)	E41

External Sleeve Holder E43~E45

CC □□ Insert		E43
DC □□ Insert		E44
VB / VC □□ Insert		E45

Toolholders for Small Double Sided Tooling (Screw Clamp) E46~E47

CN □ U Insert	(Without Offset)	E46
DN □ U Insert	(Without Offset)	E46
TN □ U Insert	(Without Offset)	E47

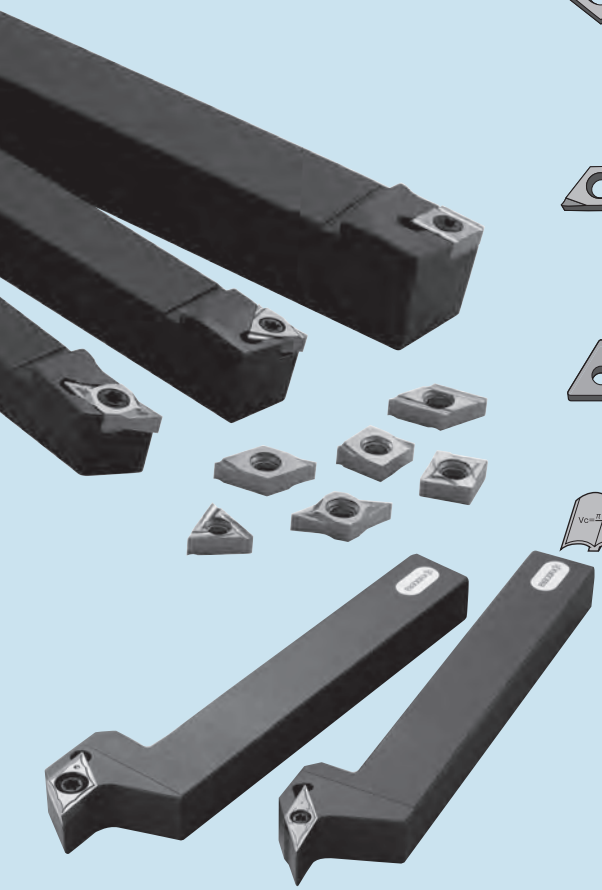
Toolholder for Double Sided Tooling for Automatic Lathe (Lever Lock) E48~E49

CN □□ Insert	(Without Offset)	E48
TN □□ Insert	(Without Offset)	E49

Technical Information E50~E51

Recommended Cutting Conditions E50

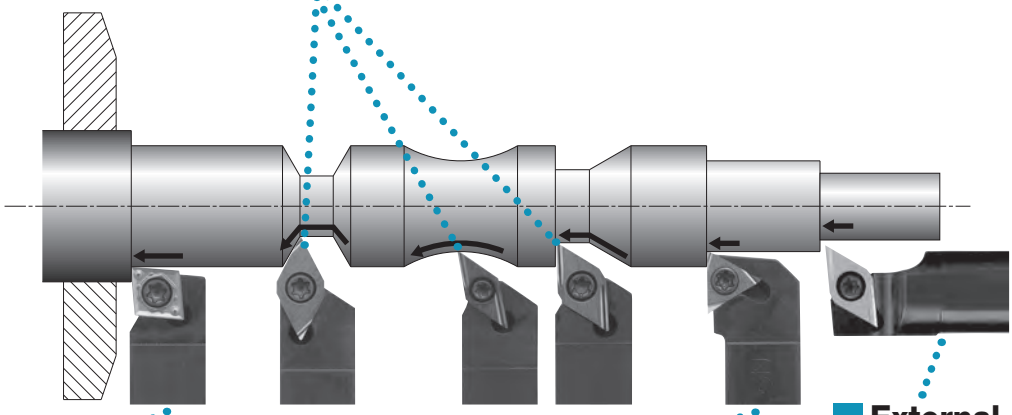
Alternative Toolholder Reference Table for Small Parts Machining E52~E54



Summary of External Turning

External / Copying

						
ADJC-FF	SDJC-FF(JCT) SDJC-FF-Y	SDJC	SDLC-FF SDLP-FF	SDLN-FF	SDNC-F	SDNC
Back Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp	Screw Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp	Screw Clamp
E28	E28~E30	E29	E32, E34	E46	E33	E33



External / Facing

			
ACLC-FF	SCLC-FF(JCT)	SCLC	SCLN-FF
Back Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp	Screw Clamp Without Offset
E26	E26, E27	E27	E46

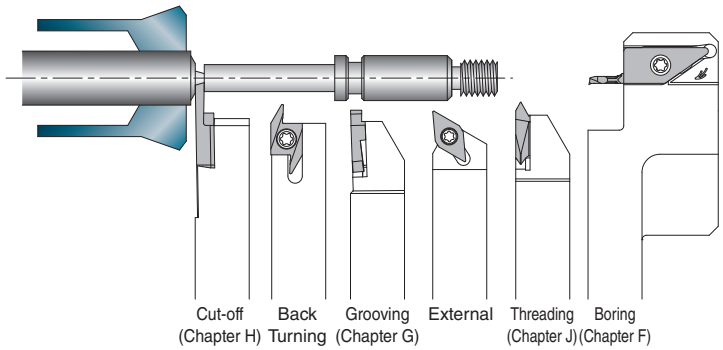
External

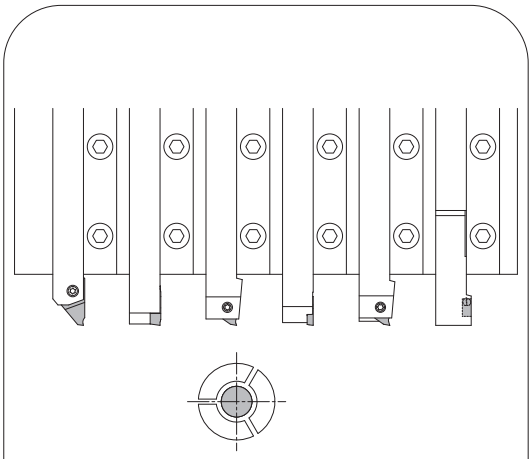
	
STGC(P)	STLN-FF
Screw Clamp	Screw Clamp Without Offset
E35	E47

External Sleeve Holder


S-SDLC
Screw Clamp Shank Dia. ø12~ø25.4
E44

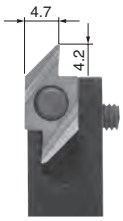
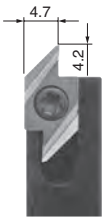
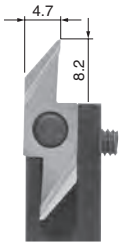
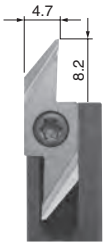
Tooling example (1) CNC Automatic lathe (Gang Type)

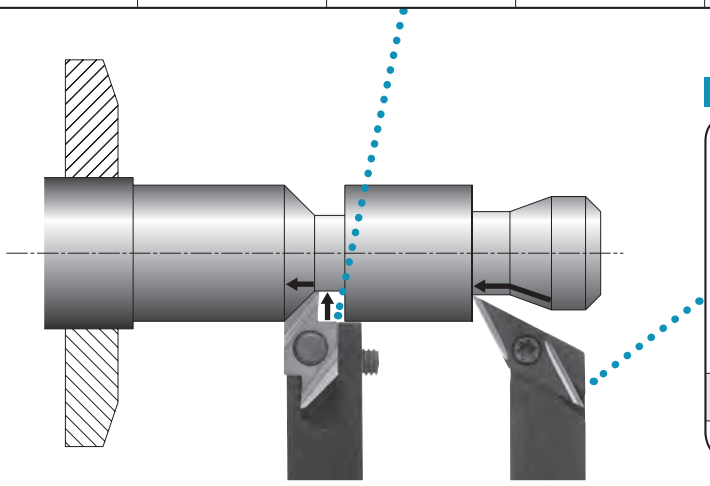




Tools installed on gang tool post

Back Turning

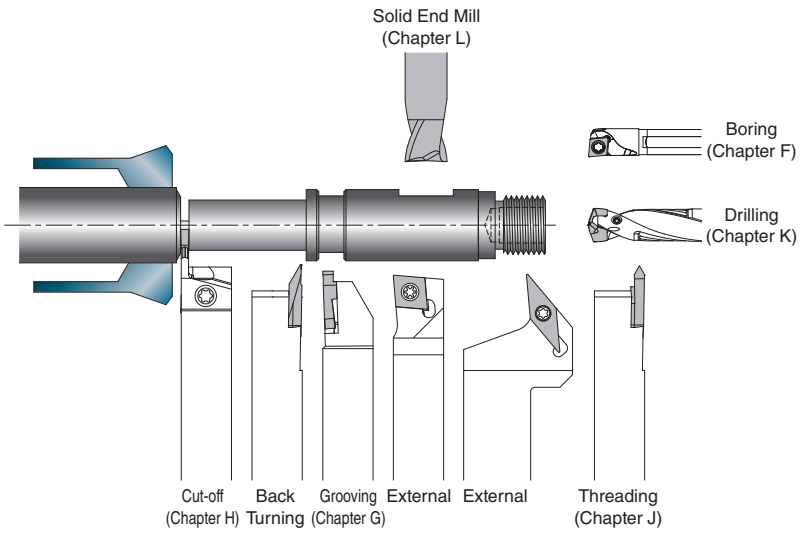
AABS-40F	SABS-40F	AABW-40F	SABW-40F	AABW-50F	SABW-50F	KTKF
						
Back Clamp Edge Width : 2.8 ap : ~4.0	Screw Clamp Edge Width : 2.8 ap : ~4.0	Back Clamp Edge Width : 4.7 ap : ~4.0	Screw Clamp Edge Width : 4.7 ap : ~4.0	Back Clamp Edge Width : 4.7 ap : ~5.0	Screw Clamp Edge Width : 4.7 ap : ~5.0	Screw Clamp Edge Width : 1.5~3.8 Max. ap : 1.8~5.5
E21	E21	E22	E22	E23	E23	E12

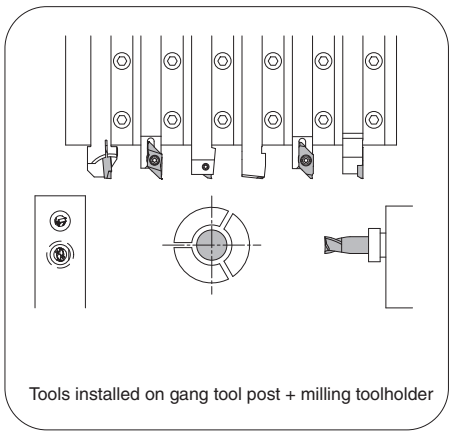


External / Facing / Copying / Undercutting

SVPB	SVPP-FF
	
Screw Clamp	Screw Clamp Without Offset
E37	E42

Tooling example (2) CNC Automatic lathe (Gang Type)





Tools installed on gang tool post + milling toolholder

For Swiss tool automatic lathe (Gang type tool post)

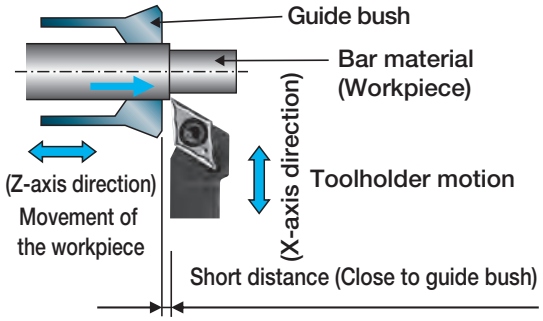
How to use Goose-neck Holder



Swiss tool automatic lathe (Guide bush system)

Goose-neck holder is applicable to automatic lathes whose toolholder does not move to longitudinal direction (Z-axis direction)

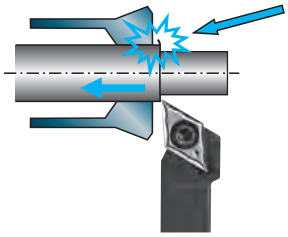
In case of machining with the conventional toolholder



Goose-neck holder is applicable to automatic lathe that toolholder does not move to longitudinal direction (Z-axis direction)

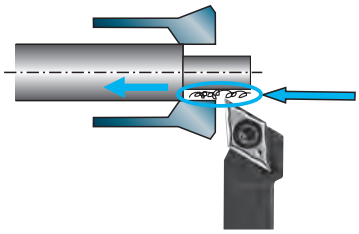
Problems of machining with the conventional toolholder

Problems of machining with the conventional toolholder

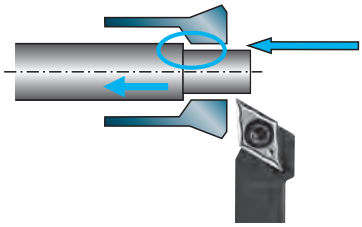


<Case 1>
During multiple passes, when bar material returns into guide bush, the burr contacts and breaks guide bush.

<Case 2>
The workpiece burr contacts the guide bush and causes dimensional variation.



<Case 3>
During multiple passes, when bar material returns into guide bush, the chips contact and break guide bush.

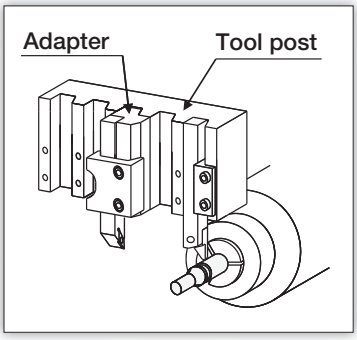


<Case 4>
Bar material deviation from the guide bush disables machining.

Problems of Toolholder Installation

When using a conventional toolholder,

1) Additional space is required for an adapter.
2) Toolholder's handling is difficult due to limited space.
3) Necessary to buy an adapter.
4) An adapter may interfere with the next tool post.



Advantages of Goose-neck Holder

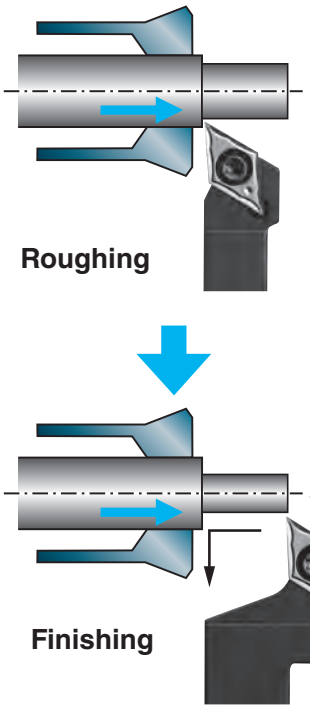
Advantages of Using Goose-neck Holder

When using Goose-neck Holder

1) Machining precision improves by additional finishing process
2) Chips do not come into the guide bush
3) Better chip control due to large chip evacuation space

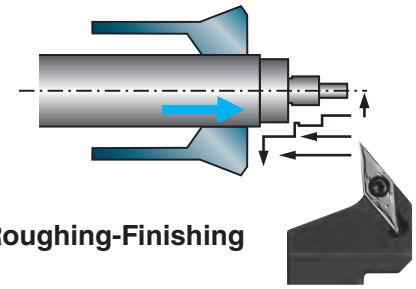
Available for machining after roughing without returning bar material into guide bush, preventing damages and improving precision.

Pattern 1

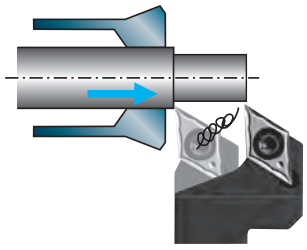


Available for roughing and finishing with one Goose-neck Holder.

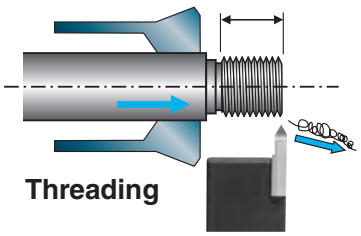
Pattern 2



For better chip control



Optimum cutting edge position and large space for efficient chip evacuation.

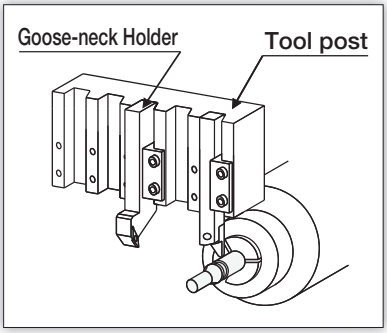


* With conventional threading toolholders, chip biting into guide bush can cause damages on threads.

Advantages of Toolholder Installation

When using a Goose-neck Holder

1) Maximum number of toolholders can be attached
2) No interference with next tool post

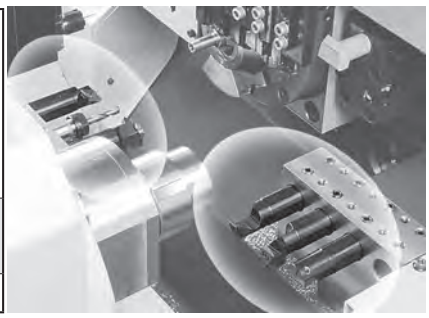


External Sleeve Holder

More tools attachable to CNC Automatic Lathe !

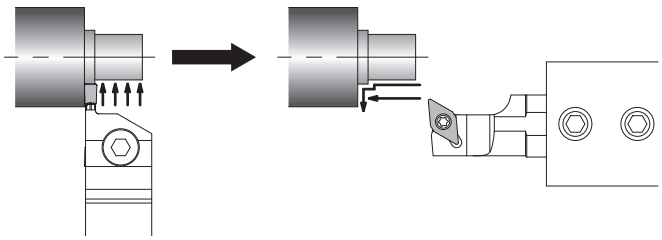
Limit to attachable tools at intricate part machining ▶ ▶ ▶ Use External Sleeve Holders

			
S-SCLC	S-SDUC	S-SDLC	S-SVUB(C)
Screw Clamp Shank Dia. ø12~ø25.4	Screw Clamp Shank Dia. ø14~ø25.4	Screw Clamp Shank Dia. ø12~ø25.4	Screw Clamp Shank Dia. ø12~ø25.4
E43	E44	E44	E45



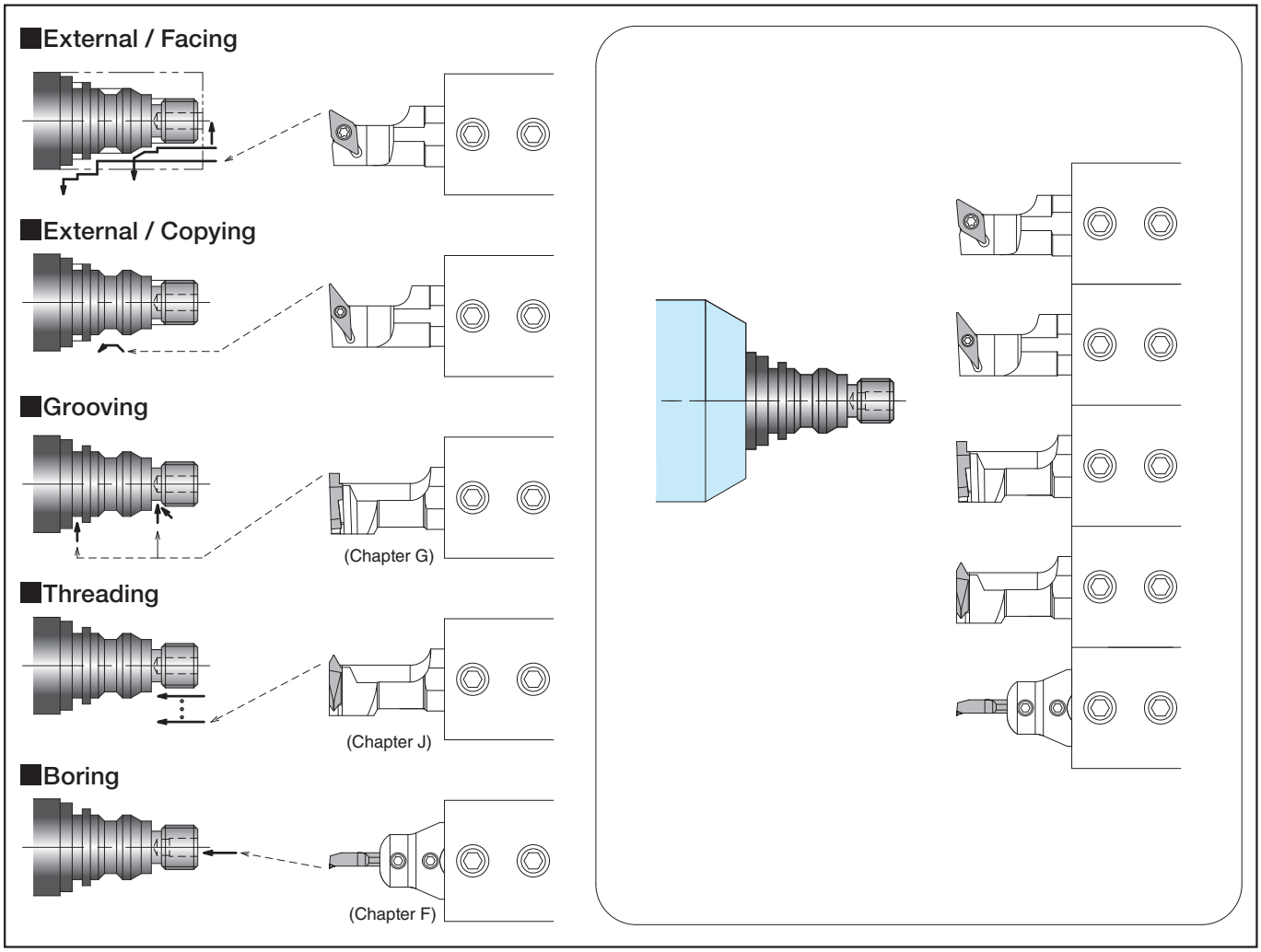
For Tooling Layout and Automatic Lathe List by Manufacturer, See Page R46~R54

Finishing by Sleeve Holder



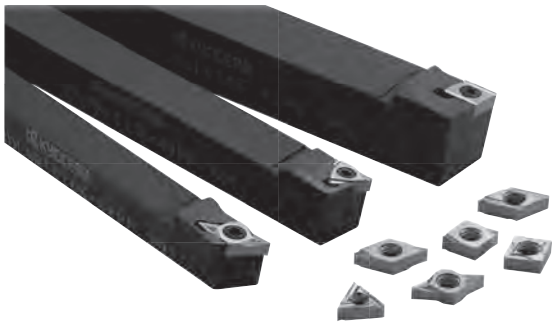
1) Roughing by grooving toolholder
2) Finishing by Sleeve Holder improves chip control and reduces cutting time

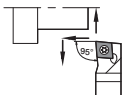
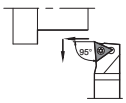
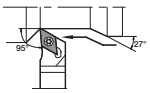
Tooling Example (3) CNC Automatic lathe (Opposed Gang Type)



For Tooling Layout and Automatic Lathe List by Manufacturer, See Page R46~R54

Toolholders for Small Double Sided Tooling (Screw Clamp)

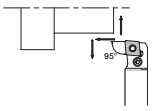
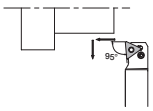


Applications	External / Facing	External / Up Facing	External / Copying
Cutting Edge Angle	95°	95°	95°
Screw Clamp (Without Offset)	 SCLN	 STLN	 SDLN
See Page	E46	E47	E46

Newly designed negative inserts (double-sided) enable high productivity and stability by economical doubled insert edge numbers
Sharp cutting equivalent to positive inserts (single-sided)

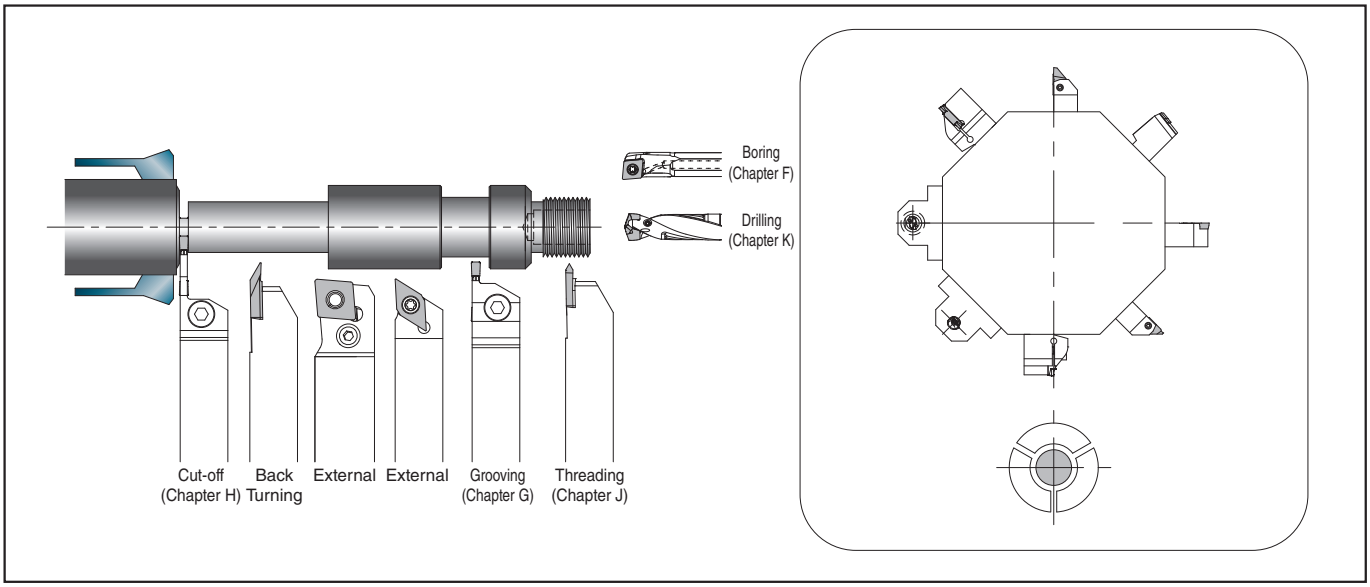
Toolholder for Double Sided Tooling for Automatic Lathe (Lever Lock, Without Offset)



Applications	External / Facing	External / Up Facing
Cutting Edge Angle	95°	95°
Lever Lock (Without Offset)	 PCLN-FF	 PTLN-FF
See Page	E48	E49

The lever lock type is available for small parts machining for external machining

Tooling Example (4)



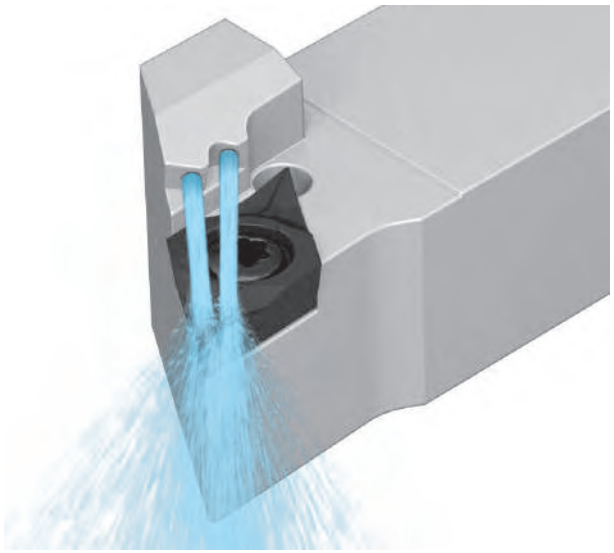
For Tooling Layout and Automatic Lathe List by Manufacturer, See Page R46~R54

Screw Clamp-JCT

Double-coolant hole design delivers an ample supply of coolant to the tool edge
Excellent Chip Control and Long Tool Life

1 Excellent Chip Control

Double-coolant hole design provides coolant to the insert cutting edge surface



2 Sufficient cooling of the cutting edge leads to longer tool life

Double Coolant Holes

Stable chip curls
Excellent chip control

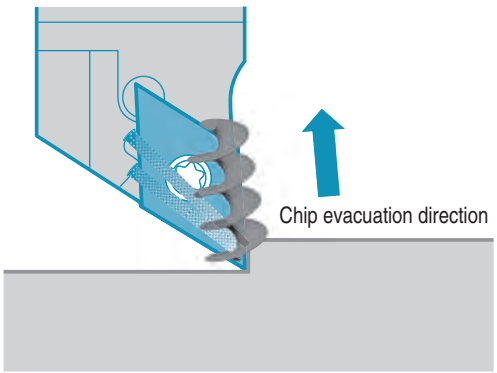
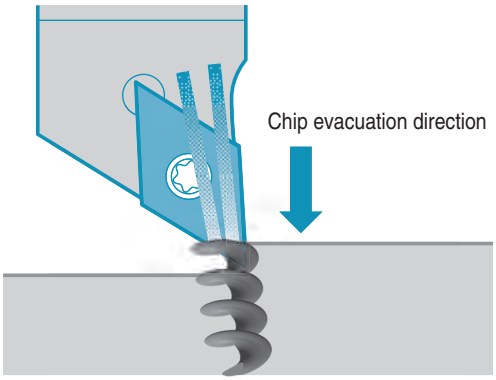
The cutting edge stays cool
Long tool life



Insert cross-section

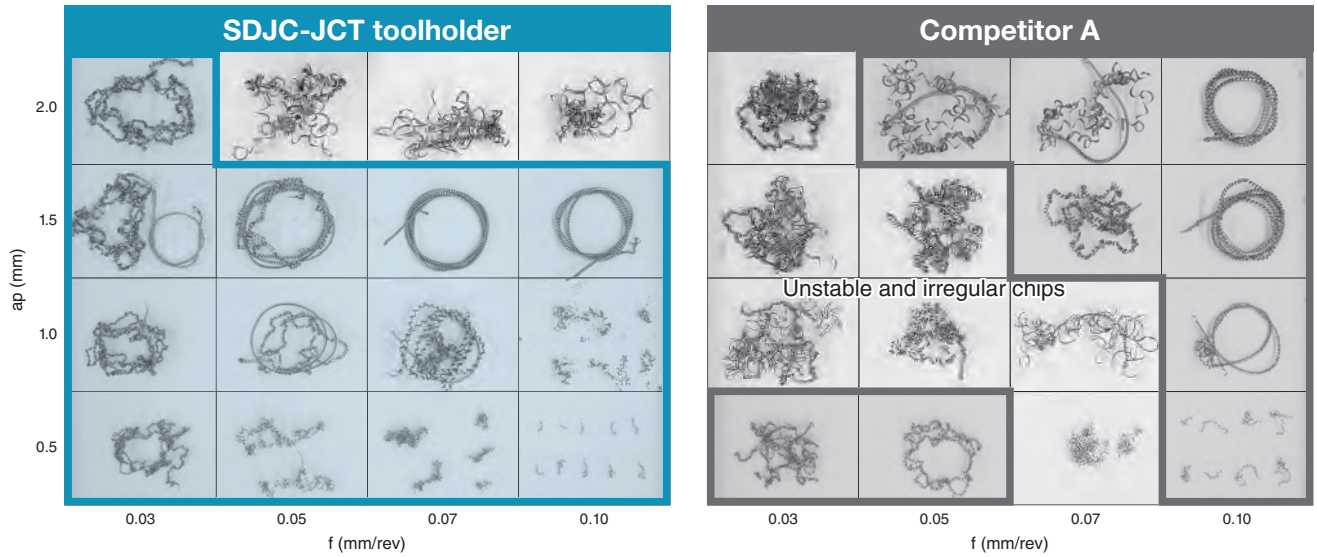
Coolant System Comparison (Internal evaluation)

(Image)

	Screw Clamp-JCT	Competitor A
Coolant System	Coolant discharges towards the chips 	Discharges coolant down onto the chip forcing the chip into the part 
Chip Control Performance	✓ Stable chip curls	△ Chip becomes unstable
Coolant Effects	✓ The cutting edge stays cool	△ Chip can cause interference with the workpiece

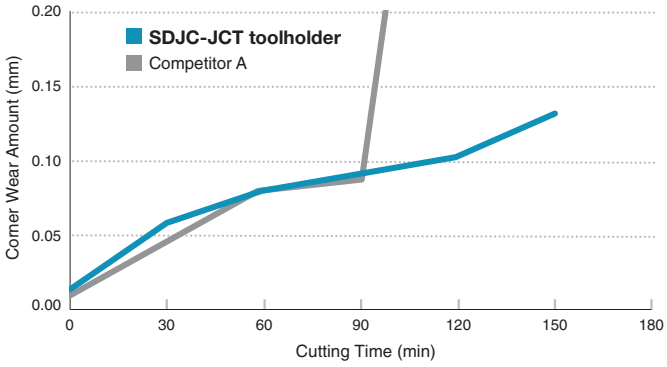
Toolholder with Coolant Holes Chip Control Comparison (Internal evaluation)

SDJC-JCT toolholder allows excellent chip control in a wide variety of cutting conditions



Cutting Conditions : Vc = 80 m/min, DCGT11T302MP-CK PR1535 (Same inserts were used) Workpiece Material : TAB6400 (Ti-6Al-4V) External coolant + Internal coolant (1.5MPa) External

Toolholder with Coolant Holes Wear Resistance Comparison (Internal evaluation)

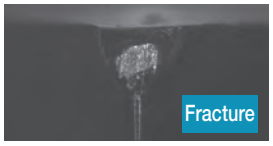


Cutting edge condition

SDJC-JCT toolholder (after machining 150min)



Competitor A (after machining 105min)

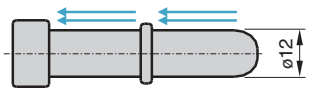


Cutting Conditions : Vc = 200 m/min, External : ap = 2.0 mm, f = 0.05 mm/rev, Facing : ap = 0.2 mm, f = 0.03 mm/rev
DCGT11T302MFP-GQ PR1535 (Same inserts were used) Workpiece Material : SUS304 External coolant + Internal coolant (1.5MPa) External / Facing

Case Studies

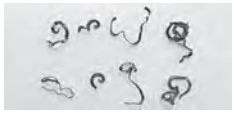
Pipe SUS304

Vc = 160 m/min
ap = 0.9 / 1.2 mm
f = 0.18 mm/rev
Wet (Internal Coolant : 14MPa)
DCMT11T304 type



Chip Control

SDJC-JCT toolholder (Internal coolant)



Good Chip Control

Competitor B (Internal coolant)

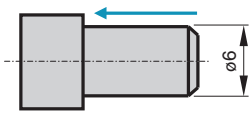


Changes to SDJC-JCT improved chip control and tool life.

(User Evaluation)

Pin SKS93

Vc = 180 m/min
ap = 1.4 mm
f = 0.13 mm/rev
Wet
DCMT11T304 type



Chip Control

SDJC-JCT toolholder (Internal Coolant : 2.5MPa)



Good Chip Control

Conventional toolholder (External coolant)



SDJC-JCT toolholder with internal coolant improved chip control. Reduced chip entanglement.

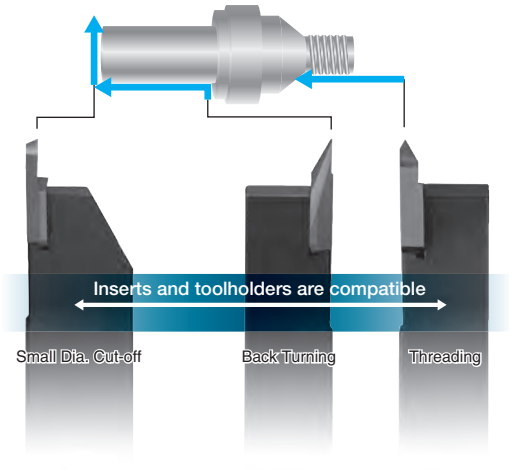
(User Evaluation)

Summary of External Turning

Cutting tool for small workpiece

KTKF

See Page E12



Inserts for back turning

TKFB

See Page E12

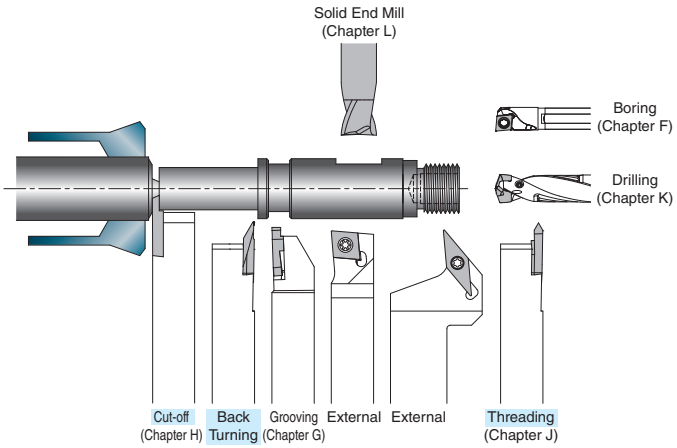
- **Excellent Chip Control with Molded Chipbreaker(GQ Chipbreaker)**
- **New Insert Grades for Steel Machining**
  PR1725
- **Insert Grades for Stainless Steel Machining**
  PR1535

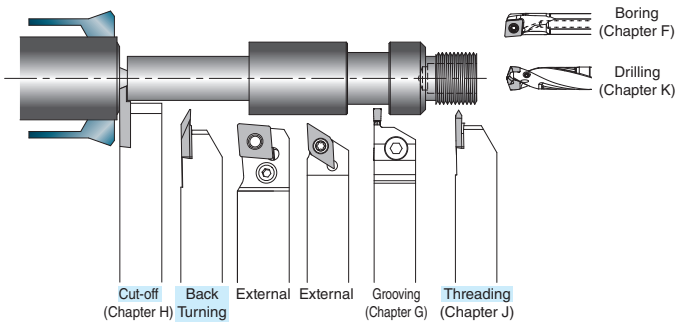


GQ Chipbreaker

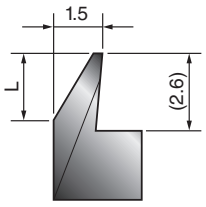
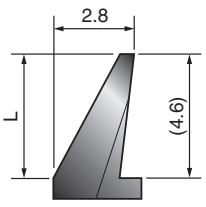
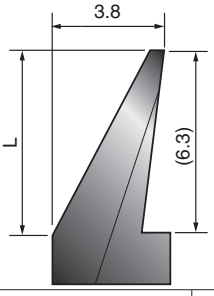
KTKF is applicable to back turning, threading and cut-off with one toolholder

Tooling example of KTKF toolholder





Details of cutting edge

Small machining		General purpose		Large machining	
					
Description	Cutting Edge Length L	Description	Cutting Edge Length L	Description	Cutting Edge Length L
TKFB12R15..	2.1	TKFB12R28..	4.2	TKFB16R38..	5.8
-	-	TKFB12L28..	4.4	TKFB16L38..	6.2
For small diameter and short length workpiece Stable machining with minimum overhang		For general purpose Good chip control		Large ap at one pass	

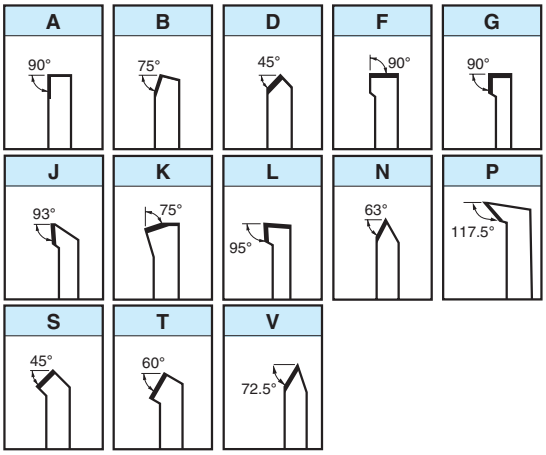
Small Parts Machining Identification System

Square Shank Identification System

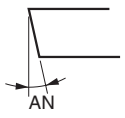
Clamping System	Insert Shape	Hand of Tool	Shank Height	Shank Width	Others
A : Back Clamp **C** : Top Clamp **P** : Lever Lock **S** : Screw Clamp	**C** : 80°Rhombic **D** : 55°Rhombic **S** : 90°Square **T** : 60°Triangle **V** : 35°Rhombic	**R** : Right-hand **L** : Left-hand **N** : Neutral	Shank Height (mm)	Shank Width (mm)	Manufacture's Option Optional Mark or Number e.g.) FF : Without Offset

S	C	L	C	R	12	12	JX	–	09	FF

Cutting Edge Angle

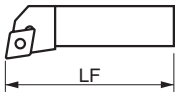


Insert Relief Angle



B : 5°Positive
C : 7°Positive
N : 0°Negative
P : 11°Positive

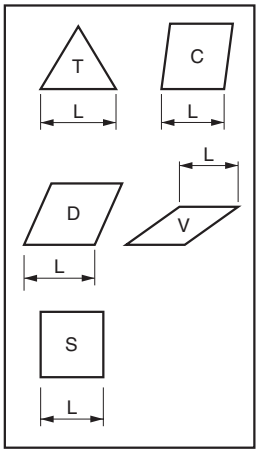
Toolholder Length



(mm)

F : 80 (85)	**JX**: 120
H : 100	**K** : 125
	M : 150

Insert Size



● Some back turning toolholders are Kyocera's original products, therefore their descriptions are not accordant with international standards.

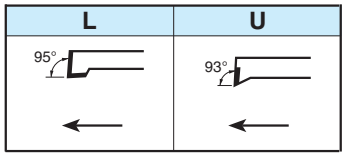
External Sleeve Holder Identification System

Shank	Toolholder Length	Clamping System	Insert Shape	Hand of Tool
S Steel	**F** : 80 (85) **G** : 90 **H** : 100 **K** : 125 (120)	**S** : Screw Clamp	**C** : 80°Rhombic **D** : 55°Rhombic **V** : 35°Rhombic	**L** : Left-hand

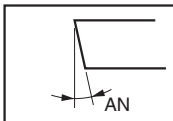
S	20	K	–	S	C	L	C	L	09

Shank Diameter

Cutting Edge Angle

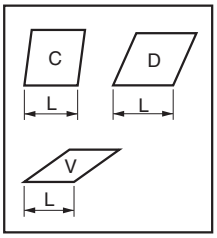


Insert Relief Angle



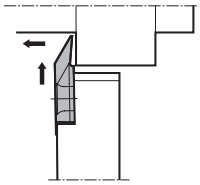
B : 5°Positive
C : 7°Positive

Insert Size



● Specification may change without any prior notice.
● Due to the installation size contrains on the machine, the toolholder length of some products may not match with the symbol.

KTKF / KTKF Goose-neck Holder / KTKF Y-axis Toolholder NEW



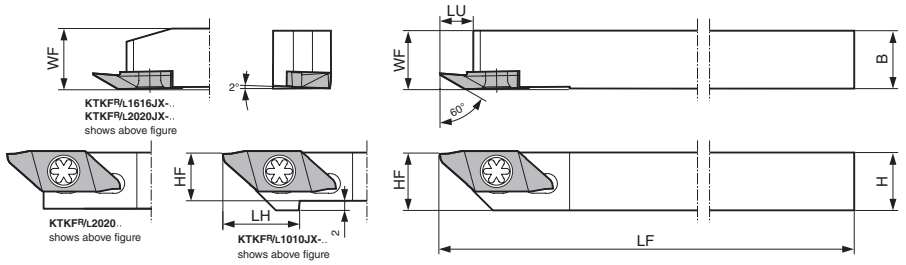


Fig. 1

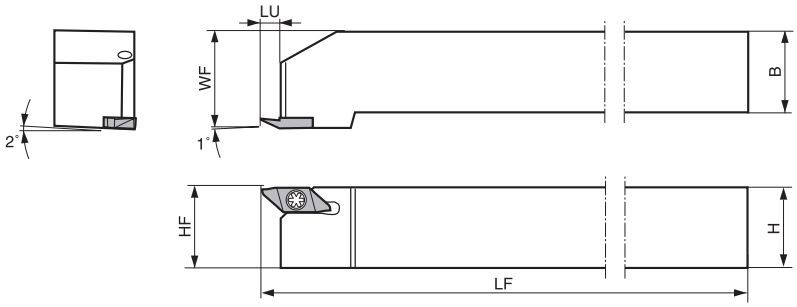
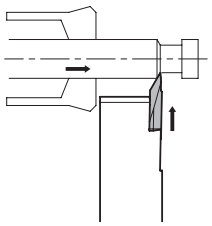


Fig. 2

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.



<Goose-neck Holder>

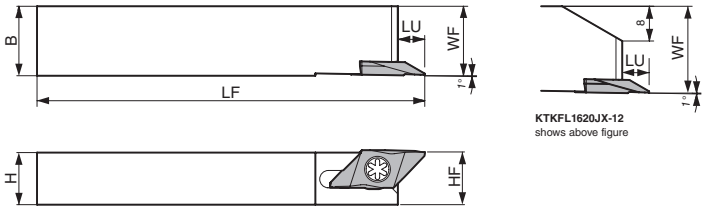
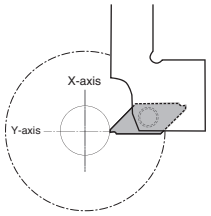


Fig. 3

●Left-hand shown

Left-hand Insert for Left-hand Toolholder.



<Y-axis Toolholder>

*HBKW KTKFR1216JX-12-Y:15mm
KTKFR1616JX-12-Y:11mm

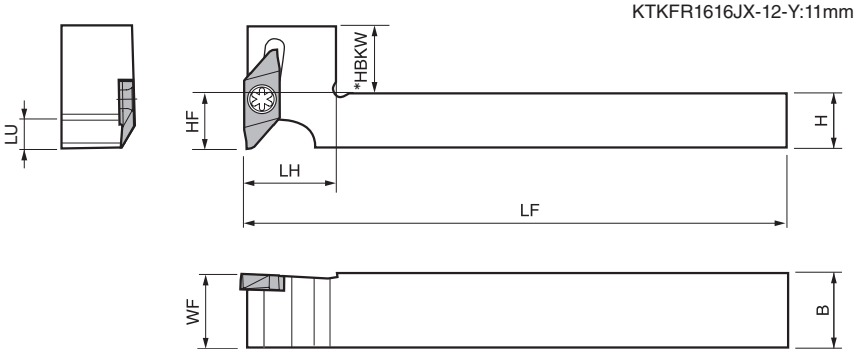


Fig. 4

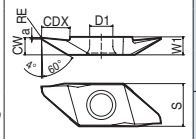
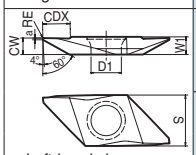
Right-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LH	WF	LU	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts
KTKF$^{R}_{L}$	1010JX-12	●	●	10	10	10	120	15	10	6	Fig. 1	SB-4590TRWN	FT-10	TKFB12$^{R}_{L}$ …
	1212JX-12	●	●	12	12	12		-	12					
	1616JX-12	●	●	16	16	16			16					
	2020JX-12	●	●	20	20	20			20					
KTKFR	2525M-12	●		25	25	25	150		30		Fig. 2			TKFB12R …
KTKF$^{R}_{L}$	1010JX-16	●	●	10	10	10	120	20	10	8	Fig. 1	SB-4590TRWN	FT-10	TKFB16$^{R}_{L}$ …
	1212JX-16	●	●	12	12	12		-	12					
	1616JX-16	●	●	16	16	16			16					
	2020JX-16	●	●	20	20	20			20					
KTKFR	2525M-16	●		25	25	25	150		30		Fig. 2			TKFB16R …
KTKF$^{R}_{L}$	1212F-12	●	●	12	12	12	85	-	12	6	Fig. 1	SB-4590TRWN	FT-10	TKFB12$^{R}_{L}$ …
	1212F-16	●	●							8				TKFB16$^{R}_{L}$ …
KTKFL	1216JX-12		●	12	12	16	120	-	16	6	Fig. 3	SB-4590TRWN	FT-10	TKFB12L …
	1620JX-12		●	16	16	20			20					
KTKFR	1216JX-12-Y	●		12	12	16	120	20	16	6	Fig. 4	SB-4590TRWN	FT-10	TKFB12R …
NEW	1616JX-12-Y	●		16	16			25						

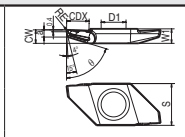
· LU shows the distance from the toolholder to the cutting edge.
· See Page **H13** for internal coolant type (coolant-through holders)
· Please see the precautions in **E15** when using Y-axis toolholder.

Applicable Inserts (See Page B100)

Insert (Photo shows Right-hand)	Description		Corner-R(RE) (mm)
  ●Right-hand shown	TKFB	12R15005M	<0.05
		12R28005M	<0.05
		12R28010M	<0.1
	TKFB	16R38005M	<0.05
		16R38010M	<0.1
 ●Left-hand shown	TKFB	12L28005MR	<0.05
		12L28010MR	<0.1
	TKFB	16L38005MR	<0.05
		16L38010MR	<0.1

Recommended Cutting Conditions ➡ **E51**

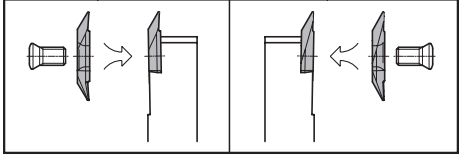
Applicable Inserts (Molded Chipbreaker, P: Polished edge, See Page B101)

Insert	Description		Corner-R(RE) (mm)
  ●Right-hand shown	TKFB	12R28005(P)-GQ	0.05
		12R28015(P)-GQ	0.15
	TKFB	16R38005(P)-GQ	0.05
		16R38015(P)-GQ	0.15

Recommended Cutting Conditions ➡ **E51**

Combination of Toolholders and Inserts

Toolholder	Right-hand	Toolholder	Left-hand
Insert	Right-hand	Insert	Left-hand

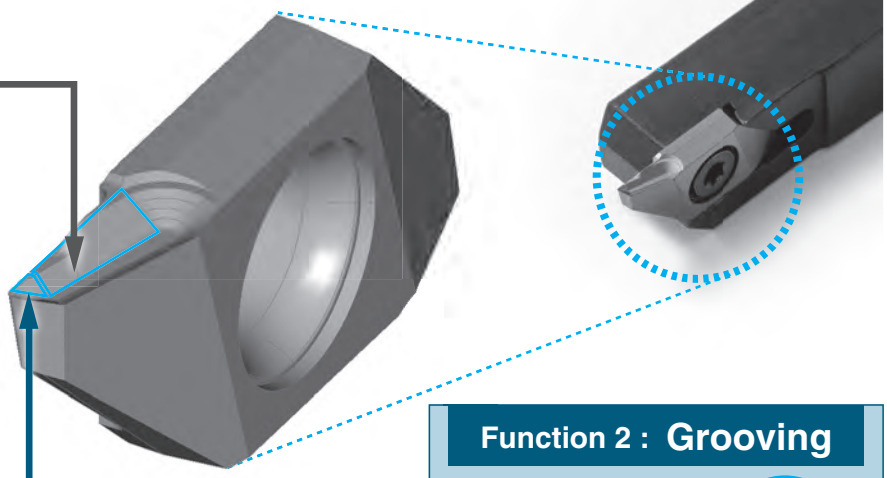


● : Std. Item

TKFB type GQ Chipbreaker for back Turning

Solution for problems in the conventional back-turning tools
Unique molded chipbreaker provides excellent surface finish with smooth chip control

Point 1 Unique double-function chipbreaker for improved chip control

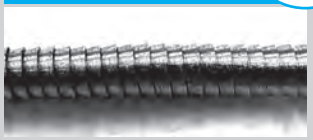


Function 1 : External

Preventing chip entanglement

Stable chip control

GQ Chipbreaker



Competitor A (Ground Chipbreaker)



Function 2 : Grooving

Preventing chip biting

Good surface roughness

GQ Chipbreaker



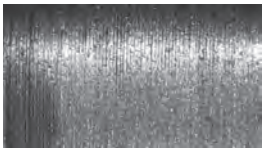
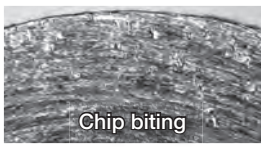
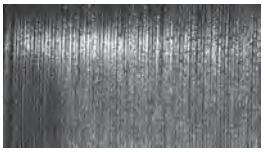
Competitor A (Ground Chipbreaker)



Point 2 Excellent surface finish by preventing chip biting and clogging

Surface finish comparison

Cutting Conditions : Vc=100m/min ap=3.0mm f=0.02mm/rev (Grooving) 0.05mm/rev (External)
Workpiece Material : S45C Wet

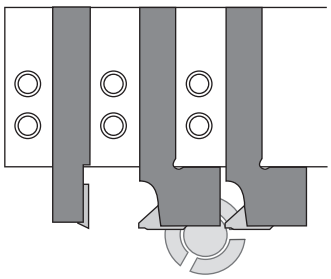
	TKFB GQ Chipbreaker		Competitor B (Ground Chipbreaker)	
	Facing	External	Facing	External
Workpiece surface	 Excellent surface		 Chip biting	
	2.9μmRz	3.8μmRz	31.2μmRz	7.6μmRz

GQ Chipbreaker realizes excellent surface finish with single pass. Suitable for cycle time reduction.

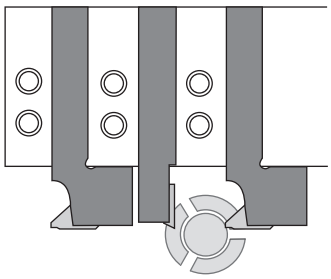
Precautions for using Y-axis toolholder

Do not use Y-axis toolholders side by side to prevent interference. (Only two Y-axis holder can be used at the same time)

With interference

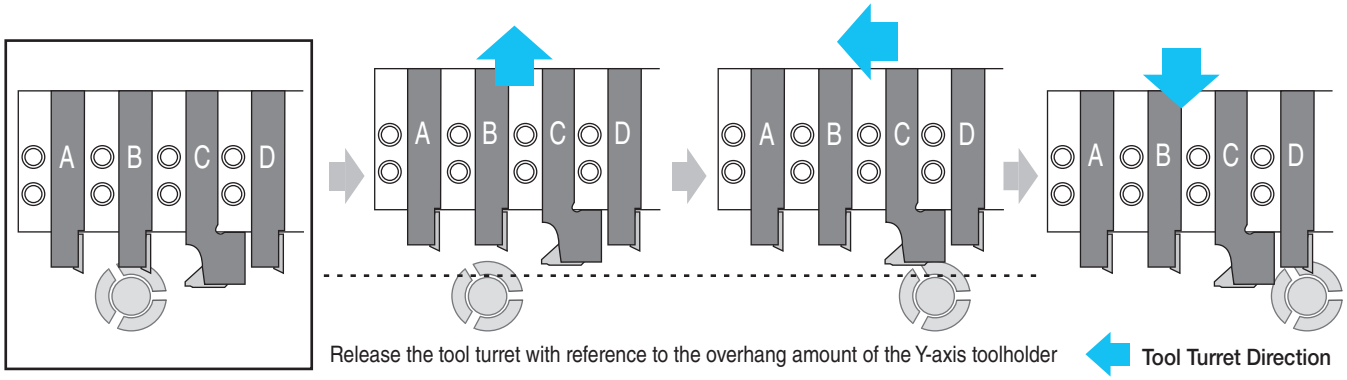


Without interference



Standard toolholders may be mounted between two Y-axis toolholders

When changing the tool, set the retracted position with reference to the cutting edge of the Y-axis holder. (When exchanging from tool B to D)

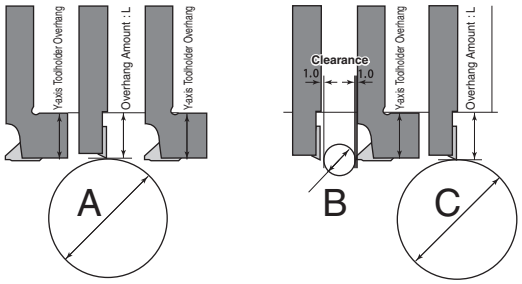
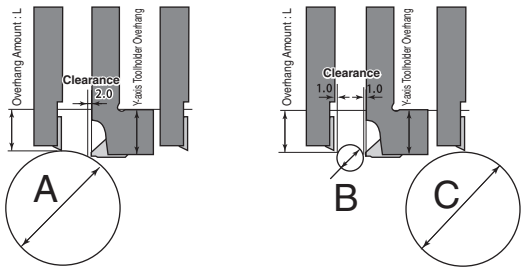


Release the tool turret with reference to the overhang amount of the Y-axis toolholder

Tool Turret Direction

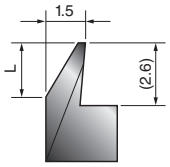
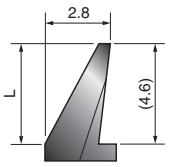
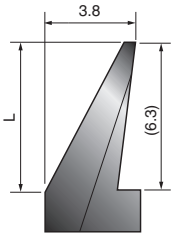
Note that using other toolholders together will result in dierent outside diameters

(Unit : mm)

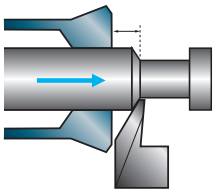
Y-axis Toolholder Overhang	Examples	Overhang Amount L / Available Outside Cutting Diameter (ø)	20	22	25
20		A	Without Restriction	Without Restriction	Without Restriction
		B	13.0	13.0	13.0
		C	Without Restriction	Without Restriction	Without Restriction
25		A	38.0	58.0	Without Restriction
		B	14.9	13.6	13.0
		C	45.0	60.0	Without Restriction

Details of cutting edge and how to select

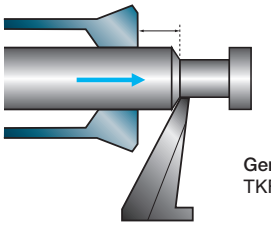
Details of cutting edge

Small machining		General purpose		Large machining	
					
Description	Cutting Edge Length L	Description	Cutting Edge Length L	Description	Cutting Edge Length L
TKFB12R15..	2.1	TKFB12R28..	4.2	TKFB16R38..	5.8
-	-	TKFB12L28..	4.4	TKFB16L38..	6.2
For small diameter and short length workpiece Stable machining with minimum overhang		For general purpose Good chip control		Large ap at one pass	

Selection



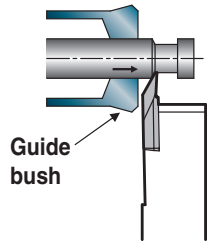
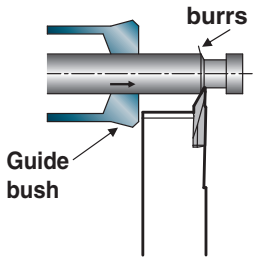
Small machining
TKFB12R15..



General purpose
TKFB12R28..

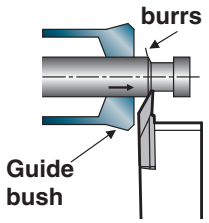
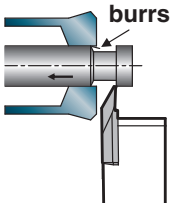
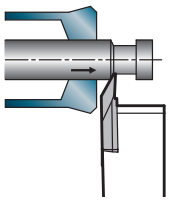
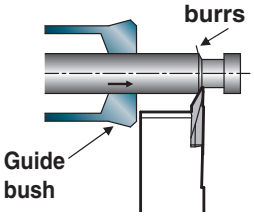
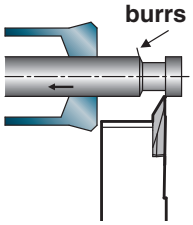
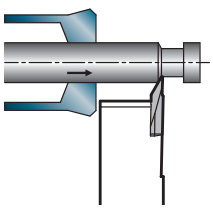
In case ap is same, if the insert with narrower edge width is used, overhang length from the guide bush is shorter, which enables better stability due to less workpiece deflection.
⇒ High precision machining

How to select back turning toolholder hand

Right-hand		Machining near the guide bush is possible Narrow cutting edge width of TKFB12R15005M (1.5mm) allows it. → Optimum for small parts and high precision machining
Left-hand	The workpiece burrs do not contact the guide bush. 	Machining with a distance from guide bush Good chip control due to large space between the guide bush and the tool → Excellent chip control in roughing and finishing (plural passes) Stable accuracy of external diameter dimension : When burrs occur, if a Left-hand toolholder is used, it is not necessary to return workpiece into guide bush in finishing. Also, Left-hand toolholders prevent guide bush wear caused by chip biting.

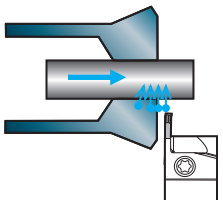
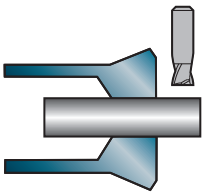
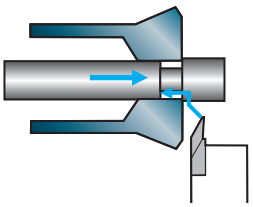
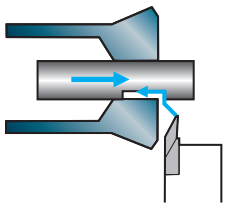
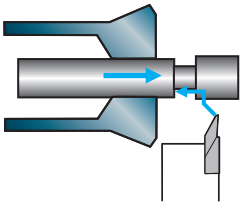
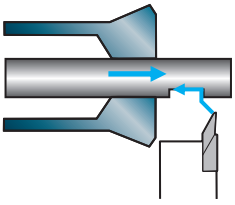
Workpiece movement and tool hand selection

In roughing and finishing

	Roughing	Workpiece position after roughing	Finishing
Right-hand			
Left-hand			

* Good dimension accuracy : If a Left-hand toolholder is used, burrs on workpiece generated in roughing do not damage the guide bush in finishing.

Chip control improvement in back turning

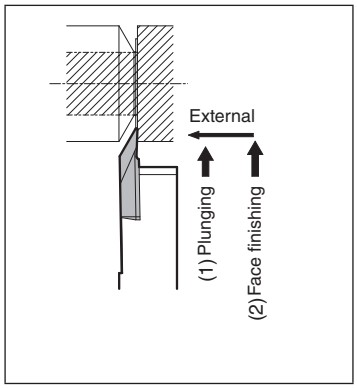
	Chip control improvement by tool pass changes I	Chip control improvement by tool pass changes II
Roughing	● Roughing with grooving tools (1) GMM2420-020MW (Grooving) 	● Pre-Stage machining is processed with solid end mill (1) 2FESW040-040-04 (Solid End Mill) 
Finishing (Countermeasures 1) Use Right-hand toolholder	(1) When using TKFB12R28010M (for back turning / right hand)  Advantages : Good surface roughness Disadvantages : If a machining pass is long, the guide bush cannot support the workpiece	(1) When using TKFB12R28010M (for back turning / right hand)  Advantages : 1. Minimal deflection in long machining passes 2. Chips are broken into small pieces, though the workpiece material is sticky Disadvantages : The pre-stage machining may cause fractures, because of interrupted machining
Finishing (Countermeasures 2) Use Left-hand toolholder	(2) When using TKFB12L28010M (for back turning / left hand)  Advantages : 1. Good surface roughness 2. High precision machining if the machined portion does not contact the guide bush Disadvantages : If a machining pass is long, the guide bush cannot support the workpiece	(2) When using TKFB12L28010M (for back turning / left hand)  Advantages : 1. Minimal deflection in long machining passes 2. Chips are broken into small pieces, though the workpiece material is sticky 3. High precision machining if the machined portion does not contact the guide bush Disadvantages : The pre-stage machining may cause fractures, because of interrupted machining

Countermeasure against peeled surface in face back turning

When peeled surface occurs on the workpiece face, please apply the countermeasures below.

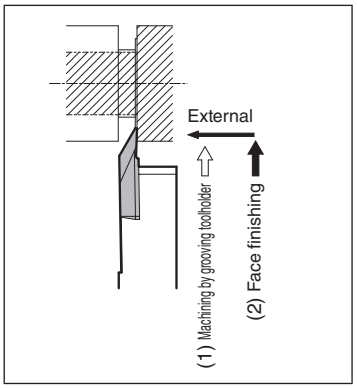
● Countermeasures 1

Face finishing



● Countermeasures 2

Face finishing after grooving

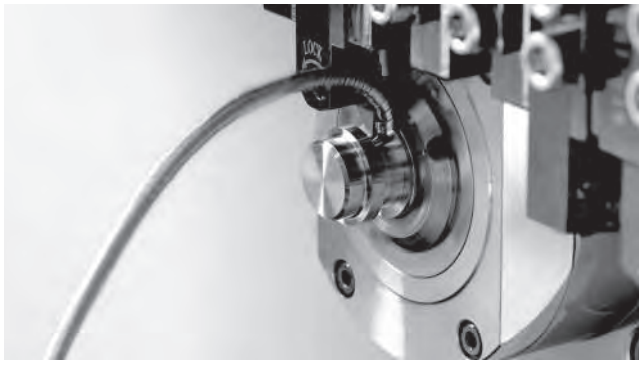


KTKF for Small Part Machining Applications

GTP Chipbreaker

Grooving and Turning Possible

Cutting Time Reduction



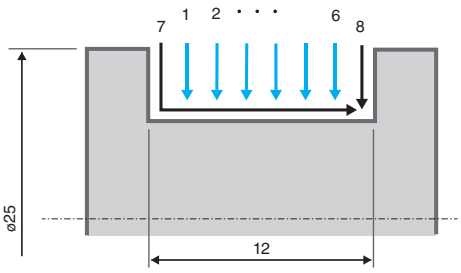
1 Grooving and Turning Available

Cutting Time Comparison (Internal evaluation)

Competitor A

Multiple Grooves and a Finishing Pass

Workpiece Material : S45C(ø25)



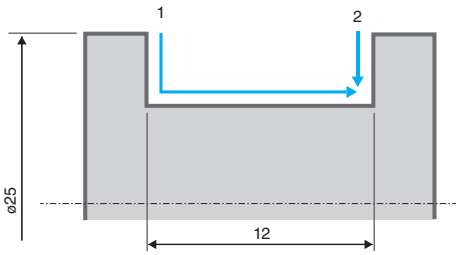
Cutting Conditions: Multiple Grooves
Vc=100m/min
ap=3.5mm, f=0.10mm/rev

Cutting Conditions: Finishing
Vc=100m/min
ap=0.5mm, f=0.05mm/rev

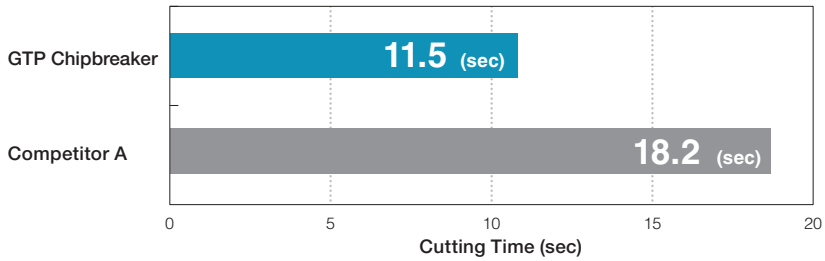
TKF12R200-GTP

Grooving and Turning

Workpiece Material : S45C(ø25)



Cutting Conditions: Grooving and Turning
Vc=100m/min
ap=4mm, f=0.05mm/rev



GTP chipbreaker required fewer machining paths than Competitor

40%

Cutting Time Reduction

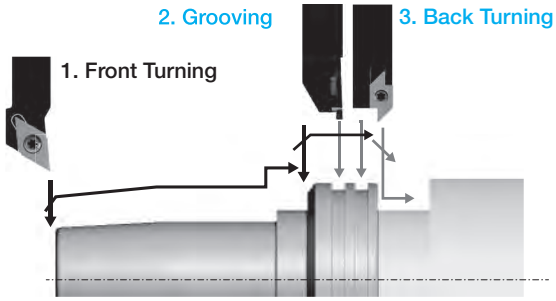
Solution Solution to Integrate Tools

A GTP Chipbreaker provides integration of front turning, grooving and back turning

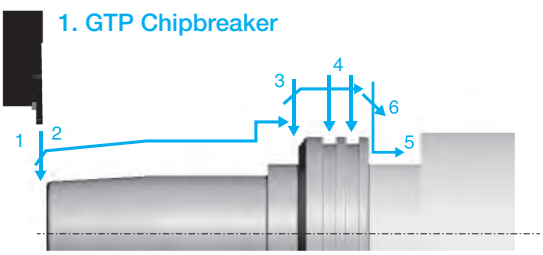


Workpiece example

Conventional Tools

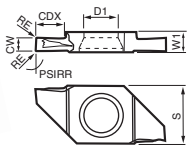


GTP Chipbreaker



*Maximum grooving width and cutting depth. (Max.grooving width/Max. D.O.C.) TKF12R200-GTP (2.0mm/4.0mm), TKF16R300-GTP (3.0mm/5.5mm)

Standard Stock Description

Insert		Description	Dimension (mm)						Angle	MEGACOAT NANO PLUS	MEGACOAT NANO	Applicable Toolholders
			CW	CDX	RE	W1	S	D1	PSIRR	PR1725	PR1535	
		TKF12R200-GTP	2.0	4.3	0.08	3.0	8.7	5.0	0°	●	●	KTKFR…12
		TKF16R300-GTP	3.0	5.8		4.0	9.5			●	●	KTKFR…16

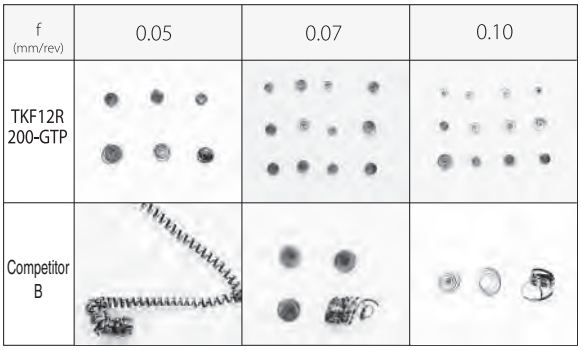
Recommended Cutting Conditions

★: 1st Recommendation ☆: 2nd Recommendation

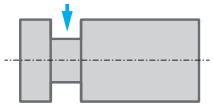
Workpiece Material		Recommended Insert Grade			
		MEGACOAT NANO PLUS		MEGACOAT NANO	
		PR1725		PR1535	
		Grooving	Turning	Grooving	Turning
Carbon Steel / Alloy Steel	Vc (m/min)	★ 60~200		☆ 60~150	
	f (mm/rev)	0.03~0.07	0.05~0.15	0.03~0.07	0.05~0.15
Stainless Steel	Vc (m/min)	☆ 60~150		★ 60~130	
	f (mm/rev)	0.02~0.05	0.03~0.10	0.02~0.05	0.03~0.10

Chip Control Comparison (Internal evaluation)

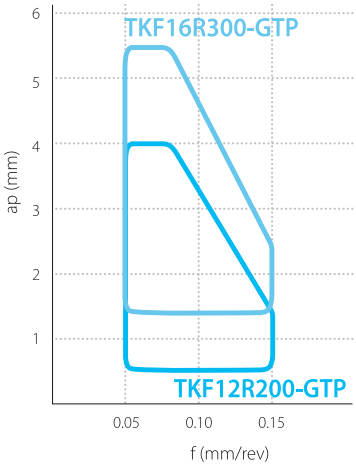
Grooving



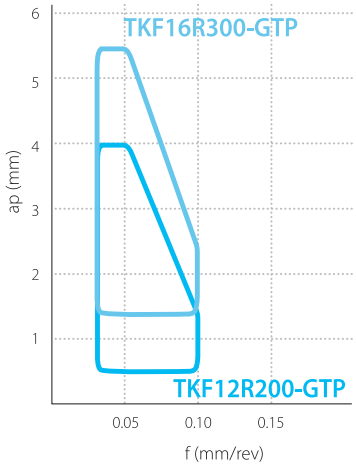
Cutting Conditions : Vc=100m/min, ap=4mm, Wet
Workpiece Material : S45C(ø25)



Recommended Chipbreaker Range (Steel)

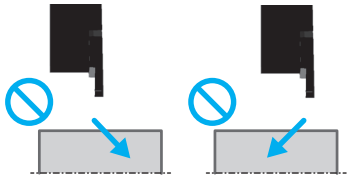


Recommended Chipbreaker Range (SUS)



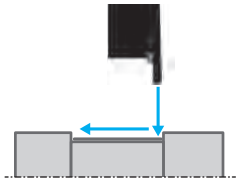
Caution for machining

Ramping



Ramping is not recommended if the workpiece is not pre-machined as shown in the right gures

Back Turning

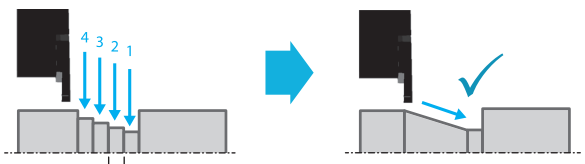


When back turning is used for nishing, make sure that the side cutting edge (back) of the tool is within 1mm

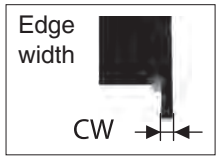


Tips for Ramping

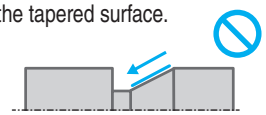
Step grooving is required before ramping. (Refer to the gure below)



*The width of the groove must be smaller than the edge width to overlap the previous groove



Back turning is not recommended on the tapered surface.

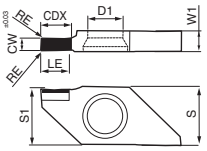
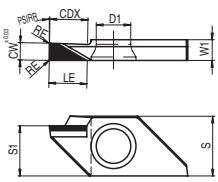
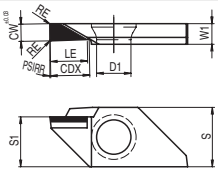
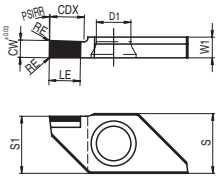


● : Std. Item

When using TKF-AGT / TKF-AS type Inserts

The KTKF toolholder can be used as a multi-functional tooling for non-ferrous metals and non-metals when combined with a TKF-AGT / TKF-AS insert. (Fig. 1)

Applicable Inserts (See Page C32·C33)

Insert (Photo shows Right-hand)		Description	
NEW 	 • Right-hand shown	TKF12R	200-AGT
			250-AGT
 Turning / Grooving	 • Right-hand shown	TKF12R/L	200-AS
		TKF12R	250-AS
		TKF16R/L	250-AS
	 • Insert hand: Left-hand / PCD edge hand: Right-hand shown	TKF16L	250-ASR
 Grooving (Turning is possible)	 • Right-hand shown	TKF12R/L	150-NB
			200-NB
			250-NB
			250-NB4.5

Applicable Toolholders ➔ E12
Recommended Cutting Conditions ➔ E51

Note 1) The cutting edge of the TKF-AS / -ASR will be 1 mm lower than the center line when attached to the KTKF toolholder (Ref. to Fig. 2). Adjust the height by making NC lathe parameter settings or inserting a plate.

2) If the 1 mm adjustment is not possible, use the TKF..-AGT/TKF..-NB. (Ref. to Fig. 3)

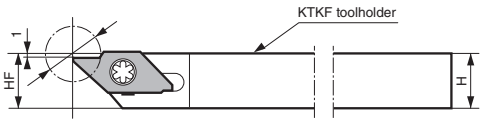


Fig. 2 When a TKF-AS / -ASR insert is attached (The cutting edge is 1mm lower than the center line)

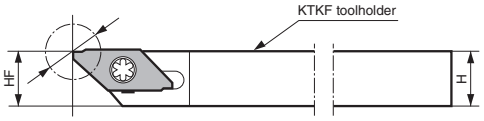


Fig. 3 When a TKF-NB insert is attached

Example of spool machining

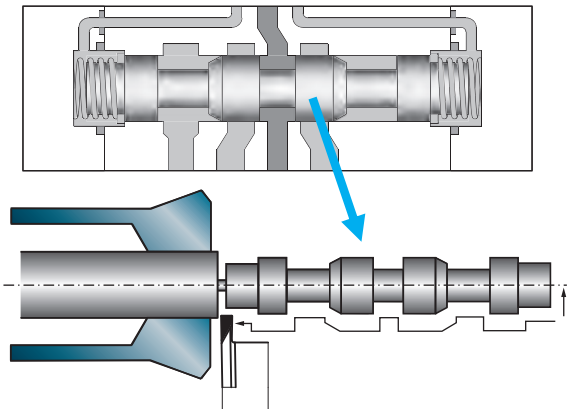
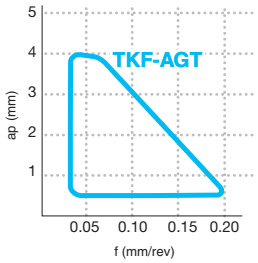


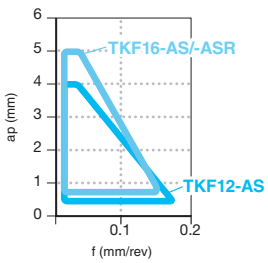
Fig. 1 Example of the pass of KTKF toolholder + TKF-AGT / TKF-AS insert

Applicable Range

TKF12R-AGT



TKF12-AS TKF16-AS/-ASR



* PCD Inserts for turning and grooving

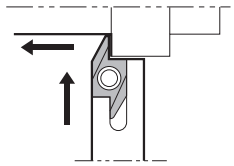
* Not recommended for cut-off

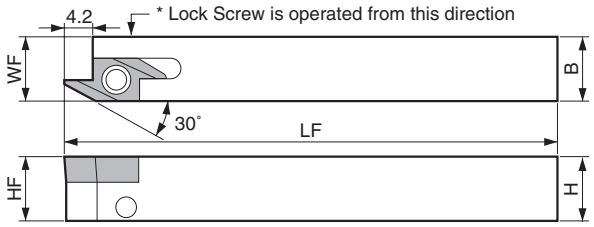
Inserts Identification System

TKF	12	R	200	-	AGT	
TKF	12	L	200	-	AS	R

- TKF / TKF: Insert Type
- 12 / 12: Insert Size
- R / L: Insert Hand (R : Right-hand, L : Left-hand)
- 200 / 200: Width (Edge Width)
- AGT / AS: Name of Chipbreaker (AGT : AGT Chipbreaker, AS : AS Chipbreaker, NB : Without Chipbreaker)
- R: PCD insert hand (Without Indication : The edge hand is same as the insert hand, R : Right-hand)

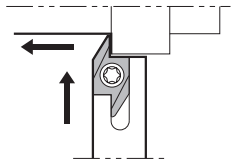
AABS-40F (Edge Width : 2.8mm, MAX. Depth : 4mm)

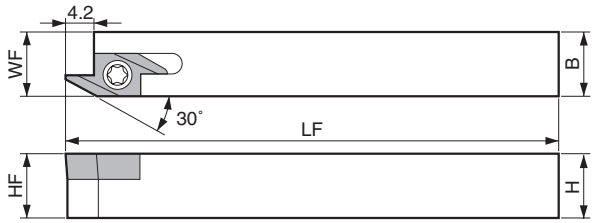




●Right-hand shown

SABS-40F (Edge Width : 2.8mm, MAX. Depth : 4mm)



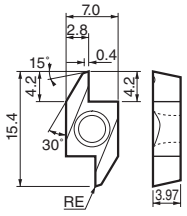


●Right-hand shown

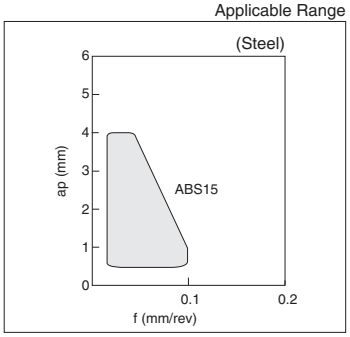
Toolholder Dimensions

Description		Stock	Dimension (mm)					Std. Corner-R (RE)	Spare Parts			
			H	HF	B	LF	WF		Anchor Pin	Lock Screw	Clamp Screw	Wrench
AABSR	1010JX-40F	●	10	10	10	120	10.2	0.15	LPA-11	HSB4X8R	-	FH-2
	1212JX-40F	●	12	12	12		12.2		LPA-13			
	1616JX-40F	●	16	16	16		16.2		LPA-17			
SABSR	1010JX-40F	●	10	10	10	120	10.2	0.15	-	-	SB-3080TR	FT-10
	1212JX-40F	●	12	12	12		12.2					
	1616JX-40F	●	16	16	16		16.2					
SABSR	1212F -40F	●	12	12	12	85	12.2	0.15	-	-	SB-3080TR	FT-10
	2020K -40F	●	20	20	20	125	20.2					

Applicable Inserts

Insert		Description	Corner-R (RE) (mm)	See Page
		**ABS15R4005**	0.05	**B102**
		15R4015	0.15	
		ABS15R4005M	<0.05	
		15R4015M	<0.15	

Applicable Range

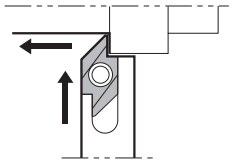


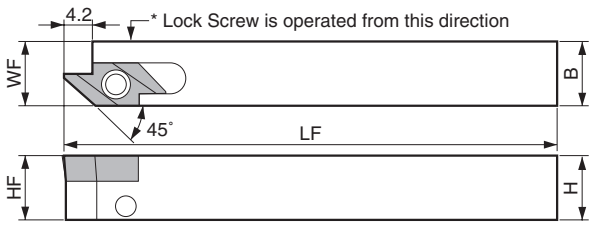
Recommended Cutting Conditions E51

● : Std. Item

Toolholders for Back Turning [ABW15 Insert]

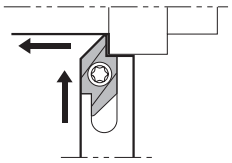
AABW-40F (Edge Width : 4.7mm, MAX. Depth : 4mm)

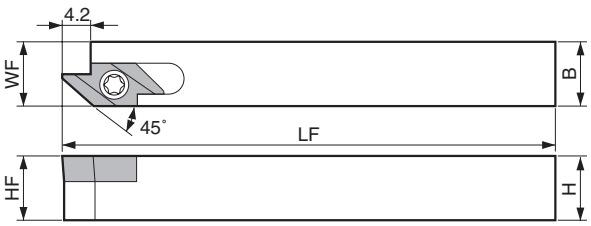




●Right-hand shown

SABW-40F (Edge Width : 4.7mm, MAX. Depth : 4mm)



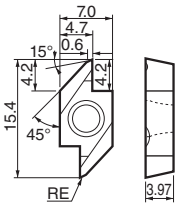


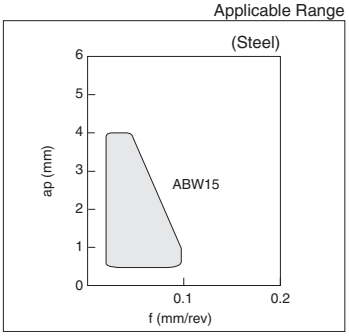
●Right-hand shown

● Toolholder Dimensions

Description		Stock	Dimension (mm)					Std. Corner-R (RE)	Spare Parts				
			H	HF	B	LF	WF		Anchor Pin	Lock Screw	Clamp Screw	Wrench	
AABWR	1010JX-40F	●	10	10	10	120	10.2	0.15	LPA-11	HSB4X8R	-	FH-2	
	1212JX-40F	●	12	12	12		12.2		LPA-13				
	1616JX-40F	●	16	16	16		16.2		LPA-17				
SABWR	1010JX-40F	●	10	10	10	120	10.2	0.15	-	-	SB-3080TR	FT-10	
	1212JX-40F	●	12	12	12		12.2						
	1616JX-40F	●	16	16	16		16.2						
SABWR	2020K -40F	●	20	20	20	125	20.2	0.15	-	-	SB-3080TR	FT-10	

● Applicable Inserts

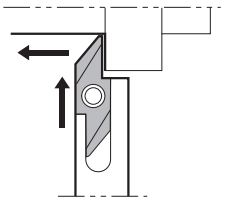
Insert		Description	Corner-R (RE) (mm)	See Page
		**ABW15R4005**	0.05	**B102**
		15R4015	0.15	
		ABW15R4005M	<0.05	
		15R4015M	<0.15	

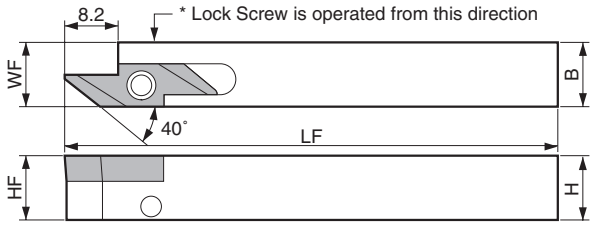


Recommended Cutting Conditions ➡ E51

● : Std. Item

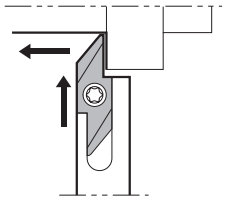
AABW-50F (Edge Width : 4.7mm, MAX. Depth : 5mm)

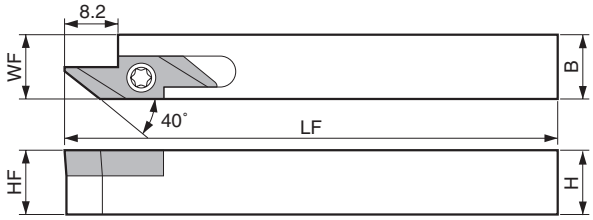




●Right-hand shown

SABW-50F (Edge Width : 4.7mm, MAX. Depth : 5mm)



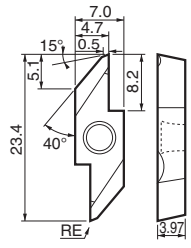


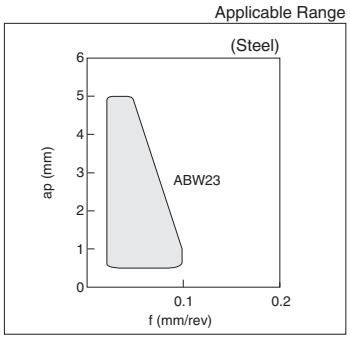
●Right-hand shown

Toolholder Dimensions

Description		Stock	Dimension (mm)					Std. Corner-R (RE)	Spare Parts				
			H	HF	B	LF	WF		Anchor Pin	Lock Screw	Clamp Screw	Wrench	
AABWR	**1010JX-50F**	●	10	10	10	120	10.2	0.15	LPA-11	HSB4X8R	-	FH-2	
	1212JX-50F	●	12	12	12		12.2		LPA-13				
	1616JX-50F	●	16	16	16		16.2		LPA-17				
SABWR	**1010JX-50F**	●	10	10	10	120	10.2	0.15	-	-	SB-3080TR	FT-10	
	1212JX-50F	●	12	12	12		12.2						
	1616JX-50F	●	16	16	16		16.2						
SABWR	**2020K -50F**	●	20	20	20	125	20.2	0.15	-	-	SB-3080TR	FT-10	

Applicable Inserts

Insert		Description	Corner-R (RE) (mm)	See Page
		**ABW23R5005**	0.05	**B102**
		23R5015	0.15	
		ABW23R5005M	<0.05	
		23R5015M	<0.15	

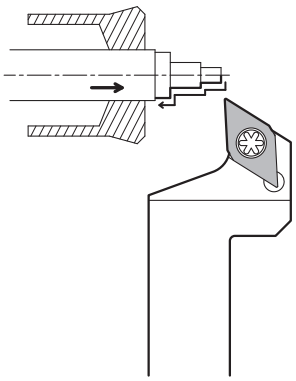


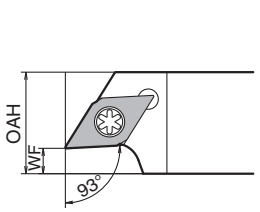
Recommended Cutting Conditions E51

● : Std. Item

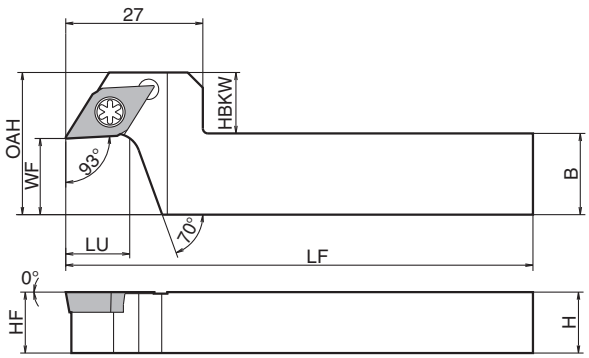
Goose-neck Holder [DC □□ Insert]

SDJC (External / Copying)





SDJCR1620JX-11-F05
shows above figure



●Right-hand shown

Toolholder Dimensions

Description		Stock	Dimension (mm) H	HF	B	LF	LU	OAH	HBKW	WF	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDJCR	1216JX-11-F05	●	12	12	16	120	12.6	18	2	5	0.2	SB-4085TR	FT-15
	1216JX-11-F15	●						28	12	15			
	1620JX-11-F05	●	16	16	20			20	-	5			
	1620JX-11-F15	●						28	8	15			

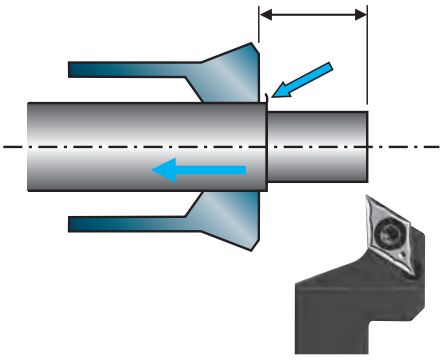
Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	* Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing	Finishing / Precision
See Page	B62	B62	B62	B62	B63	B63	B64	B63	B67	B66
Insert / Toolholder Description	CF	GF	SKS	SK	WP (Wiper)	PP	GK	GQ	R-F	R-FSF
SDJCR..-11-F..	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..
Applications	Low Feed	Low Feed / Precision	Low Feed	Low Feed / Precision	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals
See Page	B68,B69	B68	B70,B71	B70	B65	B65	B65	B71	B71	B71
Insert / Toolholder Description	(E/F)R-U	FR-USF	(E/F)R-J	FR-JSF	XP	XQ	MQ	Without Chipbreaker	AH	R-A3
SDJCR..-11-F..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..
Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials							
See Page	C25	C25	C15							
Insert / Toolholder Description	PCD	APD	CBN							
SDJCR..-11-F..	DCMT11T3..	DCMT11T3..	DCMW11T3..							

* For WP chipbreaker, cutting edge offsets or program corrections are required. R37

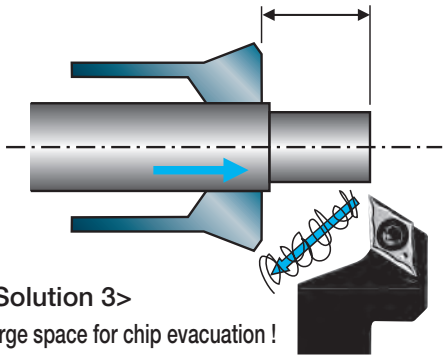
Recommended Cutting Conditions E50

Goose-neck holder is available for multiple passes at roughing and finishing !



<Solution 1>
The workpiece burr does not contact the guide bush and no breakage will be caused !

<Solution 2>
Longitudinal dimension will be stable. External diameter will be stable owing to multiple pass machining (roughing and finishing).

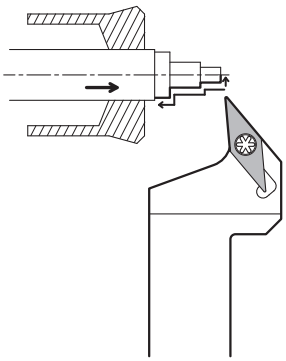


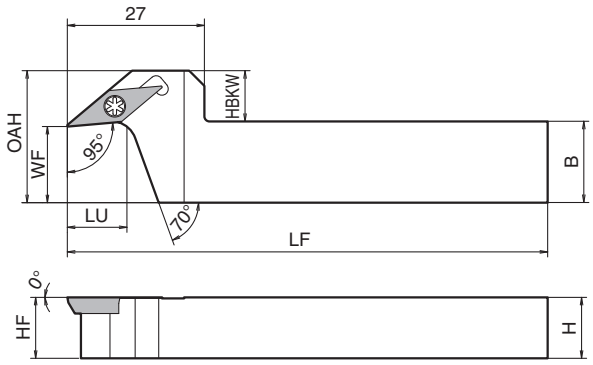
<Solution 3>
Large space for chip evacuation !
Better and smooth chip control.

● : Std. Item

Goose-neck Holder [VP □□ Insert]

SVLP (External / Copying)





•Right-hand shown

Toolholder Dimensions

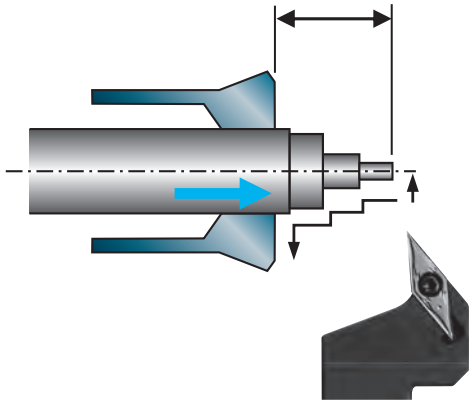
Description		Stock	Dimension (mm)								Std. Corner-R (RE)	Spare Parts	
			H	HF	B	LF	LU	OAH	HBKW	WF		Clamp Screw	Wrench
SVLPR	1216JX-11-F15	●	12	12	16	120	12	26	10	15	0.2	SB-2570TR	FT-8
	1620JX-11-F15	●	16	16	20				6				

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision				
See Page	B94	B94	B94	B95	B96	B96				
Insert / Toolholder Description	CF	CK	GF	R-FSF	FR-U	FR-USF				
SVLPR...-11-F..	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPET1103..	VPET1103..				

Recommended Cutting Conditions E50

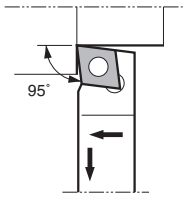
One toolholder for complex shape workpiece

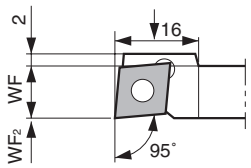


Toolholder for VP type insert is available !
Complex shape workpiece can be processed with one toolholder.
It can be used for undercutting and external / face finishing.

● : Std. Item

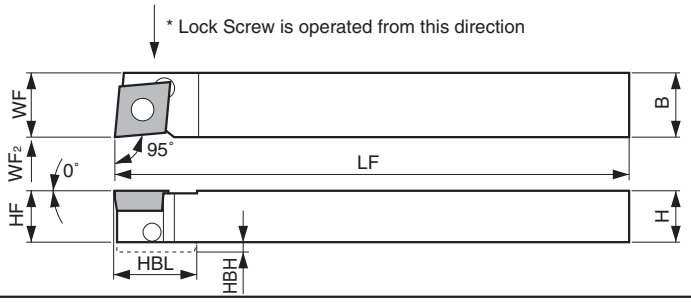
ACLC-FF (Without Offset) (External / Facing)





ACLC$^{R}_{L}$1010JX-09FF
shows above figure

●Right-hand shown



Toolholder Dimensions

Description		Stock R	Stock L	H	HF	HBH	B	LF	HBL	WF	WF_2	Std. Corner-R (RE)	Spare Parts: Anchor Pin	Spare Parts: Lock Screw	Spare Parts: Wrench
ACLC$^{R}_{L}$	1010JX-06FF	●	●	10	10	-	10	120	-	10	0	0.2	LPF-11	HSB4X8$^{R}_{L}$	FH-2
	1010JX-09FF	●	●	10	10	2	10		16	10			LPF-13		
	1212JX-09FF	●	●	12	12	-	12		-	12					
	1616JX-09FF	●	●	16	16		16			16			LPF-17		

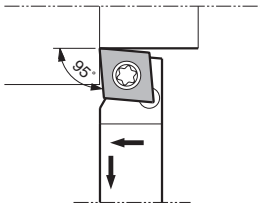
· Lock Screw : HSB4X8R for Right-hand Toolholder, HSB4X8L for Left-hand Toolholder.

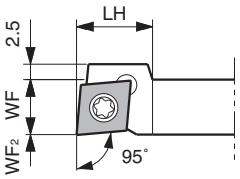
Applicable Inserts

Applications	Finishing	Finishing	Finishing - Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B53	B53	B54	B58,B59	B55	B60	B60	B60	C24	C14
Insert / Toolholder Description	SKS	SK	GK	(E/F)$^{R}_{L}$-U	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
ACLC$^{R}_{L}$...-06FF	CCGT0602..	CCGT0602..	CCMT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
ACLC$^{R}_{L}$...-09FF	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

Recommended Cutting Conditions ➔ E50

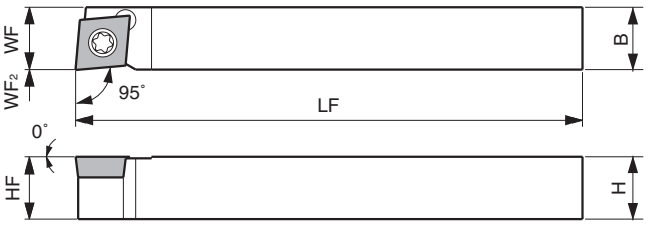
SCLC-FF (Without Offset) (External / Facing)





SCLC$^{R}_{L}$1010JX-09FF
shows above figure

●Right-hand shown

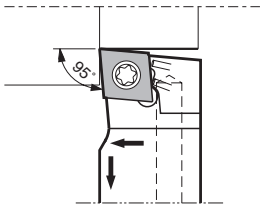


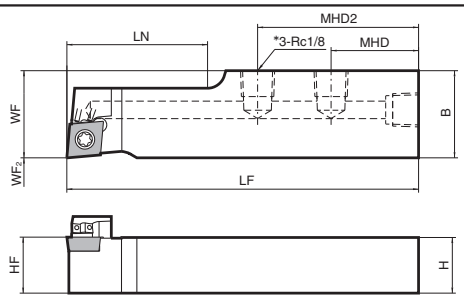
Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LH	WF	WF_2	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SCLC$^{R}_{L}$	0808F-06FF	●	●	8	8	8	85	-	8	0	0.2	SB-2570TR	FT-8
	1212F-09FF	●	●	12	12	12			12			SB-4085TR	FT-15
SCLC$^{R}_{L}$	1010JX-06FF	●	●	10	10	10	120	-	10	0	0.2	SB-2570TR	FT-8
	1010JX-09FF	●	●	10	10	10		15	10		0.2	SB-4085TR	FT-15
	1212JX-09FF	●	●	12	12	12		-	12				
	1616JX-09FF	●	●	16	16	16			16				
	2020JX-09FF	●	●	20	20	20			20				

● : Std. Item

SCLC-FFJCT (Without Offset) (External / Facing / Coolant-through holders)





*SCLCR1220…: 2-Rc1/8

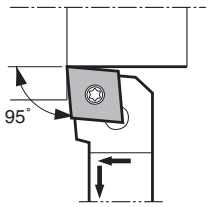
●Right-hand shown

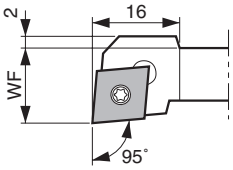
Toolholder Dimensions

Description	Stock		Dimension (mm)									Std. Corner-R (RE)	Spare Parts		
													Clamp Screw	Wrench	Plug
	R	L	H	HF	B	LF	LN	WF	WF_2	MHD	MHD2				
SCLCR 1220H-09FFJCT	●		12	12	20	100	28	20	0	35	-	0.2	SB-4085TR	FT-15	GP-1
1625H-09FFJCT	●		16	16	25	100	40	25		25	46				
2025H-09FFJCT	●		20	20	25	100	40	25		25	46				

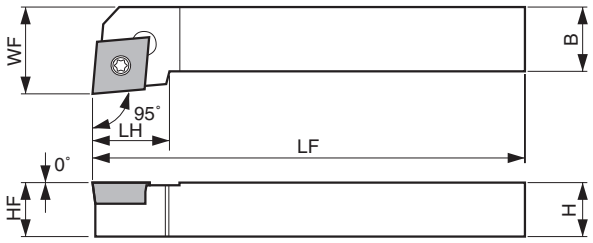
Please see page **H14** and **H15** for piping parts of coolant-through holders.

SCLC (External / Facing)



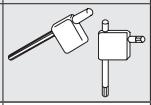
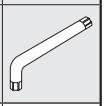


SCLC$^{R}_{L}$1010F-09
shows above figure



●Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)						Std. Corner-R (RE)	Spare Parts		
											Clamp Screw	Wrench	Wrench
		R	L	H	HF	B	LF	LH	WF				
SCLC$^{R}_{L}$	1010F -06	●	●	10	10	10	80	9	12	0.2	SB-2570TR	FT-8	-
	1010F -09	●	●	10	10	10	80	14	14	0.2	SB-4085TR	FT-15	-
	1212H -09	●	●	12	12	12	100		16				
	1616H -09	●	●	16	16	16		15	20				
	2020K -09	●	●	20	20	20	125	20	25				
	2525M -09	●	●	25	25	25	150	22	32				
	1616H -12	●	●	16	16	16	100	20	20	0.4	SB-5090TR	-	LTW-20
	2020K -12	●	●	20	20	20	125	22	25				
	2525M -12	●	●	25	25	25	150		32				

Applicable Inserts (SCLC-FF / SCLC-FFJCT /SCLC)

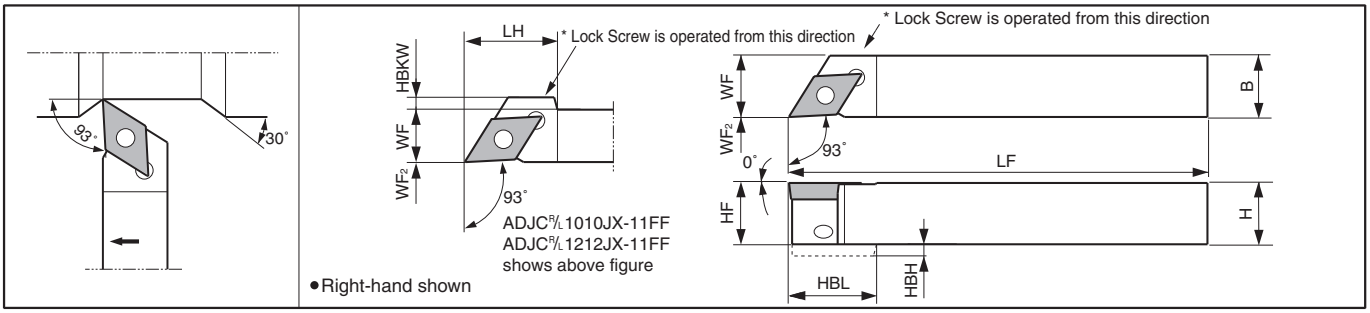
Applications	Finishing	Finishing	Finishing - Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B53	B53	B54	B58,B59	B55	B60	B60	B60	C24	C14
Insert / Toolholder Description	SKS	SK	GK	(E/F)$^{R}_{L}$-U	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
										
SCLC$^{R}_{L}$...-06FF/-06	CCGT0602..	CCGT0602..	CCMT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
SCLC$^{R}_{L}$...-09FF(JCT)/-09	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..
SCLC$^{R}_{L}$...-12	-	-	CCMT1204..	-	-	-	-	CCGT1204..	-	-

Recommended Cutting Conditions ➡ E50

● : Std. Item

External Toolholders [DC □□ Insert]

ADJC-FF (Without Offset) (External / Copying)



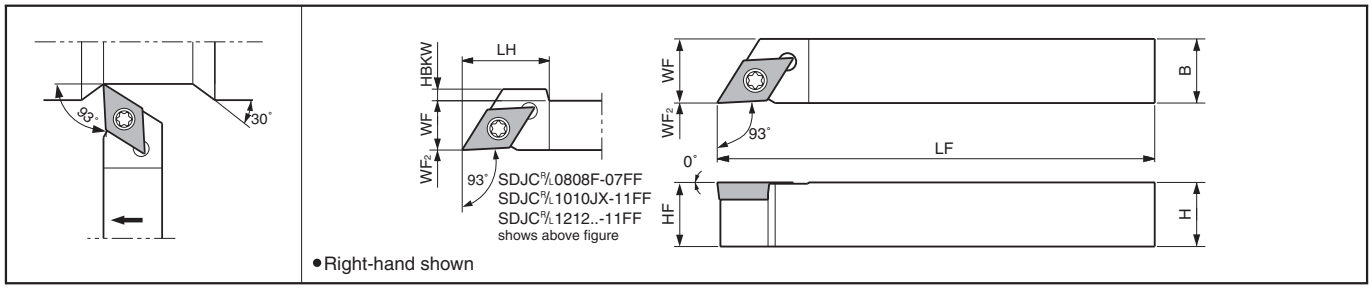
●Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)									Std. Corner-R (RE)	Spare Parts		
														Anchor Pin	Lock Screw	Wrench
		R	L	H	HF	HBH	B	LF	LH HBL	WF	HBKW	WF_2				
ADJCR/L	1010JX-07FF	●	●	10	10	-	10	120	-	10	-	0	0.2	LPF-11	HSB4X8R/L	FH-2
	1010JX-11FF	●	●	10	10	2	10		20	10	3			LPF-13		
	1212JX-11FF	●	●	12	12	-	12			12	1		0.2			
	1616JX-11FF	●	●	16	16		16		-	16	-			LPF-17		

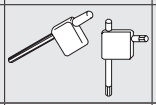
· Lock Screw : HSB4X8R for Right-hand Toolholder, HSB4X8L for Left-hand Toolholder.

SDJC-FF (Without Offset) (External / Copying)



●Right-hand shown

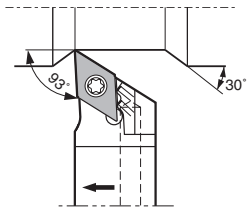
Toolholder Dimensions

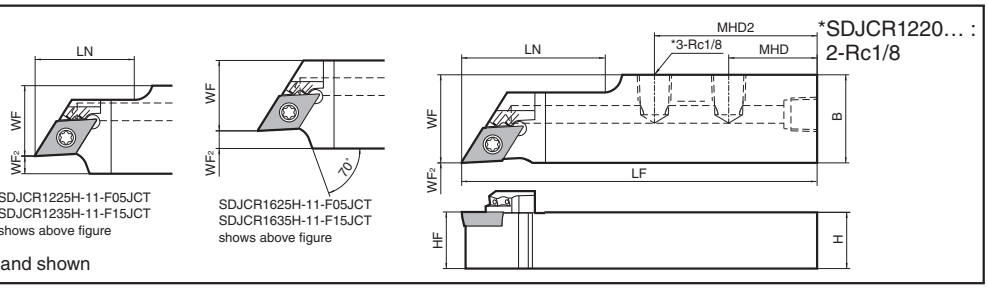
Description		Stock		Dimension (mm)								Std. Corner-R (RE)	Spare Parts			
													Clamp Screw	Wrench		
		R	L	H	HF	B	LF	LH	WF	HBKW	WF_2					
SDJCR/L	0808F -07FF	●	●	8	8	8	85	14	8	0.5	0	0.2	SB-2570TR	FT-8		
	1212F -11FF	●	●	12	12	12		20	12	1			SB-4085TR	FT-15		
SDJCR/L	1010JX-07FF	●	●	10	10	10	120	-	10	-	0	0.2	SB-2570TR	FT-8		
	1010JX-11FF	●	●	10	10	10		20	10	3		0.2	SB-4085TR	FT-15		
	1212JX-11FF	●	●	12	12	12			12	1						
	1616JX-11FF	●	●	16	16	16		-	16	-						
	2020JX-11FF	●	●	20	20	20			20							

● : Std. Item

External Toolholders [DC□□ Insert]

SDJC-JCT (External / Copying , Coolant-through Holders)





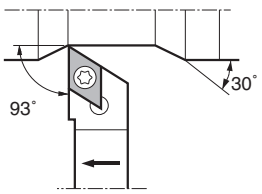
●Right-hand shown

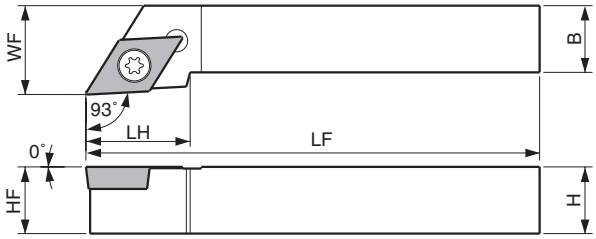
Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LN	WF	WF_2	MHD	MHD2	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Wrench	Plug
SDJCR	1220H-11FFJCT	●		12	12	20	100	28	20	0	35	-	0.2	SB-4085TR	FT-15	GP-1
	1625H-11FFJCT	●		16	16	25		40	25		25	46				
	2025H-11FFJCT	●		20	20	25		40	25		25	46				
SDJCR	1225H-11-F05JCT	●		12	12	25	100	28	20	5	35	-	0.2			
	1235H-11-F15JCT	●		12	12	35		28	20	15	35	-				
SDJCR	1625H-11-F05JCT	●		16	16	25	100	-	20	5	25	46	0.2			
	1635H-11-F15JCT	●		16	16	35		-	20	15	25	46				

Please see page **H14** and **H15** for piping parts of coolant-through holders.

SDJC (External / Copying)





●Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Wrench
SDJC$^{R/L}$	1010F -07	●	●	10	10	10	80	12	12	0.2	SB-2570TR	FT-8
SDJC$^{R/L}$	1010F -11	●	●	10	10	10	80	18	12	0.2	SB-4085TR	FT-15
	1212H -11	●	●	12	12	12	100		16			
	1616H -11	●	●	16	16	16			20			
	2020K -11	●	●	20	20	20	125		25			
	2525M -11	●	●	25	25	25	150	23	32			

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	* Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing	Finishing / Precision	Low Feed
See Page	B62	B62	B62	B63	B63	B64	B63	B67	B66	B68,B69
Insert / Toolholder Description	CF	SKS	SK	WP (Wiper)	PP	GK	GQ	$^{R/L}$-F	$^{R/L}$-FSF	(E/F)$^{R/L}$-U
DJC$^{R/L}$...-07FF/-07	DCGT0702..	DCGT0702..	DCGT0702..	DCMX0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
DJC$^{R/L}$...-11FF/-11...JCT/-11	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..

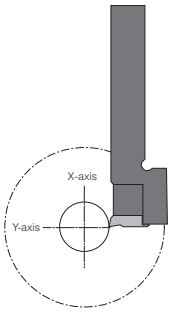
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B68	B70,B71	B65	B65	B65	B71	B71	B71	C25	C15
Insert / Toolholder Description	F$^{R/L}$-USF	(E/F)$^{R/L}$-J	XP	XQ	MQ	Without Chipbreaker	AH	$^{R/L}$-A3	PCD	CBN
DJC$^{R/L}$...-07FF/-07	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
DJC$^{R/L}$...-11FF/-11...JCT/-11	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

* For WP chipbreaker, cutting edge offsets or program corrections are required. R37

Recommended Cutting Conditions E50

● : Std. Item

SDJC-FF-Y (Y-axis Toolholder) NEW



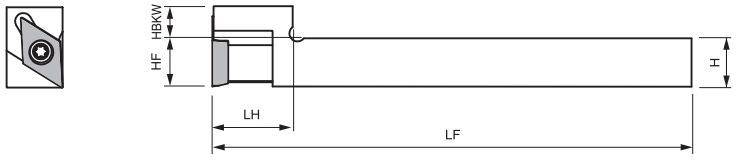


Fig. 1

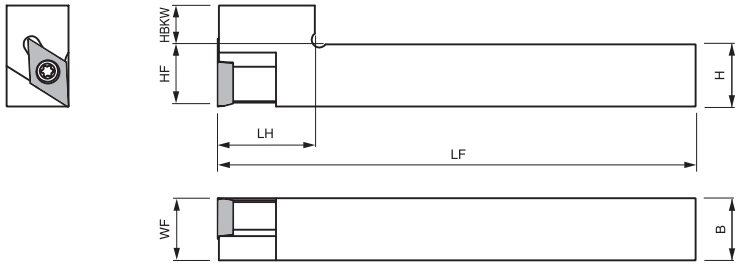


Fig. 2

Right-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Stock		Dimension (mm)									Drawing	Spare Parts		Applicable Inserts
	R	L	H	HF	B	LF	LH	WF	HBKW	HBL	HBH		Clamp Screw	Wrench	
SDJCR 1212JX-11FF-Y	●		12	12	12	120	20	14	8	22	2	Fig.1	SB-4085TR	FT-15	DC □□ 11T3...
1616JX-11FF-Y	●		16	16	16		25	16	10	-	-	Fig.2			

Please see the precautions in **E31** when using Y-axis toolholder.

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	* Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing
See Page	**B62**	**B62**	**B62**	**B62**	**B62**	**B63**	**B63**	**B64**	**B63**	**B67**
Insert / Toolholder Description	**CF**	**GF**	**SKS**	**SK**	**CK**	**WP (Wiper)**	**PP**	**GK**	**GQ**	**R/L-F**
SDJCR...-11FF-Y	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..
Applications	Finishing / Precision	Low Feed	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals
See Page	**B66**	**B68,B69**	**B68**	**B70,B71**	**B65**	**B65**	**B65**	**B71**	**B71**	**B71**
Insert / Toolholder Description	**R/L-FSF**	**(E/F)R/L-U**	**FR/L-USF**	**(E/F)R/L-J**	**XP**	**XQ**	**MQ**	**Without Chipbreaker**	**AH**	**R/L-A3**
SDJCR...-11FF-Y	DCET11T3..	DCGT11T3..	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..
Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials							
See Page	**C25**	**C25**	**C15**							
Insert / Toolholder Description	**PCD**	**APD**	**CBN**							
SDJCR...-11FF-Y	DCMT11T3..	DCMT11T3..	DCMW11T3..							

* For WP chipbreaker, cutting edge offsets or program corrections are required. R37

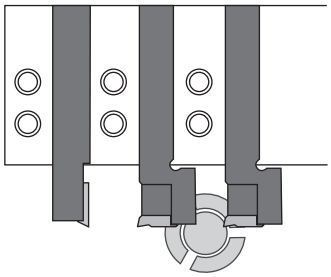
Recommended Cutting Conditions E50

● : Std. Item

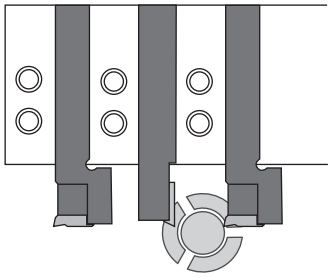
Precautions for using Y-axis toolholder

Do not use Y-axis toolholders side by side to prevent interference. (Only two Y-axis holder can be used at the same time)

With interference

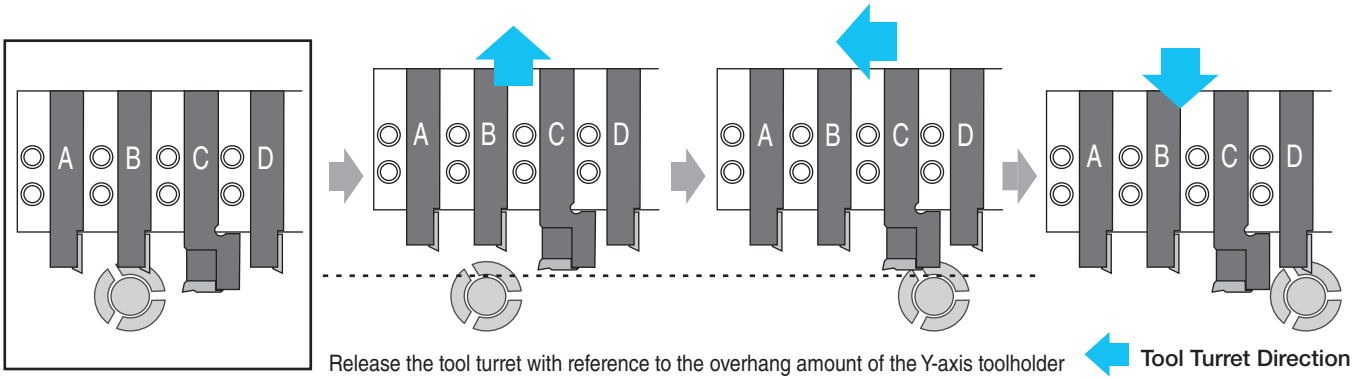


Without interference



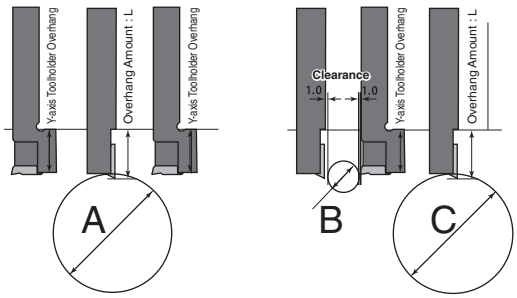
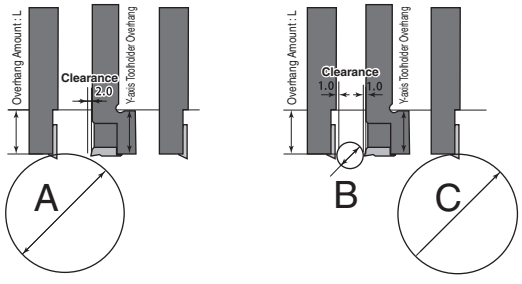
Standard toolholders may be mounted between two Y-axis toolholders

When changing the tool, set the retracted position with reference to the cutting edge of the Y-axis holder. (When exchanging from tool B to D)



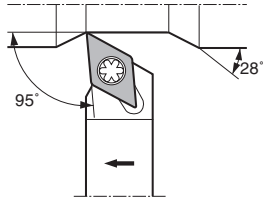
Note that using other toolholders together will result in dierent outside diameters

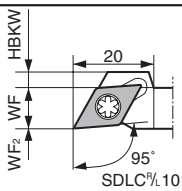
(Unit : mm)

Y-axis Toolholder Overhang	Examples	Available Outside Cutting Diameter (ϕ) \ Overhang Amount L	20	22	25
20		A	Without Restriction	Without Restriction	Without Restriction
		B	13.0	13.0	13.0
		C	Without Restriction	Without Restriction	Without Restriction
25		A	38.0	58.0	Without Restriction
		B	14.9	13.6	13.0
		C	45.0	60.0	Without Restriction

External Toolholders [DC □□ Insert]

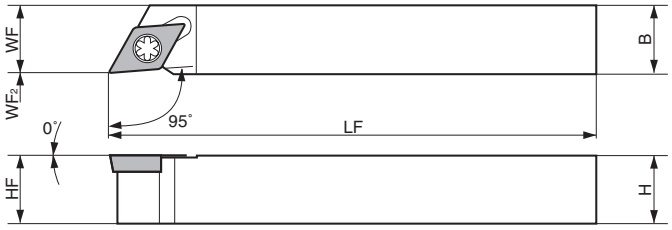
SDLC-FF (Without Offset) (External / Copying)





SDLC$^{R/L}$1010..-11FF
SDLC$^{R/L}$1212..-11FF
shows above figure

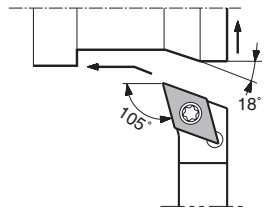
●Right-hand shown

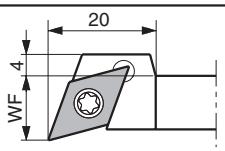


Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	WF	HBKW	WF_2	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDLC$^{R/L}$	1010JX-07FF	●	●	10	10	10	120	10	-	0	0.2	SB-2570TR	FT-8
	1212JX-07FF	●	●	12	12	12		12					
	1616JX-07FF	●	●	16	16	16		16					
SDLC$^{R/L}$	1010JX-11FF	●	●	10	10	10	120	10	4	0	0.2	SB-4085TR	FT-15
	1212JX-11FF	●	●	12	12	12		12	2				
	1616JX-11FF	●	●	16	16	16		16	-				
SDLC$^{R/L}$	1212F -07FF	●	●	12	12	12	85	12	-	0	0.2	SB-2570TR	FT-8
SDLC$^{R/L}$	1010F -11FF	●		10	10	10	80	10	4	0	0.2	SB-4085TR	FT-15
	1212F -11FF	●		12	12	12	85	12	2				
	1616H -11FF	●		16	16	16	100	16	-				

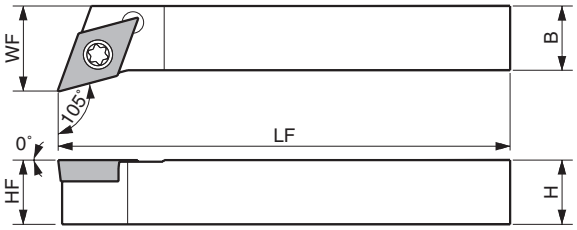
SDXC (External / Facing / Copying)





SDXC$^{R/L}$1010JX-11
shows above figure

●Right-hand shown



Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	WF	Std. Corner-R(RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDXC$^{R/L}$	1010JX-07	●	●	10	10	10	120	12	0.2	SB-2570TR	FT-8
	1010JX-11	●	●	10	10	10		12	0.2	SB-4085TR	FT-15
	1212JX-11	●	●	12	12	12		16			
	1616JX-11	●	●	16	16	16		20			

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing	Finishing / Precision	Low Feed
See Page	B62	B62	B62	-	B63	B64	B63	B67	B66	B68,B69
Insert / Toolholder Description	CF	SKS	SK	WP (Wiper)	PP	GK	GQ	$^{R/L}$-F	$^{R/L}$-FSF	(E/F)$^{R/L}$-U
SDLC$^{R/L}$...-07FF	DCGT0702..	DCGT0702..	DCGT0702..	-	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
SDXC$^{R/L}$...-07										
SDLC$^{R/L}$...-11FF	DCGT11T3..	DCGT11T3..	DCGT11T3..	-	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..
SDXC$^{R/L}$...-11										

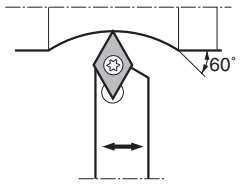
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B68	B70,B71	B65	B65	B65	B71	B71	B71	C25	C15
Insert / Toolholder Description	F$^{R/L}$-USF	(E/F)$^{R/L}$-J	XP	XQ	MQ	Without Chipbreaker	AH	$^{R/L}$-A3	PCD	CBN
SDLC$^{R/L}$...-07FF	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDXC$^{R/L}$...-07										
SDLC$^{R/L}$...-11FF	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
SDXC$^{R/L}$...-11										

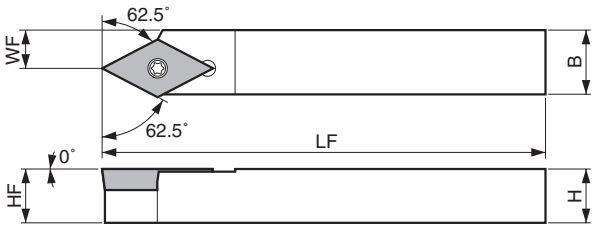
Recommended Cutting Conditions ➔ E50

● : Std. Item

External Toolholders [DC□□ Insert]

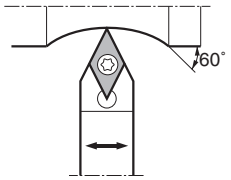
SDNC-F (External / Copying)

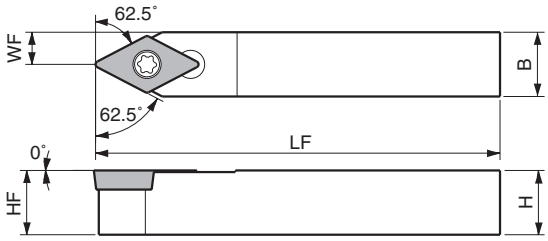




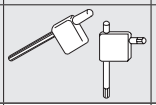
●Right-hand shown

SDNC (External / Copying)





Toolholder Dimensions

Description		Stock R	Stock N	Stock L	Dimension (mm) H	HF	B	LF	WF	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench		
														
SDNC$^{R}_{L}$	1010JX-07F	●		●	10	10	10	120	7	0.2	SB-2570TR	FT-8		
SDNCN	1010JX-07		●		10	10	10		5	0.2	SB-2570TR	FT-8		
	1212JX-07		●		12	12	12		6					
	1010JX-11		●		10	10	10	120	5	0.2	SB-4085TR	FT-15		
	1212JX-11		●		12	12	12		6					
	1616JX-11		●		16	16	16		8					
SDNCN	0808F -07		●		8	8	8	85	4	0.2	SB-2570TR	FT-8		
SDNCN	1010F -11		●		10	10	10	80	5	0.2	SB-4085TR	FT-15		
	1212F -11		●		12	12	12	85	6					
	1616H -11		●		16	16	16	100	8					

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing	Finishing / Precision	Low Feed
See Page	B62	B62	B62	-	B63	B64	B63	B67	B66	B68,B69
Insert / Toolholder Description	CF	SKS	SK	WP (Wiper)	PP	GK	GQ	$^{R}_{L}$-F	$^{R}_{L}$-FSF	(E/F)$^{R}_{L}$-U
SDNC$^{R}_{L}$...-07F	DCGT0702..	DCGT0702..	DCGT0702..	-	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
SDNCN...-07										
SDNCN...-11	DCGT11T3..	DCGT11T3..	DCGT11T3..	-	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..

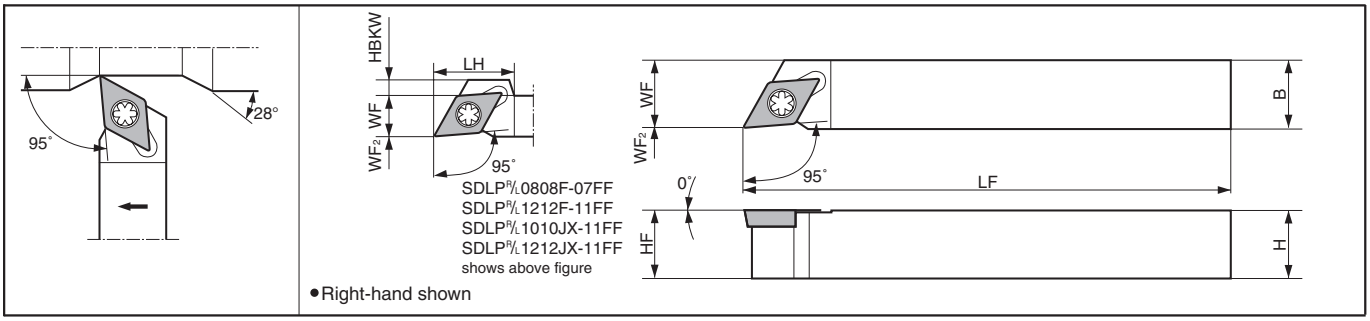
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B68	B70,B71	B65	B65	B65	B71	B71	B71	C25	C15
Insert / Toolholder Description	F$^{R}_{L}$-USF	(E/F)$^{R}_{L}$-J	XP	XQ	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
SDNC$^{R}_{L}$...-07F	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDNCN...-07										
SDNCN...-11	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

Recommended Cutting Conditions ➡ E50

● : Std. Item

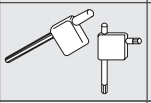
External Toolholders [DP □□ Insert]

SDLP-FF (Without Offset) (External / Copying)



●Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)								Std. Corner-R (RE)	Spare Parts			
													Clamp Screw	Wrench		
		R	L	H	HF	B	LF	LH	WF	HBKW	WF_2					
SDLPR/L	**0808F -07FF**	●	●	8	8	8	85	14	8	0.5	0	0.2	SB-2570TR	FT-8		
SDLPR/L	**1010JX-07FF**	●	●	10	10	10	120	-	10	-	0	0.2	SB-2570TR	FT-8		
	1010JX-11FF	●	●	10	10	10		20	10	4			SB-4085TR	FT-15		
	1212JX-11FF	●	●	12	12	12			12	2						
	1616JX-11FF	●	●	16	16	16		-	16	-						

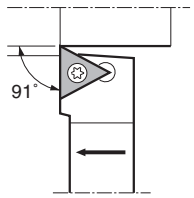
Applicable Inserts

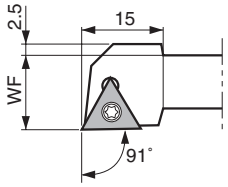
Applications	Finishing / Precision	Low Feed / Precision								
See Page	**B72**	**B72**								
Insert / Toolholder Description	R/L**-FSF** 	FR/L**-USF** 								
SDLPR/L...-07FF	DPET0702..	DPET0702..								
SDLPR/L...-11FF	DPET11T3..	DPET11T3..								

Recommended Cutting Conditions ➔ **E50**

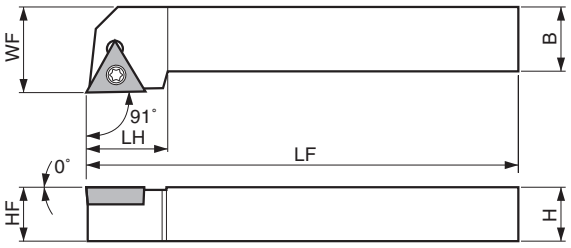
● : Std. Item

STGC(P) (External)





STGC(P)R/L1010F-11
shows above figure



•Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LH	WF	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench
STGCR/L	0808E -08	●		8	8	8	70	12	10	0.2	SB-2050TR	FT-6
	1010F -08	●	●	10	10	10	80		12			
STGCR/L	1010F -11	●	●	10	10	10	80	15	14	0.4	SB-2570TR	FT-8
	1212H -11	●	●	12	12	12	100		16			
	1616H -11	●	●	16	16	16			20			
	2020K -11	●	●	20	20	20	125		25			
	2525M -11	●	●	25	25	25	150	20	32			
STGPR/L	0808E -08	●		8	8	8	70	12	10	0.2	SB-2050TR	FT-6
STGPR/L	1010F -11	●	●	10	10	10	80	15	14	0.2	SB-3080TR	FT-10
	1212H -11	●	●	12	12	12	100		16			
	1616H -11	●	●	16	16	16			20			

Applicable Inserts (STGC)

Applications	Low Feed	Low Feed / Precision	Cast Iron	Non-ferrous Metals	Non-ferrous Metals
See Page	B78	B77	B79	B79	C26
Insert / Toolholder Description	(E/F)R/L-U	FR/L-USF	Without Chipbreaker	R/L-A3	PCD
STGCR/L...-08	TCGT0802..	TCET0802..	TCGW0802..	-	TCMT0802..
STGCR/L...-11	TCGT1103..	TCET1103..	TCGW1103..	TCGT1103..	TCMT1103.. TCGW1103..

Applicable Inserts (STGP)

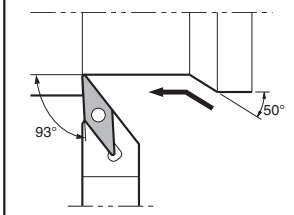
Applications	Minute ap	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Low Feed / Precision	Medium	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Cast Iron
See Page	B80	B80	B81	B82,B83	B85	B86	B84	B81	B81	B86
Insert / Toolholder Description	CF	PP	HQ	R/L	R/L-FSF	FR/L-USF	R/L-H	XP	XQ	Without Chipbreaker
STGPR/L...-08	TPGT0802..	-	-	TPGH0802..	TPET0802..	TPET0802..	-	-	-	TPGB0802..
STGPR/L...-11	-	TPMT1103..	TPMT1103..	TPGH1103..	TPET1103..	TPET1103..	TPGH1103..	TPMT1103..	TPMT1103..	TPGB1103..

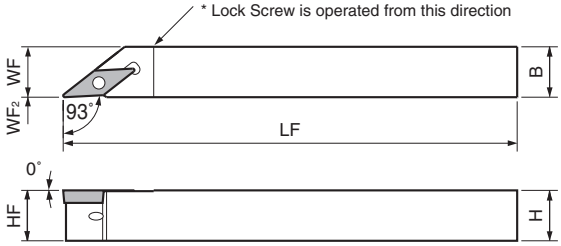
Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	C26~C28	C28	C16
Insert / Toolholder Description	PCD	APD	CBN
STGPR/L...-08	TPMH0802.. TPGB0802..	-	TPGB0802..
STGPR/L...-11	TPMH1103.. TPGB1103..	TPMT1103..	TPGB1103..

Recommended Cutting Conditions ➔ E50

● : Std. Item

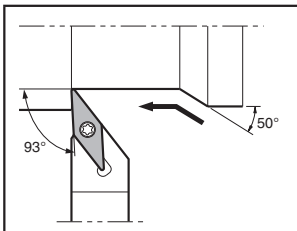
AVJB-FF (Without Offset) (External / Copying)

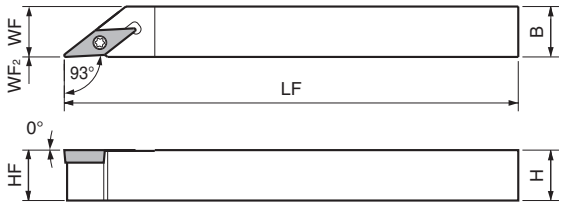




●Right-hand shown

SVJB-FF (Without Offset) (External / Copying)





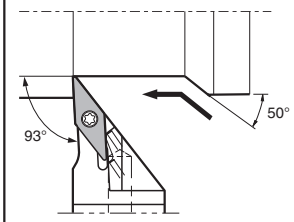
●Right-hand shown

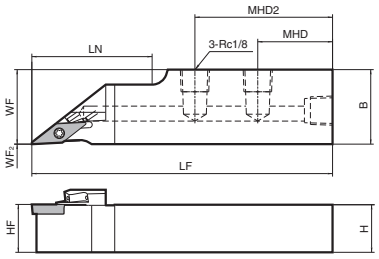
Toolholder Dimensions

Description		Stock		Dimension (mm)						Std. Corner-R (RE)	Spare Parts			
											Anchor Pin	Lock Screw	Clamp Screw	Wrench
		R	L	H	HF	B	LF	WF	WF_2					
AVJB R/L	1010JX-11FF	●	●	10	10	10	120	10	0	0.4	LPF-11	HSB4X8 R/L	-	FH-2
	1212JX-11FF	●	●	12	12	12		12			LPF-1113			
	1616JX-11FF	●	●	16	16	16		16			LPF-1117			
SVJB R/L	1010JX-11FF	●	●	10	10	10	120	10	0	0.4	-	-	SB-2570TR	FT-8
	1212JX-11FF	●	●	12	12	12		12						
	1616JX-11FF	●	●	16	16	16		16						
	2020JX-11FF	●	●	20	20	20		20						

· Lock Screw : HSB4X8R for Right-hand Toolholder, HSB4X8L for Left-hand Toolholder.

SVJB-FFJCT





●Right-hand shown

Toolholder Dimensions

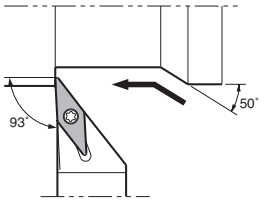
Description		Stock		Dimension (mm)									Std. Corner-R (RE)	Spare Parts		
														Clamp Screw	Wrench	Plug
		R	L	H	HF	B	LF	LN	WF	WF_2	MHD	MHD2				
SVJBR	1220H-11FFJCT	●		12	12	20	100	28	20	0	35	-	0.4	SB-2570TR	FT-8	GP-1
	1625H-11FFJCT	●		16	16	25		40	25		25	46				
	2025H-11FFJCT	●		20	20	25		40	25		25	46				

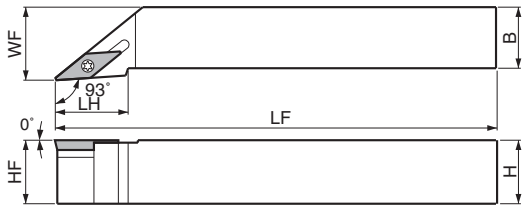
Please see page **H14** and **H15** for piping parts of coolant-through holders.

● : Std. Item

External Toolholders [VB □□ / VC □□ Insert]

SVJB (External / Copying)





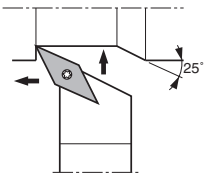
●Right-hand shown

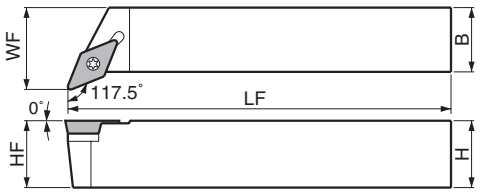
Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LH	WF	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVJB R/L	2020K-11	●	●	20	20	20	125	30	25	0.4	SB-2570TR	FT-8	-	-	-
	2525M-11	●	●	25	25	25	150	35	32						
SVJB R/L	2020K-16N	●	●	20	20	20	125	30	25	0.8	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
	2525M-16N	●	●	25	25	25	150		32						

· For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).

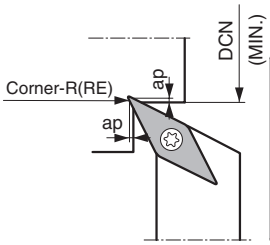
SVPB (External / Facing / Copying / Undercutting)





●Right-hand shown

Undercutting diameter of SVPB



Corner-R (RE)	ap (mm)	DCN (MIN.)
0.4	0.5	ø25
	1	ø30
0.8	0.5	ø45
	1	ø55

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	WF	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVPB R/L	1010JX-11	●	●	10	10	10	120	14.5	0.4	SB-2570TR	FT-8	-	-	-
	1212JX-11	●	●	12	12	12		16.5						
	1616JX-11	●	●	16	16	16		20.5						
SVPB R/L	2020K-11	●	●	20	20	20	125	25	0.4	SB-2570TR	FT-8	-	-	-
	2525M-11	●	●	25	25	25	150	32						
SVPB R/L	2020K-16N	●	●	20	20	20	125	25	0.8	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
	2525M-16N	●	●	25	25	25	150	32						

· For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).

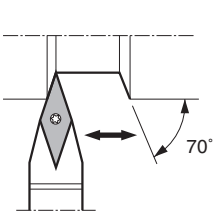
Applicable Inserts

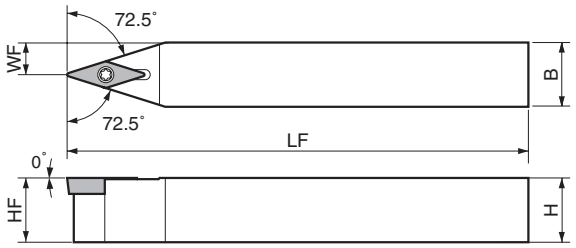
Applications	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Finishing - Medium	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B89	B89	B89	B90	B89	B91	B93	B93	C28	C17
Insert / Toolholder Description	GP	VF	HQ	R/L-F	R/L-FSF	R/L-Y	AH	R/L-A3	PCD	CBN
□VJB R/L ...-11FF(JCT)/-11	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	VBMT1103..	VBGW1103..
SVPB R/L ...-11										
SVJB R/L ...-16 N	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..
SVPB R/L ...-16N										

Recommended Cutting Conditions E50

● : Std. Item

SVVB (External / Copying)





Toolholder Dimensions

Description		Stock	Dimension (mm) H	HF	B	LF	WF		Std. Corner-R (RE)	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVVBN	1010JX-11	●	10	10	10	120	5		0.4	SB-2570TR	FT-8	-	-	-
	1212JX-11	●	12	12	12		6							
	1616JX-11	●	16	16	16		8							
SVVBN	1010F-11	●	10	10	10	80	5		0.4	SB-2570TR	FT-8	-	-	-
	1212F-11	●	12	12	12	85	6							
	1616H-11	●	16	16	16	100	8							
	2020K-11	●	20	20	20	125	10							
	2525M-11	●	25	25	25	150	12.5							
SVVBN	2020K-16N	●	20	20	20	125	10		0.8	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
	2525M-16N	●	25	25	25	150	12.5							

· For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).

Applicable Inserts

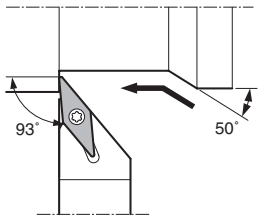
Applications	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Finishing - Medium	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B89	B89	B89	B90	B89	B91	B93	B93	C28	C17
Insert / Toolholder Description	GP	VF	HQ	R/L-F	R/L-FSF	R/L-Y	AH	R/L-A3	PCD	CBN
SVVBN...-11	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	VBMT1103..	VBGW1103..
SVVBN...-16N	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..

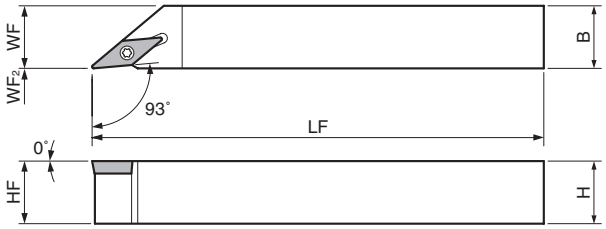
Recommended Cutting Conditions E50

● : Std. Item

External Toolholders [VC □□ Insert]

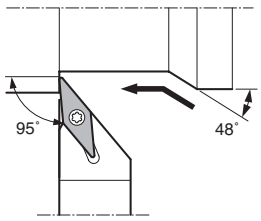
SVJC-FF (Without Offset) (External / Copying)

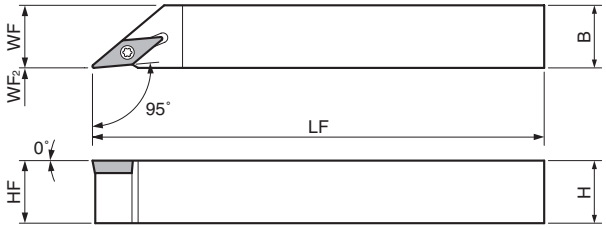




●Right-hand shown

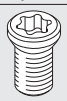
SVLC-FF (Without Offset) (External / Copying)





●Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	WF	WF_2	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench		
														
SVJC R/L	1010JX-11FF	●	●	10	10	10	120	10						
	1212F-11FF	●	●	12	12	12	85	12						
	1212JX-11FF	●	●	12	12	12		12	0	0.2	SB-2570TR	FT-8		
	1616JX-11FF	●	●	16	16	16	120	16						
	2020JX-11FF	●	●	20	20	20		20						
SVLC R/L	1212F-11FF	●	●	12	12	12	85	12						
	1212JX-11FF	●	●	12	12	12	120	12	0	0.2	SB-2570TR	FT-8		
	1616JX-11FF	●	●	16	16	16	120	16						

Applicable Inserts

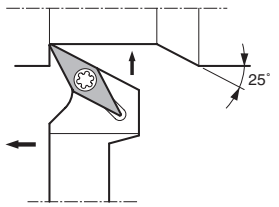
Applications	Minute ap	Finishing	Finishing	Finishing	Finishing - Medium
See Page	B92	B92	B92	B93	B93
Insert / Toolholder Description	CF	GF	SKS	R/L-F	R/L-Y
					
SVJC R/L...11FF	VCGT1103..	VCGT1103..	VCGT1103..	VCET1103..	VCET1103..
SVLC R/L...11FF					

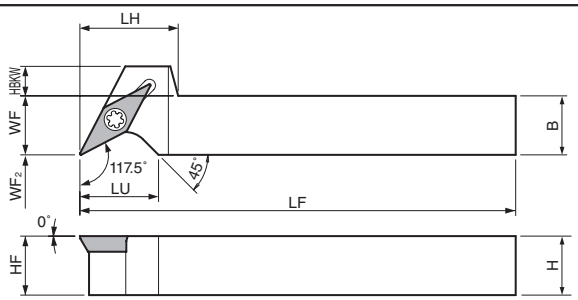
Recommended Cutting Conditions E50

● : Std. Item

External Toolholders [VC □□ Insert]

SVPC-FF (Without Offset) (External / Facing / Copying / Undercutting)



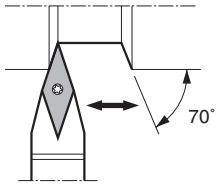


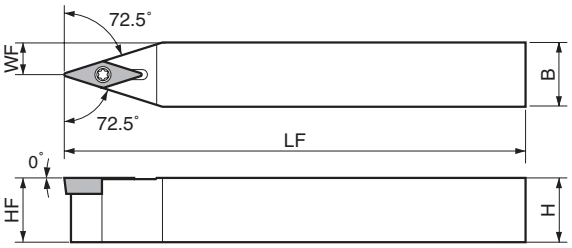
•Right-hand shown

Toolholder Dimensions

Description		Stock	Dimension (mm)									Std. Corner-R (RE)	Spare Parts		
			H	HF	B	LF	LU	LH	WF	HBKW	WF_2		Clamp Screw	Wrench	
SVPCR	1010JX-11FF	●	10	10	10	120	16	20	10	8	0	0.2	SB-2570TR	FT-8	
	1212F-11FF	●	12	12	12	85			12	6					
	1212JX-11FF	●	12	12	12	120									
	1616JX-11FF	●	16	16	16		20		16	2					

SVVC (External / Copying)





Toolholder Dimensions

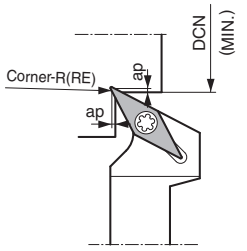
Description		Stock	Dimension (mm)						Std. Corner-R (RE)	Spare Parts				
			H	HF	B	LF	WF			Clamp Screw	Wrench			
SVVCN	1010JX-11	●	10	10	10	120	5		0.2	SB-2570TR	FT-8			
	1212JX-11	●	12	12	12		6							
	1616JX-11	●	16	16	16		8							

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing - Medium
See Page	B92	B92	B92	B93	B93
Insert / Toolholder Description	CF	GF	SKS	R/L-F	R/L-Y
SVPCR...11FF	VCGT1103..	VCGT1103..	VCGT1103..	VCET1103..R-F	VCET1103..R-Y
SVVCN...11				VCET1103..R/L-F	VCET1103..R/L-Y

Recommended Cutting Conditions ➡ E50

Undercutting diameter of SVPC-FF

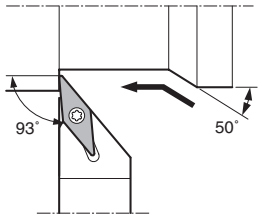


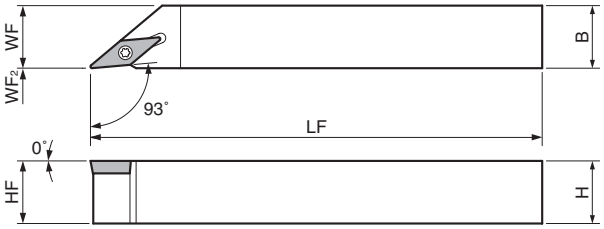
Corner-R (RE)	ap (mm)	DCN (MIN.)
0.2	0.5	ø20
	0.7	ø25

● : Std. Item

External Toolholders [VP □□ Insert]

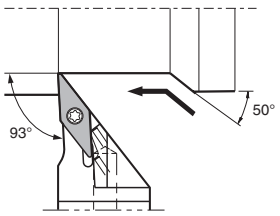
SVJP-FF (Without Offset) (External / Copying)

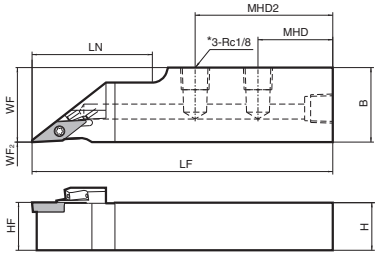




●Right-hand shown

SVJP-FFJCT (Without Offset) (External / Copying , Coolant-through Holders)

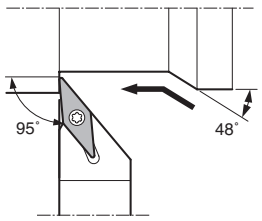


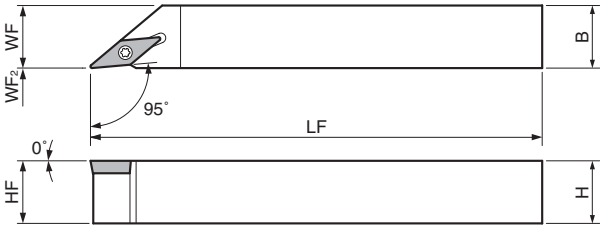


*SVJPR1220…: 2-Rc1/8

●Right-hand shown

SVLP-FF (Without Offset) (External / Copying)





●Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LN	WF	WF_2	MHD	MHD2	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Plug
SVJP R/L	1212F -11FF	●	●	12	12	12	85	-	12	0	-	-	0.2	SB-2570TR	FT-8	-
	1212JX -11FF	●	●	12	12	12	120		12							
	1616JX -11FF	●	●	16	16	16			16							
	2020JX -11FF	●	●	20	20	20			20							
SVJPR	1220H-11FFJCT	●		12	12	20	100	28	20	0	35	-	0.2	SB-2570TR	FT-8	GP-1
	1625H-11FFJCT	●		16	16	25		40	25		25	46				
	2025H-11FFJCT	●		20	20	25		40	25		25	46				
SVLP R/L	1010JX -08FF	●	●	10	10	10	120	-	10	0	-	-	0.1	SB-2050TR	FT-6	-
	1212JX -08FF	●	●	12	12	12			12							
	1616JX -08FF	●	●	16	16	16			16							
SVLP R/L	1212JX -11FF	●	●	12	12	12	120	-	12	0	-	-	0.2	SB-2570TR	FT-8	-
	1616JX -11FF	●	●	16	16	16			16							
SVLP R/L	1212F -08FF	●	●	12	12	12	85	-	12	0	-	-	0.1	SB-2050TR	FT-6	-
	1212F -11FF	●	●	12	12	12	85		12	0			0.2	SB-2570TR	FT-8	

Please see page **H14** and **H15** for piping parts of coolant-through holders.

Applicable Inserts

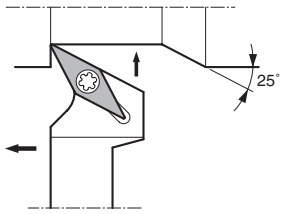
Applications	Minute ap	Finishing	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
See Page	B94	B94	B94	B94	B95	B96	B96
Insert / Toolholder Description	CF	SKS	CK	GF	R/L-FSF	FR/L-U	FR/L-USF
SVLP R/L...-08FF	-	-	VPGT0802..	-	VPET0802..	-	VPET0802..
SV□P R/L...-11FF	VPGT1103..	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPET1103..	VPET1103..

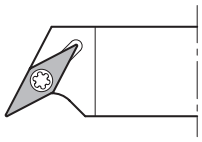
Recommended Cutting Conditions ➔ **E50**

● : Std. Item

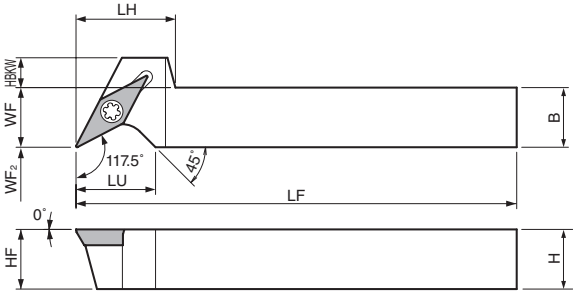
External Toolholders [VP □□ Insert]

SVPP-FF (Without Offset) (External / Facing / Copying / Undercutting)





SVPPR1616..-08FF
shows above figure



●Right-hand shown

Toolholder Dimensions

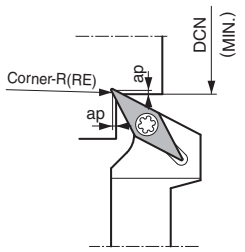
Description		Stock	Dimension (mm)									Std. Corner-R (RE)	Spare Parts		
			H	HF	B	LF	LU	LH	WF	HBKW	WF_2		Clamp Screw	Wrench	
SVPPR	1010JX-08FF	●	10	10	10	120	12	16	10	4	0	0.1	SB-2050TR	FT-6	
	1212JX-08FF	●	12	12	12				12	2					
	1616JX-08FF	●	16	16	16			-	16	-					
SVPPR	1010JX-11FF	●	10	10	10	120	16	20	10	8	0	0.2	SB-2570TR	FT-8	
	1212JX-11FF	●	12	12	12				12	6					
	1616JX-11FF	●	16	16	16				16	2					
SVPPR	1212F -08FF	●	12	12	12	85	12	16	12	2	0	0.1	SB-2050TR	FT-6	
	1212F -11FF	●	12	12	12	85	16	20	12	6	0	0.2	SB-2570TR	FT-8	

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
See Page	B94	B94	B94	B94	B95	B96	B96
Insert / Toolholder Description	CF	SKS	CK	GF	F⁵/L-FSF	F⁵/L-U	F⁵/L-USF
SVPPR...-08FF	-	-	VPGT0802..	-	VPET0802..	-	VPET0802..
SVPPR...-11FF	VPGT1103..	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPET1103..	VPET1103..

Recommended Cutting Conditions E50

Undercutting diameter of SVPP-FF

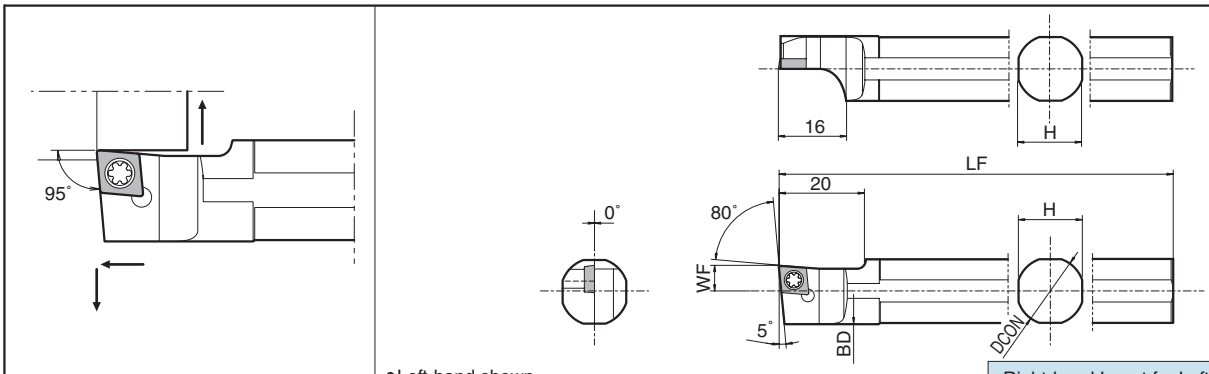


Corner-R (RE)	ap (mm)	DCN (MIN.)
0.2	0.5	ø20
	1	ø25

● : Std. Item

External Sleeve Holders [CC□□ Insert]

S-SCLC (External / Facing)



●Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

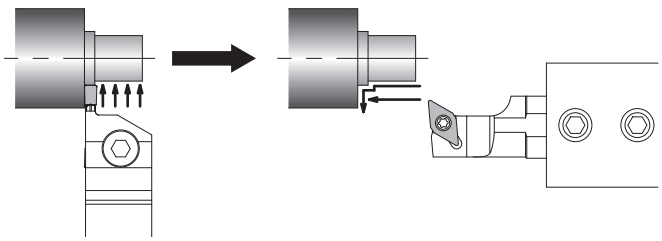
Description	Stock	Dimension (mm)					Std. Corner-R (RE)	Spare Parts			
		DCON	LF	WF	BD	H		Clamp Screw	Wrench		
S12F -SCLCL06	●	12	80	6	13.4	11	0.4	SB-2560TR	FT-8		
S14H -SCLCL06	●	14	100			13					
S15F -SCLCL06	●	15.875	85		15.4	15		SB-2570TR			
S16F -SCLCL06	●	16									
S19G -SCLCL06	●	19.05	90		18.4	17					
S19K -SCLCL06	●		120								
S20G -SCLCL06	●	20	90		19.4	18					
S20K -SCLCL06	●		120								
S19G -SCLCL09	●	19.05	90	10	18.4	17	0.4	SB-4065TR	FT-15		
S19K -SCLCL09	●		120								
S20G -SCLCL09	●	20	90		19.4	18					
S20K -SCLCL09	●		120								
S25.0H-SCLCL09	●	25	100		24.4	23					
S25K -SCLCL09	●	25.4	120		24.8						

Applicable Inserts

Applications	Finishing	Finishing	Finishing - Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B53	B53	B54	B58,B59	B55	B60	B60	B60	C24	C14
Insert / Toolholder Description	SKS	SK	GK	(E/F)R-U	MQ	Without Chipbreaker	AH	R-A3	PCD	CBN
S-SCLCL06	CCGT0602..	CCGT0602..	CCMT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
S-SCLCL09	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

Recommended Cutting Conditions ➡ E50

● Finishing by Sleeve Holder

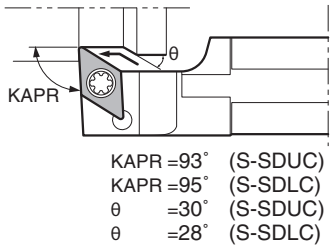


1) Roughing by grooving toolholder
2) Finishing by Sleeve Holder improves chip control and reduces cutting time

● : Std. Item

External Sleeve Holder [DC□□ Insert]

S-SDUC (External / Copying) / S-SDLC (External / Copying)



KAPR =93° (S-SDUC)
KAPR =95° (S-SDLC)
θ =30° (S-SDUC)
θ =28° (S-SDLC)

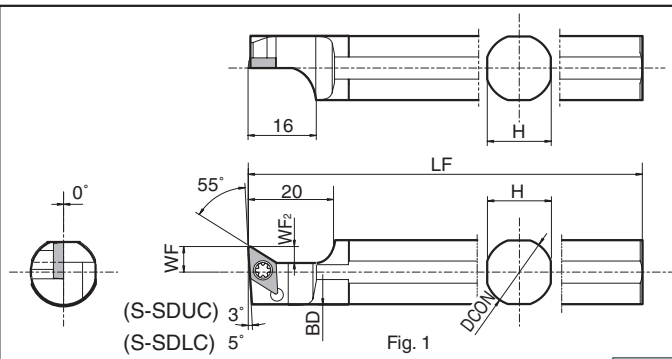


Fig. 1

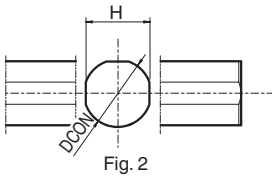


Fig. 2

●Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock	Dimension (mm) DCON	LF	WF	BD	H	WF_2	Std. Corner-R (RE)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
S14H -SDUCL07	●	14	100	6	13.4	13	3.8	0.4	Fig. 1	SB-2560TR	FT-8
S15F -SDUCL07	●	15.875	85		15.4	15					
S19G -SDUCL07	●	19.05	90		18.4	17					
S19K -SDUCL07	●		120								
S20G -SDUCL07	●	20	90		19.4	18					
S20K -SDUCL07	●		120								
S19G -SDUCL11	●	19.05	90	10	18.4	17	5.8	0.4		SB-4085TR	FT-15
S19K -SDUCL11	●		120								
S20G -SDUCL11	●	20	90		19.4	18					
S20K -SDUCL11	●		120								
S22K -SDUCL11	●	22	120		21.4	20					
S25.0H-SDUCL11	●	25	100		24.4	23					
S25K -SDUCL11	●	25.4	120		24.8						
S12F -SDLCL07	●	12	80	6	13.4	11	3.8	0.4	Fig. 2	SB-2560TR	FT-8
S14H -SDLCL07	●	14	100			13					
S15F -SDLCL07	●	15.875	85		15.4	15					
S16F -SDLCL07	●	16									
S19G -SDLCL07	●	19.05	90		18.4	17					
S19K -SDLCL07	●		120								
S20G -SDLCL07	●	20	90		19.4	18					
S20K -SDLCL07	●		120								
S19G -SDLCL11	●	19.05	90	10	18.4	17	5.8	0.4		SB-4085TR	FT-15
S19K -SDLCL11	●		120								
S20G -SDLCL11	●	20	90		19.4	18					
S20K -SDLCL11	●		120								
S22K -SDLCL11	●	22	120		21.4	20					
S25.0H-SDLCL11	●	25	100		24.4	23					
S25K -SDLCL11	●	25.4	120		24.8						

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	* Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing	Finishing / Precision	Low Feed
See Page	B62	B62	B62	B63	B63	B64	B63	B67	B66	B68,B69
Insert / Toolholder Description	CF	SKS	SK	WP (Wiper)	PP	GK	GQ	R-F	R-FSF	(E/F)R-U
S-SD□CL07	DCGT0702..	DCGT0702..	DCGT0702..	DCMX0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..
S-SD□CL11	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..
Applications	Low Feed / Precision	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B68	B70,B71	B65	B65	B65	B71	B71	B71	C25	C15
Insert / Toolholder Description	FR-USF	(E/F)R-J	XP	XQ	MQ	Without Chipbreaker	AH	R-A3	PCD	CBN
S-SD□CL07	DCET0702..	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
S-SD□CL11	DCET11T3..	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

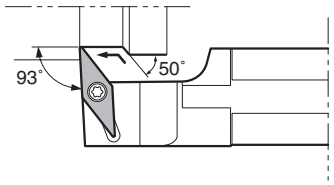
* For WP chipbreaker, cutting edge offsets or program corrections are required. (S-SDLC cannot be used) R37

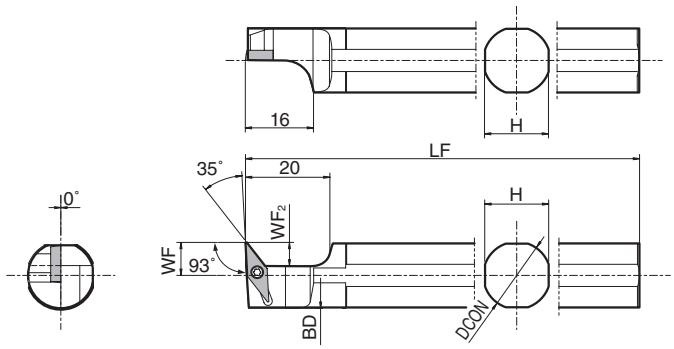
Recommended Cutting Conditions E50

●: Std. Item

External Sleeve Holder [VB □□ / VC □□ Insert]

S-SVUB(C) (External / Copying)





●Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock	Dimension (mm)						Std. Corner-R (RE)	Spare Parts			
		DCON	LF	WF	BD	H	WF_2		Clamp Screw	Wrench		
S19G -SVUBL11	●	19.05	90	10.5	18.4	17	8	0.4	SB-2570TR	FT-8		
S19K -SVUBL11	●		120									
S20G -SVUBL11	●	20	90		19.4	18						
S20K -SVUBL11	●		120									
S25.0H-SVUBL11	●	25	100		24.4	23						
S25K -SVUBL11	●	25.4	120		24.8							
S12F -SVUCL08	●	12	80	7.5	13.4	11	5.5	0.4	SB-2050TR	FT-6		
S14H -SVUCL08	●	14	100			13						
S15F -SVUCL08	●	15.875	85	8	15.4	15						
S16F -SVUCL08	●	16										
S19G -SVUCL11	●	19.05	90	10.5	18.4	17	8	0.2	SB-2570TR	FT-8		
S19K -SVUCL11	●		120									
S20G -SVUCL11	●	20	90		19.4	18						
S20K -SVUCL11	●		120									
S25.0H-SVUCL11	●	25	100		24.4	23						
S25K -SVUCL11	●	25.4	120		24.8							

Applicable Inserts

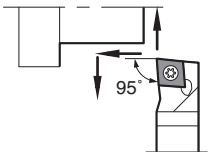
Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Finishing - Medium
See Page	**B92**	**B92**	**B92**	**B89**	**B89,B92**	**B89,B92**	**B90,B93**	**B89**	**B91,B93**
Insert / Toolholder Description	**CF**	**GF**	**SKS**	**GP**	**VF**	**HQ**	**R-F**	**R-FSF**	**R-Y**
S-SVUCL08	-	-	-	-	VCMT0802..	VCMT0802..	-	-	-
S-SVUBL11	-	-	-	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..
S-SVUCL11	VCGT1103..	VCGT1103..	VCGT1103..	-	-	-	VCET1103..	-	VCET1103..

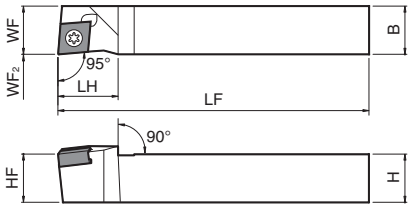
Applications	Non-ferrous Metals	Hard Materials
See Page	**C28**	**C17**
Insert / Toolholder Description	**PCD**	**CBN**
S-SVUCL08	VCMT0802..	VCGW0802..
S-SVUBL11	VBMT1103..	VBGW1103..
S-SVUCL11	-	-

Recommended Cutting Conditions E50

● : Std. Item

SCLN (Without Offset) (External / Facing)





Side Rake Angle : -6°
Angle of Inclination : -6°

●Right-hand shown

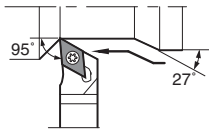
Toolholder Dimensions

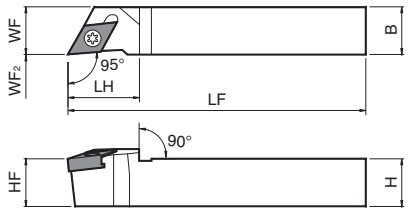
Description		Stock	Dimension (mm)							Std. Corner-R (RE)	Spare Parts		Applicable Inserts
			H	HF	B	LF	LH	WF	WF_2		Clamp Screw	Wrench	
SCLNR	**1010K-07FF**	●	10	10	10	120	15	10	0	0.2	SB-3080TR	LTW-10SS	CNGU0703.. CNMU0703..
	1212F-07FF	●	12	12	12	85		12					
	1212K-07FF	●				120							
	1616K-07FF	●	16	16	16			16					

Applicable Inserts

Applications	Finishing - Medium	Medium - Roughing	Finishing	Low Feed
See Page	**B50**	**B50**	**B50**	**B50**
Insert / Toolholder Description	**SK**	**GK**	**FR-F**	**FR-U**
SCLNR...-07FF	CNGU0703..	CNMU0703..	CNGU0703..	CNGU0703..

SDLN (Without Offset) (External / Copying)





Side Rake Angle : -6°
Angle of Inclination : -7°

●Right-hand shown

Toolholder Dimensions

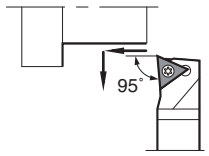
Description		Stock	Dimension (mm)							Std. Corner-R (RE)	Spare Parts		Applicable Inserts
			H	HF	B	LF	LH	WF	WF_2		Clamp Screw	Wrench	
SDLNR	**1010K-08FF**	●	10	10	10	120	18	10	0	0.2	SB-3080TR	LTW-10SS	DNGU0803.. DNMU0803..
	1212F-08FF	●	12	12	12	85		12					
	1212K-08FF	●				120							
	1616K-08FF	●	16	16	16			16					

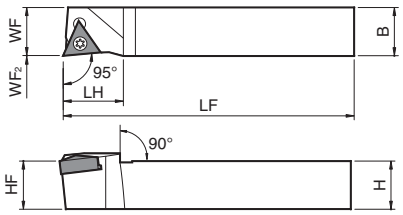
Applicable Inserts

Applications	Finishing - Medium	Medium - Roughing	Finishing	Low Feed
See Page	**B51**	**B51**	**B51**	**B51**
Insert / Toolholder Description	**SK**	**GK**	**FR-F**	**(F/E)R-U**
SDLNR...-08FF	DNGU0803..	DNMU0803..	DNGU0803..	DNGU0803..

● : Std. Item

STLN (Without Offset) (External / Up Facing)





Side Rake Angle : -6°
Angle of Inclination : -7°

●Right-hand shown

Toolholder Dimensions

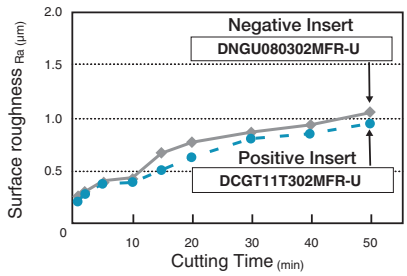
Description		Stock	Dimension (mm)							Std. Corner-R (RE)	Spare Parts		Applicable Inserts
			H	HF	B	LF	LH	WF	WF_2		Clamp Screw	Wrench	
STLNR	1010K-09FF	●	10	10	10	120	15	10	0	0.2	SB-2570TR	LTW-8SS	TNGU0903..
	1212F-09FF	●	12	12	12	85		12					
	1212K-09FF	●				120							
	1616K-09FF	●	16	16	16			16					

Applicable Inserts

Applications	Finishing	Low Feed
See Page	B52	B52
Insert / Toolholder Description	FR-F 	(E/F)R-U 
STLNR...-09FF	TNGU0903..	TNGU0903..

Double-sided design allows all edges to be used. Compared to the positive type, this offers less cost per insert and more stability.

Comparison of surface roughness (Sharp edge)



<Cutting Conditions>
Workpiece Material : S45C Vc=100m/min, ap=1.5mm, f=0.03mm/rev, Wet
(Internal evaluation)

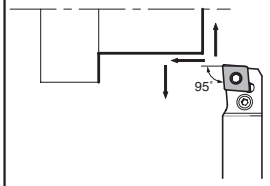
Recommended Cutting Conditions

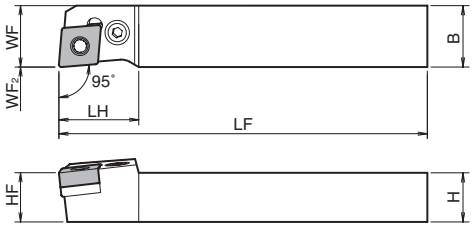
Workpiece Material	Insert Grades			
	PR1225	PR1535	PR1705	PR1725
Free-cutting Steel	-	-	◕ Vc=100m/min (60~150)	◔ Vc=100m/min (60~150)
Carbon Steel / Alloy Steel	◔ Vc=100m/min (60~150)	◔ Vc=100m/min (60~150)	◔ Vc=130m/min (60~220)	◕ Vc=130m/min (60~200)
Stainless Steel	◔ Vc=80m/min (50~150)	◕ Vc=100m/min (60~180)	-	◔ Vc=100m/min (80~150)

◕ : Continuous to Light interruption / 1st Choice
◔ : Continuous to Light interruption / 2nd Choice

● : Std. Item

PCLN-FF (Without Offset) (External / Facing)





Side Rake Angle : -6°
Angle of Inclination : -6°

●Right-hand shown

Toolholder Dimensions

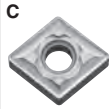
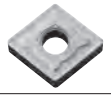
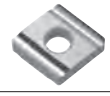
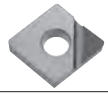
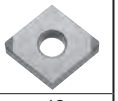
Description		Stock	Dimension (mm)							Std. Corner-R (RE)	Spare Parts					
			H	HF	B	LF	LH	WF	WF_2		Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PCLNR	1620JX-12FF	●	16	16	20	120	26	20	0	0.8	LL-2N	LS-2N	LC-42N	LSP-2	PC-2	LW-3
	2020JX-12FF	●	20	20												

Applicable Inserts (1st Choice)

Applications	Finishing - Medium	Medium - Roughing
See Page	B19	B19
Insert / Toolholder Description	FP-SK 	FP-TK 
PCLNR...-12FF	CNGG1204..FP-SK	CNGG1204..FP-TK

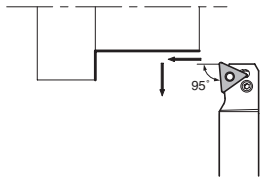
Recommended Cutting Conditions ➡ E47

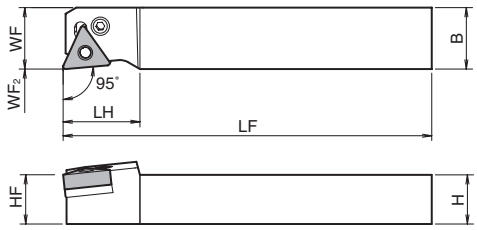
Applicable Inserts (Optional)

Applications	Finishing	Finishing - Medium	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing
Insert	WF (Wiper) 	WF (Wiper) 	PP 	PQ 	CQ 	CJ 	GS 	PG 	PS 
Size	12	12	12	12	12	12	12	12	12
Page	B16	B16	B16	B16	B17	B17	B17	B17	B17
Applications	Medium - Roughing / High Feed Rate	Roughing	Roughing	Single-sided / Roughing / High Feed Rate	Finishing	Medium	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium
Insert	PT 	Standard 	PH 	PX 	R/L-S 	R/L 	XF 	XP 	XQ 
Size	12	12	12	12	-	12	12	12	12
Page	B18	B18	B18	B19	-	B22	B19	B19	B19
Applications	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Insert	XS 	MQ 	MS 	MU 	KQ 	KG 	KH 	C 	ZS 
Size	12	12	12	12	12	12	12	12	12
Page	B19	B20	B20	B20	B21	B21	B21	B21	B21
Applications	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Heat-resistant Alloys	Hard Materials
Insert	GC 	Without Chipbreaker 	Ceramic 	AH 	A3 	PCD 	SQ 	R/L-SX 	CBN 
Size	12	12	12	12	12	12	12	12	12
Page	B21	B21	B106	B22	B22	C23	B20	B21	C6, C7

● : Std. Item

PTLN-FF (Without Offset) (External / Up Facing)





Side Rake Angle : -6°
Angle of Inclination : -6°

●Right-hand shown

Toolholder Dimensions

Description		Stock	Dimension (mm)							Std. Corner-R (RE)	Spare Parts					
			H	HF	B	LF	LH	WF	WF_2		Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PTLNR	1620JX-16FF	●	16	16	20	120	24	20	0	0.8	LL-1N	LS-1N	LT-32N * LT-32N-20	LSP-1	PC-1	FH-2.5
	2020JX-16FF	●	20	20												

· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

Applicable Inserts (1st Choice)

Applications	Finishing - Medium	Medium - Roughing	Large D.O.C.
See Page	B38	B39	B38
Insert / Toolholder Description	FP-SK	FP-TK	R-LD
PTLNR...-16FF	TNGG1604..FP-SK	TNGG1604..FP-TK	TNMG1604..R-LD

Recommended Cutting Conditions E47

Applicable Inserts (Optional)

Applications	Finishing	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Medium - Roughing / High Feed Rate	Roughing
Insert	PP	PQ	CQ	GS	PG	PS	PT	GT	PH
Size	16	16	16	16	16	16	16	16	16
Page	B36	B36	B36	B36	B36	B37	B37	B37	B37
Applications	Single-sided / Roughing / High Feed Rate	Roughing	Finishing	Finishing - Roughing	Medium-Roughing / Low Cutting Force	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing
Insert	PX	Standard	R-S	R-□	R-25R	XF	XP	XQ	XS
Size	16	16	16	16	16	16	16	16	16
Page	B38	B37	B42	B42,B43	B43	B38	B38	B38	B38
Applications	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
Insert	MQ	MS	MU	KQ	KG	KH	C	ZS	GC
Size	16	16	16	16	16	16	16	16	16
Page	B39	B39	B39	B40	B40	B40	B40	B40	B40
Applications	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials			
Insert	Without Chipbreaker	Ceramic	AH	R-A3	PCD	CBN			
Size	16	16	16	16	16	16			
Page	B40	B111	B41	B41	C23	C11			

● : Std. Item

Recommended Cutting Conditions

Recommended Cutting Conditions - External Turning (Positive Insert) [ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grade	Corner-R (RE)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
*P	Low Carbon Steel Low Carbon Alloy	HB ≦ 300	Precision Finishing	Continuous	F	PR1725	0.05	100 - 150 - 200	0.05 - 0.07 - 0.15	0.03 - 0.05 - 0.1
				Interruption		PR1725	0.2	80 - 120 - 160	0.05 - 0.1 - 0.2	0.03 - 0.1 - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1725	0.2	100 - 150 - 200	0.02 - 0.05 - 0.1	0.02 - 0.05 - 0.12
			Finishing	Continuous	GF	PR1725	0.2	100 - 140 - 180	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		PR1725	0.4	80 - 120 - 160	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing - Medium	Continuous	GQ	PR1725	0.2	80 - 120 - 160	0.8 - 3.0 - 5.0	0.03 - 0.05 - 0.1
				Interruption		PR1725	0.4	60 - 100 - 140	0.8 - 2.0 - 3.0	0.03 - 0.05 - 0.1
			Low Feed & Large D.O.C.	Continuous	J , U	PR1725	0.2	80 - 100 - 140	0.5 - 2.0 - 3.5	0.02 - 0.05 - 0.1
	Medium Carbon Steel Medium Carbon Alloy	HB ≦ 330	Precision Finishing	Continuous	F	PR1725	0.05	100 - 150 - 200	0.05 - 0.07 - 0.15	0.03 - 0.05 - 0.1
				Interruption		PR1725	0.2	80 - 120 - 160	0.05 - 0.1 - 0.2	0.03 - 0.1 - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1725	0.2	100 - 150 - 200	0.02 - 0.05 - 0.1	0.02 - 0.05 - 0.12
			Finishing	Continuous	GF	PR1725	0.2	100 - 140 - 180	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		PR1725	0.4	80 - 120 - 160	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing - Medium	Continuous	GQ	PR1725	0.2	80 - 120 - 160	0.8 - 3.0 - 5.0	0.03 - 0.05 - 0.1
				Interruption		PR1725	0.4	60 - 100 - 140	0.8 - 2.0 - 3.0	0.03 - 0.05 - 0.1
			Low Feed & Large D.O.C.	Continuous	J , U	PR1725	0.2	80 - 100 - 140	0.5 - 2.0 - 3.5	0.02 - 0.05 - 0.1
	High Carbon Alloy	HB ≦ 280	Precision Finishing	Continuous	F	PR1725	0.05	100 - 150 - 200	0.05 - 0.07 - 0.15	0.03 - 0.05 - 0.1
				Interruption		PR1725	0.2	80 - 120 - 160	0.05 - 0.1 - 0.2	0.03 - 0.1 - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1725	0.2	100 - 150 - 200	0.02 - 0.05 - 0.1	0.02 - 0.05 - 0.12
			Finishing	Continuous	GF	PR1725	0.2	100 - 140 - 180	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		PR1725	0.4	80 - 120 - 160	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing - Medium	Continuous	GQ	PR1725	0.2	80 - 120 - 160	0.3 - 1.5 - 3.0	0.03 - 0.05 - 0.1
				Interruption		PR1725	0.4	60 - 100 - 140	0.3 - 1.0 - 2.0	0.03 - 0.05 - 0.1
			Low Feed & Large D.O.C.	Continuous	J , U	PR1725	0.2	80 - 100 - 140	0.5 - 2.0 - 3.5	0.02 - 0.05 - 0.1
M	Stainless Steel (Austenitic related)	HB ≦ 220	Finishing	Continuous	GF	PR1225	0.2	80 - 100 - 120	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption		PR1535	0.4	60 - 80 - 100	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium	Continuous	GQ	PR1225	0.2	80 - 100 - 120	0.5 - 1.5 - 3.0	0.03 - 0.08 - 0.12
				Interruption		PR1535	0.4	60 - 80 - 100	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.15
	Stainless Steel (Precipitation Hardening)	HB ≦ 300	Finishing	Continuous	GF	PR1225	0.2	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption		PR1535	0.4	30 - 50 - 70	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium	Continuous	GQ	PR1225	0.2	40 - 60 - 80	0.5 - 1.0 - 2.0	0.03 - 0.08 - 0.12
				Interruption		PR1535	0.4	30 - 50 - 70	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
K	Gray Cast Iron	HB ≦ 250	Finishing	Continuous	Standard	CA310	0.4	100 - 120 - 150	0.2 - 0.5 - 1.0	0.1 - 0.15 - 0.2
				Interruption		CA315	0.4	80 - 100 - 120	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium	Continuous	Standard	CA310	0.4	100 - 120 - 150	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2
				Interruption		CA315	0.8	80 - 100 - 120	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.15
	Nodular Cast Iron	HB ≦ 270	Finishing	Continuous	Standard	CA310	0.4	80 - 100 - 120	0.2 - 0.5 - 1.0	0.1 - 0.15 - 0.2
				Interruption		CA315	0.4	60 - 80 - 100	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium	Continuous	Standard	CA315	0.4	80 - 100 - 120	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2
				Interruption		CA320	0.8	60 - 80 - 100	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.15
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys (Si10% or less) etc.	HB ≦ 100	High Speed Machining (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.2	150 - 250 - 350	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			Finishing (Long Tool Life)	Continuous	F	PDL025	0.2	100 - 150 - 200	0.05 - 0.3 - 0.5	0.02 - 0.07 - 0.1
				Interruption		PDL025	0.4	100 - 150 - 200	0.05 - 0.3 - 0.5	0.02 - 0.07 - 0.1
			Finishing	Continuous	F	KW10	0.2	100 - 150 - 200	0.05 - 0.3 - 0.5	0.02 - 0.07 - 0.1
				Interruption		KW10	0.4	100 - 150 - 200	0.05 - 0.3 - 0.5	0.02 - 0.07 - 0.1
			Medium	Continuous	U	KW10	0.2	100 - 150 - 200	0.2 - 0.5 - 1.5	0.03 - 0.1 - 0.2
				Interruption		KW10	0.4	100 - 150 - 200	0.2 - 0.5 - 1.5	0.03 - 0.1 - 0.2
S	Titanium Alloys	HB ≦ 400	Precision Finishing (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.2	100 - 120 - 150	0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1
				Interruption		KPD001	0.4	70 - 100 - 120	0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1
			Medium	Continuous	F , U	KW10	0.4	30 - 50 - 70	0.1 - 0.5 - 1.0	0.03 - 0.1 - 0.2
				Interruption		KW10	0.4	30 - 50 - 70	0.1 - 0.5 - 1.0	0.03 - 0.1 - 0.2
	Heat-resistant Alloys	HB ≦ 350	Finishing	Continuous	F , U	KW10	0.4	10 - 30 - 50	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption	Without Chipbreaker	KW10	0.8	10 - 30 - 50	0.2 - 0.5 - 0.7	0.03 - 0.05 - 0.1
			Finishing	Continuous	MQ	PR1535	0.4	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption		PR1535	0.8	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
H	Hardened Steel Hard Materials	40~50 HRC	Finishing	Continuous	GK	PR1425	0.2	40 - 60 - 80	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1
				Interruption		PR1425	0.4	40 - 60 - 80	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1
		50~68 HRC	Finishing	Continuous	ME	KBN05M	0.2	80 - 120 - 150	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1
				Interruption	MET	KBN05M	0.4	60 - 100 - 120	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1

* For machining free-cutting steels, such as SUM, etc., use PR1705 at Vc=200m/min or less. For ap and f, refer to specs for low carbon steels.

Recommended Cutting Conditions - Back Turning

● KTKF ➡ E13

Workpiece Material		MEGACOAT NANO PLUS PR1725		MEGACOAT NANO PR1535		MEGACOAT PR1225		Remarks
		Grooving	Turning	Grooving	Turning	Grooving	Turning	
Carbon Steel / Alloy Steel	Vc (m/min)	★ 60 ~ 200		☆ 60 ~ 150		☆ 60 ~ 150		Coolant
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.15	0.01 ~ 0.03	0.02 ~ 0.15	0.01 ~ 0.03	0.02 ~ 0.15	
Stainless Steel	Vc (m/min)	☆ 60 ~ 150		★ 60 ~ 130		☆ 60 ~ 130		
	f (mm/rev)	0.01 ~ 0.02	0.02 ~ 0.1	0.01 ~ 0.02	0.02 ~ 0.1	0.01 ~ 0.02	0.02 ~ 0.1	

★: 1st Recommendation
☆: 2nd Recommendation

Workpiece Material		Carbide KW10		PCD KPD001		Remarks
		Grooving	Turning	Grooving	Turning	
Cast Iron	Vc (m/min)	50 ~ 100		-		Coolant
	f (mm/rev)	0.01 ~ 0.02	0.02 ~ 0.15	-		
Aluminum Alloys	Vc (m/min)	200 ~ 450		200 ~ 500		
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.15	0.01 ~ 0.03	0.02 ~ 0.12	
Brass	Vc (m/min)	100 ~ 200		100 ~ 350		
	f (mm/rev)	0.01 ~ 0.05	0.02 ~ 0.2	0.01 ~ 0.05	0.02 ~ 0.15	

● KTKF (GQ Chipbreaker) ➡ E13

Workpiece Material		MEGACOAT NANO PLUS PR1725		MEGACOAT NANO PR1535		MEGACOAT PR1225		Remarks
		Grooving	Turning	Grooving	Turning	Grooving	Turning	
Carbon Steel / Alloy Steel	Vc (m/min)	★ 60 ~ 200		☆ 60 ~ 150		☆ 60 ~ 150		Coolant
	f (mm/rev)	0.01 ~ 0.04	0.02 ~ 0.15	0.01 ~ 0.04	0.02 ~ 0.15	0.01 ~ 0.04	0.02 ~ 0.15	
Stainless Steel	Vc (m/min)	☆ 60 ~ 150		★ 60 ~ 130		☆ 60 ~ 130		
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.1	0.01 ~ 0.03	0.02 ~ 0.1	0.01 ~ 0.03	0.02 ~ 0.1	

★: 1st Recommendation
☆: 2nd Recommendation

● ABS15, ABW15, ABW23 ➡ E21~E23

Workpiece Material		MEGACOAT NANO PLUS PR1725		PR1705		MEGACOAT PR1225		PVD Coated Carbide PR930		Remarks
		Grooving	Turning	Grooving	Turning	Grooving	Turning	Grooving	Turning	
Carbon Steel / Alloy Steel	Vc (m/min)	★ 60 ~ 180		☆ 80 ~ 200		☆ 60 ~ 150		☆ 80 ~ 100		Coolant
	f (mm/rev)	0.02	0.02 ~ 0.07	0.02	0.02 ~ 0.07	0.02	0.02 ~ 0.07	0.02	0.02 ~ 0.07	
Stainless Steel	Vc (m/min)	☆ 30 ~ 130		☆ 40 ~ 150		★ 40 ~ 120		☆ 30 ~ 50		
	f (mm/rev)	0.02	0.02 ~ 0.05	0.02	0.02 ~ 0.05	0.02	0.02 ~ 0.05	0.02	0.02 ~ 0.05	

★: 1st Recommendation
☆: 2nd Recommendation

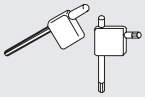
Workpiece Material		Carbide KW10		Remarks
		Grooving	Turning	
Aluminum Alloys	Vc (m/min)	150 ~ 200		Coolant
	f (mm/rev)	0.02	0.02 ~ 0.10	
Brass	Vc (m/min)	100 ~ 160		
	f (mm/rev)	0.03	0.02 ~ 0.15	

Alternative Toolholder Reference Table for Small Parts Machining (Back Clamp)

Insert Description	Conventional Toolholder					Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Anchor Pin	Spare Parts: Lock Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	See Page
									
ABS.. 40	**AABSR0810K-40F**	125	LPA-11	HSB4X8R	FH-2	**-**	-	No Alternative	**-**
	AABSR1010K-40F	125				**AABSR1010JX-40F**	120		**E21**
	AABSR1212M-40F	150	LPA-13			**AABSR1212JX-40F**	120		
	AABSR1616M-40F	150	LPA-17			**AABSR1616JX-40F**	120		
ABW.. 40	**AABWR0810K-40F**	125	LPA-11	HSB4X8R	FH-2	**-**	-	No Alternative	**-**
	AABWR1010K-40F	125				**AABWR1010JX-40F**	120		**E22**
	AABWR1212M-40F	150	LPA-13			**AABWR1212JX-40F**	120		
	AABWR1616M-40F	150	LPA-17			**AABWR1616JX-40F**	120		
ABW.. 50	**AABWR0810K-50F**	125	LPA-11	HSB4X8R	FH-2	**-**	-	No Alternative	**-**
	AABWR1010K-50F	125				**AABWR1010JX-50F**	120		**E23**
	AABWR1212M-50F	150	LPA-13			**AABWR1212JX-50F**	120		
	AABWR1616M-50F	150	LPA-17			**AABWR1616JX-50F**	120		
CC..	**ACLC$^{R}_{L}$0810K-06F**	125	LPF-11	HSB4X8R (Right-hand toolholder) HSB4X8L (Left-hand toolholder)	FH-2	**SCLC$^{R}_{L}$0808F-06FF**	120	Clamping system is different.	**E26**
	ACLC$^{R}_{L}$1010K-06F	125				**ACLC$^{R}_{L}$1010JX-06FF**	120		
	ACLC$^{R}_{L}$1010K-09F	125	LPF-13			**ACLC$^{R}_{L}$1010JX-09FF**	120		
	ACLC$^{R}_{L}$1212M-09F	150				**ACLC$^{R}_{L}$1212JX-09FF**	120		
	ACLC$^{R}_{L}$1616M-09F	150	LPF-17			**ACLC$^{R}_{L}$1616JX-09FF**	120		
DC..	**ADJC$^{R}_{L}$0810K-07F**	125	LPF-11	HSB4X8R (Right-hand toolholder) HSB4X8L (Left-hand toolholder)	FH-2	**SDJC$^{R}_{L}$0808F-07FF**	120	Clamping system is different.	**E28**
	ADJC$^{R}_{L}$1010K-07F	125				**ADJC$^{R}_{L}$1010JX-07FF**	120		
	ADJC$^{R}_{L}$1010K-11F	125	LPF-13			**ADJC$^{R}_{L}$1010JX-11FF**	120		
	ADJC$^{R}_{L}$1212M-11F	150				**ADJC$^{R}_{L}$1212JX-11FF**	120		
	ADJC$^{R}_{L}$1616M-11F	150	LPF-17			**ADJC$^{R}_{L}$1616JX-11FF**	120		
	ADNCR0810K-07F	125	LPF-11	HSB4X8R	FH-2	**-**	-	No Alternative	**-**
	ADNCR1010K-07F	125				**SDNCN1010JX-07**	120	Clamping system is different. Neutral	**E33**
	ADNCR1010K-11F	125	LPF-13			**SDNCN1010JX-11**	120		
	ADNCR1212M-11F	150				**SDNCN1212JX-11**	120		
	ADNCR1616M-11F	150	LPF-17			**SDNCN1616JX-11**	120		
VB..	**AVJB$^{R}_{L}$1010K-11F**	125	LPF-11	HSB4X8R (Right-hand toolholder) HSB4X8L (Left-hand toolholder)	FH-2	**AVJB$^{R}_{L}$1010JX-11FF**	120		**E36**
	AVJB$^{R}_{L}$1212M-11F	150	LPF-1113			**AVJB$^{R}_{L}$1212JX-11FF**	120		
	AVJB$^{R}_{L}$1616M-11F	150	LPF-1117			**AVJB$^{R}_{L}$1616JX-11FF**	120		
	AVVB$^{R}_{L}$1010K-11F	125	LPF-11	HSB4X8R (Right-hand toolholder) HSB4X8L (Left-hand toolholder)	FH-2	**SVVBN1010JX-11**	120	Clamping system is different. Neutral	**E38**
	AVVB$^{R}_{L}$1212M-11F	150	LPF-1113			**SVVBN1212JX-11**	120		
	AVVB$^{R}_{L}$1616M-11F	150	LPF-1117			**SVVBN1616JX-11**	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Small Parts Machining (Screw Clamp)

Insert Description	Conventional Toolholder				Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	See Page
								
ABS.. 40	SABSR0810K-40F	125	SB-3080TR	FT-10	-	-	No Alternative	-
	SABSR1010K-40F	125			SABSR1010JX-40F	120		E21
	SABSR1212M-40F	150			SABSR1212JX-40F	120		
	SABSR1616M-40F	150			SABSR1616JX-40F	120		
ABW.. 40	SABWR0810K-40F	125	SB-3080TR	FT-10	-	-	No Alternative	-
	SABWR1010K-40F	125			SABWR1010JX-40F	120		E22
	SABWR1212M-40F	150			SABWR1212JX-40F	120		
	SABWR1616M-40F	150			SABWR1616JX-40F	120		
ABW.. 50	SABWR0810K-50F	125	SB-3080TR	FT-10	-	-	No Alternative	-
	SABWR1010K-50F	125			SABWR1010JX-50F	120		E23
	SABWR1212M-50F	150			SABWR1212JX-50F	120		
	SABWR1616M-50F	150			SABWR1616JX-50F	120		
CC..	SCACR/L0808K-06	125	SB-2570TR	FT-8	SCLCR/L0808F-06FF	85	Cutting edge angle is different.	E26
	SCACR/L1010K-06	125			SCLCR/L1010JX-06FF	120		
	SCACR/L1010K-09	125	SB-4085TR	FT-15	SCLCR/L1010JX-09FF	120		
	SCACR/L1212M-09	150			SCLCR/L1212JX-09FF	120		
	SCACR/L1616M-09	150			SCLCR/L1616JX-09FF	120		
	SCACR1212F-09FF	85	SB-4085TR	FT-15	SCLCR1212JX-09FF	120		
	SCLCR/L0808E-06	70	SB-2570TR	FT-8	SCLCR/L0808F-06FF	85		
DC..	SDJCR/L0808F-07F	80	SB-2570TR	FT-8	SDJCR/L0808F-07FF	85		E28
	SDJCR/L1010F-07F	80			SDJCR/L1010JX-07FF	120		
	SDJCR/L1010F-11F	80	SB-4085TR	FT-15	SDJCR/L1010JX-11FF	120		
	SDJCR/L1212H-11F	100			SDJCR/L1212JX-11FF	120		
	SDJCR/L1616H-11F	100			SDJCR/L1616JX-11FF	120		
	SDLCR/L1010F-07FF	80	SB-2570TR	FT-8	SDLCR/L1010JX-07FF	120		E32
	SDLCR/L1212H-07FF	100			SDLCR/L1212F-07FF	85	Short length type	
					SDLCR/L1212JX-07FF	120		
	SDLCR/L1616H-07FF	100			SDLCR/L1616JX-07FF	120		
	SDLCR/L1212F-11FF	85	SB-4085TR	FT-15	SDLCR/L1212JX-11FF	120		
	SDLCR/L1212H-11FF	100						
	SDLCL1616H-11FF	100			SDLCL1616JX-11FF	120		
	SDNCR/L1010F-07F	80	SB-2570TR	FT-8	SDNCR/L1010JX-07F	120		E33
	SDNCR/L1010F-11F	80	SB-4085TR	FT-15	SDNCR/L1010JX-07F	120	Insert size is different.	
					SDNCN1010JX-11	120	Neutral	
	SDNCR/L1212H-11F	100	SB-4085TR	FT-15	SDNCN1212F-11	85	Neutral Short length type	
					SDNCN1212JX-11	120	Neutral	
	SDNCR/L1616H-11F	100	SB-4085TR	FT-15	SDNCN1616JX-11	120	Neutral	
	SDNCN0808E-07	70	SB-2570TR	FT-8	SDNCN0808F-07	85		
	SDNCN1010F-07	80			SDNCN1010JX-07	120		
	SDNCN1212H-07	100			SDNCN1212JX-07	120		
	SDNCN1212H-11	100	SB-4085TR	FT-15	SDNCN1212F-11	85	Short length type	
					SDNCN1212JX-11	120		
	SDXCR/L1010F-07	80	SB-2570TR	FT-8	SDXCR/L1010JX-07	120		E32
	SDXCR/L1010F-11	80	SB-4085TR	FT-15	SDXCR/L1010JX-11	120		
	SDXCR/L1212H-11	100			SDXCR/L1212JX-11	120		
	SDXCR/L1616H-11	100			SDXCR/L1616JX-11	120		
DP..	SDLPR/L0808F-07F	80	SB-2570TR	FT-8	SDLPR/L0808F-07FF	85		E34
	SDLPR/L1010F-07F	80			SDLPR/L1010JX-07FF	120		
	SDLPR/L1010F-11F	80	SB-4085TR	FT-15	SDLPR/L1010JX-11FF	120		
	SDLPR/L1212F-11FF	85						
	SDLPR/L1212H-11F	100			SDLPR/L1212JX-11FF	120		
	SDLPR/L1616H-11F	100			SDLPR/L1616JX-11FF	120		
TC..	STGCR/L0808E-08	70	SB-2050TR	FT-6	-	-	No Alternative	-
TP..	STGPR/L1010F-08	80	SB-2050TR	FT-6	-	-	No Alternative	-

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Small Parts Machining (Screw Clamp)

Insert Description	Conventional Toolholder				Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	See Page
								
VB..	SVJB[R/L]1010F-11F	80	SB-2570TR	FT-8	SVJB[R/L]1010JX-11FF	120		E36
	SVJB[R/L]1212H-11F	100			SVJB[R/L]1212JX-11FF	120		
	SVJB[R/L]1616H-11F	100			SVJB[R/L]1616JX-11FF	120		
	SVPB[R/L]1010F-11	80	SB-2570TR	FT-8	SVPB[R/L]1010JX-11	120		E37
	SVPB[R/L]1212H-11	100			SVPB[R/L]1212JX-11	120		
	SVPB[R/L]1616H-11	100			SVPB[R/L]1616JX-11	120		
	SVVBN1212H-11	100	SB-2570TR	FT-8	SVVBN1212JX-11	120		E38
VP..	SVLP[R/L]1010F-08FF	80	SB-2050TR	FT-6	SVLP[R/L]1010JX-08FF	120		E41
	SVLP[R/L]1212H-08FF	100			SVLP[R/L]1212F-08FF	85	Short length type	
					SVLP[R/L]1212JX-08FF	120		
	SVLP[R/L]1616H-08FF	100			SVLP[R/L]1616JX-08FF	120		
	SVLP[R/L]1010F-11F	80	SB-2570TR	FT-8	SVLP[R/L]1010JX-08FF	120	Insert size is different.	
	SVLP[R/L]1212H-11F	100			SVLP[R/L]1212F-11FF	85	Short length type	
					SVLP[R/L]1212JX-11FF	120		
	SVLP[R/L]1616H-11F	100			SVLP[R/L]1616JX-11FF	120		
	SVPPR1010F-11	80	SB-2570TR	FT-8	SVPBR1010JX-11	120	Insert relief angle is different.	E37
					SVPPR1010JX-11FF		Without Offset	E42
	SVPPR1212H-11	100			SVPBR1212JX-11	120	Insert relief angle is different.	E37
					SVPPR1212JX-11FF		Without Offset	E42
	SVPPR1616H-11	100			SVPBR1616JX-11	120	Insert relief angle is different.	E37
					SVPPR1616JX-11FF		Without Offset	E42
	SVPPL1616H-11	100	SB-2570TR	FT-8	SVPBL1616JX-11	120	Insert relief angle is different.	E37

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Small Parts Machining (Screw Clamp) Toolholders for Back Turning

Insert Description	Conventional Toolholder				Alternative Toolholder			
	Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Description	Overall length (mm)	Remarks	See Page
								
TKFB..	KTKF[R/L]1010K-12	125	SB-4590TRWN	LTW-10S	KTKF[R/L]1010JX-12	120		E13
	KTKF[R/L]1212M-12	150			KTKF[R/L]1212JX-12	120		
	KTKF[R/L]1616M-12	150			KTKF[R/L]1616JX-12	120		
	KTKF[R/L]1010K-16	125			KTKF[R/L]1010JX-16	120		
	KTKF[R/L]1212M-16	150			KTKF[R/L]1212JX-16	120		
	KTKF[R/L]1616M-16	150			KTKF[R/L]1616JX-16	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size. Make sure of their specifications by referring to the catalog or other documents.

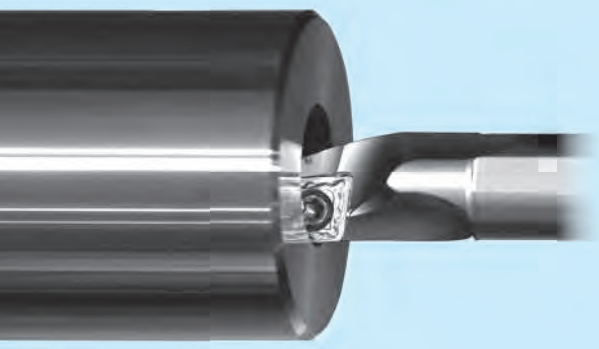


Boring

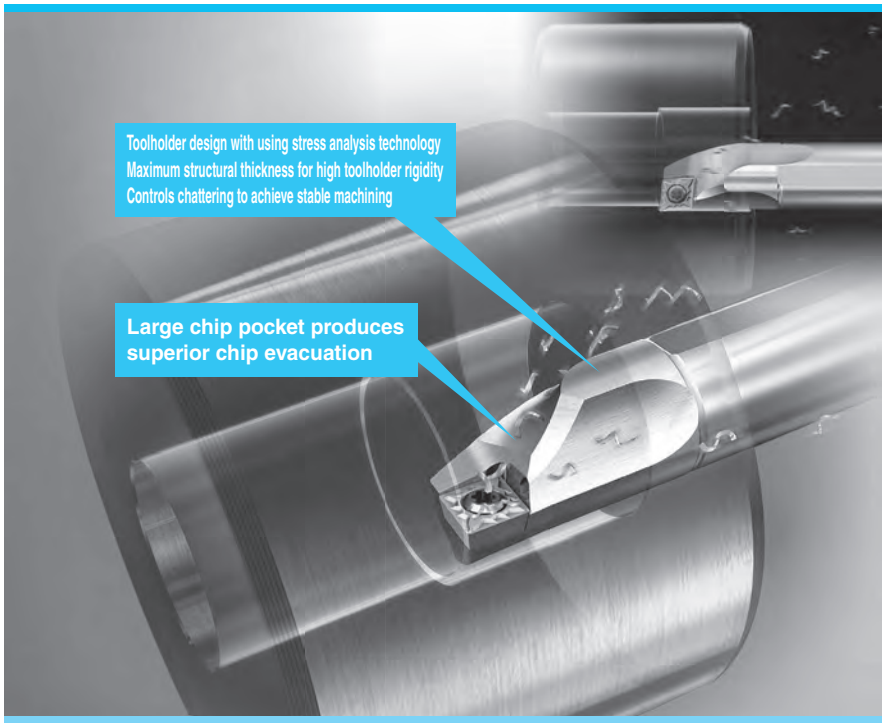
F

F1~F94

Product Introduction		**F2~F5**
Identification System / Product Lineup		**F6~F11**
Solid Tip-Bars for Micro Boring		**F12~F39**
EZ Bars	EZB-HP / EZB-ST / EZB-NB EZBF / EZVB / EZBT	F14
EZ Bar PLUS	S/C-SCLC, S/C-STLB(P), S/C-SWUB	F23
System Tip-Bars	VNB-S / VNB / VNBT / VNBX-S	F32
Twin-Bars	TWB / TWBT	F38
Boring Bars for Positive Inserts		**F40~F63**
CC□□Insert		F40
CP□□Insert		F42
DC□□Insert		F44
JC□□Insert		F48
TC□□Insert		F49
TB / TP□□Insert		F50
VB / VC / VP□□Insert		F54
WB / WP□□Insert		F60
SP□□Insert		F62
TP□□Insert (without Hole)		F63
Boring Toolholders for Bearing Machining (Square Shank)		**F64**
AD Bars		**F65~F68**
CN□□Insert		F65
DN□□Insert		F66
TN□□Insert		F66
CC□□Insert		F67
DC□□Insert		F67
Boring Adapter (with Coolant Hole / Anti-vibration Dampener System)		F68
Boring Bars for Negative Inserts		**F69~F80**
CN□□Insert		F69
DN□□Insert		F71
SN□□Insert		F75
TN□□Insert		F76
WN□□Insert		F78
Boring Bars for Ceramic Tools / Boring Bars for Solid CBN Tools		**F81**
Sleeves		**F82~F86**
EZH-CT / EZH-HP / EZH-ST		F82
SHA / SH / SHC / SJS		F84
Assembly (AS) List / Former Parts List		**F87**
Alternative Toolholder Reference Table for Boring Bar		**F88~F91**
Recommended Cutting Conditions		**F92~F94**
Parts Compatibility of Lever Lock Toolholders		**R55**



Dynamic Bar

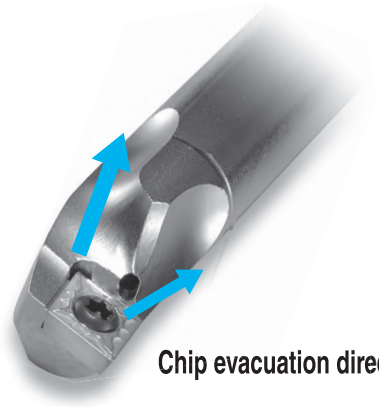


Dynamic design by using the latest computer simulation technology

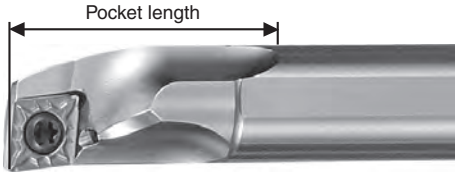
Superior chip evacuation (External coolant)

	Dynamic Bar	Competitor A	Competitor B
Inside the workpiece			

In the products of competitor A and B chips remain inside the workpiece, but chips from the Dynamic Bar are all evacuated from the workpiece.

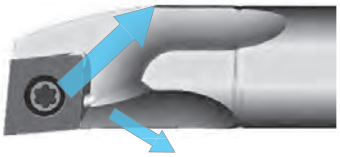
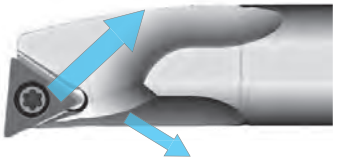


Comparison of pocket length



Description	Pocket length (mm)	
	Dynamic Bar	Competitor A
A16-SCLPR09-18 type	37	29
A20-SCLCR09-22 type	48	32

Chip evacuation direction

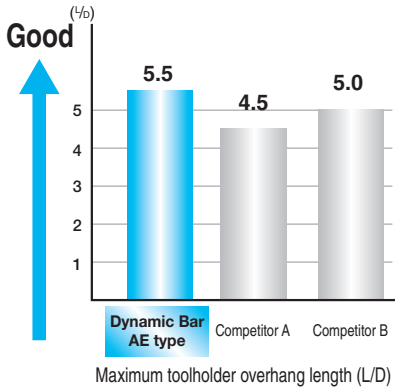
SCLC(P) type	STLB(P) type
	
Better evacuation by backward chip flow	

The Dynamic Bar achieves superior chip evacuation

High rigidity and chattering resistance are ensured by using a special alloy and with help of stress analysis technology.

Previously unattained surface finish and dimensional accuracy are now achieved.

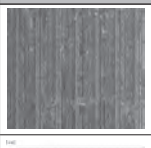
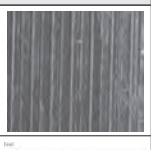
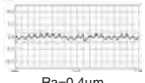
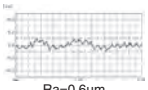
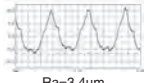
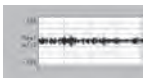
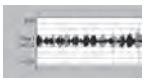
Comparison of vibration tendency



<Cutting Conditions>
SCM415
Vc=150m/min
ap=0.5mm
f=0.1mm/rev
S16-SCLPR09 type
CPMH090304L-Y

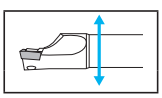
Comparison of surface finish

Vibration of the Dynamic Bar was minimal even at high cutting speeds, enabling stable machining.

	Dynamic Bar	Competitor A	Competitor B
Surface wall			
Surface Roughness	 Ra=0.4μm Rz=2.3μm	 Ra=0.6μm Rz=3.6μm	 Ra=3.4μm Rz=14.0μm
Oscillatory waveform			

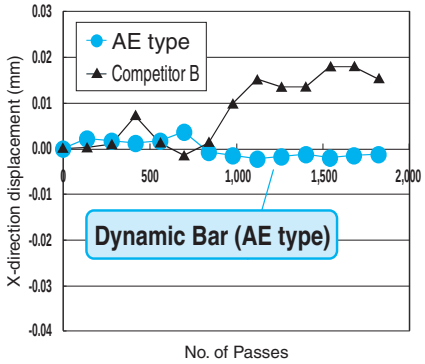
<Cutting Conditions>
SCM415
Vc=210m/min
ap=0.5mm
f=0.1mm/rev
A16Q-SCLPR09-18 type
CPMT090304XP(PV7020)
L/D=4
External coolant

Direction of vibration measurement



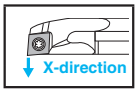
Cutting Point Precision

The AE Dynamic Bar maintains precise cutting edge positional accuracy through the use of a special alloy, thereby achieving high precision machining.



<Cutting Conditions>
SCM435
Vc=180m/min
ap=2mm
f=0.2mm/rev
S/A16Q-SCLPR09-18 type
CPMH090308(CA5525)
L/D=4
External coolant

Direction of measurement



Toolholder Lineup

· Excellent Bar (AE type)

Excellent Bar with coolant hole (internal coolant) (A..AE) enables better chip evacuation.



· Steel Shank Bar

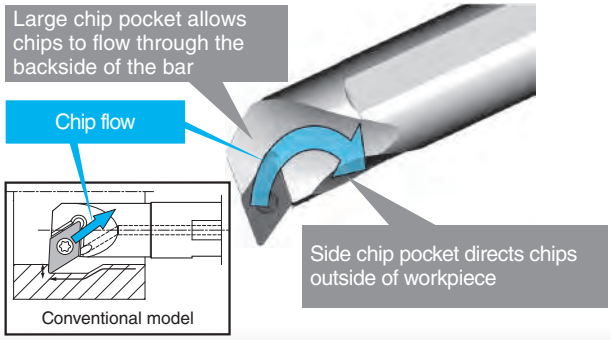
The steel shank bar (without coolant hole) provides superior cost performance



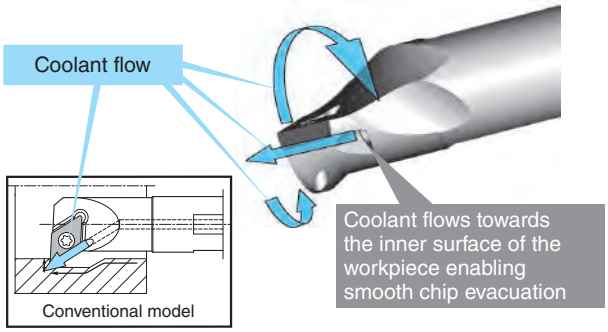
Advantages of Dynamic Bar SDUC

New design and concept focusing on chip evacuation

New design **Streamlined pocket enables effective chip evacuation**



New concept **Coolant flows toward the workpiece's inner surface**



AD Bars Interchangeable Head Boring Bars with Anti-vibration Dampener System F65

The AD (Advanced Dampener) system enables a maximum overhang of 6 times L/D.
Highly efficient machining : The anti-vibration dampener effect enables large cutting-depths and high feed rates.
Applicable for a variety of machining conditions due to the interchangeable head design.







Double Clamp Boring Bars for Negative Inserts

Stable machining is realized in Double Clamp and Direction adjustment mechanism coolant hole.

● **Improved Clamping Rigidity**

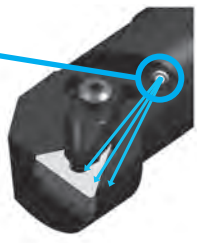
Firmly clamp the insert in two directions with one action. Along with improving the accuracy of the insert position, long tool life can be achieved.



● **Direction adjustment mechanism coolant hole**

Discharge direction of coolant is adjustment flexible focusing on coolant to edge reliably builds up.

*Not applicable to high-pressure coolant.



Nozzle setting

Adjust by using wrench etc. that enters ø2.5 or less holes.



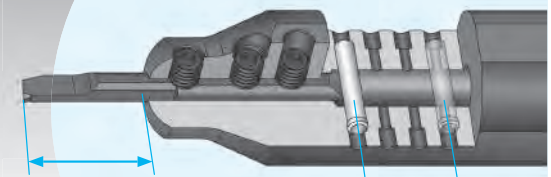
Easy adjustment and high precision EZ Bars

Kyocera's original EZ adjust structure
- Easy adjustment and high precision
- EZ Bars prevent deviation with high-rigidity clamping

Wide range of items applicable to various applications
MEGACOAT PR1225 for stable machining and extended tool life



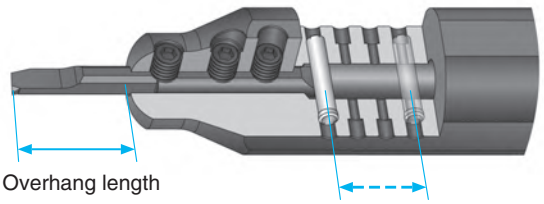
Kyocera's original EZ adjust structure



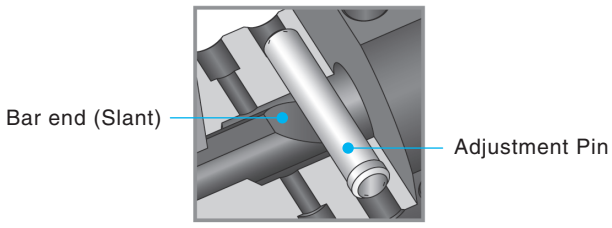
EZ adjust structure

Bar overhang is adjustable by replacing adjustment pin.
Internal coolant sleeve (EZH-CT) is available.

1 Easy adjustment and high precision



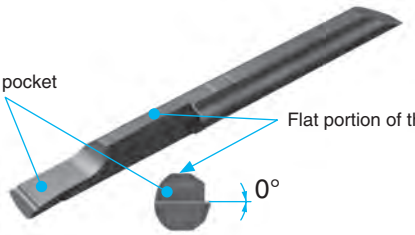
Excellent clamping force



Bar is firmly clamped on the slanted end by the Adjustment Pin

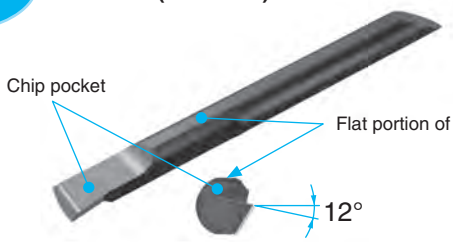
2 2 types of bars

Precision-oriented — **HP (High precision)**



F14

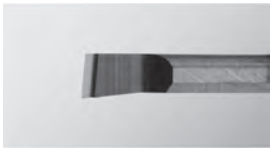
Cost-oriented — **ST (Standard)**



F16

* Chip pocket angles are different.
* Even when using a same sleeve, the Min. Bore Dia. can be different depending on which bar to attach.

3 3 Chipbreakers for various applications

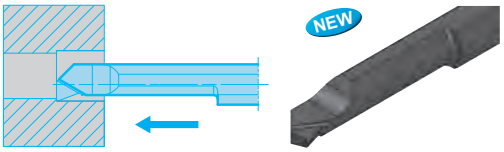
H Chipbreaker (Without lead angle)	F Chipbreaker (With lead angle)	NB (Without Chipbreaker)
		
Tough edge (General purpose)	Sharp cutting (For finishing)	Non-ferrous Metals

· 2 types of corner-R for each chipbreaker
H Chipbreaker : 0.08mm, 0.15mm
F Chipbreaker : 0.05mm, 0.15mm
NB (Without Chipbreaker) : 0.05mm(PR1225)
0.035mm(PCD·CBN)

* Lineup depend on description

Large Lineup for Various Applications

90° Lead Angle EZBF



Creates a finished surface against the bore face



General Boring

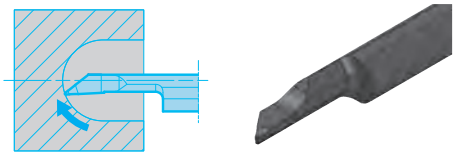
No up facing



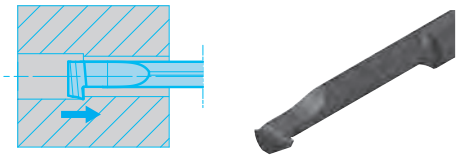
90°Lead Angle Boring

Max. D.O.C.:1.0mm(ø3.0)

Internal Facing · Internal Profiling EZVB



Back Boring EZBT



EZ Bar PLUS

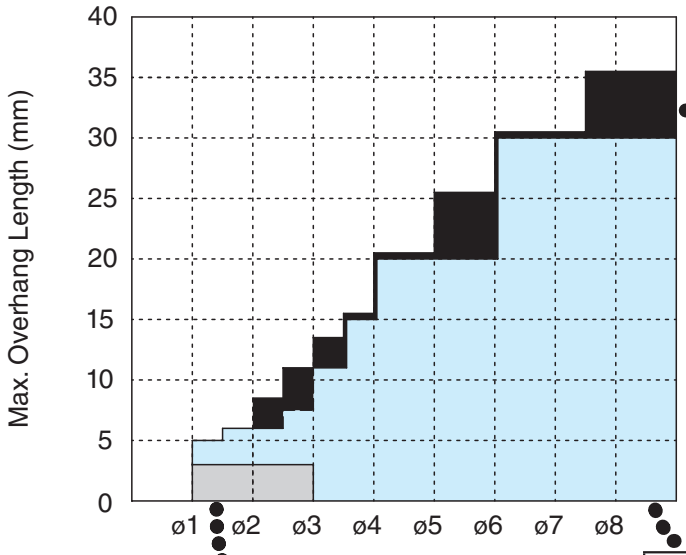
High Precision Solid Bar with Convenience of Indexable Inserts
Reduce Machining Costs



Indexable type
Minimum Bore Diameter 5 mm

● Guide for usage (Adjustable overhang type)

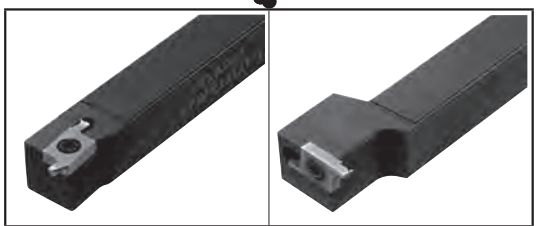
Solid Tip-Bars Type : Min. Bore Dia. ø1~



Easy adjustment and high precision
EZ Bars



→F12



Twin-Bars →F38~F39



SVN →F34

Square Shank (Straight)



S-SVN →F35

Round Shank (Standard)



SVNS →F34

System Tip-Bars →F32

Boring Bar Identification System (Round Shank)

Shank Type	Bar Length	Clamping System	Insert Shape	Hand of Tool	Others
S Steel A Steel (with Coolant Hole) C Carbide E Carbide (with Coolant Hole)	F : 80, G : 90, H : 100, J : 110, K : 125, L : 140, M : 150, N : 160, P : 170 Q : 180, R : 200, S : 250, T : 300, U : 350, V : 400, W : 450, Y : 500, X : Special	C : Top Clamp M : Multi Lock P : Pin Lock or Lever Lock S : Screw Clamp W : Wedge Lock	C : 80˚Rhombic D : 55˚Rhombic J : 70˚Rhombic R : Round S : 90˚Square T : 60˚Triangle V : 35˚Rhombic W : 80˚Trigon	R : Right-hand L : Left-hand	Manufacture's Option: Optional Mark or Number Example A(N) : Dynamic Bar AE : Excellent Bar which is Dynamic Bar type E : Excellent Bar

S	12	M	-	S	C	L	P	R	09	-	16	
	Shank Dia.			Cutting Edge Angle			Insert Relief Angle		Insert Size		Min. Bore Dia.	

Cutting Edge Angle: F (90˚), K (75˚), L (95˚), P (117.5˚), Q (107.5˚), S (45˚), U (93˚), W (60˚), Y (85˚), X (110˚), Z (93˚(95˚))

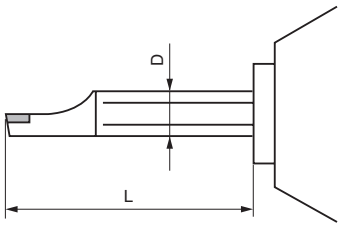
Insert Relief Angle: AN
B : 5˚Positive
C : 7˚Positive
D : 15˚Positive
E : 20˚Positive
N : 0˚Negative
P : 11˚Positive

Insert Size: C, D,J,Y, S, T, R, V (L)

● Anti-vibration interchangeable head mechanism Boring Bar "AD Bars" for the identification system for boring bars with interchangeable head see page F65

Guide Line for Overhang Length of Boring Bar (Workpiece Material : S45C)

Overhang Length (L / D)	Shank Material
3	Steel
4	Steel (Dynamic Bar)
5	Excellent
5.5	Excellent (Dynamic Bar)
6	AD Bars (with Anti-vibration Dampener System)
7	Carbide



Carbide Shank Boring Bar

◯ Short Shank Series

Short Shank Types with length of 1/2 and 2/3 of standard type are available. (-1/2 or -2/3 is shown at the end of the description).
When installing on machines, no additional machining (to change toolholder length) is required.


Standard Size

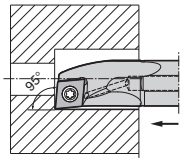
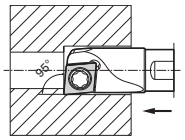
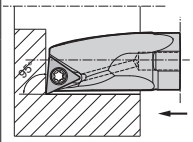
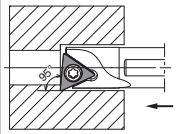
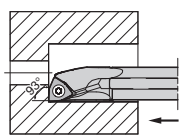
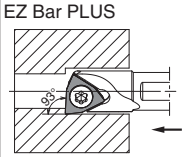

2/3 Size


1/2 Size

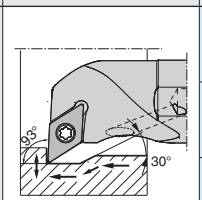
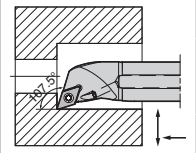
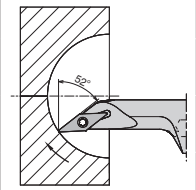
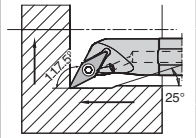
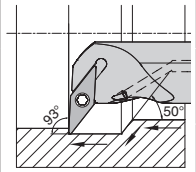
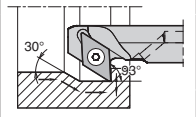
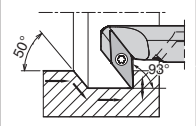
Solid Tip-Bars for Micro Boring

Applications	Solid Tip-Bars Type	Shape	Shank Type Max. Overhang Length (L/D)	Min. Bore Dia. DMIN 1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	See Page for Toolholders	Summary
Boring	**EZB-HP** EZ Bars → F14		Solid L/D=~5			●	●	●	●	●	●	●		●		●		●	F26~F31	
	EZB-HP-LT EZ Bars (Long Type) → F14		Solid			●	●	●	●	●		●		●						
	EZB-ST EZ Bars → F16		Solid L/D=~5			●	●	●	●	●	●		●		●		●			
	EZB-NB EZ Bars (PR1225/GW05) → F17		Solid L/D=~5			●	●	●	●	●	●		●		●		●			
	CBN **EZB-NB** EZ Bars PCD → F17		Solid L/D=~5					●		●		●		●		●				
	TWB Twin-Bars → F38		Solid	●	●	●	●	●											F38	
	TWBT Twin-Bars → F39		Solid	●	●	●	●	●											F39	
	VNB-S System Tip-Bars → F32		Solid	●	●	●	●	●	●	●									F34 F35	
	VNB System Tip-Bars → F33		Solid			●		●		●		●		●		●				
	VNBX-S System Tip-Bars → F36		Solid	●	●	●		●	●	●									F37	
90° Lead Angle	NEW **EZBF** → F19		Solid					●		●		●		●					F26~F31	
Copying	**EZVB** EZ Bars → F20		Solid						●		●		●		●				F27~F31	
Back Boring	NEW **EZBT** EZ Bars → F22		Solid							●		●							F27~F31	
	VNBT System Tip-Bars → F33		Solid							●		●							F34 F35	

Dynamic Bar / EZ Bar PLUS

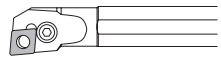
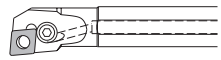
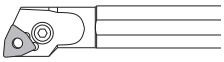
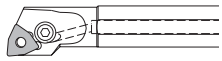
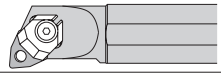
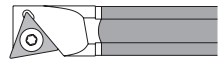
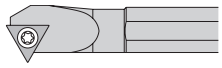
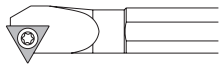
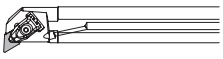
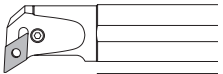
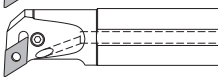
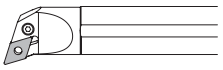
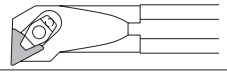
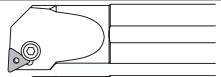
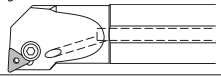
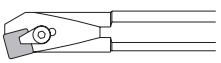
Applications	Shape	Boring Bar Type	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Min. Bore Dia. DMIN 5	6	7	8	10	12	13	14	16	18	20	22	23	25	26	27	30	31	32	34	40	50	See Page for Toolholders
Boring / Internal Facing		A...SCLC-AE	Excellent L/D=~5.5	●						●	●		●		●		●				●							F41
		S...SCLC-AE	Excellent L/D=~5.5		○	●	●	●	●																			
		S...SCLC-A	Steel L/D=~4		○					●	●		●		●		●				●							
		C...SCLC-AN	Carbide L/D=~7		○	●	●	●	●																			
		E...SCLC-A(N)	Carbide L/D=~7	●						●	●		●		●		●				●							
		A...SCLP-AE	Excellent L/D=~5.5	●							●		●	●	●		●				●							F43
		S...SCLP-A	Steel L/D=~4		○						●		●	●	●		●				●							
		E...SCLP-A(N)	Carbide L/D=~7	●							●		●	●	●		●				●							
	EZ Bar PLUS 	S...SCLC-EZ(P)	Steel L/D=~3		○	●	●	●	●	●																	F23
		C...SCLC-EZ(P)	Carbide L/D=~5		○	●	●	●	●	●																	
		A...STLP-AE	Excellent L/D=~5.5	●						●	●		●	●	●		●		●		●							F51
		S...STLB-AE			○				●																			
		S...STLB(P)-A	Steel L/D=~4		○				●	●	●		●	●	●		●				●							
		E...STLP-A(N)	Carbide L/D=~7	●						●	●		●	●	●		●		●		●							
		C...STLB-AN			○				●																			
		A...STLC-AE	Excellent L/D=~5.5	●						●	●		●		●		●											F49
		S...STLC-A	Steel L/D=~4		○					●	●		●		●		●											
	EZ Bar PLUS 	S...STLB(P)-EZP	Steel L/D=~3		○				●	●																	F22
		C...STLB(P)-EZP	Carbide L/D=~5		○				●	●																	
Boring		S...SWUB-AE	Excellent L/D=~5.5		○		●	●	●																			F61
		A...SWUB(P)-AE	Excellent L/D=~5.5	●						●	●		●		●		●											
		S...SWUB(P)-A	Steel L/D=~4		○		●	●	●	●	●		●		●		●											
		C...SWUB-AN	Carbide L/D=~7		○		●	●	●																			
		E...SWUB(P)-A(N)	Carbide L/D=~7	●						●	●		●		●		●											
	EZ Bar PLUS 	S...SWUB-EZP	Steel L/D=~3		○		●	●	●																		F23
		C...SWUB-EZP	Carbide L/D=~5		○		●	●	●																			

Dynamic Bar

Applications	Shape	Boring Bar Type	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Min. Bore Dia. DMIN 5	6	7	8	10	12	13	14	16	18	20	22	23	25	26	27	30	31	32	34	40	50	See Page for Toolholders
Copying		**A...SDUC-AE**	Excellent L/D=~5.5	●									●	●		●		●			●			●				**F45**
		S...SDUC-A	Steel L/D=~4		○								●	●		●		●			●			●				
		E...SDUC-A	Carbide L/D=~7	●									●	●		●		●			●			●				
		**A...SDQC-AE**	Excellent L/D=~5.5	●								●		●		●			●			●						**F46**
		S...SDQC-A	Steel L/D=~4		○							●		●		●			●			●						
		E...SDQC-A	Carbide L/D=~7	●								●		●		●			●			●						
		**A...SVJB(C)-AE**	Excellent L/D=~5.5	●										●		●			●			●				●	●	**F54**
		A...SVJP-AE		●										●														
		S...SVJB(C)-A	Steel L/D=~4		○									●		●			●			●				●	●	
		S...SVJP-A			○									●														
		**A...SVPC(B)-AE**	Excellent L/D=~5.5	●									●		●		●			●			●			●		**F56**
		S...SVPC(B)-A	Steel L/D=~4		○								●		●		●			●			●			●		
		E...SVPC(B)-A	Carbide L/D=~7	●									●		●		●			●			●					
		**A...SVUB(C)-AE**	Excellent L/D=~5.5	●										●		●			●						●	●		**F59**
		S...SVUB(C)-A	Steel L/D=~4		○									●		●			●						●	●		
		E...SVUB(C)-A	Carbide L/D=~7	●											●				●		●	29			●			
Back Copying		**A...SDZC-AE**	Excellent L/D=~5.5	●									●	●		●		●			●			●				**F47**
		S...SDZC-A	Steel L/D=~4		○								●	●		●		●			●			●				
		E...SDZC-A	Carbide L/D=~7	●									●	●		●		●			●							
		**A...SVZB(C)-AE**	Excellent L/D=~5.5	●										●		●			●						●	●		**F59**
		S...SVZB(C)-A	Steel L/D=~4		○									●		●			●						●	●		

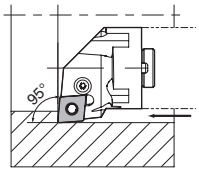
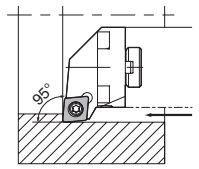
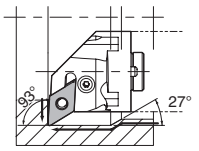
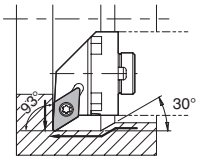
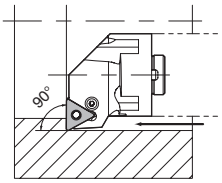
For Min. Bore Dia. øA, the figure under ● may be applied depending on the toolholder type.

Boring Bars

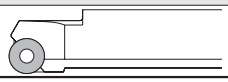
Applications	Boring Bar Type	Shape	Shank Type / Max. Overhang Length (L/D)	Coolant Hole: Yes	Coolant Hole: No	Insert Type	Min. Bore Dia. DMIN: 5	6	7	8	10	12	14	16	18	20	25	30	32	40	50	63	See Page for Toolholders
Boring / Internal Facing	A...DCLN12		Steel L/D=~3	●		Negative													●	●	●		F69
	S...PCLN○○		Steel L/D=~3		○	Negative										●	● 27		●	●	●		F70
	A...PCLN09		Steel L/D=~3	●		Negative										●	● 27		●				
	A...DWLN08		Steel L/D=~3	●		Negative													●	●	●		F79
	S...PWLN○○		Steel L/D=~3		○	Negative										●	● 27		●	●	●		F78 F80
	A...PWLN06		Steel L/D=~3	●		Negative										●	● 27		●				F78
	S...WWLN08-E		Excellent L/D=~5		○	Negative											● 28		● 34	●			F80
	C...STXP(B)		Carbide L/D=~7		○	Positive			● 7.5	● 9	● 11												F53
	C...SJLC		Carbide L/D=~7		○	Positive	● 5.5																F48
Copying	S...STWP-E		Excellent L/D=~5		○	Positive						●		●		●	●		●				F52
	S...STWP		Steel L/D=~3		○	Positive						●		●		●	●						
	A...DDUN15		Steel L/D=~3	●		Negative														●	●	●	F72
	S...PDUN11		Steel L/D=~3		○	Negative											● 27		●	●			F71
	A...PDUN11		Steel L/D=~3	●		Negative											● 27		●	●			
	S...PDUN15		Steel L/D=~3		○	Negative													●	● 44	● 54		F73
	S...PDQN15		Steel L/D=~3		○	Negative													●	● 44	● 54		F73
Back Copying	C...STZB		Carbide L/D=~7		○	Positive				● 8.5													F53
	C...SJZC		Carbide L/D=~7		○	Positive		● 6.5															F48
	S...PDZN15		Steel L/D=~3		○	Negative													●	● 44	● 54		F73
Boring	S...CTUP		Steel L/D=~3		○	Positive								●		●	● 27		● 34	● 43	●		F63
	A...DTFN○○		Steel L/D=~3	●		Negative													●	●	●		F76
	S...PTUN○○		Steel L/D=~3		○	Negative										●	●	●	●	●	●		F77
	A...PTUN11		Steel L/D=~3	●		Negative										●	●		●				
	A...DSKN12		Steel L/D=~3	●		Negative													●	●	●		F75
	S...SSKP		Steel L/D=~3		○	Positive										●							F62
	S...CSKP		Steel L/D=~3		○	Positive										●	● 27		● 34				

For Min. Bore Dia. øA, the figure under ● may be applied depending on the toolholder type.

AD Bars Interchangeable Head Boring Bars with Anti-vibration Dampener System

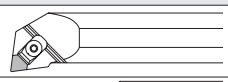
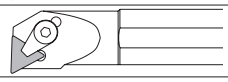
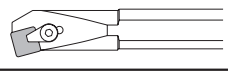
Applications	Boring Bar Type	Shape	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Insert Type	Min. Bore Dia. DMIN 7	8	10	12	14	16	18	20	25	30	32	40	43	50	63	See Page for Toolholders
Boring / Internal Facing	**HA-PCLN12**		Anti-vibration Dampener System L/D=~5.5	●		Negative												●		●	●	F65
	HA-SCLC09		Anti-vibration Dampener System L/D=~6	●		Positive												●				F67
Copying	**HA-PDUN15**		Anti-vibration Dampener System L/D=~6	●		Negative													●	●	●	F66
	HA-SDUC11		Anti-vibration Dampener System L/D=~6	●		Positive												●				F67
Boring	**HA-PTFN16**		Anti-vibration Dampener System L/D=~6	●		Negative												●		●	●	F66

Boring Toolholders for Bearing Machining (Square Shank)

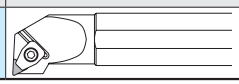
Applications	Boring Bar Type	Shape	Min. Bore Dia. DMIN 20	25	30	32	40	50	See Page for Toolholders
Boring	**SRCP-B**		●			●			F64

Applications	Boring Bar Type	Shape	Min. Bore Dia. DMIN 20	25	30	32	40	50	See Page for Toolholders
Round-Chamfering	**CBSN-B**		●						F64

Boring Bars for Ceramic / Solid CBN Tools (L/D=~3)

Applications	Boring Bar Type	Shape	Min. Bore Dia. DMIN 16	18	20	25	30	32	40	50	See Page for Toolholders
Boring / Internal Facing	**S-CELN**									●	F81
Boring	**S-CTUP**		●		●	● 27		● 34	● 43	●	F63
	S-CSKP				●	● 27		● 34			F62

For Min. Bore Dia. øA, the figure under ● may be applied depending on the toolholder type.

Applications	Boring Bar Type	Shape	Min. Bore Dia. DMIN 20	25	30	32	40	50	See Page for Toolholders
Boring	**S-CTUN-A**				●				F81

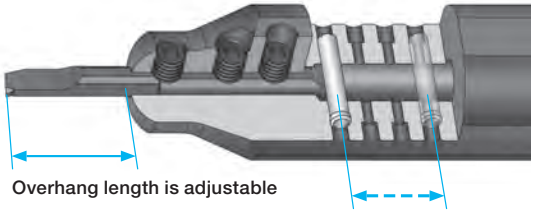
Easy adjustment and high precision EZ Bars

Kyocera's original EZ adjust structure

- **Easy adjustment and high precision**
- **EZ Bars prevent deviation with high-rigidity clamping**

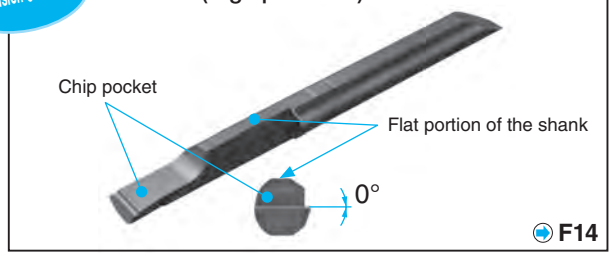
Wide range of items applicable to various applications

Kyocera's original EZ adjust structure



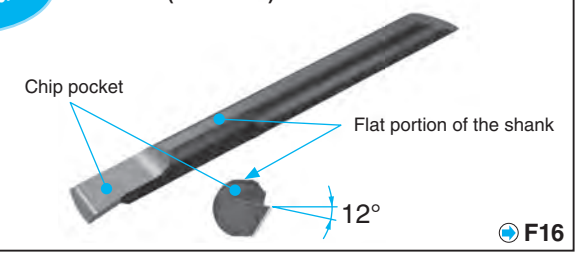
2 types of bars

Precision-oriented — **HP** (High precision)



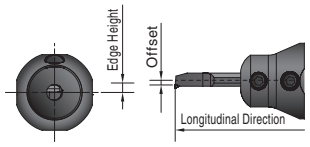
F14

Cost-oriented — **ST** (Standard)



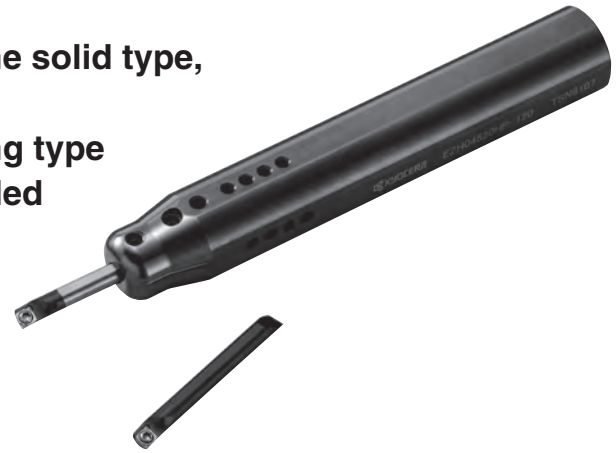
F16

● Bar Tolerance

Bar setting image	Bar Tolerance	Offset	Longitudinal Direction	Edge Height	Min. Bore Dia.
	Precision-oriented HP (High precision)	±0.025mm	±0.05mm	+0.05/0mm	Same as Shank Dia.
	Cost-oriented ST (Standard)	±0.06mm	±0.1mm	+0.06/0mm	Not same as Shank Dia.

* See Page of “Dimension” for details.

Lineup expansion along with the solid type, indexable type "EZ Bar PLUS" Left-hand insert and back boring type for the solid type are newly added



3 types of sleeve (EZH-CT , EZH-HP , EZH-ST)

EZH-CT



High precision , with coolant hole (Adjustable overhang length)

EZH-HP



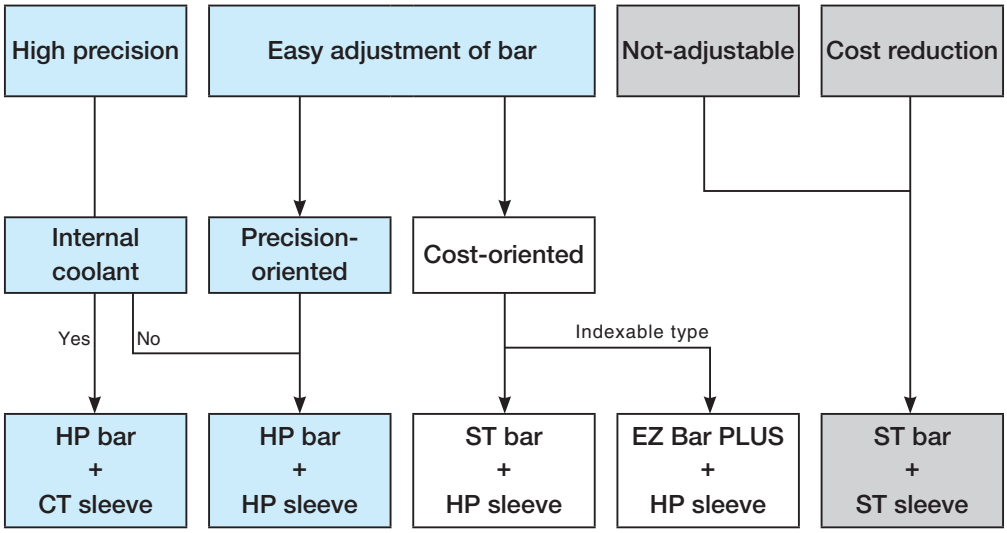
Overhang length is adjustable (Adjustable overhang length)

EZH-ST

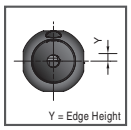


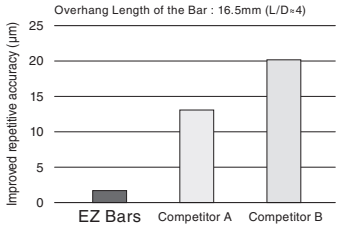
Not-adjustable

How to select bars and sleeves for each application



· Excellent repeat accuracy by the combination of HP bar + CT / HP sleeve

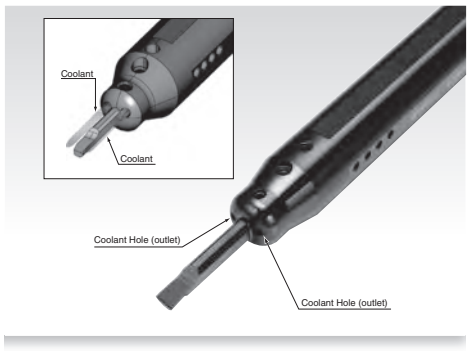




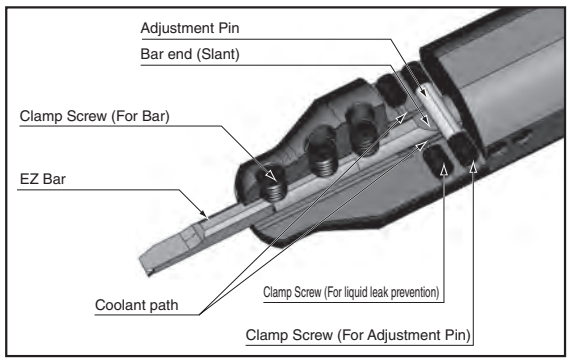
EZH-CT (high precision / with coolant hole) is added in the EZH sleeve lineup

Kyocera's unique EZ adjust structure and internal coolant system improve dimensional accuracy and surface roughness

Coolant discharge system of EZH-CT



Structure of EZH-CT



How to fix EZ Bars (EZH-CT sleeve)

● How to use adjustment pin and prevent liquid leak (Fig. 1)

(1) Put the adjustment pin into the hole according to the overhang length. Push it into the sleeve, using the wrench (LW-1.5).
(2) Tighten the clamp screw for the adjustment pin (HS3X3P, HS3X4P) using the wrench (LW-1.5) from the both sides of the sleeve.
(3) Put the clamp screws (HS3X3P, HS3X4P) into the holes for liquid leak prevention, using the wrench (LW-1.5) and fix them from the both sides of the sleeve.

● How to fix bar (Fig. 2)

(1) With the chip pocket upward, set the bar into the sleeve. Press the slant of the end of the bar with the adjustment pin. Make sure that the bar does not move (Fig. 3)
(2) Tighten the clamp screw with wrench (LW-2) and fix the bar.
(Use LW-1.5 if shank dia. is 3mm or less)

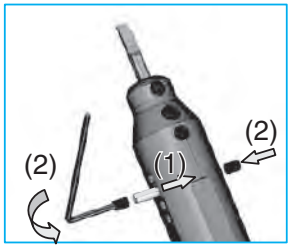


Fig. 1 How to use adjustment pin

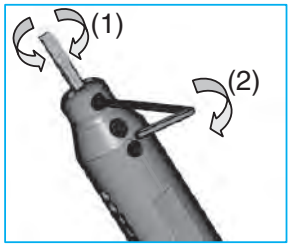


Fig. 2 How to fix bar

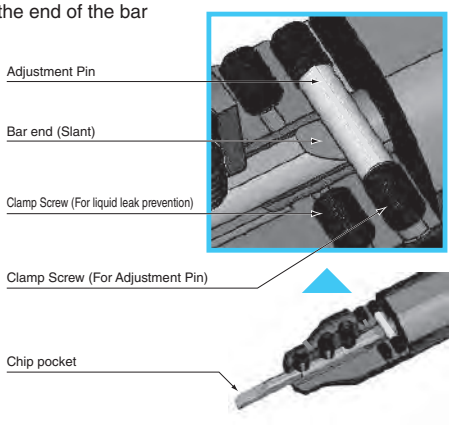
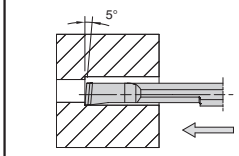


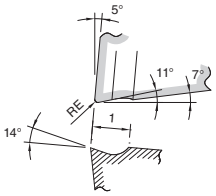
Fig. 3 Fixed bar

EZB-HP (Boring)

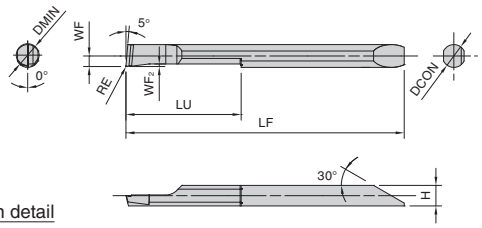


H Chipbreaker
- Without lead angle
- Tough edge (General purpose)

- Right-hand shown



Chipbreaker in detail



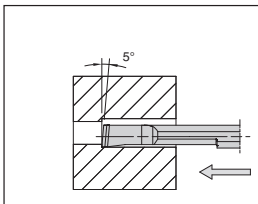
EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)							Grades				Applicable Sleeves
										MEGACOAT		Carbide		
										PR1225		GW05		F26~F31
		DMIN	DCON	H	LF	LU	WF	WF_2	RE	R	L	R	L	
EZB R/L	020020HP-008H	2	2	1.8	32	8	0.85	0.25	0.08 ±0.015	●	●	●		EZH020…
	025025HP-008H	2.5	2.5	2.3	35	10.5	1.1	0.25	0.08 ±0.015	●	●	●		EZH025…
	025025HP-015H								0.15 ±0.02	●				
	030030HP-008H	3	3	2.7	38.9	13	1.35	0.3	0.08 ±0.015	●	●	●		EZH030…
	030030HP-015H								0.15 ±0.02	●				
	035035HP-008H	3.5	3.5	3.2	41.9	15	1.6	0.4	0.08 ±0.015	●	●	●		EZH035…
	035035HP-015H								0.15 ±0.02	●				
	040040HP-008H	4	4	3.6	48.8	20	1.85	0.4	0.08 ±0.015	●	●	●		EZH040…
	040040HP-015H								0.15 ±0.02	●				
	045045HP-008H	4.5	4.5	4.1	51.1	22.5	2.1	0.5	0.08 ±0.015	●	●	●		EZH045…
	045045HP-015H								0.15 ±0.02	●				
	050050HP-008H	5	5	4.6	58.1	25	2.35	0.5	0.08 ±0.015	●	●	●		EZH050…
	050050HP-015H								0.15 ±0.02	●				
	060060HP-008H	6	6	5.6	66.1	30	2.85	0.6	0.08 ±0.015	●	●	●		EZH060…
	060060HP-015H								0.15 ±0.02	●				
	070070HP-008H	7	7	6.3	73.8	35	3.3	0.7	0.08 ±0.015	●	●	●		EZH070…
	070070HP-015H								0.15 ±0.02	●				
	080080HP-008H	8	8	7.2	84.8	40	3.75	0.8	0.08 ±0.015	●	●	●		EZH080…
	080080HP-015H								0.15 ±0.02	●				

Tolerance : Offset ±0.025mm (of the reference pin), overall length ±0.05mm, edge height +0.05/0mm
*See **F12** for details on tolerances

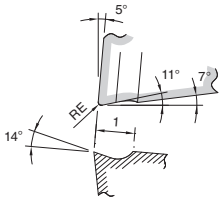
Recommended Cutting Conditions F18

EZB-HP (Boring, Long Type)

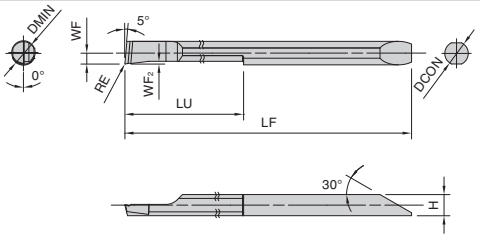


H Chipbreaker
- Without lead angle
- Tough edge (General purpose)

- Right-hand shown



Chipbreaker in detail



EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)										Grades	Applicable Sleeves
							*Overhang Length						MEGACOAT	
		DMIN	DCON	H	LF	LU	No.1	No.2	No.3	No.4	WF	WF_2	RE	PR1225	F26~F31
EZBR	020020HP-008H-LT	2	2	1.8	36	12	12.5	8.5	-	-	0.85	0.25	0.08 ±0.015	●	EZH020…
	025025HP-008H-LT	2.5	2.5	2.3	39.5	15	15.5	11.5	-	-	1.1			●	EZH025…
	030030HP-008H-LT	3	3	2.7	47.9	18	*22.5*	18.5	14.5	-	1.35	0.3		●	EZH030…
	035035HP-008H-LT	3.5	3.5	3.2	51.9	21	*25.5*	21.5	17.5	-	1.6	0.4		●	EZH035…
	040040HP-008H-LT	4	4	3.6	60.8	28	*32.5*	28.5	24.5	20.5	1.85			●	EZH040…
	050050HP-008H-LT	5	5	4.6	73.1	35	*40.5*	35.5	30.5	25.5	2.35	0.5		●	EZH050…
	060060HP-008H-LT	6	6	5.6	83.1	42	*47.5*	42.5	37.5	32.5	2.85	0.6		●	EZH060…

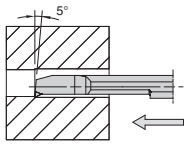
Tolerance : Offset ±0.025mm (of the reference pin), overall length ±0.05mm, edge height +0.05/0mm
*See **F12** for details on tolerances
* In case of overhang length mentioned in italics, modified insert is required

Recommended Cutting Conditions F18

● : Std. Item

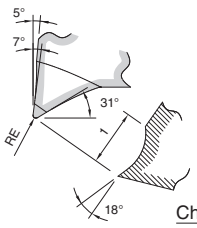
EZ Bars are sold in 1 piece boxes

EZB-HP (Boring)

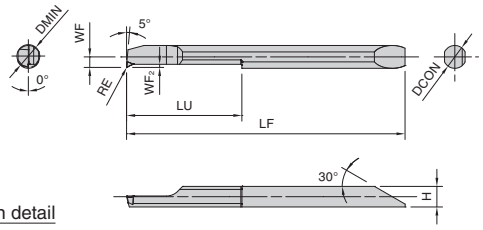


F Chipbreaker
- With lead angle
- Sharp cutting (For finishing)

- Right-hand shown



Chipbreaker in detail



EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)							Grades MEGACOAT	Applicable Sleeves
		DMIN	DCON	H	LF	LU	WF	WF_2	RE	PR1225	F26~F31
EZBR	020020HP-005F	2	2	1.8	32	8	0.85	0.25	0.05 ±0.01	●	EZH020…
	025025HP-005F	2.5	2.5	2.3	35	10.5	1.1	0.3	0.05 ±0.01	●	EZH025…
	025025HP-015F								0.15 ±0.02	●	
	030030HP-005F	3	3	2.7	38.9	13	1.35	0.4	0.05 ±0.01	●	EZH030…
	030030HP-015F								0.15 ±0.02	●	
	035035HP-005F	3.5	3.5	3.2	41.9	15	1.6	0.5	0.05 ±0.01	●	EZH035…
	035035HP-015F								0.15 ±0.02	●	
	040040HP-005F	4	4	3.6	48.8	20	1.85	0.5	0.05 ±0.01	●	EZH040…
	040040HP-015F								0.15 ±0.02	●	
	045045HP-005F	4.5	4.5	4.1	51.1	22.5	2.1	0.7	0.05 ±0.01	●	EZH045…
	045045HP-015F								0.15 ±0.02	●	
	050050HP-005F	5	5	4.6	58.1	25	2.35	0.7	0.05 ±0.01	●	EZH050…
	050050HP-015F								0.15 ±0.02	●	
	060060HP-005F	6	6	5.6	66.1	30	2.85	0.9	0.05 ±0.01	●	EZH060…
	060060HP-015F								0.15 ±0.02	●	
	070070HP-005F	7	7	6.3	73.8	35	3.3	1	0.05 ±0.01	●	EZH070…
	070070HP-015F								0.15 ±0.02	●	
	080080HP-005F	8	8	7.2	84.8	40	3.75	1	0.05 ±0.01	●	EZH080…
	080080HP-015F								0.15 ±0.02	●	

Tolerance : Offset ±0.025mm (of the reference pin), overall length ±0.05mm, edge height +0.05/0mm
*See **F12** for details on tolerances

Recommended Cutting Conditions F18

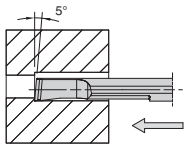
EZ Bars Identification System

EZ	B	R	020	020	HP	-	008	H
Symbol of EZ Bars	Applications	Insert Hand	Min. Bore Dia.	Shank Dia.	Symbol of Precision		Corner-R(RE)	Name of Chipbreaker
	B : Boring Bars	R : Right-hand L : Left-hand	020 : 2mm 025 : 2.5mm ⋮	020 : 2mm 025 : 2.5mm ⋮	HP : High Precision ST : Standard		008 : 0.08mm 015 : 0.15mm ⋮	H : Without lead angle F : With lead angle NB : Without chipbreaker

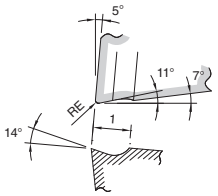
● : Std. Item

EZ Bars are sold in 1 piece boxes

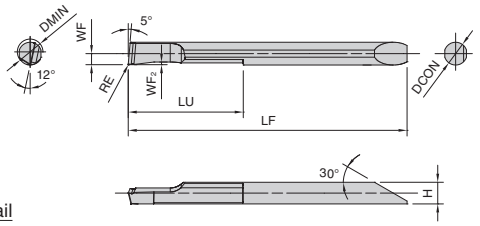
EZB-ST (Boring)

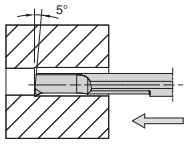


H Chipbreaker
- Without lead angle
- Tough edge (General purpose)
- Right-hand shown

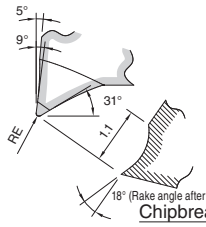


Chipbreaker in detail

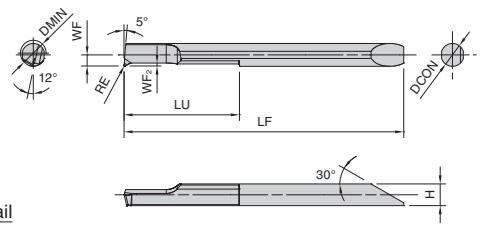




F Chipbreaker
- With lead angle
- Sharp cutting (For finishing)
- Right-hand shown



Chipbreaker in detail



EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)							Grades MEGACOAT	Applicable Sleeves ➡ F26~F31
		DMIN	DCON	H	LF	LU	WF	WF_2	RE	PR1225	
EZBR	020017ST-008H	2	1.7	1.5	27.3	7	0.79	0.19	0.08 ±0.015	●	EZH017…
	025020ST-008H	2.5	2	1.82	32	8	0.94	0.16	0.08 ±0.015	●	EZH020…
	025020ST-015H								0.15 ±0.02	●	
	030025ST-008H	3	2.5	2.3	35	10.5	1.19	0.15	0.08 ±0.015	●	EZH025…
	030025ST-015H								0.15 ±0.02	●	
	035030ST-008H	3.5	3	2.8	39	13	1.44	0.18	0.08 ±0.015	●	EZH030…
	035030ST-015H								0.15 ±0.02	●	
	040035ST-008H	4	3.5	3.3	42	15	1.69	0.24	0.08 ±0.015	●	EZH035…
	040035ST-015H								0.15 ±0.02	●	
	045040ST-008H	4.5	4	3.8	49	20	1.94	0.27	0.08 ±0.015	●	EZH040…
	045040ST-015H								0.15 ±0.02	●	
	055050ST-008H	5.5	5	4.8	58.2	25	2.44	0.33	0.08 ±0.015	●	EZH050…
	055050ST-015H								0.15 ±0.02	●	
	065060ST-008H	6.5	6	5.8	66.2	30	2.94	0.38	0.08 ±0.015	●	EZH060…
	065060ST-015H								0.15 ±0.02	●	
	075070ST-008H	7.5	7	6.8	74.2	35	3.44	0.44	0.08 ±0.015	●	EZH070…
	075070ST-015H								0.15 ±0.02	●	
EZBR	020017ST-005F	2	1.7	1.5	27.3	7	0.79	0.2	0.05 ±0.01	●	EZH017…
	025020ST-005F	2.5	2	1.82	32	8	0.94	0.16	0.05 ±0.01	●	EZH020…
	025020ST-015F								0.15 ±0.02	●	
	030025ST-005F	3	2.5	2.3	35	10.5	1.19	0.2	0.05 ±0.01	●	EZH025…
	030025ST-015F								0.15 ±0.02	●	
	035030ST-005F	3.5	3	2.8	39	13	1.44	0.26	0.05 ±0.01	●	EZH030…
	035030ST-015F								0.15 ±0.02	●	
	040035ST-005F	4	3.5	3.3	42	15	1.69	0.33	0.05 ±0.01	●	EZH035…
	040035ST-015F								0.15 ±0.02	●	
	045040ST-005F	4.5	4	3.8	49	20	1.94	0.31	0.05 ±0.01	●	EZH040…
	045040ST-015F								0.15 ±0.02	●	
	055050ST-005F	5.5	5	4.8	58.2	25	2.44	0.45	0.05 ±0.01	●	EZH050…
	055050ST-015F								0.15 ±0.02	●	
	065060ST-005F	6.5	6	5.8	66.2	30	2.94	0.59	0.05 ±0.01	●	EZH060…
	065060ST-015F								0.15 ±0.02	●	
	075070ST-005F	7.5	7	6.8	74.2	35	3.44	0.65	0.05 ±0.01	●	EZH070…
	075070ST-015F								0.15 ±0.02	●	

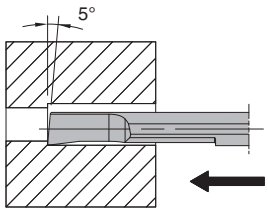
Tolerance : Offset ±0.06mm , overall length ±0.1mm, edge height +0.06/0mm
*See **F12** for details on tolerances

Recommended Cutting Conditions ➡ F18

● : Std. Item

EZ Bars are sold in 1 piece boxes

EZB-NB (Boring)



<PR1225,GW05>

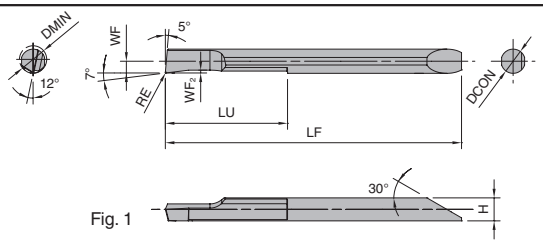
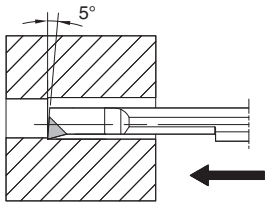


Fig. 1

●Right-hand shown



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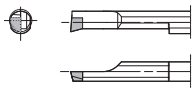


Fig. 2 EZBR030 type

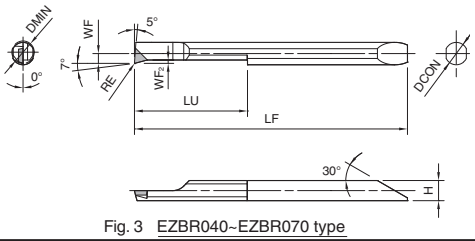


Fig. 3 EZBR040~EZBR070 type

●Right-hand shown

EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)							Drawing	Grades				Applicable Sleeves ➡ F26~F31
											MEGA COAT	Carbide	MEGA COAT CBN	PCD	
		DMIN	DCON	H	LF	LU	WF	WF_2	RE		PR1225	GW05	KBN05M	KPD001	
EZBR	020017-005NB	2	1.7	1.5	27.3	7	0.79	0.2	±0.015 0.05	Fig. 1	●	●			EZH017…
	025020-005NB	2.5	2	1.82	32	8	0.94	0.16			●	●			EZH020…
	030025-005NB	3	2.5	2.3	35	10.5	1.19	0.16			●	●			EZH025…
	035030-005NB	3.5	3	2.8	39	13	1.44	0.19			●	●			EZH030…
	040035-005NB	4	3.5	3.3	42	15	1.69	0.25			●	●			EZH035…
	045040-005NB	4.5	4	3.8	49	20	1.94	0.28			●	●			EZH040…
	055050-005NB	5.5	5	4.8	58.2	25	2.44	0.33			●	●			EZH050…
	065060-005NB	6.5	6	5.8	66.2	30	2.94	0.39			●	●			EZH060…
	075070-005NB	7.5	7	6.8	74.2	35	3.44	0.45			●	●			EZH070…
EZBR	030030-003NB	3	3	2.6	38.8	13	1.25	0.3	±0.015 0.035	Fig. 2			●		EZH030…
	040040-003NB	4	4	3.6	48.8	20	1.75	0.5		Fig. 3			●		EZH040…
	050050-003NB	5	5	4.6	58.1	25	2.25						●		EZH050…
	060060-003NB	6	6	5.6	66.1	30	2.75						●		EZH060…
	070070-003NB	7	7	6.6	74.1	35	3.25						●		EZH070…
EZBR	040040-003NB	4	4	3.6	48.8	20	1.75	0.5	±0.015 0.035	Fig. 3				●	EZH040…
	050050-003NB	5	5	4.6	58.1	25	2.25							●	EZH050…
	060060-003NB	6	6	5.6	66.1	30	2.75							●	EZH060…
	070070-003NB	7	7	6.6	74.1	35	3.25							●	EZH070…

Recommended Cutting Conditions ➡ F18

Edge Preparation

Grades	Edge Preparation	Remarks
PR1225,GW05	Sharp Edge	-
KBN05M	T00815	0.08mm x 15° Chamfered Cutting Edge
KPD001	Sharp Edge	-

● : Std. Item

EZ Bars are sold in 1 piece boxes

Recommended Cutting Conditions

H Chipbreaker (EZB-HP-H / EZB-ST-H)

Workpiece Material	Insert Grades (Cutting Speed Vc : m/min)		EZB020/025 type		EZB030/035 type		EZB040/045 type		EZB050/055/060/065/070/075/080 type		Remarks
	MEGACOAT	Carbide	ap (mm), f (mm/rev)								
	PR1225	**GW05**	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	-	~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	30~80	-	~0.2	~0.02	~0.3	~0.03	~0.35	~0.05	~0.4	~0.07	
Non-ferrous Metals	-	~100	~0.3	~0.05	~0.4	~0.06	~0.45	~0.1	~0.5	~0.15	

H Chipbreaker [EZB-HP-H-LT (Long type)]

Workpiece Material	Insert Grades (Cutting Speed Vc : m/min)	EZB020/025/030/035 type		EZB040/050/060 type		Remarks
	MEGACOAT	ap (mm), f (mm/rev)				
	PR1225	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~60	~0.3	~0.05	~0.4	~0.1	Coolant
Stainless Steel	20~40	~0.25	~0.05	~0.3	~0.07	

F Chipbreaker (EZB-HP-F / EZB-ST-F)

Workpiece Material	Insert Grades (Cutting Speed Vc : m/min)	EZB020/025 type		EZB030/035 type		EZB040/045 type		EZB050/055/060/065/070/075/080 type		Remarks
	MEGACOAT	ap (mm), f (mm/rev)								
	PR1225	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	~0.2	~0.03	~0.2	~0.05	~0.3	~0.07	~0.3	~0.07	Coolant
Stainless Steel	30~80	~0.2	~0.02	~0.2	~0.03	~0.25	~0.05	~0.25	~0.05	

NB (Without Chipbreaker)

Workpiece Material	Insert Grades (Cutting Speed Vc : m/min)		EZB020/025 type		EZB030/035 type		EZB040/045 type		EZB055/065/075 type		Remarks
	MEGACOAT	Carbide	ap (mm), f (mm/rev)								
	PR1225	**GW05**	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	-	~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	30~80	-	~0.2	~0.02	~0.3	~0.03	~0.35	~0.05	~0.4	~0.07	
Non-ferrous Metals	-	~100	~0.3	~0.05	~0.4	~0.06	~0.45	~0.07	~0.5	~0.1	

Workpiece Material	Insert Grades (Cutting Speed Vc : m/min)		EZB030 type		EZB040/045 type		EZB050/060/070 type		Remarks
	MEGACOAT CBN	PCD	ap (mm), f (mm/rev)						
	KBN05M	**KPD001**	ap	f	ap	f	ap	f	
Non-ferrous Metals	-	~300	-	-	~0.45	~0.1	~0.5	~0.15	Coolant
Hard Materials	~100	-	~0.07	~0.03	~0.10	~0.05	~0.15	~0.07	

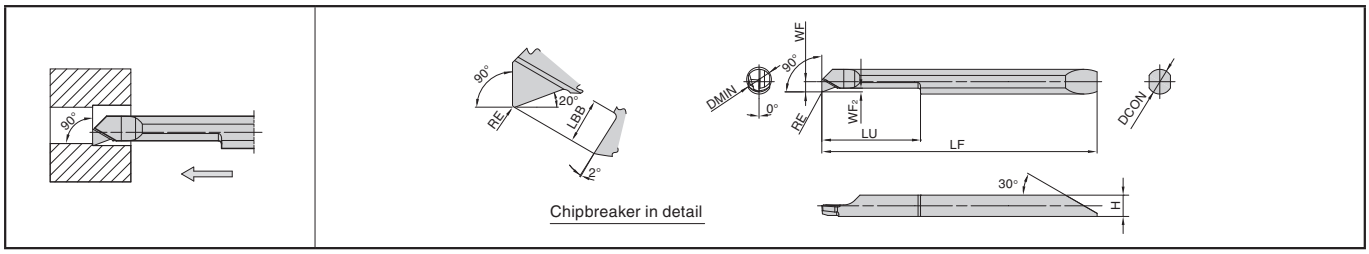
Compatibility of EZ Bars

EZ Bars are compatible with conventional Tip-Bars.

Sleeve \ Insert	**EZB-HP**	**EZB-ST / NB**	**HPB** (Discontinued Description)
EZH-CT/HP	✓	✓	✓*1 *2 (Compatible)
EZH-ST	✓	✓	✓*1 (Compatible)
PSH (Discontinued Description)	✓*1 (Compatible)	✓*1 (Compatible)	✓

*1 Some diameter types of conventional Tip-Bars are incompatible.
*2 Use them without Adjustment Pins. Overhang length of bar is not adjustable.

EZBF (90° Lead Angle) NEW



EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Grades MEGACOAT	Applicable Sleeves
		DMIN	DCON	H	LF	LU	WF	WF_2	LBB	RE	PR1225	
EZBFR	030030-008	3	3	2.5	37.7	12	1.2	0.45	1.5	0.08 $^{\pm0.015}$	●	EZH030…
	040040-008	4	4	3.45	44.6	16	1.65	0.55	2.0	0.08 $^{\pm0.015}$	●	EZH040…
	050050-015	5	5	4.3	52.7	20	2.15	0.7	2.4	0.15 $^{\pm0.02}$	●	EZH050…
	060060-015	6	6	5.15	59.6	24	2.55	0.85	2.8	0.15 $^{\pm0.02}$	●	EZH060…

Tolerance : Offset ±0.05mm , overall length ±0.05mm, edge height +0.05/0mm
*See **F12** for details on tolerances

Recommended Cutting Conditions

Workpiece Material	Insert Grades (Cutting Speed Vc : m/min)	EZBFR030030-008		EZBFR040040-008		EZBFR050050/ 060060-015		Remarks
	MEGACOAT	ap (mm), f (mm/rev)						
	PR1225	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	~0.2	~0.05	~0.3	~0.05	~0.5	~0.05	Coolant
Stainless Steel	30~80	~0.2	~0.05	~0.3	~0.05	~0.5	~0.05	

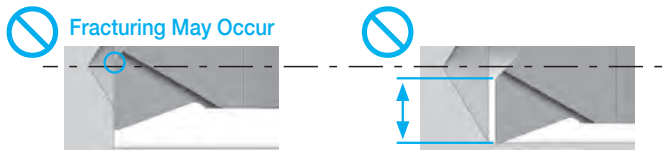
Precautions

✓ Recommended ⊘ Not Recommended

1. Machining in blind hole is not recommended.



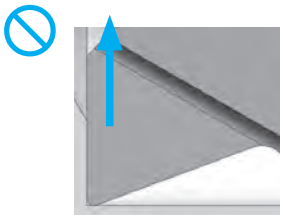
2. If front cutting edge exceeds beyond workpiece center line, fracturing may occur.



e.g. Min boring diameter of ø 4 : 1.9 mm front cutting edge length

Off-center Boring

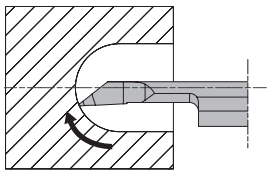
3. Up facing is not recommended. (Fracturing May Occur)

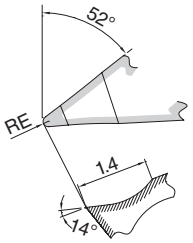


● : Std. Item

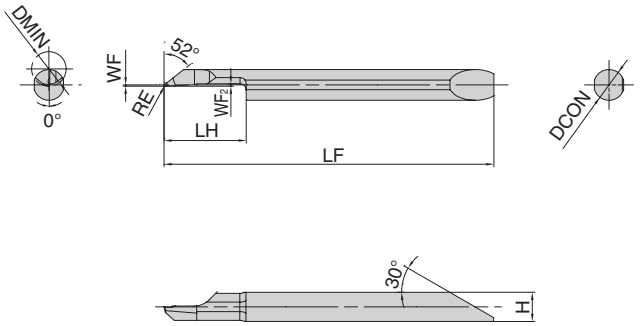
EZ Bars are sold in 1 piece boxes

EZVB (Boring / Internal Facing / Copying)





Chipbreaker in detail



●Right-hand shown

EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)							Grades MEGACOAT	Applicable Sleeves
		DMIN	DCON	H	LF	LH	WF	WF_2	RE	**PR1225**	**F26~F31**
EZVBR	**035030-010**	3.5	3	2.8	38	8	0.17	0.22	0.1 ±0.015	●	EZH030…
	045040-010	4.5	4	3.8	43	10	0.17	0.26	0.1 ±0.015	●	EZH040…
	055050-010	5.5	5	4.8	50.2	12	0.17	0.29	0.1 ±0.015	●	EZH050…
	065060-010	6.5	6	5.8	55.2	14	0.17	0.32	0.1 ±0.015	●	EZH060…

Recommended Cutting Conditions

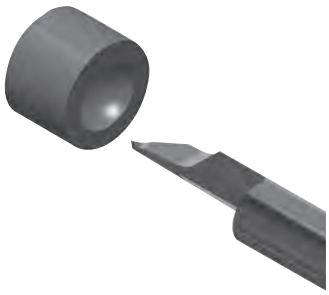
Workpiece Material	Insert Grades (Cutting Speed Vc : m/min)	EZVB035 type		EZVB045 type		EZVB055/065 type		Remarks
	MEGACOAT	ap (mm), f (mm/rev)						
	PR1225	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	30~100	~0.05	~0.04	~0.07	~0.07	~0.1	~0.07	Coolant
Stainless Steel	30~80	~0.03	~0.03	~0.05	~0.05	~0.07	~0.05	

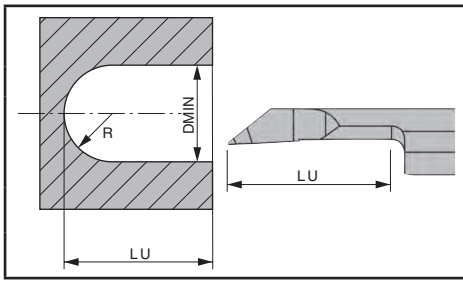
EZ Bars are sold in 1 piece boxes

● : Std. Item

Application of EZVB

1. Application Range



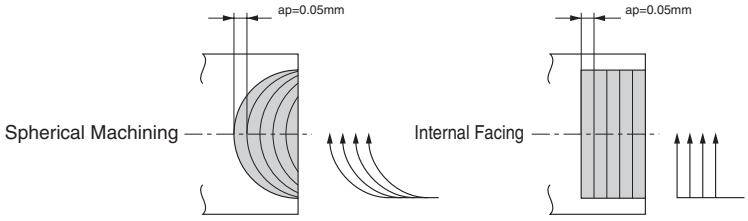


(mm)

Description		Min. Bore Dia. DMIN	R	LU
EZVBR	035030-010	3.5	1.75	8
	045040-010	4.5	2.25	10
	055050-010	5.5	2.75	12
	065060-010	6.5	3.25	14

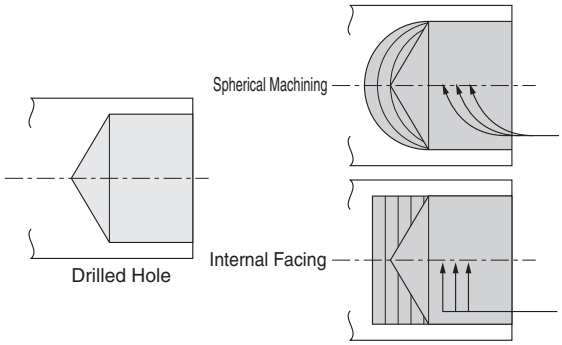
2. Application

Case with No Existing Hole



(Note) f shall be 0.03mm/rev or less at internal facing.

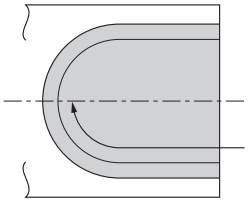
Case with Drilled Hole



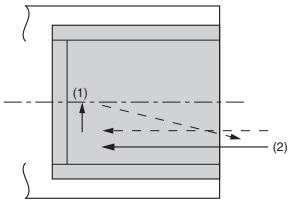
(Note) f shall be 0.03mm/rev or less at internal facing.

Finishing

Spherical Machining

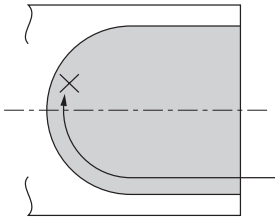


Internal Facing

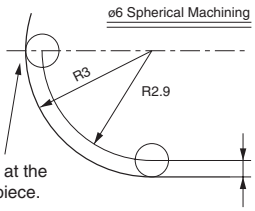


Machining Process
(1) Finish the internal face first.
(2) Next, finish the internal diameter.

3. Caution

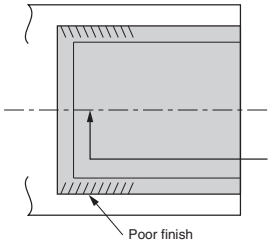


When machining past the center of the workpiece, insert may break.



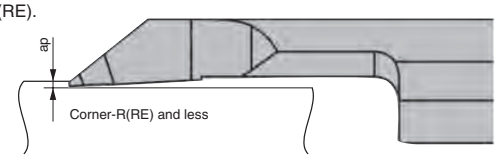
Fix the insert edge at the center of the workpiece.

Adjust the machining program to radius minus the value of corner-R(RE).



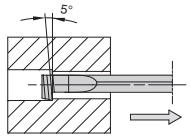
This type of machining is possible, but the chips might scratch the surface.

For internal profiling, ap should be less than the value of corner-R(RE).

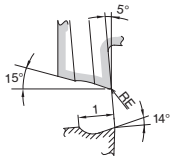


[Burrs may occur, if ap is bigger than corner-R(RE)]

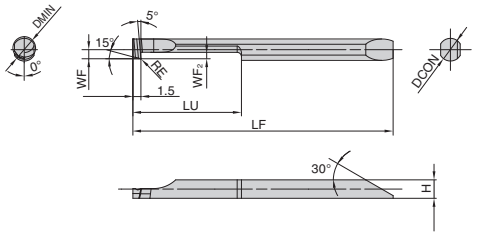
EZBT (Back Boring) NEW



●Right-hand shown



Chipbreaker in detail



EZ Bars Dimensions

Description		Min. Bore Dia.	Dimension (mm)						Grades		Applicable Sleeves
									MEGACOAT	Carbide	
		DMIN	DCON	H	LF	LU	WF	WF_2	RE	**PR1225**	**GW05**	F27~F31
EZBTR	**040040-005**	4	4	3.45	48.7	20	1.7	1.2	$^{+0}_{-0.02}$ 0.05	●	●	EZH040…
	050050-005	5	5	4.3	58.7	25	2.15	1.5		●	●	EZH050…

Recommended Cutting Conditions

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min)		EZBTR040040-005		EZBTR050050-005		Remarks
	MEGACOAT	Carbide	ap (mm), f (mm/rev)				
	PR1225	**GW05**	ap	f	ap	f	
Carbon Steel / Alloy Steel	★ 30-100	–	-0.45	-0.07	-0.5	-0.1	Coolant
Stainless Steel	★ 30-80	–	-0.45	-0.05	-0.5	-0.07	
Non-ferrous Metals	–	★ 30-100	-0.45	-0.1	-0.5	-0.15	

★ : 1st Recommendation

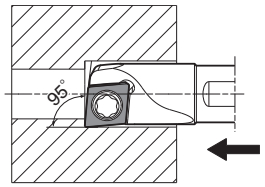
EZ Bars are sold in 1 piece boxes

● : Std. Item

EZ Bar PLUS (Indexable boring bar)

S-SCLC-EZP

Max. Overhang Length L/D=~3



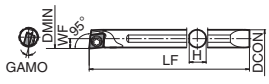


Fig. 1

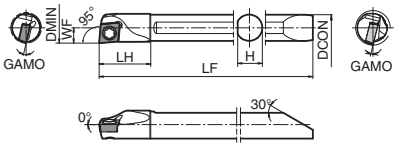


Fig. 2

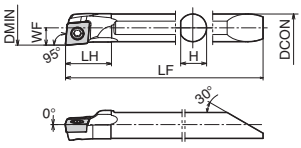


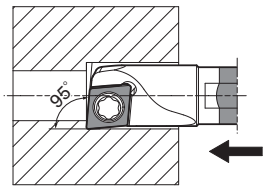
Fig. 3

●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

C-SCLC-EZP

Max. Overhang Length L/D=~5



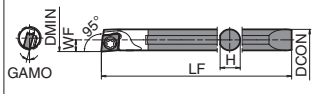


Fig. 4

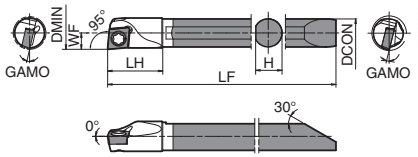


Fig. 5

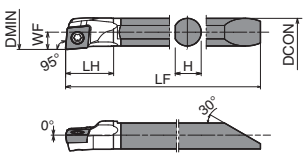


Fig. 6

●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

	Description	Stock	Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts		Applicable Sleeves
													Clamp Screw	Wrench	
		R	DMIN	DCON	H	LF	LH	WF							➡ F27,F29
Steel	S045X-SCLCR03-050EZP	●	5	4.5	4.3	42.4	-	2.5	15°	0.2	No	Fig. 1	SB-1635TR	FT-6	EZH045…
	S050X-SCLCR03-060EZP	●	6	5	4.7	48.4	9	3	13°			Fig. 2			EZH050…
	S060X-SCLCR04-070EZP	●	7	6	5.7	54.4	10	3.5					SB-2035TR		EZH060…
	S070X-SCLCR04-080EZP	●	8	7	6.7	60.4	10.3	4	11°						EZH070…
	S080X-SCLCR06-100EZP	●	10	8	7.5	69.5	13.3	5	14°	0.4		Fig. 3	SB-2545TR	FT-8	EZH080…
Carbide	C045X-SCLCR03-050EZP	●	5	4.5	4.3	51.4	-	2.5	15°	0.2	No	Fig. 4	SB-1635TR	FT-6	EZH045…
	C050X-SCLCR03-060EZP	●	6	5	4.7	58.4	9	3	13°			Fig. 5			EZH050…
	C060X-SCLCR04-070EZP	●	7	6	5.7	66.4	10	3.5					SB-2035TR		EZH060…
	C070X-SCLCR04-080EZP	●	8	7	6.7	74.4	11	4	11°						EZH070…
	C080X-SCLCR06-100EZP	●	10	8	7.5	85.5	14	5	14°	0.4		Fig. 6	SB-2545TR	FT-8	EZH080…

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Medium
See Page	B53	B53	B53	B53	B53	B54	B54	B54	B54	B54, B55
Insert / Toolholder Description	CF	PF	GF	SKS	SK	WP (Wiper)	PP	GK	HQ	Standard
...-SCLCR03-...	CCGT0301..	CCGT0301..	-	-	-	-	-	-	-	-
...-SCLCR04-...	CCGT0401..	CCGT0401..	-	-	-	-	-	-	-	-
...-SCLCR06-...	-	CCGT0602..	CCGT0602..	CCGT0602..	CCGT0602..	CCMT0602..	CCMT0602..	CCMT0602..	CCMT0602..	CCGT0602..

Applications	Finishing - Medium	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision	Cast Iron	Non-ferrous Metals	Hard Materials		
See Page	B53	B56	B55	B58, B59	B57	B60	C24	C14		
Insert / Toolholder Description	GQ	L-F	L-FSF	(E/F) L-U	FL-USF	Without chipbreaker	PCD	CBN		
...-SCLCR03-...	-	CCGT0301..	CCET0301..	-	-	-	-	CCMW0301..		
...-SCLCR04-...	-	CCGT0401..	CCET0401..	-	-	-	CCGW0401..	CCMW0401..		
...-SCLCR06-...	CCGT0602..	-	-	CCGT0602..	CCET0602..	CCGW0602..	CCMT0602.. CCGW0602..	CCMW0602..		

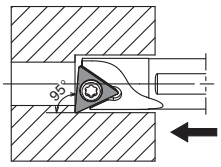
Recommended Cutting Conditions ➡ F92~F93
Applicable Sleeves ➡ F82~F86

● : Std. Item

EZ Bar PLUS (Indexable boring bar)

S-STLB(P)-EZP

Max. Overhang Length L/D=~3



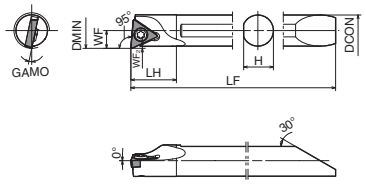


Fig. 1

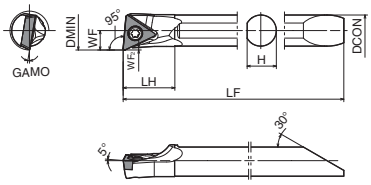


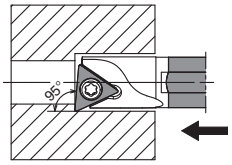
Fig. 2

●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

C-STLB(P)-EZP

Max. Overhang Length L/D=~5



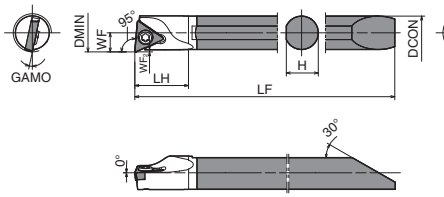


Fig. 3

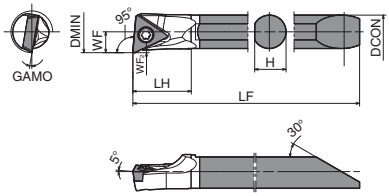


Fig. 4

●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

	Description	Stock	Min. Bore Dia.	Dimension (mm)						GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts		Applicable Sleeves
														Clamp Screw	Wrench	
		R	DMIN	DCON	H	LF	LH	WF	WF_2							
Steel	S070X-STLBR06-080EZP*	●	8	7	6.7	60.4	10.3	4	0.4	12°	0.2	No	Fig. 1	SB-2035TR	FT-6	EZH070…
Steel	S080X-STLPR09-100EZP	●	10	8	7.5	69.5	13.3	5	0.5	10°	0.4	No	Fig. 2	SB-2545TR	FT-8	EZH080…
Carbide	C070X-STLBR06-080EZP*	●	8	7	6.7	74.4	11	4	0.4	12°	0.2	No	Fig. 3	SB-2035TR	FT-6	EZH070…
Carbide	C080X-STLPR09-100EZP	●	10	8	7.5	85.5	14	5	0.5	10°	0.4	No	Fig. 4	SB-2545TR	FT-8	EZH080…

* TB□□060108.. type inserts can not be used.

Applicable Inserts

Applications	Minute ap	Finishing	* Finishing	Finishing	* Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Medium
See Page	B76, B80	B76, B80	B80	B80	B85	B81	B76	B81	B76, B82, B83	B84
Insert / Toolholder Description	CF	PF	WP (Wiper)	PP	R-P	GP	DP	HQ	L	L-H
...-STLBR06-...	TBGT0601..	TBGT0601..	-	-	-	-	TBMT0601..	-	TBGT0601..	-
...-STLPR09-...	TPGT0902..	TPGT0902..	TPMX0902..	TPMT0902..	TPEH0902..	TPMT0902..	-	TPMT0902..	TPGH0902..	TPGH0902..

Applications	Soft Steel / Finishing	Cast Iron	Non-ferrous Metals	Hard Materials
See Page	B81	B76, B86	C26, C27	C16
Insert / Toolholder Description	XP	Without chipbreaker	PCD	CBN
...-STLBR06-...	-	TBGW0601..	TBMT0601.. TBGW0601..	-
...-STLPR09-...	TPMT0902..	TPGB0902..	TPMH0902.. TPGB0902..	TPGB0902..

* Use Right-handed P Chipbreaker

For WP chipbreaker, cutting edge offsets or program corrections are required. R37

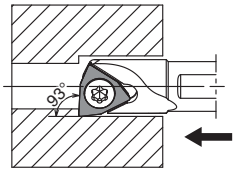
Recommended Cutting Conditions F92~F93
Applicable Sleeves F82~F86

● : Std. Item

EZ Bar PLUS (Indexable boring bar)

S-SWUB-EZP

Max. Overhang Length L/D=~3



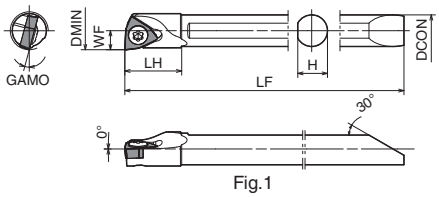


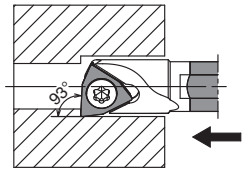
Fig.1

●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

C-SWUB-EZP

Max. Overhang Length L/D=~5



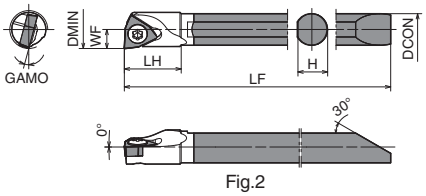


Fig.2

●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

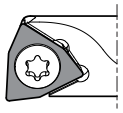
	Description	Stock	Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts		Applicable Sleeves ➡ F27,F29
													Clamp Screw	Wrench	
		R	DMIN	DCON	H	LF	LH	WF							
Steel	S050X-SWUBR06-060EZP	●	6	5	4.7	48.4	9	3	15°	0.2	No	Fig. 1	SB-2035TR	FT-6	EZH050…
	S060X-SWUBR06-070EZP	●	7	6	5.7	54.4	10	3.5	13°						EZH060…
	S070X-SWUBR08-080EZP	●	8	7	6.7	60.4	10.3	4	15°						EZH070…
Carbide	C050X-SWUBR06-060EZP	●	6	5	4.7	58.4	9	3	15°	0.2	No	Fig. 2	SB-2035TR	FT-6	EZH050…
	C060X-SWUBR06-070EZP	●	7	6	5.7	66.4	10	3.5	13°						EZH060…
	C070X-SWUBR08-080EZP	●	8	7	6.7	74.4	11	4	15°						EZH070…

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Cast Iron	Non-ferrous Metals	Hard Materials
See Page	B97	B97	B97	B98	B98	B98	C29	C18
Insert / Toolholder Description	L-CF	L-PF	L-DP	L-P	L-F	Without chipbreaker	PCD	CBN
...-SWUBR06-...	WBGT0601..	WBGT0601..	WBMT0601..	-	WBGT0601..	WBGW0601..	WBMT0601..	WBGW0601..
...-SWUBR08-...	-	WBGT0802..	WBMT0802..	WBET0802..	WBGT0802..	WBGW0802..	WBMT0802..	WBGW0802..

Recommended Cutting Conditions ➡ F92~F93

Applicable Sleeves ➡ F82, F83, F85, F86



----SWUBR06---- Insert mounting side

● Right-hand shown

● : Std. Item

EZH-CT sleeve

Adjustable with Coolant Hole

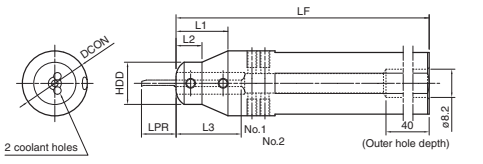


Fig. 1

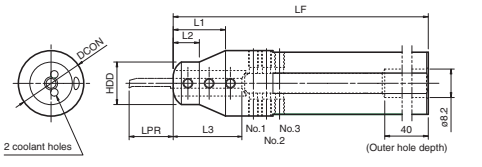


Fig. 2

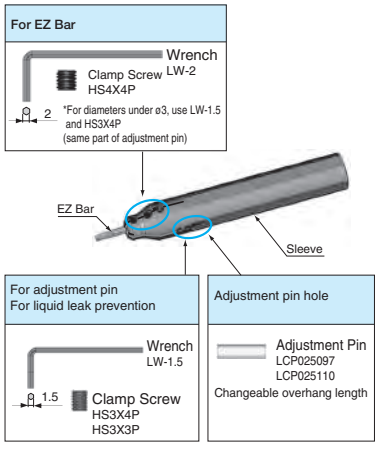
Sleeve Dimensions

Description		Stock	Dimension (mm)										Overhang Length of the Bar*2 LPR(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars F14~F17 F19, F20 G51 J32
			DCB	DCON	HDD	DCB_2	H	LF	L1	L2	*1 L3	L4	No.1	No.2	No.3	No.4		
EZH	01719CT-120	●	1.7	19.05	13	6	18	120	16	8	16	30.5	7.5	3.5	-	-	Fig. 1	EZBR…017…
	01720CT-120	●		20			19	120										
	01722CT-135	●		22			21	135				41.5						
	01725.0CT-135	●		25			24	135										
	01725.4CT-120	●		25.4			24.4	120				30.5						
EZH	02019CT-120	●	2	19.05	13	6	18	120	16	8	20	30.5	8.5	4.5	-	-	Fig. 1	EZB$^{R}_{L}$…020…
	02020CT-120	●		20			19	120										
	02022CT-135	●		22			21	135				41.5						
	02025.0CT-135	●		25			24	135										
	02025.4CT-120	●		25.4			24.4	120				30.5						
EZH	02519CT-120	●	2.5	19.05	13	6	18	120	16	8	20	30.5	11	7	-	-	Fig. 1	EZB$^{R}_{L}$…025… EZTR…025-…
	02520CT-120	●		20			19	120										
	02522CT-135	●		22			21	135				41.5						
	02525.0CT-135	●		25			24	135										
	02525.4CT-120	●		25.4			24.4	120				30.5						
EZH	03019CT-120	●	3	19.05	13	6	18	120	16	8	21	30.5	13.5	9.5	5.5	-	Fig. 2	EZB$^{R}_{L}$…030… EZBFR…030-… EZVBR…030-… EZGR…030-… EZTR…030-…
	03020CT-120	●		20			19	120										
	03022CT-135	●		22			21	135				41.5						
	03025.0CT-135	●		25			24	135										
	03025.4CT-120	●		25.4			24.4	120				30.5						

*1. L3 shows DCB length.
*2. LPR shows Overhang length of the EZB Bar when attached to sleeve.
· Choose sleeves (DCB) to meet with DCON dimension of bar.
· A hole on the rear end of sleeve is prepared hole for Rc1/8 threading. Please modify by additional processing if necessary. The body hardness is 42HRC.

Spare Parts Description (for EZH-CT Sleeves)

Description		Spare Parts: Adjustment Pin	Clamp Screw (for adjustment pin)	Wrench	Clamp Screw (for bar)	Wrench
EZH	017…CT-..	LCP025097	HS3X4P (for adjustment pin and liquid leak prevention)	LW-1.5 Tightening Torque 1N·m	HS3X4P	LW-1.5 Tightening Torque 1N·m
	020…CT-..					
	025…CT-..					
	030…CT-..					
EZH	035…CT-..	LCP025097	HS3X4P (for adjustment pin and liquid leak prevention)	LW-1.5 Tightening Torque 1N·m	HS4X4P (for bar)	LW-2 Tightening Torque 2N·m
	040…CT-..					
	045…CT-..					
	050…CT-..					
	060…CT-..					
	070…CT-..					
	080…CT-..	LCP025110	HS3X3P (for adjustment pin and liquid leak prevention)			



1) If shank dia. is ø2.5mm or less, use clamp screw (HS3X4P)

For adjustment pin	2 pcs
For liquid leak prevention	2 pcs
For EZ Bar	2 pcs

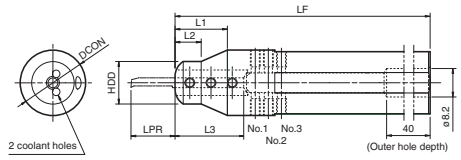
2) If shank dia. is ø3mm, use clamp screw (HS3X4P)

For adjustment pin	2 pcs
For liquid leak prevention	4 pcs
For EZ Bar	3 pcs

● : Std. Item

EZH-CT sleeve

Adjustable with Coolant Hole



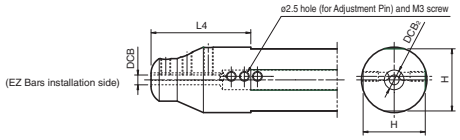
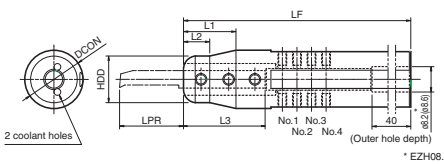


Fig. 2



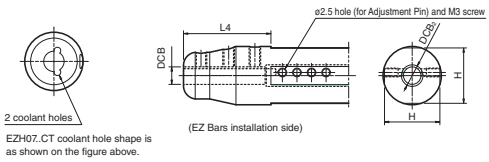


Fig. 3

Sleeve Dimensions

Description		Stock	Dimension (mm)										Overhang Length of the Bar *2 LPR(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars / EZ Bar PLUS F14~F17 F19, F20 F22~F25 G51, G78 J32
			DCB	DCON	HDD	DCB_2	H	LF	L1	L2	*1 L3	L4	No.1	No.2	No.3	No.4		
EZH	03519CT-120	●	3.5	19.05	13	6	18	120	16	8	21	31.1	15.5	11.5	7.5	-	Fig. 2	EZB R/L…035… EZTR…035-…
	03520CT-120	●		20			19	120										
	03522CT-135	●		22			21	135				41.5						
	03525.0CT-135	●		25			24	135										
	03525.4CT-120	●		25.4			24.4	120				31.1						
EZH	04019CT-120	●	4	19.05	13	6	18	120	16	8	22	32.7	20.5	16.5	12.5	8.5	Fig. 3	EZB R/L…040… EZBTR…040-… EZBFR…040-… EZVBR…040-… EZG R/L…040-… EZFG R/L…040-… EZTR…040-…
	04020CT-120	●		20			19	120										
	04022CT-135	●		22			21	135				41.5						
	04025.0CT-135	●		25			24	135										
	04025.4CT-120	●		25.4			24.4	120				32.7						
EZH	04519CT-120	●	4.5	19.05	16	6	18	120	18	9	23	30.0	23 (14)	18.5 (9.5)	14 (–)	9.5 (–)	Fig.3	EZB R/L…045… _045X-…-050EZP
	04520CT-120	●		20			19	120										
	04522CT-135	●		22			21	135				44.0						
	04525.0CT-135	●		25			24	135										
	04525.4CT-120	●		25.4			24.4	120				30.0						
EZH	05019CT-120	●	5	19.05	16	6	18	120	18	9	26	30.0	25.5 (15.5)	20.5 (10.5)	15.5 (–)	10.5 (–)	Fig. 3	EZB R/L…050… EZBTR…050-… EZBFR…050-… EZVBR…050-… EZG R/L…050-… EZFG R/L…050-… EZTR…050-… _050X-…-060EZP
	05020CT-120	●		20			19	120										
	05022CT-135	●		22			21	135				44.0						
	05025.0CT-135	●		25			24	135										
	05025.4CT-120	●		25.4			24.4	120				30.0						
EZH	06019CT-120	●	6	19.05	16	7.4	18	120	18	9	28	30.0	30.5 (18.5)	25.5 (13.5)	20.5 (–)	15.5 (–)	Fig. 3	EZB R/L…060… EZBFR…060-… EZVBR…060-… EZG R/L…060-… EZTR…060-… _060X-…-070EZP
	06020CT-120	●		20			19	120										
	06022CT-135	●		22			21	135				41.5						
	06025.0CT-135	●		25			24	135										
	06025.4CT-120	●		25.4			24.4	120				30.0						
EZH	07019CT-120	●	7	19.05	16	7.4	18	120	18	9	29	30.0	35.5 (21.5)	30.5 (16.5)	25.5 (11.5)	20.5 (–)	Fig. 3	EZB R/L…070… EZG R/L…070-… EZFG R/L…070-… EZTR…070-… _070X-…-080EZP
	07020CT-120	●		20			19	120										
	07022CT-135	●		22			21	135				44.0						
	07025.0CT-135	●		25			24	135										
	07025.4CT-120	●		25.4			24.4	120				30.0						
EZH	08019CT-120	●	8	19.05	16	8.6	18	120	18	9	33	34.0	40.5 (24.5)	35.5 (19.5)	30.5 (14.5)	25.5 (–)	Fig. 3	EZB R/L…080… _080X-…-100EZP
	08020CT-120	●		20			19	120										
	08022CT-135	●		22			21	135				44.0						
	08025.0CT-135	●		25			24	135										
	08025.4CT-120	●		25.4			24.4	120				34.0						

*1. L3 shows DCB length.
*2. LPR shows Overhang length of the EZB Bar when attached to sleeve. ( ) value indicates the overhang length when installed the steel boring bar (EZ Bar PLUS).
· Choose sleeves (DCB) to meet with DCON dimension of bar.
· A hole on the rear end of sleeve is prepared hole for Rc1/8 threading. Please modify by additional processing if necessary. The body hardness is 42HRC.

For how to fix EZ Bars (EZH-CT sleeve), please refer to F13.

● : Std. Item

EZH-HP sleeve

Adjustable

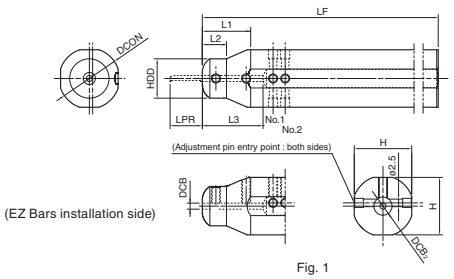


Fig. 1

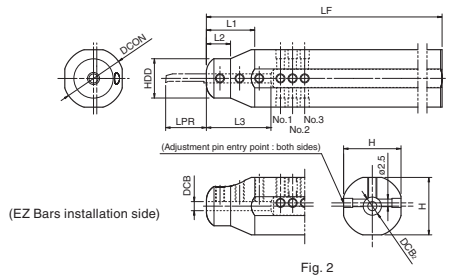


Fig. 2

Description		Stock	Dimension (mm)								Overhang Length of the Bar*2 LPR(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars F14~F17, F19 F20, F22 G51, G78 J32
			DCB	DCON	HDD	DCB_2	H	LF	L1	L2	*1L3	No.1	No.2	No.3	No.4	
EZH	01716HP-100	●	1.7	16	13	6	15	100	16	8	16	7.5	3.5	-	-	Fig. 1	EZBR…017…
	01719HP-120	●		19.05			18	120								
	01720HP-120	●		20			19	120								
	01722HP-135	●		22			21	135								
	01725.0HP-135	●		25			24	135								
	01725.4HP-120	●		25.4			24.4	120								
EZH	02016HP-100	●	2	16	13	6	15	100	16	8	20	8.5	4.5	-	-	Fig. 1	EZB[R]/L…020…
	02019HP-120	●		19.05			18	120								
	02020HP-120	●		20			19	120								
	02022HP-135	●		22			21	135								
	02025.0HP-135	●		25			24	135								
	02025.4HP-120	●		25.4			24.4	120								
EZH	02516HP-100	●	2.5	16	13	6	15	100	16	8	20	11	7	-	-	Fig. 1	EZB[R]/L…025… EZTR…025-…
	02519HP-120	●		19.05			18	120								
	02520HP-120	●		20			19	120								
	02522HP-135	●		22			21	135								
	02525.0HP-135	●		25			24	135								
	02525.4HP-120	●		25.4			24.4	120								
EZH	03016HP-100	●	3	16	13	6	15	100	16	8	21	13.5	9.5	5.5	-	Fig. 2	EZB[R]/L…030… EZBFR…030-… EZVBR…030-… EZGR…030-… EZTR…030-…
	03019HP-120	●		19.05			18	120								
	03020HP-120	●		20			19	120								
	03022HP-135	●		22			21	135								
	03025.0HP-135	●		25			24	135								
	03025.4HP-120	●		25.4			24.4	120								
EZH	03516HP-100	●	3.5	16	13	6	15	100	16	8	22	15.5	11.5	7.5	-	Fig. 2	EZB[R]/L…035… EZTR…035-…
	03519HP-120	●		19.05			18	120								
	03520HP-120	●		20			19	120								
	03522HP-135	●		22			21	135								
	03525.0HP-135	●		25			24	135								
	03525.4HP-120	●		25.4			24.4	120								
EZH	04016HP-100	●	4	16	13	6	15	100	16	8	24	20.5	16.5	12.5	8.5	Fig. 4	EZB[R]/L…040… EZBTR…040-… EZBFR…040-… EZVBR…040-… EZG[R]/L…040-… EZFG[R]/L…040-… EZTR…040-…
	04019HP-120	●		19.05			18	120								
	04020HP-120	●		20			19	120								
	04022HP-135	●		22			21	135								
	04025.0HP-135	●		25			24	135								
	04025.4HP-120	●		25.4			24.4	120								

*1. L3 shows DCB length.
*2. LPR shows Overhang length of the EZB Bar when attached to sleeve.
· Choose sleeves (DCB) to meet with DCON dimension of bar.

Sleeve Identification System

EZ H 017 16 HP - 100

Symbol of EZ Bars	Applications	Shank Dia. of EZ Bars	Sleeve Shank Dia.	Symbol of Precision		Overall length of sleeve
				CT : High precision, with coolant hole		
	H : Sleeve	017 : 1.7mm, 025 : 2.5mm…	16 : 16mm, 25.4 : 25.4mm…	HP : High Precision	ST : Standard	100 : 100mm, 120 : 120mm…

How to fix EZ Bars

■ How to use adjustment pin (Fig. 5)
(1) Put the adjustment pin into the hole.
(2) Push it into the sleeve, using the wrench (LW-1.5).
(3) Tightening the clamp screw (HS3X4P) with wrench (LW-1.5) to fix the adjustment pin.

■ How to fix bar (Fig. 6)
(1) With the chip pocket upward, set the bar into the sleeve. Press the slant of the end of the bar with the adjustment pin. Make sure that the bar does not move (Fig. 7)
(2) Tighten the clamp screw with wrench (LW-2) and fix the bar. (Use LW-1.5 if shank dia. is 3mm or less)

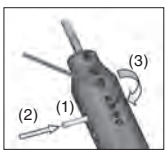


Fig. 5
How to use adjustment pin

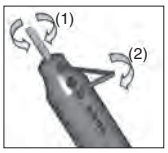


Fig. 6
How to fix bar

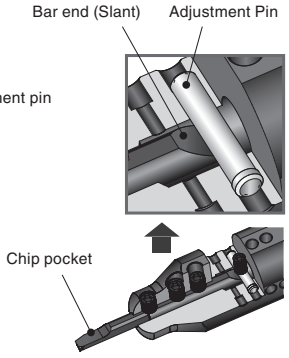


Fig. 7 Fixed bar

● : Std. Item

EZH-HP sleeve

Adjustable

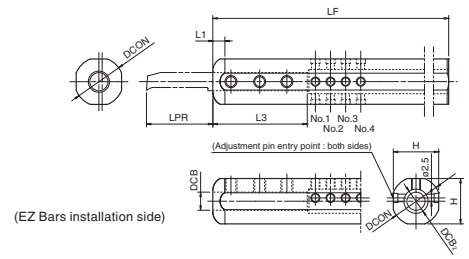


Fig. 3

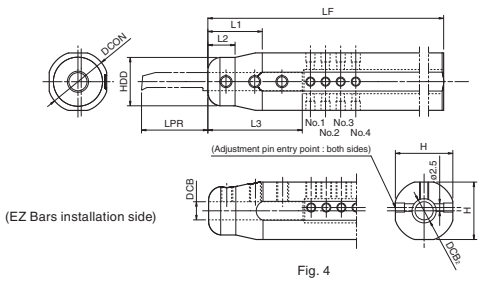
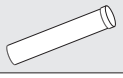


Fig. 4

Description		Stock	Dimension (mm)								Overhang Length of the Bar*2 LPR(mm) Adjustment Pin Setting Position				Drawing	Applicable EZ Bars EZ Bar PLUS ➡ F14~F17 F19, F20 F22~F25 ➡ G51, G78 ➡ J32
			DCB	DCON	HDD	DCB_2	H	LF	L1	L2	*1L3	No.1	No.2	No.3	No.4	
EZH	04516HP-100	●	4.5	16	16	6	15	100	18	9	25.3	23 (14)	18.5 (9.5)	14 (–)	9.5 (–)	Fig. 3	EZB$^{R}_{L}$...045... _045X-...050EZP
	04519HP-120	●		19.05			18	120								Fig. 4
	04520HP-120	●		20			19	120								
	04522HP-135	●		22			21	135								
	04525.0HP-135	●		25			24	135								
	04525.4HP-120	●		25.4			24.4	120								
EZH	05016HP-100	●	5	16	16	6	15	100	18	9	29	25.5 (15.5)	20.5 (10.5)	15.5 (–)	10.5 (–)	Fig. 3	EZB$^{R}_{L}$…050… EZBTR…050-… EZBFR…050-… EZVBR…050-… EZG$^{R}_{L}$…050-… EZFG$^{R}_{L}$…050-… EZTR…050-… _050X-…-060EZP
	05019HP-120	●		19.05			18	120								Fig. 4
	05020HP-120	●		20			19	120								
	05022HP-135	●		22			21	135								
	05025.0HP-135	●		25			24	135								
	05025.4HP-120	●		25.4			24.4	120								
EZH	06016HP-100	●	6	16	16	8	15	100	18	9	31	30.5 (18.5)	25.5 (13.5)	20.5 (–)	15.5 (–)	Fig. 3	EZB$^{R}_{L}$...060... EZBFR...060-... EZVBR...060-... EZG$^{R}_{L}$...060-... EZTR...060-... _060X-...-070EZP
	06019HP-120	●		19.05			18	120								Fig. 4
	06020HP-120	●		20			19	120								
	06022HP-135	●		22			21	135								
	06025.0HP-135	●		25			24	135								
	06025.4HP-120	●		25.4			24.4	120								
EZH	07016HP-100	●	7	16	16	8	15	100	18	9	33	35.5 (21.5)	30.5 (16.5)	25.5 (11.5)	20.5 (–)	Fig. 3	EZB$^{R}_{L}$…070… EZG$^{R}_{L}$…070-… EZFG$^{R}_{L}$…070-… EZTR…070-… _070X-…-080EZP
	07019HP-120	●		19.05			18	120								Fig. 4
	07020HP-120	●		20			19	120								
	07022HP-135	●		22			21	135								
	07025.0HP-135	●		25			24	135								
	07025.4HP-120	●		25.4			24.4	120								
EZH	08019HP-120	●	8	19.05	16	8.4	18	120	18	9	37	40.5 (24.5)	35.5 (19.5)	30.5 (14.5)	25.5 (–)	Fig. 4	EZB$^{R}_{L}$…080… _080X-…-100EZP
	08020HP-120	●		20			19	120								
	08022HP-135	●		22			21	135								
	08025.0HP-135	●		25			24	135								
	08025.4HP-120	●		25.4			24.4	120								

*1. L3 shows DCB length.
*2. LPR shows overhang length of the EZB Bar when attached to sleeve. ( ) value indicates the overhang length when installed the steel boring bar (EZ Bar PLUS).
· Choose sleeves (DCB) to meet with DCON dimension of bar.

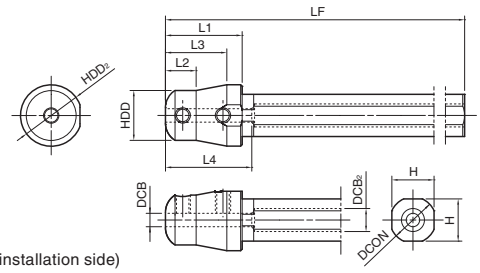
Spare Parts Description (for EZH-HP Sleeves)

Description		Spare Parts: Adjustment Pin	Clamp Screw (for Adjustment Pin)	Wrench	Clamp Screw (for Bar)	Wrench	Applicable EZ Bars EZ Bar PLUS	
								
EZH	017...HP-..	LCP025140	HS3X4P (for both Adjustment Pin and Bar)	LW-1.5 Tightening Torque 1N·m	HS3X4P	LW-1.5 Tightening Torque 1N·m	EZBR...017...	
	020...HP-..						EZB$^{R}_{L}$…020…	
	025...HP-..						EZB$^{R}_{L}$…025…	EZ_R…025-…
	030...HP-..						EZB$^{R}_{L}$…030…	EZ_R…030-…
EZH	035...HP-..	LCP025140	HS3X4P	LW-1.5 Tightening Torque 1N·m	HS4X4P	LW-2 Tightening Torque 2N·m	EZB$^{R}_{L}$…035…	EZ_R…035-…
	040...HP-..						EZB$^{R}_{L}$…040…	EZ_$^{R}_{L}$…040-…
	045...HP-..						EZB$^{R}_{L}$…045…	_045X-…-050EZP
	050...HP-..						EZB$^{R}_{L}$…050… _050X-…-060EZP	EZ_$^{R}_{L}$…050-…
	060...HP-..						EZB$^{R}_{L}$…060… _060X-…-070EZP	EZ_$^{R}_{L}$…060-…
	070...HP-..						EZB$^{R}_{L}$…070… _070X-…-080EZP	EZ_$^{R}_{L}$…070-…
	080...HP-..						EZB$^{R}_{L}$…080…	_080X-…-100EZP

● : Std. Item

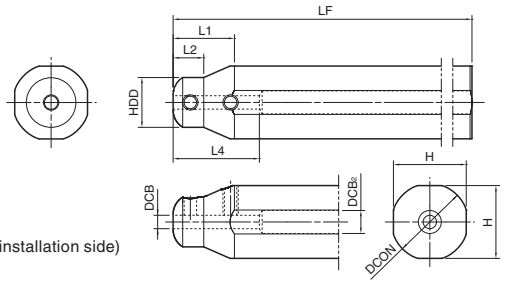
EZH-ST sleeve

Not-adjustable



(EZ Bars installation side)

Fig. 1



(EZ Bars installation side)

Fig. 2

Description		Stock	Dimension (mm)											Drawing	Applicable Bars
			DCB	DCON	HDD	HDD_2	DCB_2	H	LF	L1	L2	L3	*L4		➡ F14~F17, F19 F20, F22 ➡ G51, G78 ➡ J32
EZH	01712ST-80	●	1.7	12	13	16	6	11	80	20	8	16	16	Fig. 1	EZBR…017…
	01716ST-100	●		16		-		15	100	16		-		Fig. 2	
	01719ST-120	●		19.05				18	120						
	01720ST-120	●		20				19	120						
	01722ST-135	●		22				21	135						
	01725.0ST-135	●		25				24	135						
	01725.4ST-120	●		25.4				24.4	120						
EZH	02012ST-80	●	2	12	13	16	6	11	80	20	8	16	20	Fig. 1	EZB$^{R}_{L}$…020…
	02016ST-100	●		16		-		15	100	16		-		Fig. 2	
	02019ST-120	●		19.05				18	120						
	02020ST-120	●		20				19	120						
	02022ST-135	●		22				21	135						
	02025.0ST-135	●		25				24	135						
	02025.4ST-120	●		25.4				24.4	120						
EZH	02512ST-80	●	2.5	12	13	16	6	11	80	20	8	16	20	Fig. 1	EZB$^{R}_{L}$…025… EZTR…025-…
	02516ST-100	●		16		-		15	100	16		-		Fig. 2	
	02519ST-120	●		19.05				18	120						
	02520ST-120	●		20				19	120						
	02522ST-135	●		22				21	135						
	02525.0ST-135	●		25				24	135						
	02525.4ST-120	●		25.4				24.4	120						
EZH	03012ST-80	●	3	12	13	16	6	11	80	20	8	16	21	Fig. 1	EZB$^{R}_{L}$…030… EZBFR…030-… EZVBR…030-… EZGR…030-… EZTR…030-…
	03016ST-100	●		16		-		15	100	16		-		Fig. 2	
	03019ST-120	●		19.05				18	120						
	03020ST-120	●		20				19	120						
	03022ST-135	●		22				21	135						
	03025.0ST-135	●		25				24	135						
	03025.4ST-120	●		25.4				24.4	120						
EZH	03512ST-80	●	3.5	12	13	16	6	11	80	20	8	16	22	Fig. 1	EZB$^{R}_{L}$…035… EZTR…035-…
	03516ST-100	●		16		-		15	100	16		-		Fig. 2	
	03519ST-120	●		19.05				18	120						
	03520ST-120	●		20				19	120						
	03522ST-135	●		22				21	135						
	03525.0ST-135	●		25				24	135						
	03525.4ST-120	●		25.4				24.4	120						
EZH	04012ST-80	●	4	12	13	16	6	11	80	20	8	16	24	Fig. 1	EZB$^{R}_{L}$…040… EZBTR…040-… EZBFR…040-… EZVBR…040-… EZG$^{R}_{L}$…040-… EZFG$^{R}_{L}$…040-… EZTR…040-…
	04016ST-100	●		16		-		15	100	16		-		Fig. 2	
	04019ST-120	●		19.05				18	120						
	04020ST-120	●		20				19	120						
	04022ST-135	●		22				21	135						
	04025.0ST-135	●		25				24	135						
	04025.4ST-120	●		25.4				24.4	120						

*L4 shows DCB length

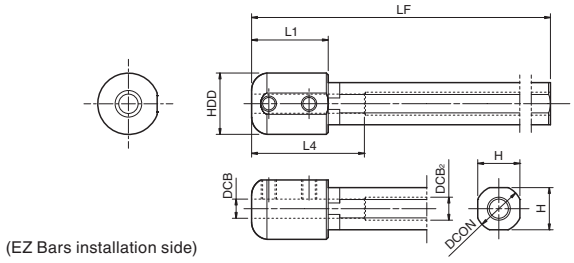
· Choose sleeves (DCB) to meet with DCON dimension of bar.

· Adjustment pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT / HP sleeves.

● : Std. Item

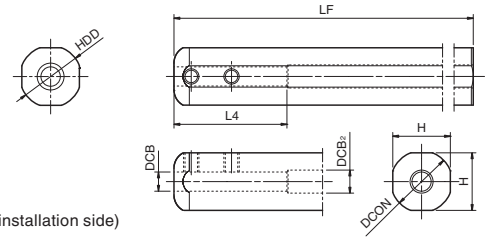
EZH-ST sleeve

Not-adjustable



(EZ Bars installation side)

Fig. 3



(EZ Bars installation side)

Fig. 4

Description		Stock	Dimension (mm)											Drawing	Applicable Bars ➡ F14~F17, F19 F20, F22~F25 ➡ G51, G78 ➡ J32
			DCB	DCON	HDD	HDD_2	DCB_2	H	LF	L1	L2	L3	*L4		
EZH	05012ST-80	●	5	12	16	-	6	11	80	20	-	-	29	Fig. 3	EZB$^{R}_{L}$…050…
	05016ST-100	●		16				15	100	-				Fig. 4	EZBTR…050-…
	05019ST-120	●		19.05				18	120	18	9			Fig. 2	EZBFR…050-…
	05020ST-120	●		20				19	120						EZVBR…050-…
	05022ST-135	●		22				21	135						EZG$^{R}_{L}$…050-…
	05025.0ST-135	●		25				24	135						EZFG$^{R}_{L}$…050-…
	05025.4ST-120	●		25.4				24.4	120						EZTR…050-…
															_050X-…-060EZP
EZH	06012ST-80	●	6	12	16	-	8	11	80	20	-	-	31	Fig. 3	EZB$^{R}_{L}$…060…
	06016ST-100	●		16				15	100	-				Fig. 4	EZBFR…060-…
	06019ST-120	●		19.05				18	120	18	9			Fig. 2	EZVBR…060-…
	06020ST-120	●		20				19	120						EZG$^{R}_{L}$…060-…
	06022ST-135	●		22				21	135						EZTR…060-…
	06025.0ST-135	●		25				24	135						_060X-…-070EZP
	06025.4ST-120	●		25.4				24.4	120						
EZH	07012ST-80	●	7	12	16	-	8	11	80	20	-	-	33	Fig. 3	EZB$^{R}_{L}$…070…
	07016ST-100	●		16				15	100	-				Fig. 4	EZG$^{R}_{L}$…070-…
	07019ST-120	●		19.05				18	120	18	9			Fig. 2	EZFG$^{R}_{L}$…070-…
	07020ST-120	●		20				19	120						EZTR…070-…
	07022ST-135	●		22				21	135						_070X-…-080EZP
	07025.0ST-135	●		25				24	135						
	07025.4ST-120	●		25.4				24.4	120						
EZH	08016ST-100	●	8	16	16	-	8.4	15	100	-	-	-	37	Fig. 4	EZB$^{R}_{L}$…080…
	08019ST-120	●		19.05				18	120	18	9			Fig. 2	_080X-…-100EZP
	08020ST-120	●		20				19	120						
	08022ST-135	●		22				21	135						
	08025.0ST-135	●		25				24	135						
	08025.4ST-120	●		25.4				24.4	120						

*L4 shows DCB length

· Choose sleeves (DCB) to meet with DCON dimension of bar.

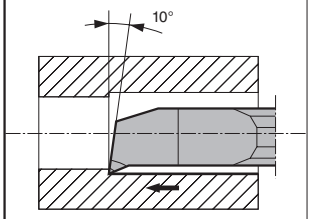
· Adjustment pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT / HP sleeves.

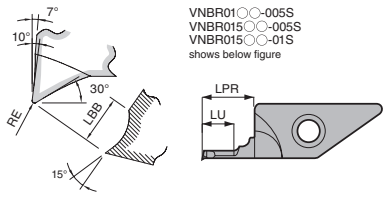
Spare Parts Description (for EZH-ST Sleeves)

Description		Spare Parts		Applicable EZ Bars		EZ Bar PLUS
		Clamp Screw	Wrench	EZB-HP EZB-HP-LT EZB-ST EZB-NB	EZBT EZBF EZVB EZG EZFG EZT	S/C-SCLC S/C-STLB(P) S/C-SWUB
						
EZH	017...ST-..	HS3X4P	LW-1.5 Tightening Torque 1N·m	EZBR…017…	-	-
	020...ST-..			EZB$^{R}_{L}$…020…		
	025...ST-..			EZB$^{R}_{L}$…025…	EZTR…025-…	-
	030...ST-..			EZB$^{R}_{L}$…030…	EZ_R…030-…	-
EZH	035...ST-..	HS4X4P	LW-2 Tightening Torque 2N·m	EZB$^{R}_{L}$…035…	EZTR…035-…	-
	040...ST-..			EZB$^{R}_{L}$…040…	EZ_$^{R}_{L}$…040-…	-
	050...ST-..			EZB$^{R}_{L}$…050…	EZ_$^{R}_{L}$…050-…	_050X-…-060EZP
	060...ST-..			EZB$^{R}_{L}$…060…	EZ_$^{R}_{L}$…060-…	_060X-…-070EZP
	070...ST-..			EZB$^{R}_{L}$…070…	EZ_$^{R}_{L}$…070-…	_070X-…-080EZP
	080...ST-..			EZB$^{R}_{L}$…080…	-	_080X-…-100EZP

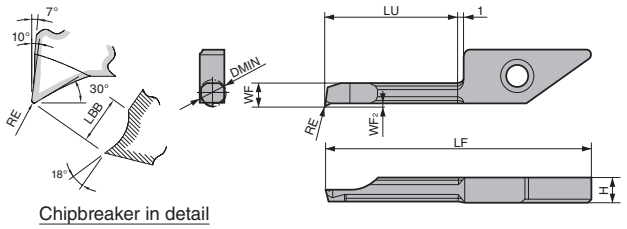
● : Std. Item

VNB-S (Boring) [Corner-R(RE) : Minus tolerance]





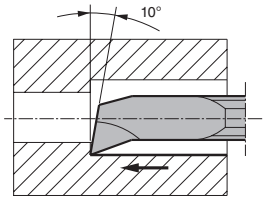
Chipbreaker in detail

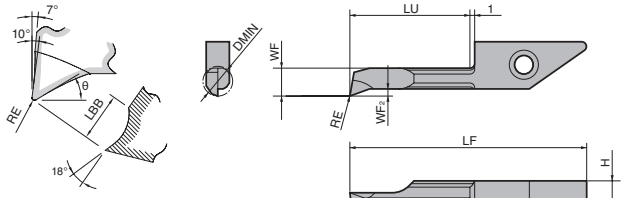


Chipbreaker in detail

●Right-hand shown

VNB (Boring)





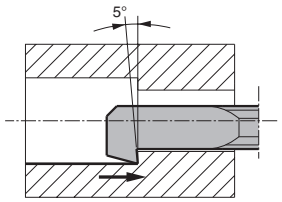
Chipbreaker in detail

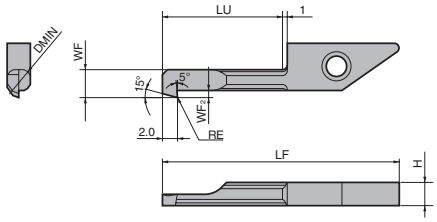
●Right-hand shown

–NB (without Chipbreaker) Top Shape

Top Shape	Grades
	Coated Carbide Carbide
	PCD

VNBT (Back Boring)





●Right-hand shown

Insert Dimensions (VNB-S)

Description		Min. Bore Dia.	Dimension (mm)								Grades				
											MEGA COAT	PVD Coated Carbide	Carbide	PCD	
		DMIN	H	LF	LU	LPR	WF	WF_2	RE	LBB	PR1225	PR930	KW10	KPD001	KPD010
VNBR	0103-005S	1.0	3.9	26.5	3	7	0.85	0.2	+0 -0.02 0.05	0.7	●	●			
	0105-005S				5						●	●			
	01503-005S	1.5			3		1.3				●	●			
	01505-005S				5						●	●			
	0206-005S	2.0		28.1	6	-	1.8	0.25		0.8	●	●			
	025075-005S	2.5			7.5		2.1	0.4			●	●			
	0311-005S	3.0		30.8	11		2.6	0.4			●	●			
	03515-005S	3.5		34.8	15		3.0	0.5			●	●			
	0411-005S	4.0	3.66	30.8	11		3.5	0.5			●	●			
	0420-005S			39.8	20						●	●			
VNBR	01503-01S	1.5	3.9	26.5	3	7	1.3	0.2	+0 -0.03 0.1	0.7	●	●			
	01505-01S				5						●	●			
	0206-01S	2.0		28.1	6	-	1.8	0.25		0.8	●	●			
	025075-01S	2.5			7.5		2.1	0.4			●	●			
	0311-01S	3.0		30.8	11		2.6	0.4			●	●			
	03515-01S	3.5		34.8	15		3.0	0.5			●	●			
	0411-01S	4.0	3.66	30.8	11		3.5	0.5			●	●			
	0420-01S			39.8	20						●	●			
VNBR	0411-02S	4.0	3.66	30.8	11	-	3.5	0.5	+0 -0.04 0.2	0.8	●	●			
	0420-02S			39.8	20						●	●			

Recommended Cutting Conditions ➡ F94

System Tip-Bars are sold in 5 piece boxes

● : Std. Item

Insert Dimensions (VNB / VNB-NB / VNBT)

Description		Min. Bore Dia.	Dimension (mm)								Grades				
											MEGA COAT	PVD Coated Carbide	Carbide	PCD	
		DMIN	H	LF	LU	WF	WF_2	RE	LBB	θ	PR1225	PR930	KW10	KPD001	KPD010
VNBR	0206-003	2	3.9	26.5	6	1.8	0.25	0.03	1.2	24°	●	●	●		
	0311-003	3		30.8	11	2.6	0.4		1.8		●	●	●		
	0411-003	4	3.66			3.5	0.5		2.7	23°	●	●	●		
	0420-003			39.8	20						●	●	●		
	0511-003	5	3.9	30.8	11	4.5	0.7		3.0		●	●	●		
	0520-003			39.8	20						●	●	●		
	0620-003	6				5.3	1.0			24°	●	●	●		
	0630-003			49.8	30						●	●	●		
	0720-003	7		39.8	20	6.2	1.0					●	●		
	0730-003			49.8	30							●	●		
VNBR	0206-01	2	3.9	26.5	6	1.8	0.25	0.1	1.2	24°	●	●	●		
	0311-01	3		30.8	11	2.6	0.4		1.8		●	●	●		
	0411-01	4	3.66			3.5	0.5		2.7	23°	●	●	●		
	0420-01			39.8	20						●	●	●		
	0511-01	5	3.9	30.8	11	4.5	0.7		3.0		●	●	●		
	0520-01			39.8	20						●	●	●		
	0620-01	6				5.3	1.0			24°	●	●	●		
	0630-01			49.8	30						●	●			
	0720-01	7		39.8	20	6.2	1.0					●	●		
	0730-01			49.8	30							●			
VNBR	0206-02	2	3.9	26.5	6	1.8	0.25	0.2	1.2	24°	●	●	●		
	0311-02	3		30.8	11	2.6	0.4		1.8		●	●	●		
	0411-02	4	3.66			3.5	0.5		2.7	23°	●	●	●		
	0420-02			39.8	20						●	●	●		
	0511-02	5	3.9	30.8	11	4.5	0.7		3.0		●	●	●		
	0520-02			39.8	20						●	●	●		
	0620-02	6				5.3	1.0			24°	●	●	●		
	0630-02			49.8	30						●	●	●		
	0720-02	7		39.8	20	6.2	1.0				●	●	●		
	0730-02			49.8	30						●	●	●		
VNBR	0206-003NB	2	3.9	26.5	6	1.8	0.25	0.03	-	15°		●	●		
	0311-003NB	3		30.8	11	2.6	0.4					●	●		
	0411-003NB	4	3.66			3.5	0.5					●	●		
	0420-003NB			39.8	20							●	●		
	0511-003NB	5	3.9	30.8	11	4.5	0.7					●	●		
	0520-003NB			39.8	20							●	●		
	0620-003NB	6				5.3	1.0					●	●		
	0630-003NB			49.8	30							●	●		
	0720-003NB	7		39.8	20	6.2	1.0					●	●		
	0730-003NB			49.8	30							●	●		
VNBR	0206-02NB	2	3.9	26.5	6	1.8	0.25	0.2	-	15°			●		
	0311-02NB	3		30.8	11	2.6	0.4						●		
	0411-02NB	4	3.66			3.5	0.5						●	●	▲
	0420-02NB			39.8	20								●	●	▲
	0511-02NB	5	3.9	30.8	11	4.5	0.7						●	●	▲
	0520-02NB			39.8	20								●	●	▲
	0620-02NB	6				5.3	1.0						●	●	▲
	0630-02NB			49.8	30								●	●	▲
	0720-02NB	7		39.8	20	6.2	1.0						●	●	▲
	0730-02NB			49.8	30								●	●	
VNBTR	0411-003	4	3.66	30.8	11	3.6	1.0	0.03	-	-		●	●		
	0420-003			39.8	20							●			
	0511-003	5	3.9	30.8	11	4.6	1.3					●	●		
	0520-003			39.8	20							●			
VNBTR	0411-01	4	3.66	30.8	11	3.6	1.0	0.1	-	-	●	●	●		
	0420-01			39.8	20						●	●			
	0511-01	5	3.9	30.8	11	4.6	1.3				●	●	●		
	0520-01			39.8	20						●	●			

Recommended Cutting Conditions F94

● : Std. Item
▲ :To be replaced by a new product

System Tip-Bars are sold in 5 piece boxes

SVN-N (without side stopper)

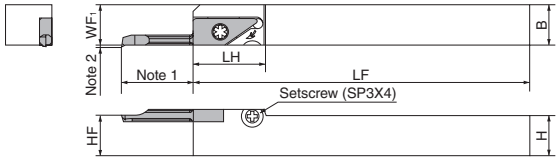


Fig. 1 (SVN-N)

SVNS-N (without side stopper / without setsscrew)

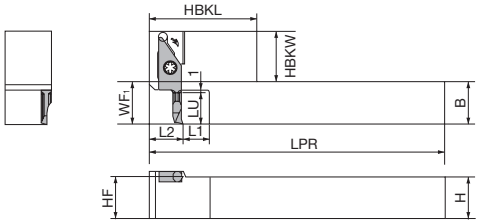


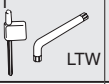
Fig. 2 (SVNS-N)

●Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Note 1 & Note 2(WF2) : For insert dimensions, see page **F32~F33**

Toolholder Dimensions

Description		Stock	Dimension (mm)									Drawing	Spare Parts			Applicable Inserts
			H=HF	B	LF LPR	LH HBKL	L1	L2	WF_1	HBKW	LU		Clamp Screw	Wrench	Setscrew	➔ F32~F33 ➔ G53 ➔ G80 ➔ J36
																
SVNR	**1010H-12N**	●	10	10	100	22	-	-	10	-	-	Fig. 1	SB-3080TR	FT-10	SP3X4	**VNBR....-...**
	1212K-12N	●	12	12	125				12							**VNBTR....-...**
	1616K-12N	●	16	16					16							**VNGR....-..**
	2020K-12N	●	20	20					20							**VNFGR....-..**
	2525M-12N	●	25	25	150				25							**VNTR...-..**
SVNSR	**1010K-12-06N**	●	10	10	125	45	10	12	10	19	6	Fig. 2	SB-3080TR	LTW-10S	-	**(VNBR..06-...)***
	1010K-12-11N	●	10	10	125		10	12	10	23	11					**(VNBR..11-...)*** **(VNBTR..11-...)*** **(VNGR....-11)*** **(VNTR...-11)***
	1212M-12-06N	●	12	12	150		10	12	12	17	6					**(VNBR..06-...)***
	1212M-12-11N	●	12	12	150		10	12	12	21	11					**(VNBR..11-...)*** **(VNBTR..11-...)*** **(VNGR....-11)*** **(VNTR...-11)***
	1212M-12-20N	●	12	12	150		10	13	12	30	20					**(VNBR..20-...)*** **(VNBTR..20-...)*** **(VNGR....-20)***
	1616M-12-06N	●	16	16	150		16	12	16	13	6					**(VNBR..06-...)***
	1616M-12-11N	●	16	16	150		16	12	16	17	11					**(VNBR..11-...)*** **(VNBTR..11-...)*** **(VNGR....-11)*** **(VNTR...-11)***
	1616M-12-20N	●	16	16	150		16	13	16	26	20					**(VNBR..20-...)*** **(VNBTR..20-...)*** **(VNGR....-20)***

1. SVN-N / S-SVN-N / S-SVN-SN (without side stopper) retains high index accuracy by easy restraint.
2. SVN-N (without side stopper) has a setscrew SP3X4. Changing the setscrew SP3X4 to a screw HS3X4 (sold separately) enables the toolholder to be used as a binding effect toolholder similar to the side stopper toolholder.

* All system Tip-Bars Inserts are used with a SVNSR-N Toolholders. However, when setting the cutting edge at the face level of the toolholder as shown in Fig. 2, use the insert shown in ( ). In these cases, the LU dimension of the toolholders corresponds to the LU dimension of the insert.

Spare Parts (Optional)

Screw Side Stopper	Wrench
	
HS3X4	LW-1.5

● : Std. Item

S-SVN-N Round Shank (Standard, without side stopper)

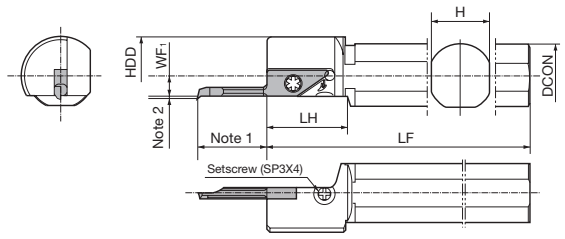


Fig. 1 (S-SVN-N)

S-SVN-SN Round Shank (Straight, without side stopper)

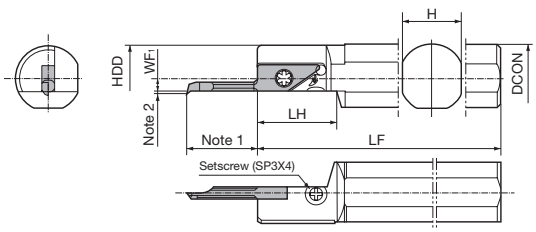


Fig. 2 (S-SVN-SN)

●Right-hand shown

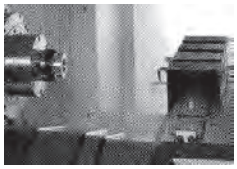
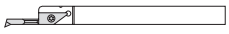
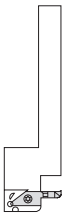
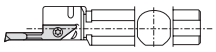
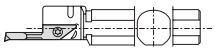
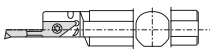
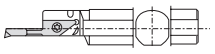
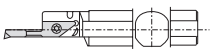
Right-hand Insert for Right-hand Toolholder.

Note 1 & Note 2(WF2) : For insert dimensions, see page **F32~F33**

Toolholder Dimensions

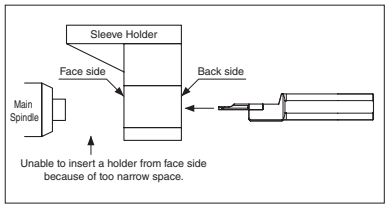
Description	Stock	Dimension (mm)							Drawing	Spare Parts					Applicable Inserts
		DCON	HDD	H	LF	LH	WF_1			Clamp Screw	Wrench	Screw Side Stopper	Setscrew	Wrench	
S12F-SVNR12N	●	12	20	11	80	23	4		Fig. 1	SB-3080TR	FT-10	-	SP3X4	-	**F32~F33** **G53** **G80** **J36**
S14G-SVNR12N	●	14	20	13	90										
S16H-SVNR12N	●	16	24	15	100		6								
S19H-SVNR12N	●	19.05	24	17	100	24									
S19N-SVNR12N	●				160										
S20H-SVNR12N	●	20	24	18	100										
S25H-SVNR12N	●	25.4	30	23	100										
S25Q-SVNR12N	●				180										
S19H-SVNR12SN	●	19.05	18.5	17	100	23	4		Fig. 2	SB-3080TR	FT-10	-	SP3X4	-	
S20H-SVNR12SN	●	20	19.5	18											
S22K-SVNR12SN	●	22	21.5	20	125										
S25.0G-SVNR12SN	●	25	24.5	23	90										

Selection of System Tip-Bars

Gang-Type (Horizontal)	Gang-Type	Gang-Type (Front Loading Sleeve Type)	Gang-Type (Back Loading Sleeve Type)
			
Square Shank (Straight) 	Square Shank (L-shape) 	Square Shank ———	Square Shank ———
Round Shank (Standard) 		Round Shank (Standard) 	Round Shank (Standard) ———
Round Shank (Straight) 		Round Shank (Straight) 	Round Shank (Straight) 

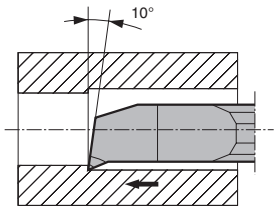
Q : There are standard types (head dia. is larger than shank) and straight types for round shanks. What is each one used for?

A : The straight type is used when it cannot be inserted from the face side of the sleeve holder and can be inserted only from the back side due to space limitation (Refer to Fig. below).
On the other hand, the standard type should be installed when it can be inserted from the face side, and the head end is used for positioning as stopper.

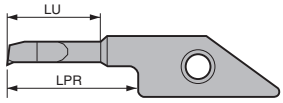


● : Std. Item

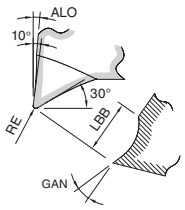
VNBX-S (Boring) [Corner-R(RE) : Minus tolerance]



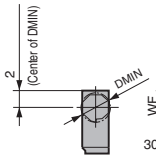
VNBXR0103 type
VNBXR0105 type
VNBXR01503 type
VNBXR01505 type
VNBXR03516 type
shows below figure

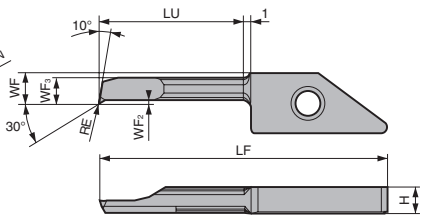


●Right-hand shown



Chipbreaker in detail





Insert Dimensions (VNBX-S)

Description		Min. Bore Dia.	Dimension (mm)											Grades PVD Coated Carbide		
		DMIN	H	LF	LU	LPR	WF	WF_2	WF_3	RE	LBB	ALO	GAN	PR930		
VNBXR	0103-005S	1.0	3.9	26.5	3	7	2.95	0.2	0.85	+0 -0.02 0.05	0.7	7°	15°	●		
	0105-005S				5									●		
	01503-005S	1.5			3				1.3					●		
	01505-005S				5									●		
	0206-005S	2.0			6	-	3	0.25	1.8		0.8	8°	18°	●		
	0311-005S	3.0		30.8	11		3.5	0.4	2.6					●		
	03511-005S	3.5					3.75	0.45	3.1					●		
	03516-005S			39.8	16	21								●		
	0411-005S	4.0	3.66	30.8	11	-	4	0.5	3.5					●		
	0420-005S			39.8	20									●		
VNBXR	01503-01S	1.5	3.9	26.5	3	7	2.95	0.2	1.3	+0 -0.03 0.1	0.7	7°	15°	●		
	01505-01S				5									●		
	0206-01S	2.0			6	-	3	0.25	1.8		0.8	8°	18°	●		
	0311-01S	3.0		30.8	11		3.5	0.4	2.6					●		
	03511-01S	3.5					3.75	0.45	3.1					●		
	03516-01S			39.8	16	21								●		
	0411-01S	4.0	3.66	30.8	11	-	4	0.5	3.5					●		
	0420-01S			39.8	20									●		
VNBXR	0411-02S	4.0	3.66	30.8	11	-	4	0.5	3.5	+0 -0.04 0.2				●		
	0420-02S			39.8	20									●		

Recommended Cutting Conditions F94

Attachment toolholder for VNBX-S System Tip-Bars

1. There are three different types of attachment toolholder for the VNBX-S System Tip-Bars (See Page **F37**).
   (1) SVNS-XN (without Side Stopper)
   (2) S-SVN-XN (without Side Stopper)
   (3) S-SVN-SXN (without Side Stopper)
2. Above toolholders assure high index accuracy by easy restraint.
3. Setscrews (SP3X4) are attached. Toolholders without Side Stopper can be used as a binding effect toolholder when removing the clamp screws and inserting screws (HS3X4 : sold separately) with a wrench (LW-1.5 : sold separately).

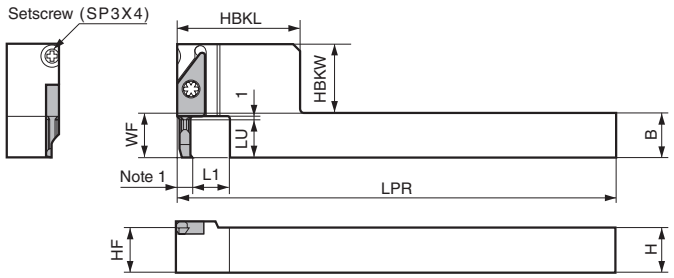
Spare Parts (Optional)

Screw (Side Stopper)	Wrench
	
HS3X4	LW-1.5

System Tip-Bars are sold in 5 piece boxes

● : Std. Item

SVNS-XN (Square Shank, L-shape)



• Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Note 1 : The dimension of Note 1 is same size as the applicable insert (VNBX) WF dimension.

Toolholder Dimensions (L-shape square shank applicable to gang tool post)

Description		Stock	Dimension (mm)									Spare Parts			* Applicable Inserts ➡ F36
			H	HF	B	LPR	HBKL	L1	WF	HBKW	LU	Clamp Screw	Wrench	Setscrew	
SVNSR	1010K-12-06XN	●	10	10	10	125	45	10	10	19	6	SB-3080TR	LTW-10S	SP3X4	(VNBXR02..)
	1010K-12-11XN	●								23	11				(VNBXR..11..)
	1212M-12-06XN	●	12	12	12	150			12	17	6				(VNBXR02..)
	1212M-12-11XN	●								21	11				(VNBXR..11..)
	1212M-12-20XN	●								30	20				(VNBXR0420..)
	1616M-12-06XN	●	16	16	16			16	16	13	6				(VNBXR02..)
	1616M-12-11XN	●								17	11				(VNBXR..11..)
	1616M-12-20XN	●								26	20				(VNBXR0420..)

* All VNBXR Inserts can be attached to a SVNS-XN Toolholder. However, when setting the cutting edge at the face level of the toolholder as shown in Fig., use the insert shown in ( ).

S-SVN-XN (Round Shank, Standard type)

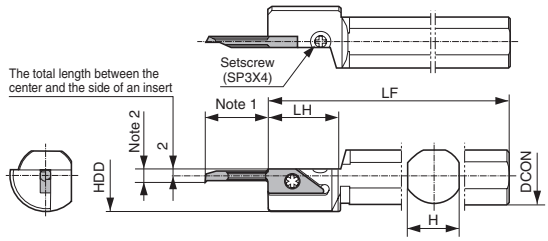


Fig. 1 (S-SVN-XN)

S-SVN-SXN (Round Shank, Straight type)

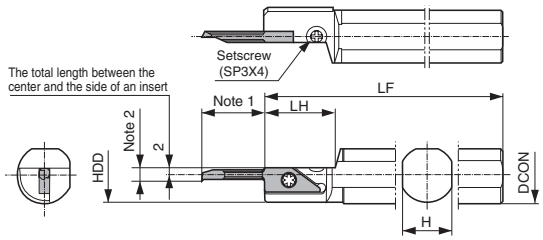


Fig. 2 (S-SVN-SXN)

• Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Note 1 : The dimension of Note 1 shows the applicable insert (VNBX) LU +1 mm.
Note 2 : The dimension of Note 1 is same size as the applicable insert (VNBX) WF.

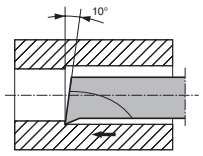
Toolholder Dimensions (Holder center axis core and insert center are coaxial type)

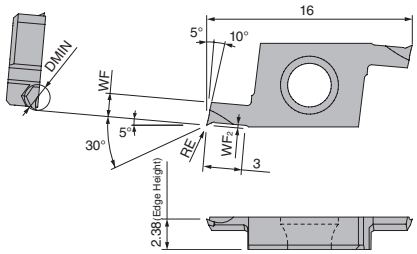
Description		Stock	Dimension (mm)								Drawing	Spare Parts			Applicable Inserts ➡ F36
			DCON	HDD	H	LF	LH					Clamp Screw	Wrench	Setscrew	
S12F	-SVNR12XN	●	12	20	11	80	23				Fig. 1	SB-3080TR	FT-10	SP3X4	VNBXR...
S14G	-SVNR12XN	●	14		13	90									
S16H	-SVNR12XN	●	16	24	15	100	24								
S19H	-SVNR12XN	●	19.05		17										
S19N	-SVNR12XN	●				160									
S20H	-SVNR12XN	●	20		18	100									
S25H	-SVNR12XN	●	25.4	30	23										
S25Q	-SVNR12XN	●				180									
S19H	-SVNR12SXN	●	19.05	18.5	17	100	23				Fig. 2	SB-3080TR	FT-10	SP3X4	VNBXR...
S20H	-SVNR12SXN	●	20	19.5	18										
S22K	-SVNR12SXN	●	22	21.5	20	125									
S25.0G	-SVNR12SXN	●	25	24.5	23	90									

*Reminder of applicable insert.

● : Std. Item

TWB (Micro Boring, Horizontal type) [Corner-R(RE) Tolerance: +0/–0.02mm, +0/–0.03mm]





●Right-hand shown

Description		Min. Bore Dia.	Dimension (mm)			Grades	
						MEGACOAT NANO	PVD Coated Carbide
		DMIN	WF	WF_2	RE	PR1535	PR1025
TWBR	01003-005	1.0	0.85	0.2	+0 -0.02 0.05	●	●
	01503-005	1.5	1.30			●	●
	02003-005	2.0	1.75	0.25		●	●
	02503-005	2.5	2.10	0.3		●	
	03003-005	3.0	2.40	0.4		●	●
TWBR	01503-010	1.5	1.30	0.2	+0 -0.03 0.1	●	●
	02003-010	2.0	1.75	0.25		●	●
	02503-010	2.5	2.10	0.3		●	●
	03003-010	3.0	2.40	0.4		●	●

STW (Square Shank for Horizontal type insert)

(For Left-hand toolholders for grooving, please see page **G82**.)



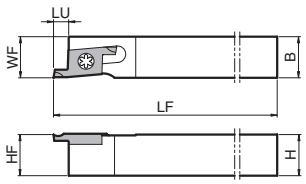


Fig. 1

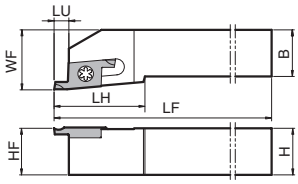


Fig. 2

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, (Left-hand Insert for Left-hand Toolholder.)

Toolholder Dimensions

Description		Stock	Dimension (mm)							Drawing	Spare Parts		Applicable Inserts
			H	HF	B	LF	LH	WF	LU		Clamp Screw	Wrench	
													F38
STWR	1212F-15	●	12	12	12	85	-	12	3	Fig. 1	SB-3080TR	LTW-10S	TWBR○○○○○-○○○
	1212K-15	●	12	12	12	125		12					
	1616K-15	●	16	16	16			16					
	2020K-15	●	20	20	20		25	25		Fig. 2			
	2525M-15	●	25	25	25	150		32					

S-STW (Round Shank for Horizontal type insert)

(For Left-hand toolholders for grooving, please see page **G82**.)



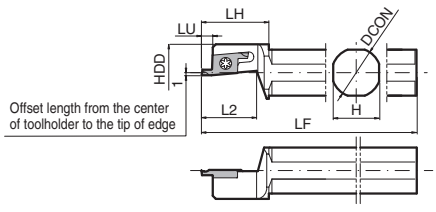


Fig. 1

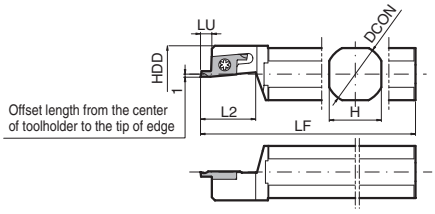


Fig. 2

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, (Left-hand Insert for Left-hand Toolholder.)

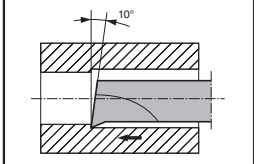
Toolholder Dimensions

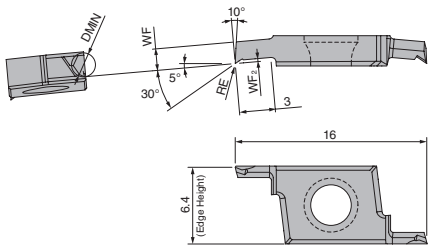
Description		Stock	Dimension (mm)							Drawing	Spare Parts		Applicable Inserts
			DCON	HDD	H	LF	L2	LH	LU		Clamp Screw	Wrench	
													F38
S12F-	STWR15	●	12	20	11	80	18	22	3	Fig. 1	SB-3080TR	LTW-10S	TWBR○○○○○-○○○
S14H-	STWR15	●	14		13	100							
S15F-	STWR15	●	15.875		15	85							
S16F-	STWR15	●	16										
S19G-	STWR15	●	19.05	18.5	17	90		-	3	Fig. 2			
S19K-	STWR15	●				120							
S20G-	STWR15	●	20	19.5	18	90							
S20K-	STWR15	●				120							
S22K-	STWR15	●	22	21.5	20	125	22						
S25.0J-	STWR15	●	25	24.5	23	110							
S25K-	STWR15	●	25.4	25	23	120							

Twin-Bars are sold in 5 piece boxes

● : Std. Item

TWBT (Micro Boring, Vertical type) [Corner-R(RE) Tolerance: +0/–0.02mm, +0/–0.03mm]





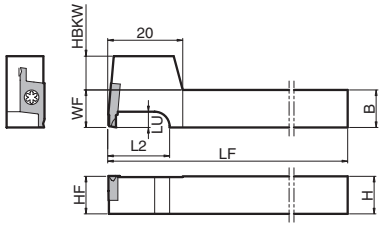
●Right-hand shown

Description		Min. Bore Dia.	Dimension (mm)			Grades	
						MEGACOAT NANO	PVD Coated Carbide
		DMIN	WF	WF_2	RE	PR1535	PR1025
TWBTR	01003-005	1.0	0.85	0.2	+0 -0.02 0.05	●	●
	01503-005	1.5	1.30			●	●
	02003-005	2.0	1.75	0.25		●	
	02503-005	2.5	2.10	0.3		●	●
	03003-005	3.0	2.30	0.4		●	●
TWBTR	01503-010	1.5	1.30	0.2	+0 -0.03 0.1	●	●
	02003-010	2.0	1.75	0.25		●	●
	02503-010	2.5	2.10	0.3		●	●
	03003-010	3.0	2.30	0.4		●	●

STWS (Square shank for Vertical type insert, L-shape type)



●Right-hand shown



Toolholder Dimensions

Description		Stock	Dimension (mm)								Drawing	Spare Parts		Applicable Inserts
			H	HF	B	LF	L2	WF	HBKW	LU		Clamp Screw	Wrench	F39 G83
STWSR	1010JX-15T	●	10	10	10	120	16	10	9	3	-	SB-3080TR	LTW-10S	TWBTR○○○○○-○○○ TWFGTR○○○
	1212JX-15T	●	12	12	12			12	7					
	1616JX-15T	●	16	16	16		20	16	3					
STWSR	1010F-15T	●	10	10	10	85	16	10	9					
	1212F-15T	●	12	12	12			12	7					

Recommended Cutting Conditions (TWB / TWBT)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)		TWBR01003 type TWBR01503 type TWBTR01003 type TWBTR01503 type		TWBR02003 type TWBR02503 type TWBR03003 type TWBTR02003 type TWBTR02503 type TWBTR03003 type		Remarks
	MEGACOAT NANO	PVD Coated Carbide	ap (mm), f (mm/rev)				
	PR1535	PR1025	ap	f	ap	f	
Carbon Steel / Alloy Steel	★ 30~100	☆ 30~100	~0.1	~0.01	~0.2	~0.03	Coolant
Stainless Steel	★ 30~80	☆ 30~80	~0.1	~0.01	~0.2	~0.02	

★ : 1st Recommendation

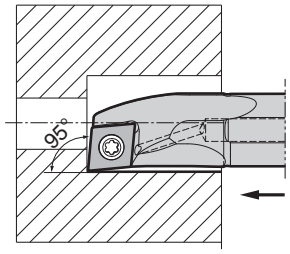
● : Std. Item

Twin-Bars are sold in 5 piece boxes

Dynamic Bar [CC□□Insert]

A/S-SCLC-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



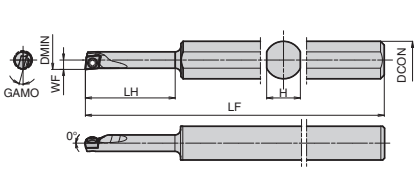


Fig. 1

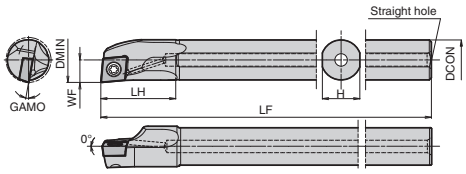


Fig. 2

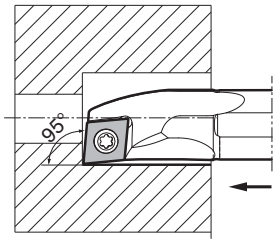
Shank Dia. DCON	Straight hole Dia.
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SCLC-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



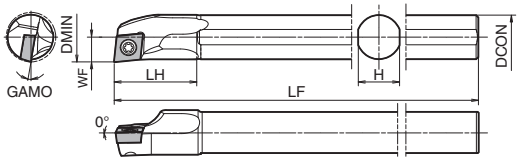


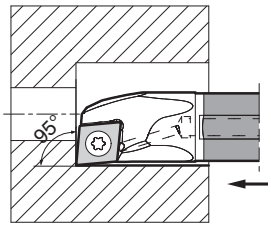
Fig. 3

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C/E-SCLC-A(N) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



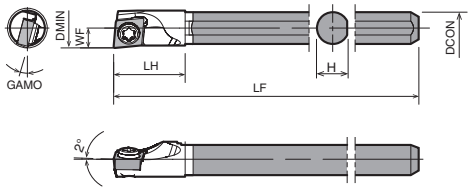


Fig. 4

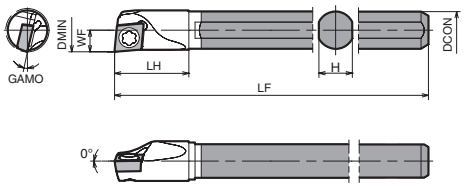


Fig. 5

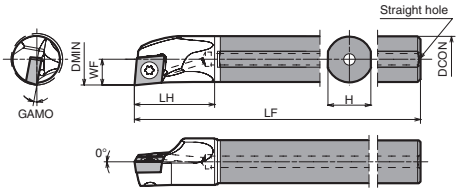


Fig. 6

Shank Dia. DCON	Straight hole Dia.
ø8	ø3
ø10	
ø12	ø4
ø16	
ø20	ø6
ø25	

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	GAMO	Std. Corner-R (RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	S10H-SCLCR/L03-05AE	●	●	5	10	9	100	24	2.5	15°	0.2	No	Fig. 1	SB-1635TR	FT-6
	S10H-SCLCR/L03-06AE	●	●	6				28	3	13°					
	S10H-SCLCR/L04-07AE	●	●	7				32	3.5					SB-2035TR	
	S10H-SCLCR/L04-08AE	●	●	8				37	4	11°					
	A08X-SCLCR/L06-10AE	●	●	10	8	7	120	16	5	14°	0.4	Yes	Fig. 2	SB-2545TR	FT-8
	A10L-SCLCR/L06-12AE	●	●	12	10	9	140	20	6	12°					
	A12M-SCLCR/L06-14AE	●	●	14	12	11	150	24	7	10°					
	A16Q-SCLCR/L09-18AE	●	●	18	16	15	180	30	9					SB-4065TR	FT-15
	A20R-SCLCR/L09-22AE	●	●	22	20	19	200	36	11	8°					
	A25S-SCLCR/L09-27AE	●	●	27	25	24	250	46	13.5	6°					
Steel	S08X-SCLCR/L06-10A	●	●	10	8	7	120	16	5	14°	0.4	No	Fig. 3	SB-2545TR	FT-8
	S10L-SCLCR/L06-12A	●	●	12	10	9	140	20	6	12°					
	S12M-SCLCR/L06-14A	●	●	14	12	11	150	24	7	10°					
	S16Q-SCLCR/L09-18A	●	●	18	16	15	180	30	9					SB-4065TR	FT-15
	S20R-SCLCR/L09-22A	●	●	22	20	19	200	36	11	8°					
	S25S-SCLCR/L09-27A	●	●	27	25	24	250	46	13.5	6°					
Carbide	C04G-SCLCR/L03-05AN	●	●	5	4	3.8	90	7	2.5	15°	0.2	No	Fig. 4	SB-1635TR	FT-6
	C05H-SCLCR/L03-06AN	●	●	6	5	4.4	100	9	3	13°			Fig. 5		
	C06J-SCLCR/L04-07AN	●	●	7	6	5.4	110	10	3.5					SB-2035TR	
	C07K-SCLCR/L04-08AN	●	●	8	7	6.4	125	11	4	11°					
	E08L-SCLCR/L06-10AN	●	●	10	8	7	140	14	5	14°	0.4	Yes	Fig. 6	SB-2545TR	FT-8
	E08L-SCLCR06-10AN2/3	●					90								
	E10N-SCLCR/L06-12AN	●	●	12	10	9	160	18	6	12°					
	E10N-SCLCR06-12AN2/3	●					105								
	E12Q-SCLCR/L06-14A	●	●	14	12	11	180	23	7	10°					
	E12Q-SCLCR 06-14A-2/3	●					120								
	E16X-SCLCR/L 09-18A	●	●	18	16	15	220	28	9					SB-4065TR	FT-15
	E16X-SCLCR 09-18A-2/3	●					145								
	E20S-SCLCR/L 09-22A	●	●	22	20	19	250	32	11	8°					
	E20S-SCLCR 09-22A-2/3	●					165								
	E25T-SCLCR/L 09-27A	●	●	27	25	24	300	38	13.5	6°					
	E25T-SCLCR 09-27A-2/3	●					200								

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Medium	Finishing - Medium	Finishing / Precision
See Page	B53	B53	B53	B54	B54	B54	B54	B54, B55	B53	B55, B56
Insert / Toolholder Description	CF	PF	SKS	WP (Wiper)	PP	GK	HQ	Standard	GQ	R/L-F / -FSF
...-SCLCR/L03-...	CCGT0301..	CCGT0301..	-	-	-	-	-	-	-	CC□T0301..
...-SCLCR/L04-...	CCGT0401..	CCGT0401..	-	-	-	-	-	-	-	CC□T0401..
...-SCLCR/L06-...	-	CCGT0602..	CCGT0602..	CCMT0602..	CCMT0602..	CCMT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-
...-SCLCR/L09-...	-	-	CCGT09T3..	CCMT09T3..	CCMT09T3..	CCMT09T3..	CCMT09T3..	CCGT09T3.. CCMT09T3..	CCGT09T3..	-

Applications	* Finishing	Low Feed	Low Feed / Precision	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B57	B58, B59	B57	B55	B60	B60	B60	B60	C24	C14
Insert / Toolholder Description	R/L-P	(E/F) R/L-U	FR/L-USF	MQ	Without Chipbreaker	AP	A3	AH	PCD	CBN
...-SCLCR/L03-...	-	-	-	-	-	-	-	-	-	CCMW0301..
...-SCLCR/L04-...	-	-	-	-	-	-	-	-	CCGW0401..	CCMW0401..
...-SCLCR/L06-...	-	CCGT0602..	CCET0602..	-	CCGW0602..	CCGT0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
...-SCLCR/L09-...	CCET09T3..	CCGT09T3..	CCET09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

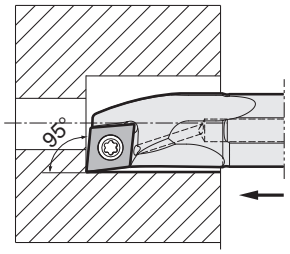
* When using P chipbreaker : Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Recommended Cutting Conditions ➡ F92~F93
Applicable Sleeves ➡ F83~F86

● : Std. Item

A-SCLP-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



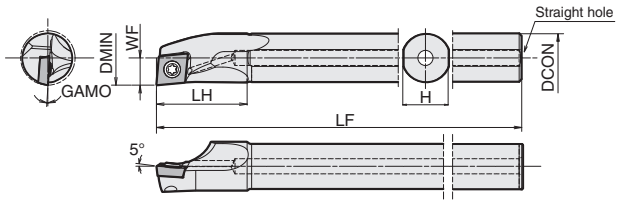


Fig. 1

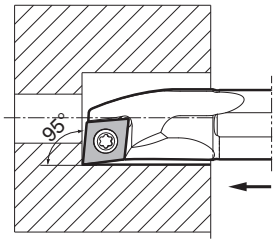
Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SCLP-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



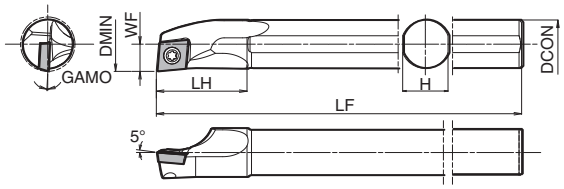


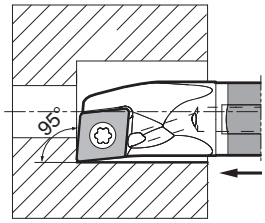
Fig. 2

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SCLP-A(N) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



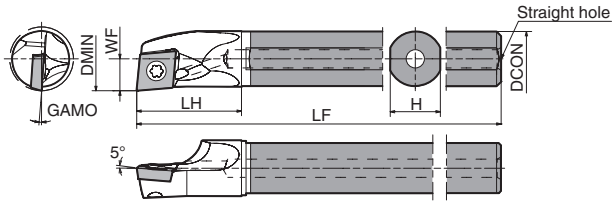


Fig. 3

Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	GAMO	Std. Corner-R (RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SCLP$^{R}_{L}$08-12AE	●	●	12	10	9	140	20	6	5°	0.4	Yes	Fig. 1	SB-3060TR	FT-10
	A12M-SCLP$^{R}_{L}$08-14AE	●	●	14	12	11	150	24	7	4°					
	A12M-SCLP$^{R}_{L}$09-16AE	●	●	16					8					SB-4065TR	FT-15
	A16Q-SCLP$^{R}_{L}$09-18AE	●	●	18	16	15	180	30	9	3.5°					
	A20R-SCLP$^{R}_{L}$09-22AE	●	●	22	20	19	200	36	11	2°					
	A25S-SCLP$^{R}_{L}$09-27AE	●	●	27	25	24	250	46	13.5	0°					
Steel	S10L-SCLP$^{R}_{L}$08-12A	●	●	12	10	9	140	20	6	5°	0.4	No	Fig. 2	SB-3060TR	FT-10
	S12M-SCLP$^{R}_{L}$08-14A	●	●	14	12	11	150	24	7	4°					
	S12M-SCLP$^{R}_{L}$09-16A	●	●	16					8					SB-4065TR	FT-15
	S16Q-SCLP$^{R}_{L}$09-18A	●	●	18	16	15	180	30	9	3.5°					
	S20R-SCLP$^{R}_{L}$09-22A	●	●	22	20	19	200	36	11	2°					
	S25S-SCLP$^{R}_{L}$09-27A	●	●	27	25	24	250	46	13.5	0°					
Carbide	E10N-SCLP$^{R}_{L}$08-12AN	●	●	12	10	9	160	18	6	5°	0.4	Yes	Fig. 3	SB-3060TR	FT-10
	E10N-SCLPR08-12AN2/3	●					105								
	E10N-SCLPR08-12AN1/2	●					80								
	E12Q-SCLP$^{R}_{L}$08-14A	●	●	14	12	11	180	23	7	4°					
	E12Q-SCLPR 08-14A-2/3	●					120								
	E12Q-SCLPR 08-14A-1/2	●					90								
	E12Q-SCLP$^{R}_{L}$09-16A	●	●	16	12	11	180	23	8	5°				SB-4065TR	FT-15
	E12Q-SCLPR 09-16A-2/3	●					120								
	E12Q-SCLPR 09-16A-1/2	●					90								
	E16X-SCLP$^{R}_{L}$ 09-18A	●	●	18	16	15	220	28	9	3.5°					
	E16X-SCLPR 09-18A-2/3	●					145								
	E16X-SCLPR 09-18A-1/2	●					110								
	E20S-SCLP$^{R}_{L}$ 09-22A	●	●	22	20	19	250	32	11	2°					
	E20S-SCLPR 09-22A-2/3	●					165								
	E20S-SCLPR 09-22A-1/2	●					125								
	E25T-SCLP$^{R}_{L}$ 09-27A	●	●	27	25	24	300	38	13.5	0°					
	E25T-SCLPR 09-27A-2/3	●					200								

Applicable Inserts

Applications	Finishing	Finishing	Finishing - Medium	Medium	Finishing - Medium	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Cast Iron	Non-ferrous Metals	Hard Materials
See Page	B61	B61	B61	B61	B61	B61	B61	B61	C25	C14
Insert / Toolholder Description	PP	GP	HQ	Standard	$^{R}_{L}$-Y	XP	XQ	Without Chipbreaker	PCD	CBN
...-SCLP$^{R}_{L}$08-...	CPMT0802..	CPMT0802..	CPMH0802..	CPMH0802..	CPMH0802..	CPMT0802..	-	CPMB0802..	CPMH0802..	CPGB0802..
...-SCLP$^{R}_{L}$09-...	CPMT0903..	CPMT0903..	CPMH0903..	CPMH0903..	CPMH0903..	CPMT0903..	CPMT0903..	CPMB0903..	CPMH0903..	CPGB0903..

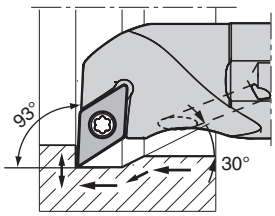
Recommended Cutting Conditions ➔ F92~F93
Applicable Sleeves ➔ F84~F86

● : Std. Item

Dynamic Bar [DC□□Insert]

A-SDUC-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



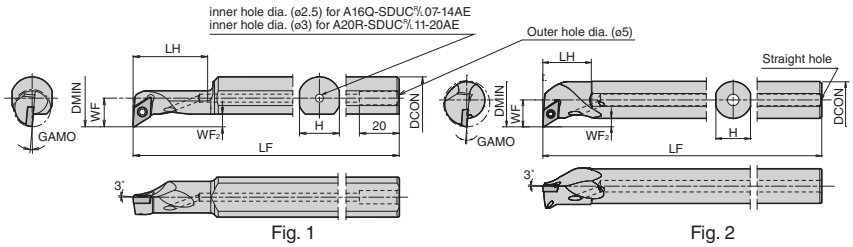


Fig. 1 Fig. 2

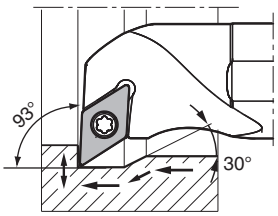
Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SDUC-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



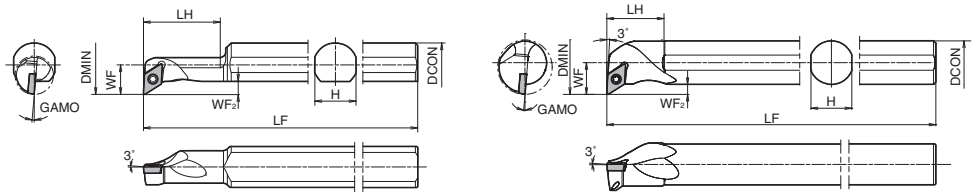


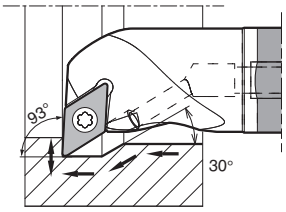
Fig. 3 Fig. 4

●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SDUC-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



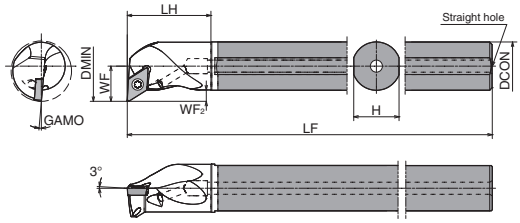


Fig. 5

Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	WF_2	GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SDUC$^{R}_{L}$07-14AE	●	●	14	10	9	140	19	8.7	3.3	5°	0.4	Yes	Fig. 2	SB-2560TR	FT-8
	A16Q-SDUC$^{R}_{L}$07-14AE	●	●		16	15	180	28	10.8	4.4				Fig. 1		
	A12M-SDUC$^{R}_{L}$07-16AE	●	●	16	12	11	150	21	9.7	3.3				Fig. 2		
	A16Q-SDUC$^{R}_{L}$07-20AE	●	●	20	16	15	180		11.7							
	A20R-SDUC$^{R}_{L}$11-20AE	●	●		20	19	200	48	15.6	6.1				Fig. 1	SB-4065TR	FT-15
	A16Q-SDUC$^{R}_{L}$11-23AE	●	●	23	16	15	180	21	14.5					Fig. 2		
	A20R-SDUC$^{R}_{L}$11-27AE	●	●	27	20	19	200	23	16.5							
	A25S-SDUC$^{R}_{L}$11-32AE	●	●	32	25	24	250	24	19							
Steel	S10L-SDUC$^{R}_{L}$07-14A	●	●	14	10	9	140	19	8.7	3.3	5°	0.4	No	Fig. 4	SB-2560TR	FT-8
	S16Q-SDUC$^{R}_{L}$07-14A	●	●		16	15	180	28	10.8	4.4				Fig. 3		
	S12M-SDUC$^{R}_{L}$07-16A	●	●	16	12	11	150	21	9.7	3.3				Fig. 4		
	S16Q-SDUC$^{R}_{L}$07-20A	●	●	20	16	15	180		11.7							
	S20R-SDUC$^{R}_{L}$11-20A	●	●		20	19	200	48	15.6	6.1				Fig. 3	SB-4065TR	FT-15
	S16Q-SDUC$^{R}_{L}$11-23A	●	●	23	16	15	180	21	14.5					Fig. 4		
	S20R-SDUC$^{R}_{L}$11-27A	●	●	27	20	19	200	23	16.5							
	S25S-SDUC$^{R}_{L}$11-32A	●	●	32	25	24	250	24	19							
Carbide	E10N-SDUC$^{R}_{L}$07-14A	●	●	14	10	9	160	20	8.7	3.3	5°	0.4	Yes	Fig. 5	SB-2560TR	FT-8
	E10N-SDUCR 07-14A-2/3	●					105									
	E12Q-SDUC$^{R}_{L}$07-16A	●	●	16	12	11	180	23	9.7							
	E12Q-SDUCR 07-16A-2/3	●					120									
	E16X-SDUC$^{R}_{L}$07-20A	●	●	20	16	15	220	28	11.7							
	E16X-SDUCR 07-20A-2/3	●					145									
	E16X-SDUC$^{R}_{L}$11-23A	●	●	23			220		14.5	6.1					SB-4065TR	FT-15
	E16X-SDUCR 11-23A-2/3	●					145									
	E20S-SDUC$^{R}_{L}$11-27A	●	●	27	20	19	250	32	16.5							
	E20S-SDUCR 11-27A-2/3	●					165									
	E25T-SDUC$^{R}_{L}$11-32A	●	●	32	25	24	300	38	19							
	E25T-SDUCR 11-32A-2/3	●					200									

Applicable Inserts

Applications	Minute ap	Finishing	* Finishing	Finishing	Finishing - Medium	Finishing - Medium	Medium	Finishing / Precision	Low Feed	Low Feed / Precision
See Page	B62	B62	B63	B63	B64	B64	B64	B66, B67	B68, B69	B68
Insert / Toolholder Description	CF	SKS	WP (Wiper)	PP	GK	HQ	Standard	$^{R}_{L}$ -F / -FSF	(E/F)$^{R}_{L}$-U	F$^{R}_{L}$-USF
...-SDUC$^{R}_{L}$07-...	DCGT0702..	DCGT0702..	DCMX0702..	DCMT0702..	DCMT0702..	DCMT0702..	DCGT0702..	DC□T0702..	DCGT0702..	DCET0702..
...-SDQC$^{R}_{L}$07-...										
...-SDZC$^{R}_{L}$07-...										
...-SDUC$^{R}_{L}$11-...	DCGT11T3..	DCGT11T3..	DCMX11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3.. DCGT11T3..	DC□T11T3..	DCGT11T3..	DCET11T3..
...-SDQC$^{R}_{L}$11-...										
...-SDZC$^{R}_{L}$11-...										

Applications	Low Feed	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B70, B71	B65	B65	B65	B71	B71	B71	B71	C25	C15
Insert / Toolholder Description	(E/F)$^{R}_{L}$-J	XP	XQ	MQ	Without Chipbreaker	AP	$^{R}_{L}$-A3	AH	PCD	CBN
...-SDUC$^{R}_{L}$07-...	DCET0702..	DCMT0702..	-	DCMT0702..	DCGW0702..	DCGT0702..	-	-	DCMT0702..	DCMW0702..
...-SDQC$^{R}_{L}$07-...										
...-SDZC$^{R}_{L}$07-...										
...-SDUC$^{R}_{L}$11-...	DC_T11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
...-SDQC$^{R}_{L}$11-...										
...-SDZC$^{R}_{L}$11-...										

* For WP chipbreaker, cutting edge offsets or program corrections are required. R37

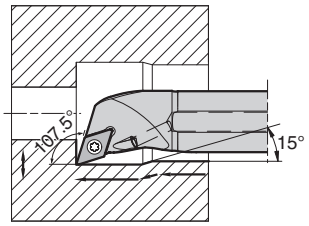
Recommended Cutting Conditions F92~F93
Applicable Sleeves F84~F86

● : Std. Item

Dynamic Bar [DC□□Insert]

A-SDQC-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



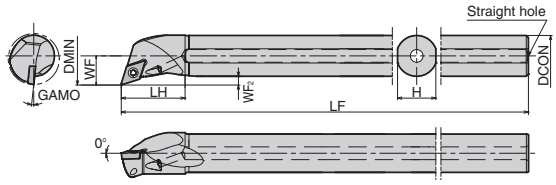


Fig. 1

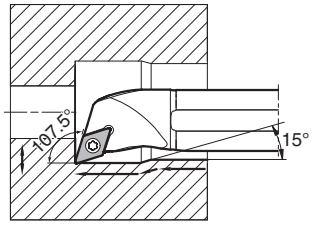
Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SDQC-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



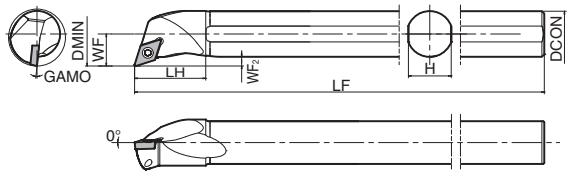


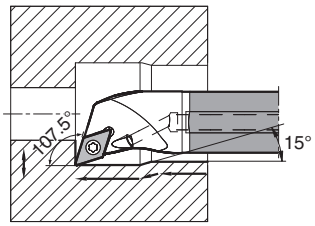
Fig. 2

●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SDQC-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



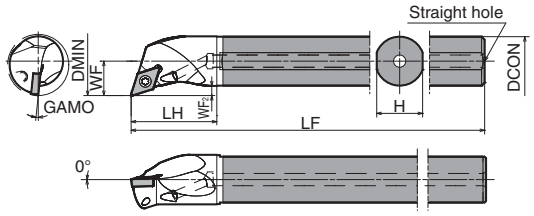


Fig. 3

Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

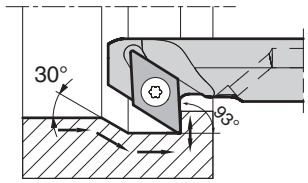
	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	WF_2	GAMO	Std. Corner-R (RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L -SDQC$^{R}_{L}$07-13AE	●	●	13	10	9	140	19	7.5	2.1	10°	0.4	Yes	Fig. 1	SB-2560TR	FT-8
	A12M-SDQC$^{R}_{L}$07-16AE	●	●	16	12	11	150	22	9.25	2.6	8°					
	A16Q-SDQC$^{R}_{L}$07-20AE	●	●	20	16	15	180	25	11.3		6°					
	A20R-SDQC$^{R}_{L}$11-25AE	●	●	25	20	19	200	31	14.4	3.7	5°				SB-4065TR	FT-15
	A25S-SDQC$^{R}_{L}$11-30AE	●	●	30	25	24	250	38	16.9		4°					
Steel	S10L-SDQC$^{R}_{L}$07-13A	●	●	13	10	9	140	19	7.5	2.1	10°	0.4	No	Fig. 2	SB-2560TR	FT-8
	S12M-SDQC$^{R}_{L}$07-16A	●	●	16	12	11	150	22	9.25	2.6	8°					
	S16Q-SDQC$^{R}_{L}$07-20A	●	●	20	16	15	180	25	11.3		6°					
	S20R-SDQC$^{R}_{L}$11-25A	●	●	25	20	19	200	31	14.4	3.7	5°				SB-4065TR	FT-15
	S25S-SDQC$^{R}_{L}$11-30A	●	●	30	25	24	250	38	16.9		4°					
Carbide	E10N-SDQC$^{R}_{L}$07-13A	●	●	13	10	9	160	20	7.5	2.1	10°	0.4	Yes	Fig. 3	SB-2560TR	FT-8
	E10N-SDQCR 07-13A-2/3	●					105									
	E12Q-SDQC$^{R}_{L}$07-16A	●	●	16	12	11	180	23	9.25	2.6	8°					
	E12Q-SDQCR 07-16A-2/3	●					120									
	E16X-SDQC$^{R}_{L}$07-20A	●	●	20	16	15	220	28	11.3	2.6	6°					
	E16X-SDQCR 07-20A-2/3	●					145									
	E20S-SDQC$^{R}_{L}$11-25A	●	●	25	20	19	250	32	14.4	3.7	5°				SB-4065TR	FT-15
	E20S-SDQCR 11-25A-2/3	●					165									
	E25T-SDQC$^{R}_{L}$11-30A	●	●	30	25	24	300	38	16.9	3.7	4°					
	E25T-SDQCR 11-30A-2/3	●					200									

WP chipbreaker (DCMX-WP : Wiper insert) is not applicable to A-SDQC-AE, S-SDQC-A and E-SDQC-A Toolholders.

● : Std. Item

A-SDZC-AE Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5.5



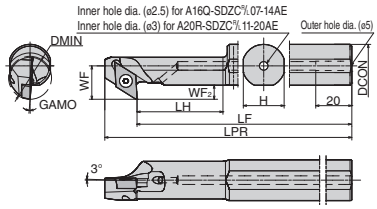


Fig. 1

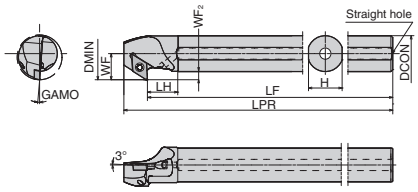


Fig. 2

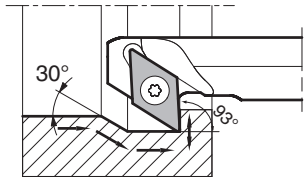
Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

S-SDZC-A Steel Bar (Back Boring)

Max. Overhang Length L/D=~4



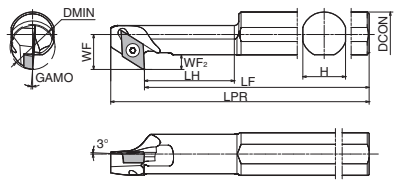


Fig. 3

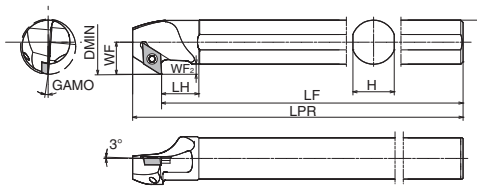


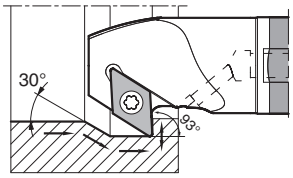
Fig. 4

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

E-SDZC-A Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7



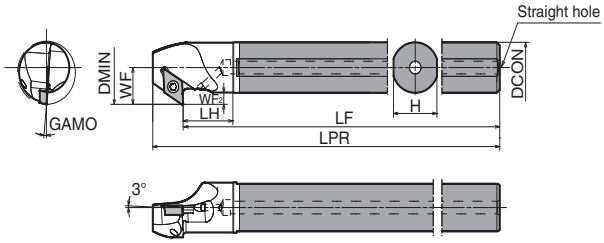


Fig. 5

Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	
ø20	ø6

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LPR	LF	LH	WF	WF_2	GAMO	Std. Corner-R (RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SDZC□07-14AE	●	●	14	10	9	140	130.5	14	8.7	3.3	5°	0.4	Yes	Fig. 2	SB-2545TR	FT-8
	A16Q-SDZC□07-14AE	●	●		16	15	180	170	30	10.8	4.4				Fig. 1		
	A12M-SDZC□07-16AE	●	●	16	12	11	150	139.5	14	9.7	3.3				Fig. 2	SB-2560TR	
	A16Q-SDZC□07-20AE	●	●	20	16	15	180	169.5		11.7							
	A20R-SDZC□11-20AE	●	●		20	19	200	185	40	15.6	6.1				Fig. 1	SB-4065TR	FT-15
	A16Q-SDZC□11-23AE	●	●	23	16	15	180	165	15	14.5					Fig. 2		
	A20R-SDZC□11-27AE	●	●	27	20	19	200	185		16.5							
	A25S-SDZC□11-32AE	●	●	32	25	24	250	235		19							
Steel	S10L-SDZC□07-14A	●	●	14	10	9	140	130.5	14	8.7	3.3	5°	0.4	No	Fig. 4	SB-2545TR	FT-8
	S16Q-SDZC□07-14A	●	●		16	15	180	170	30	10.8	4.4				Fig. 3		
	S12M-SDZC□07-16A	●	●	16	12	11	150	139.5	14	9.7	3.3				Fig. 4	SB-2560TR	
	S16Q-SDZC□07-20A	●	●	20	16	15	180	169.5		11.7							
	S20R-SDZC□11-20A	●	●		20	19	200	185	40	15.6	6.1				Fig. 3	SB-4065TR	FT-15
	S16Q-SDZC□11-23A	●	●	23	16	15	180	165	15	14.5					Fig. 4		
	S20R-SDZC□11-27A	●	●	27	20	19	200	185		16.5							
	S25S-SDZC□11-32A	●	●	32	25	24	250	235		19							
Carbide	E10N-SDZCR07-14A	●		14	10	9	160	150.5	10.5	8.7	3.3	5°	0.4	Yes	Fig. 5	SB-2545TR	FT-8
	E12Q-SDZCR07-16A	●		16	12	11	180	169.5	12.5	9.7						SB-2560TR	
	E16X-SDZCR07-20A	●		20	16	15	220	209.5	17.5	11.7							
	E16X-SDZCR11-23A	●		23				205	13	14.5	6.1					SB-4065TR	FT-15
	E20S-SDZCR11-27A	●		27	20	19	250	235	17	16.5							

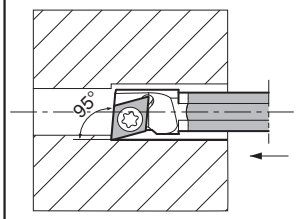
* For WP chipbreaker, cutting edge offsets or program corrections are required. R37

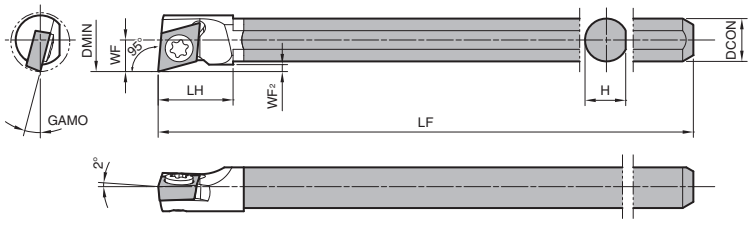
● : Std. Item

Boring Bar [JC□□Insert]

C-SJLC Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



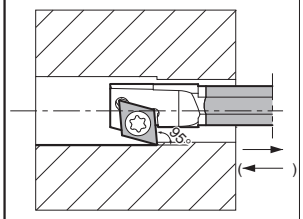


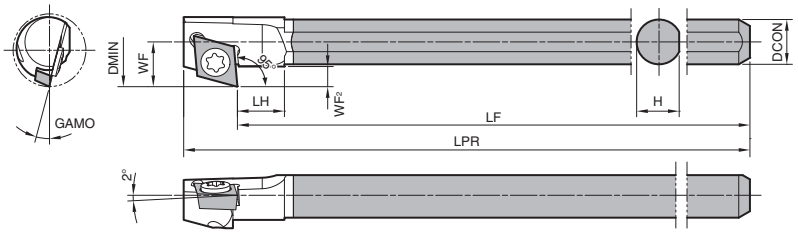
●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C-SJZC Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7





●Right-hand shown

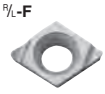
Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

* When using Right-hand Toolholder, use Right-hand insert if machining from back to front in this direction (→).
Use Left-hand insert if machining from front to back in this direction (←).

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)							GAMO	Std. Corner-R (RE)	Spare Parts	
													Clamp Screw	Wrench
	R	L	DMIN	DCON	H	LPR	LF	LH	WF	WF_2				
C04X-SJLCR/L03-055	●	●	5.5	4	3.8	-	91	7	2.95	0.65	15°	0.03	SB-1635TR	FT-6
C04X-SJZCR/L03-065	●	●	6.5			93	88.1	4	4.0	1.8				

Applicable Inserts

Applications	Finishing	Finishing / Precision								
See Page	B73	B73								
Insert / Toolholder Description	R/L-F 	R/L-FSF 								
...-SJLCR/L03-...	JCGT0301..	JCET0301..								
...-SJZCR/L03-...	JCGT0301..	JCET0301..								

Recommended Cutting Conditions ➡ F92~F93
Applicable Sleeves ➡ F83,F85,F86

• Features of C-SJLC

1. Specially designed for minimized bore dia.
2. A relief angle of 15˚ ensures high flexibility of the tool pass during necking.
3. Retaining front relief angle 5˚ and good surface roughness during internal facing.

• Features of C-SJZC

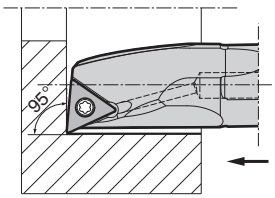
1. Back boring bars for workpiece that require high concentric circle accuracy and when a change of chuck is not possible.
2. Available for back boring and necking.
3. Despite the small size of minimum boring dia. as ø6.5, the edge gap is retained as large as 1.8 mm.

● : Std. Item

Dynamic Bar [TC□□Insert]

A-STLC-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



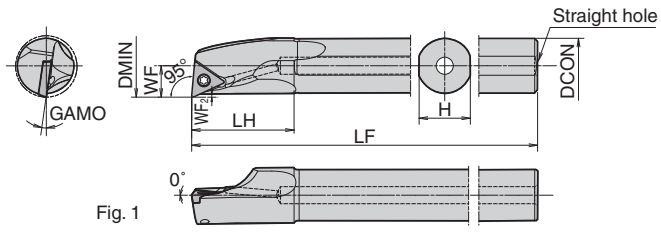


Fig. 1

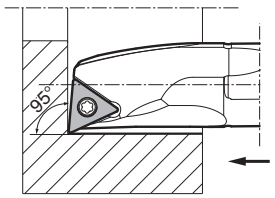
Shank Dia. DCON	Straight hole Dia.
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	

●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-STLC-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



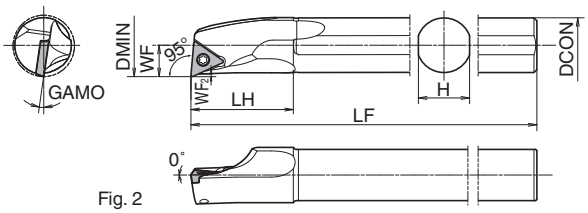


Fig. 2

●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	WF_2	GAMO	Std. Corner-R (RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A08X-STLC$^{R}_{L}$09-10AE	●	●	10	8	7	120	16	5	0.5	14°	0.4	Yes	Fig. 1	SB-2250TR	FT-7
	A10L-STLC$^{R}_{L}$09-12AE	●	●	12	10	9	140	20	6.2	0.9	12°					
	A10L-STLC$^{R}_{L}$11-12AE	●	●												SB-2560TR	FT-8
	A12M-STLC$^{R}_{L}$11-14AE	●	●	14	12	11	150	24	7.2	0.7	10°					
	A16Q-STLC$^{R}_{L}$11-18AE	●	●	18	16	15	180	30	9.2		8°					
	A20R-STLC$^{R}_{L}$11-22AE	●	●	22	20	19	200	36	11.2		6°					
Steel	S08X-STLC$^{R}_{L}$09-10A	●	●	10	8	7	120	16	5	0.5	14°	0.4	No	Fig. 2	SB-2250TR	FT-7
	S10L-STLC$^{R}_{L}$09-12A	●	●	12	10	9	140	20	6.2	0.9	12°					
	S10L-STLC$^{R}_{L}$11-12A	●	●												SB-2560TR	FT-8
	S12M-STLC$^{R}_{L}$11-14A	●	●	14	12	11	150	24	7.2	0.7	10°					
	S16Q-STLC$^{R}_{L}$11-18A	●	●	18	16	15	180	30	9.2		8°					
	S20R-STLC$^{R}_{L}$11-22A	●	●	22	20	19	200	36	11.2		6°					

Applicable Inserts

Applications	* Finishing	Finishing - Medium								
See Page	B77	B77								
Insert / Toolholder Description	WP (Wiper) 	HQ 								
...-STLC$^{R}_{L}$09-...	TCMX0902..	TCMT0902..								
...-STLC$^{R}_{L}$11-...	TCMX1102..	TCMT1102..								

* For WP chipbreaker, cutting edge offsets or program corrections are required. R37

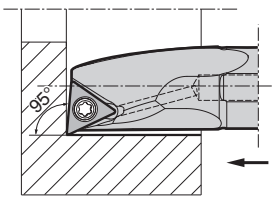
Recommended Cutting Conditions F92~F93
Applicable Sleeves F83~F86

● : Std. Item

Dynamic Bar [TB□□, TP□□ Insert]

A/S-STLB(P)-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



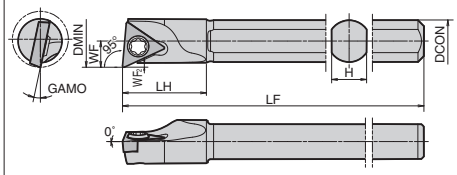


Fig. 1

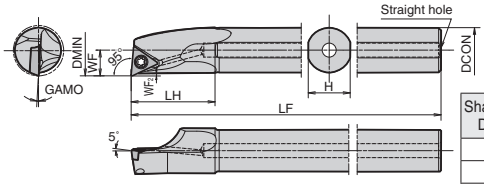


Fig. 2

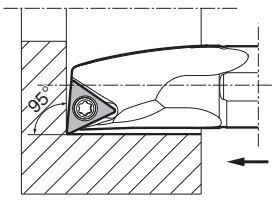
Shank Dia. DCON	Straight hole Dia.
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-STLB(P)-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



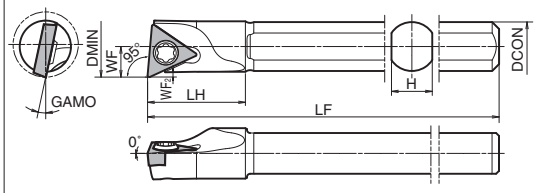


Fig. 3

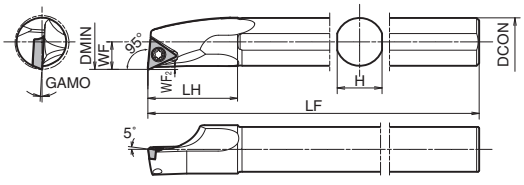


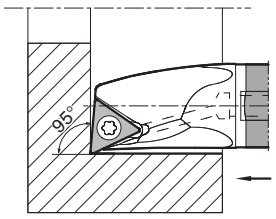
Fig. 4

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C/E-STLB(P)-A(N) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



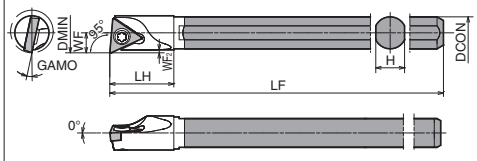


Fig. 5

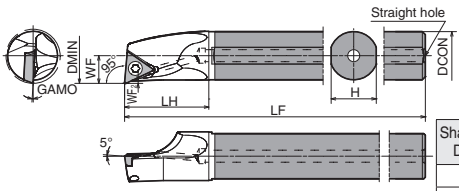


Fig. 6

Shank Dia. DCON	Straight hole Dia.
ø8	ø3
ø10	
ø12	ø4
ø16	
ø20	ø6
ø25	

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Applicable Inserts

Applications	Minute ap	Finishing	* Finishing	* Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision
See Page	B76, B80	B76, B80	B80	B80	B80	B81	B76	B81	B76, B82, B83	B85
Insert / Toolholder Description	CF	PF	WP (Wiper)	R/L-WP (Wiper)	PP	GP	DP	HQ	R/L	R/L-FSF
...-STLBR/L06-...	TBGT0601..	TBGT0601..	-	-	-	-	TBMT0601..	-	TBGT0601..	-
...-STLPR/L08-...	TPGT0802..	-	-	-	-	-	-	-	TPGH0802..	TPET0802..
...-STLPR/L09-...	TPGT0902..	TPGT0902..	TPMX0902..	-	TPMT0902..	TPMT0902..	-	TPMT0902..	TPGH0902..	-
...-STLPR/L11-...	-	-	TPMX1103..	TPMX1103..	TPMT1103..	TPMT1103..	-	TPMT1103..	TPGH1103..	TPET1103..
...-STLPR/L16-...	-	-	-	-	-	TPMT1603..	-	TPMT1603..	TPGH1603..	-

Applications	* Finishing	Medium	Low Feed / Precision	Soft Steel / Finishing	Soft Steel / Finishing - Medium	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B85	B84	B86	B81	B81	B76, B86	B86	C26~C28	C28	C16
Insert / Toolholder Description	R/L-P	R/L-H	FR/L-USF	XP	XQ	Without Chipbreaker	AP	PCD	APD	CBN
...-STLBR/L06-...	-	-	-	-	-	TBGW0601..	-	TBMT0601.. TBGW0601..	-	-
...-STLPR/L08-...	TPEH0802..	-	TPET0802..	-	-	TPGB0802..	-	TPMH0802.. TPGB0802..	-	TPGB0802..
...-STLPR/L09-...	TPEH0902..	TPGH0902..	-	TPMT0902..	-	TPGB0902..	-	TPMH0902.. TPGB0902..	-	TPGB0902..
...-STLPR/L11-...	TPEH1103..	TPGH1103..	TPET1103..	TPMT1103..	TPMT1103..	TPGB1103..	TPGT1103..	TPMH1103.. TPGB1103..	TPMT1103..	TPGB1103..
...-STLPR/L16-...	-	TPGH1603..	-	TPMT1603..	TPMT1603..	TPGB1603..	-	TPMH1603.. TPGB1603..	-	TPGB1603..

* For WP chipbreaker, cutting edge offsets or program corrections are required. R37

* When using P chipbreaker : Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Recommended Cutting Conditions F92~F93
Applicable Sleeves F83~F86

● Toolholder Dimensions

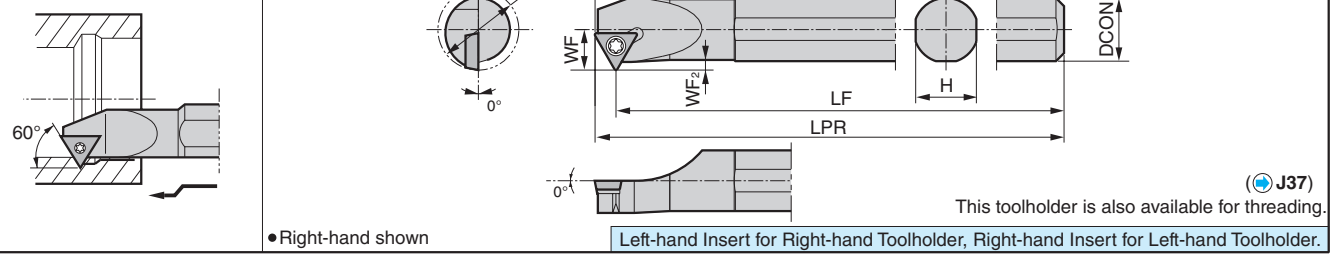
	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	WF_2	GAMO	Std. Corner-R (RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	S06H-STLBR/L06-08AE	●	●	8	6	5	100	12	3.8	0.5	12°	0.2	No	Fig. 1	SB-2035TR	FT-6
	A08X-STLPR/L08-10AE	●	●	10	8	7	120	16	5	0.5	10°	0.4	Yes	Fig. 2	SB-1TR	
	A08X-STLPR/L09-10AE	●	●												SB-2545TR	FT-8
	A10L-STLPR/L09-12AE	●	●	12	10	9	140	20	6.2	0.9	8°					
	A10L-STLPR/L11-12AE	●	●						6	0.7	10°				SB-3060TR	FT-10
	A12M-STLPR/L11-14AE	●	●	14	12	11	150	24	7.2	0.8	7°					
	A12M-STLPR/L09-16AE	●	●	16					8	0.6	5°				SB-2545TR	FT-8
	A16Q-STLPR/L11-18AE	●	●	18	16	15	180	30	9.2	0.7	3.5°				SB-3060TR	FT-10
	A20R-STLPR/L11-22AE	●	●	22	20	19	200	36	11.2		2°					
	A20R-STLPR/L16-25AE	●	●	25					13		0°				SB-4065TR	FT-15
	A25S-STLPR/L16-27AE	●	●	27	25	24	250	46	13.7							
Steel	S06H-STLBR/L06-08A	●	●	8	6	5	100	12	3.8	0.5	12°	0.2	No	Fig. 3	SB-2035TR	FT-6
	S08X-STLPR/L08-10A	●	●	10	8	7	120	16	5	0.5	10°	0.4		Fig. 4	SB-1TR	
	S08X-STLPR/L09-10A	●	●												SB-2545TR	FT-8
	S10L-STLPR/L09-12A	●	●	12	10	9	140	20	6.2	0.9	8°					
	S10L-STLPR/L11-12A	●	●						6	0.7	10°				SB-3060TR	FT-10
	S12M-STLPR/L11-14A	●	●	14	12	11	150	24	7.2	0.8	7°					
	S12M-STLPR/L09-16A	●	●	16					8	0.6	5°				SB-2545TR	FT-8
	S16Q-STLPR/L11-18A	●	●	18	16	15	180	30	9.2	0.7	3.5°				SB-3060TR	FT-10
	S20R-STLPR/L11-22A	●	●	22	20	19	200	36	11.2		2°					
	S25S-STLPR/L16-27A	●	●	27	25	24	250	46	13.7		0°				SB-4065TR	FT-15
Carbide	C06J-STLBR/L06-08AN	●	●	8	6	5.4	110	10	3.8	0.5	12°	0.2	No	Fig. 5	SB-2035TR	FT-6
	E08L-STLPR/L08-10AN	●	●	10	8	7	140	14	5	0.5	10°	0.4	Yes	Fig. 6	SB-1TR	
	E08L-STLPR/L09-10AN	●	●												SB-2545TR	FT-8
	E10N-STLPR/L09-12AN	●	●	12	10	9	160	18	6.2	0.9	8°					
	E10N-STLPR09-12AN2/3	●					105									
	E10N-STLPR09-12AN1/2	●					80									
	E10N-STLPR/L11-12AN	●	●				160		6	0.7	10°				SB-3060TR	FT-10
	E10N-STLPR11-12AN2/3	●					105									
	E10N-STLPR11-12AN1/2	●					80									
	E12Q-STLPR/L11-14A	●	●	14	12	11	180	23	7.2	0.8	7°					
	E12Q-STLPR 11-14A-2/3	●					120									
	E12Q-STLPR 11-14A-1/2	●					90									
	E12Q-STLPR/L09-16A	●	●	16			180		8	0.6	5°				SB-2545TR	FT-8
	E12Q-STLPR 09-16A-2/3	●					120									
	E12Q-STLPR 09-16A-1/2	●					90									
	E16X-STLPR/L 11-18A	●	●	18	16	15	220	28	9.2	0.7	3.5°				SB-3060TR	FT-10
	E16X-STLPR 11-18A-2/3	●					145									
	E16X-STLPR 11-18A-1/2	●					110									
	E20S-STLPR/L 11-22A	●	●	22	20	19	250	32	11.2		2°					
	E20S-STLPR 11-22A-2/3	●					165									
	E20S-STLPR 11-22A-1/2	●					125									
	E20S-STLPR/L 16-25A	●	●	25			250		13		0°				SB-4065TR	FT-15
	E20S-STLPR 16-25A-2/3	●					165									
	E20S-STLPR 16-25A-1/2	●					125									
	E25T-STLPR/L 16-27A	●	●	27	25	24	300	38	13.7							
	E25T-STLPR 16-27A-2/3	●					200									

● : Std. Item

Boring Bar [TB□□, TP□□ Insert]

S-STWP-E Excellent Bar (Copying)

Max. Overhang Length L/D=~5

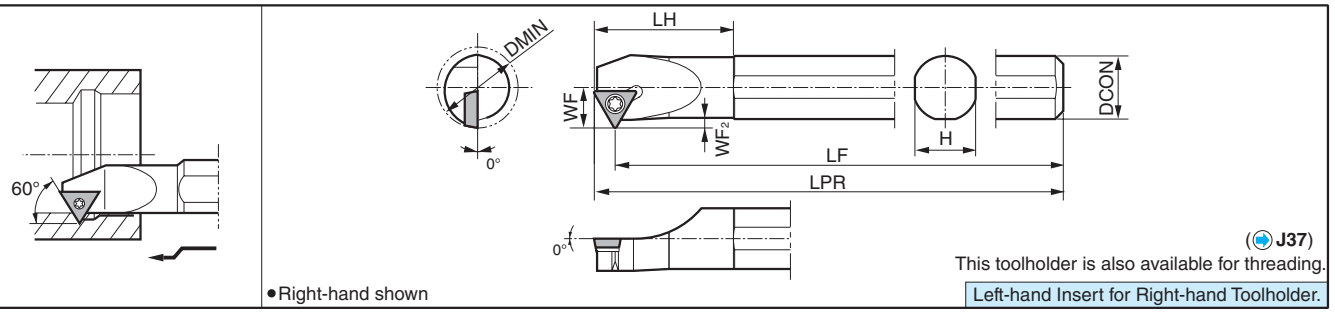


●Right-hand shown

(➡ J37)
This toolholder is also available for threading.
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-STWP Steel Bar (Copying)

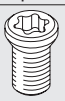
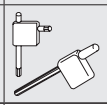
Max. Overhang Length L/D=~3



●Right-hand shown

(➡ J37)
This toolholder is also available for threading.
Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)							GAMO	Std. Corner-R (RE)	Spare Parts	
													Clamp Screw	Wrench
	R	L	DMIN	DCON	H	LPR	LF	LH	WF	WF_2				
S10M-STWP[R/L]11-12E	●	●	12	10	9.2	150	144.5	23	6	1.0	0°	0.1	SB-3STR	FT-10
S12M-STWP[R/L]11-16E	●	●	16	12	11			30	8	1.5				
S16R-STWP[R/L]11-20E	●	●	20	16	15	200	194.5	35	10	2.0			SB-3TR	
S20X-STWP[R/L]11-25E	●	●	25	20	19	220	214.5	40	12.5	2.5				
S20X-STWP[R/L]16-25E	●	●	25	20	19	220	212.3	40	14	4.0	0°	0.8	SB-4TR	FT-15
S25X-STWP[R/L]16-32E	●	●	32	25	24	270	262.3	42	16.5					
S10M-STWPR11-12	●		12	10	9.2	150	144.5	23	6	1.0	0°	0.1	SB-3STR	FT-10
S12M-STWPR11-16	●		16	12	11			30	8	1.5				
S16Q-STWPR11-20	●		20	16	15	180	174.5	35	10	2.0			SB-3TR	
S20R-STWPR11-25	●		25	20	19	200	194.5	40	12.5	2.5				

Applicable Inserts

Applications	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Medium	Low Feed / Precision	Soft Steel / Finishing	Soft Steel / Finishing - Medium
See Page	B80	B81	B81	B82, B83	B85	B84	B86	B81	B81
Insert / Toolholder Description	PP	GP	HQ	R/L	R/L-FSF	R/L-H	FR/L-USF	XP	XQ
S10M-STWP[R/L]11-12(E)	-	-	-	TPGH1102..	-	-	-	-	-
...-STWP[R/L]11-16~25(E)	TPMT1103..	TPMT1103..	TPMT1103..	TPGH1103..	TPET1103..	TPGH1103..	TPET1103..	TPMT1103..	TPMT1103..
...-STWP[R/L]16-...	-	TPMT1603..	TPMT1603..	TPGH1603..	-	TPGH1603..	-	TPMT1603..	TPMT1603..

Applications	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials				
See Page	B86	B86	C26~C28	C28	C16				
Insert / Toolholder Description	Without Chipbreaker	AP	PCD	APD	CBN				
S10M-STWP[R/L]11-12(E)	TPGB1102..	-	-	-	-				
...-STWP[R/L]11-16~25(E)	TPGB1103..	TPGT1103..	TPMH1103.. TPGB1103..	TPMT1103..	TPGB1103..				
...-STWP[R/L]16-...	TPGB1603..	-	TPMH1603.. TPGB1603..	-	TPGB1603..				

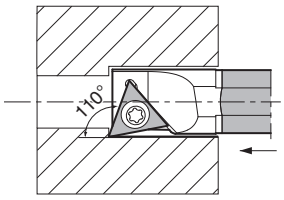
* WP chipbreaker (TPMX-WP : Wiper insert) is not applicable to S-STWP-E and S-STWP Toolholders.

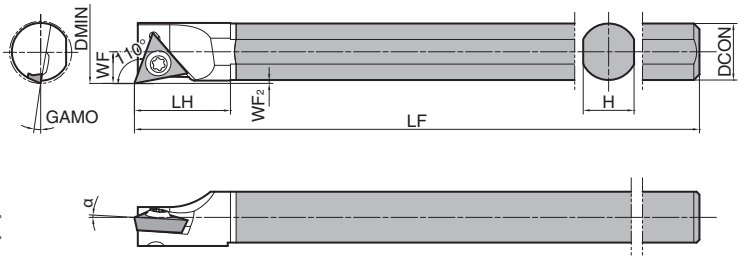
Recommended Cutting Conditions ➡ F92~F93
Applicable Sleeves ➡ F84~F86

● : Std. Item

C-STXP(B) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7





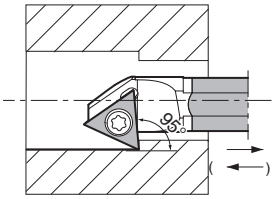
C-STXB R/L ···α=0°
C-STXP R/L ···α=5°

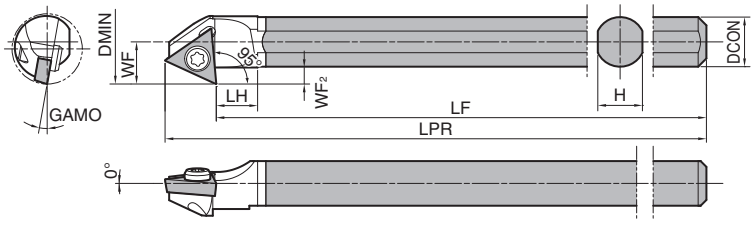
●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C-STZB Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7





●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

* When using Right-hand Toolholder, use Right-hand insert if machining from back to front in this direction (→).
Use Left-hand insert if machining from front to back in this direction (←).

Toolholder Dimensions

Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LPR	LF	LH	WF	WF_2	GAMO	Std. Corner-R (RE)	Spare Parts: Clamp Screw	Spare Parts: Wrench
C06J -STXB R/L06-075	●	●	7.5	6	5.4	-	110	11	3.75	0.5	10°	0.03	SB-1STR	FT-6
C08X -STXP R/L08-09	●	●	9.0	8	7.0	-	143	14	4.6				SB-1TR	
C10X -STXP R/L09-11	●	●	11.0	10	9.0	-	164	17	5.6				SB-2TR	FT-8
C06J -STZB R/L06-085	●	●	8.5	6	5.4	110	104.3	5	5.1	1.8			SB-1STR	FT-6

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Low Feed / Precision	Soft Steel / Finishing	Cast Iron
See Page	**B76, B80**	**B80**	**B81**	**B76**	**B81**	**B76, B82, B83**	**B85**	**B86**	**B81**	**B76, B86**
Insert / Toolholder Description	CF	PP	GP	DP	HQ	R/L	R/L-FSF	FR/L-USF	XP	Without Chipbreaker
...-STXB R/L06-...	TBGT0601..	-	-	TBMT0601..	-	TBGT0601..	-	-	-	TBGW0601..
...-STXP R/L08-...	TPGT0802..	-	-	-	-	TPGH0802..	TPET0802..	TPET0802..	-	TPGB0802..
...-STXP R/L09-...	TPGT0902..	TPMT0902..	TPMT0902..	-	TPMT0902..	TPGH0902..	-	-	TPMT0902..	TPGB0902..
...-STZB R/L06-...	TBGT0601..	-	-	TBMT0601..	-	TBGT0601..	-	-	-	TBGW0601..

Applications	Non-ferrous Metals	Hard Materials
See Page	**C26, C27**	**C16**
Insert / Toolholder Description	PCD	CBN
...-STXB R/L06-...	TBMT0601..	-
...-STXP R/L08-...	TPMH0802.. TPGB0802..	TPGB0802..
...-STXP R/L09-...	TPMH0902.. TPGB0902..	TPGB0902..
...-STZB R/L06-...	TBMT0601..	-

* WP chipbreaker (TPMX-WP : Wiper insert) is not applicable to C-STXP Toolholders.

Recommended Cutting Conditions **F92~F93**
Applicable Sleeves **F83~F86**

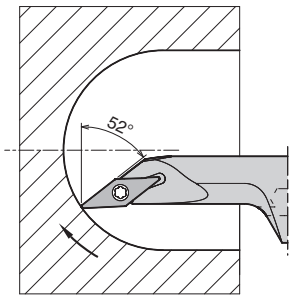
C-STXP(B) Boring Bar Cutting Conditions (Workpiece Material : SCM435)

Toolholder Description	Insert Description (Grades)	Vc (m/min)	ap (mm)	f (mm/rev)	Coolant
C06J-STXB R/L06-075	**TBGT0601003 L/R (PR930)**	30~100	0.02~0.1	0.02~0.04	Yes
C08X-STXP R/L08-09	**TPGH080201 L/R (PR930)**	30~100	0.05~0.15	0.03~0.08	Yes
C10X-STXP R/L09-11	**TPGH090201 L/R (PR930)**	30~100	0.05~0.15	0.03~0.08	Yes

● : Std. Item

A-SVJP(C)(B)-AE Excellent Bar (Internal Spherical Machining / Internal Facing / Copying)

Max. Overhang Length L/D=~5.5



For applications, See Page **F55**

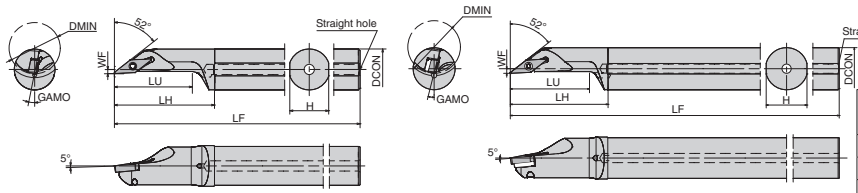


Fig. 1 Fig. 2

* No shim for SVJP(C)R/L08 / SVJBR/L11.

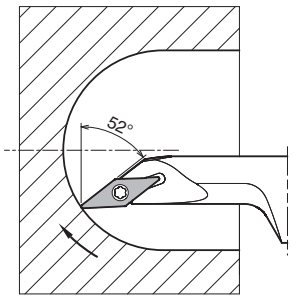
Shank Dia. DCON	Straight hole Dia.
ø12	ø4
ø16	
ø20	ø5
ø25	ø7
ø32	
ø40	ø9

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SVJP(C)(B)-A Steel Bar (Internal Spherical Machining / Internal Facing / Copying)

Max. Overhang Length L/D=~4



For applications, See Page **F55**

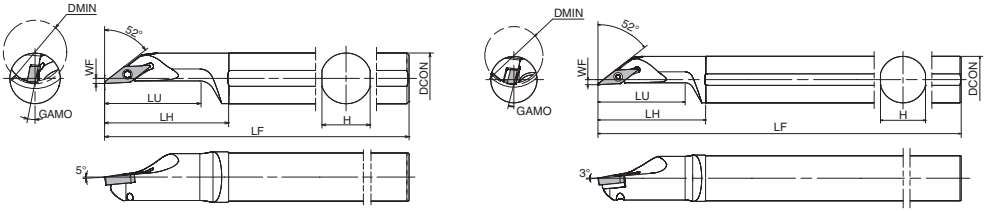


Fig. 3 Fig. 4

* No shim for SVJP(C)R/L08 / SVJBR/L11.

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LU	LH	WF	GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A12M-SVJPR/L08-16AE	●	●	16	12	11	150	26	33	2	5°	0.2	Yes	Fig. 1	SB-2050TR	FT-6
	A12M-SVJCR/L08-16AE	●	●									0.4				
	A16Q-SVJCR/L08-20AE	●	●	20	16	15	180	36	43							
	A20R-SVJBR/L11-25AE	●	●	25	20	19	200	37.5	48						SB-2570TR	FT-8
	A25S-SVJBR/L11-30AE	●	●	30	25	24	250	45	58	3.5						
	A32S-SVJBR/L16-40AE	●	●	40	32	31		60	74		8°					
	A40T-SVJBR/L16-50AE	●	●	50	40	39	300	75	91	4.5	7°			Fig. 2	SB-40125TRN	FT-15
Steel	S12M-SVJPR/L08-16A	●	●	16	12	11	150	26	33	2	5°	0.2	No	Fig. 3	SB-2050TR	FT-6
	S12M-SVJCR/L08-16A	●	●									0.4				
	S16Q-SVJCR/L08-20A	●	●	20	16	15	180	36	43							
	S20R-SVJBR/L11-25A	●	●	25	20	19	200	37.5	48						SB-2570TR	FT-8
	S25S-SVJBR/L11-30A	●	●	30	25	24	250	45	58	3.5						
	S32S-SVJBR/L16-40A	●	●	40	32	31		60	74		8°					
	S40T-SVJBR/L16-50A	●	●	50	40	39	300	75	91	4.5	7°			Fig. 4	SB-40125TRN	FT-15

Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Low Feed / Precision	Non-ferrous Metals	Non-ferrous Metals
See Page	B94	B89, B92	B89, B92	B89	B89, B92	B90	B89, B95	B96	B93	B93
Insert / Toolholder Description	CK	VF	PP	GP	HQ	R/L-F	R/L-FSF	FR/L-USF	AP	R/L-A3
...-SVJPR/L08-...	VPGT0802..	-	-	-	-	-	VPET0802..	VPET0802..	-	-
...-SVJCR/L08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVJBR/L11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	-	-	-
...-SVJBR/L16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	-	VCGT1604..	VCGT1604..

Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B93	C28	C17
Insert / Toolholder Description	AH	PCD	CBN
...-SVJPR/L08-...	-	-	-
...-SVJCR/L08-...	-	VCMT0802..	VCGW0802..
...-SVJBR/L11-...	-	VBMT1103..	VBGW1103..
...-SVJBR/L16-...	VCGT1604..	VBMT1604..	VBGW1604..

* Use of VBGT1103..-Y / VBGT1604..-Y with A-SVJB-AE / S-SVJB-A is not recommended.

Spare Parts (See Page **P25** for spare parts of old products.)

Description	Spare Parts: Shim	Spare Parts: Shim Screw	Spare Parts: Wrench (for Shim Screw)
□32S-SVJBR/L16-40A□	SVN-32N *(SVN-32S)	SS-4N	LW-4
□40T-SVJBR/L16-50A□			

· For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).

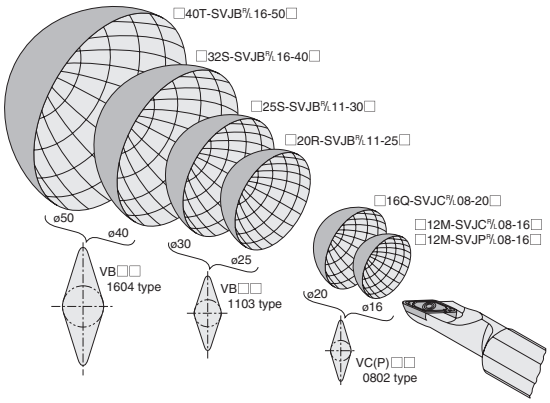
Recommended Cutting Conditions ➡ **F92~F93**
Applicable Sleeves ➡ **F84~F86**

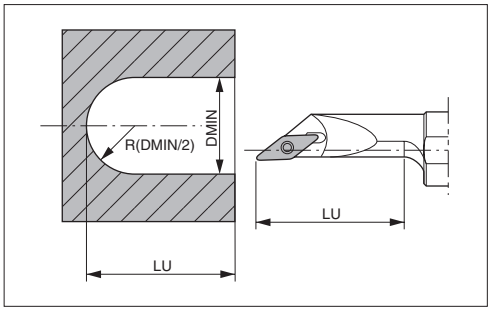
● : Std. Item

Application of □-SVJP(C)(B)-□

[See Page for Toolholders F54]

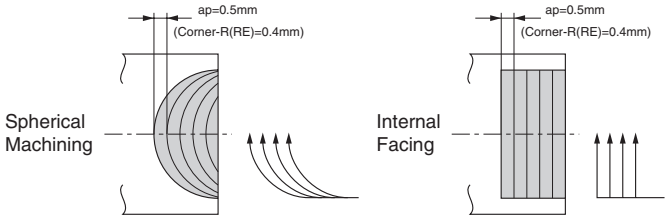
1. Application Range





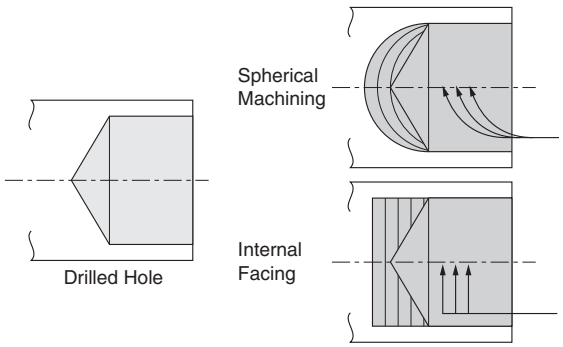
2. Application

Case with No Existing Hole



(Note) f shall be 0.05mm/rev or less at internal facing.

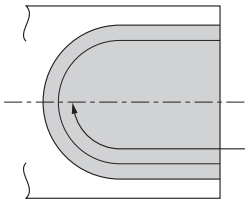
Case with Drilled Hole



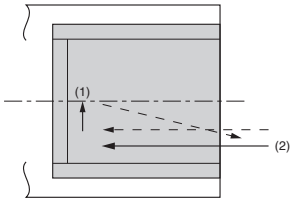
(Note) f shall be 0.05mm/rev or less at internal facing.

Finishing

Spherical Machining

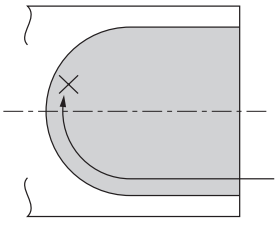


Internal Facing

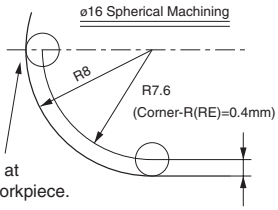


Machining Process
(1) Finish the internal face first.
(2) Next, finish the internal diameter.

3. Caution

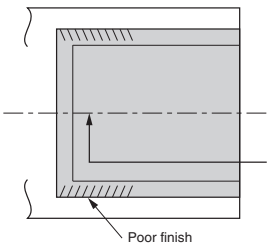


When machining past the center of the workpiece, insert may break.



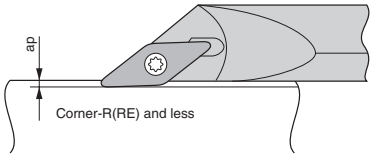
Fix the insert edge at the center of the workpiece.

Adjust the machining program to radius minus the value of corner-R(RE).



This type of machining is possible, but the chips might scratch the surface.

For internal profiling, ap should be the value of Corner-R(RE) and less.

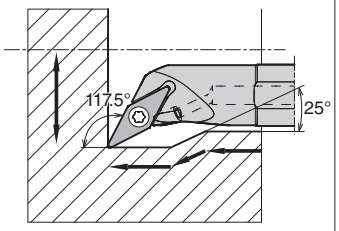


[Burrs may occur, if ap is Corner-R(RE) and more]

Dynamic Bar [VB□□, VC□□ Insert]

A-SVPC(B)-AE Excellent Bar (Copying / Undercutting)

Max. Overhang Length L/D=~5.5



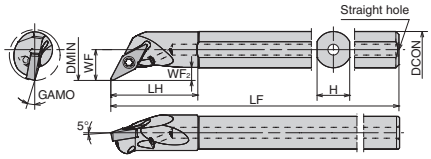


Fig. 1

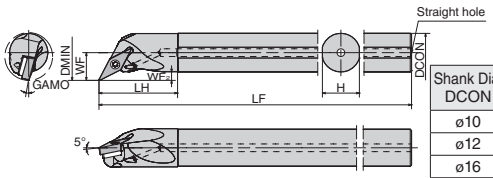


Fig. 2

Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	
ø32	

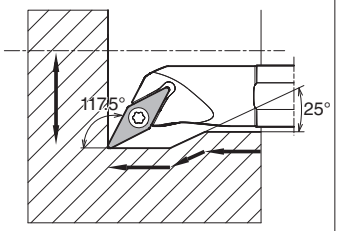
* No shim for SVPC$^{R/L}$08 / SVPB$^{R/L}$11.

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SVPC(B)-A Steel Bar (Copying / Undercutting)

Max. Overhang Length L/D=~4



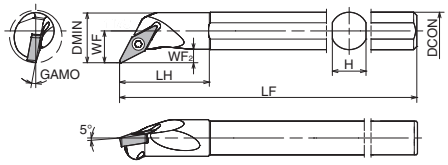


Fig. 3

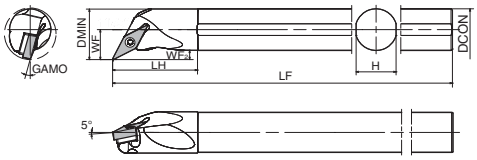


Fig. 4

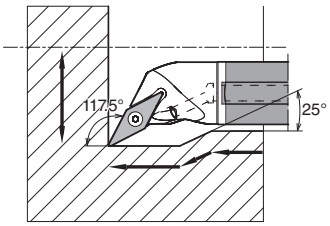
* No shim for SVPC$^{R/L}$08 / SVPB$^{R/L}$11.

● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SVPC(B)-A Carbide Shank Bar (Copying / Undercutting)

Max. Overhang Length L/D=~7



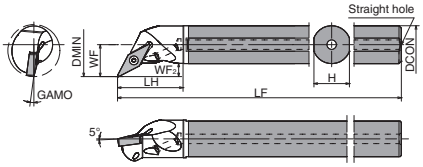


Fig. 5

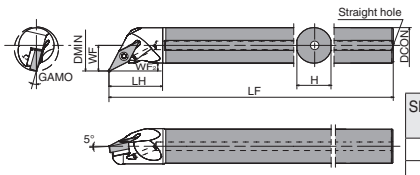


Fig. 6

Shank Dia. DCON	Straight hole Dia.
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

* No shim for SVPC$^{R/L}$08 / SVPB$^{R/L}$11.

● Right-hand shown

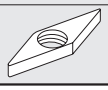
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	WF_2	GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L-SVPC$^{R/L}$08-14AE	●	●	14	10	9	140	24	8.5	3	8°	0.4	Yes	Fig. 1	SB-2050TR	FT-6
	A12M-SVPB$^{R/L}$11-18AE	●	●	18	12	11	150	29	11	4.5					SB-2570TR	FT-8
	A16Q-SVPB$^{R/L}$11-22AE	●	●	22	16	15	180	35	13.5	5	5°					
	A20R-SVPB$^{R/L}$11-26AE	●	●	26	20	19	200	41	15.5							
	A25S-SVPB$^{R/L}$16-31AE	●	●	31	25	24	250	51	18		13°			Fig. 2	SB-40125TRN	FT-15
	A32S-SVPB$^{R/L}$16-40AE	●	●	40	32	31		54	23	6.5	9°					
Steel	S10L-SVPC$^{R/L}$08-14A	●	●	14	10	9	140	24	8.5	3	8°	0.4	No	Fig. 3	SB-2050TR	FT-6
	S12M-SVPB$^{R/L}$11-18A	●	●	18	12	11	150	29	11	4.5					SB-2570TR	FT-8
	S16Q-SVPB$^{R/L}$11-22A	●	●	22	16	15	180	35	13.5	5	5°					
	S20R-SVPB$^{R/L}$11-26A	●	●	26	20	19	200	41	15.5							
	S25S-SVPB$^{R/L}$16-31A	●	●	31	25	24	250	51	18		13°			Fig. 4	SB-40125TRN	FT-15
	S32S-SVPB$^{R/L}$16-40A	●	●	40	32	31		54	23	6.5	9°					
Carbide	E10N-SVPCR08-14A	●		14	10	9	160	20	8.5	3	8°	0.4	Yes	Fig. 5	SB-2050TR	FT-6
	E12Q-SVPBR11-18A	●		18	12	11	180	23	11	4.5					SB-2570TR	FT-8
	E16X-SVPBR 11-22A	●		22	16	15	220	28	13.5	5	5°					
	E20S-SVPBR 11-26A	●		26	20	19	250	32	15.5							
	E25T-SVPBR 16-31A	●		31	25	24	300	38	18		13°			Fig. 6	SB-40125TRN	FT-15

● : Std. Item

Spare Parts (See Page **P25** for spare parts of old products.)

Description	Spare Parts		
	Shim	Shim Screw	Wrench (for Shim Screw)
			
□25□-SVPB$^{R}_{L}$16-31A□ □32S-SVPB$^{R}_{L}$16-40A□	SVN-32N *(SVN-32S)	SS-4N	LW-4

· For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).

Applicable Inserts

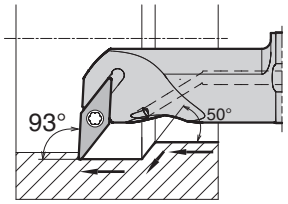
Applications	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Finishing - Medium	Low Feed / Precision	Non-ferrous Metals
See Page	-	**B89, B92**	**B89, B92**	**B89**	**B89, B92**	**B90**	**B89**	**B90, B91**	-	**B93**
Insert / Toolholder Description	**CK** 	**VF** 	**PP** 	**GP** 	**HQ** 	$^{R}_{L}$**-F** 	$^{R}_{L}$**-FSF** 	$^{R}_{L}$**-Y** 	F$^{R}_{L}$**-USF** 	**AP** 
...-SVPC$^{R}_{L}$08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVPB$^{R}_{L}$11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VB□T1103..	-	-
...-SVPB$^{R}_{L}$16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..
Applications	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials						
See Page	**B93**	**B93**	**C28**	**C17**						
Insert / Toolholder Description	$^{R}_{L}$**-A3** 	**AH** 	**PCD** 	**CBN** 						
...-SVPC$^{R}_{L}$08-...	-	-	VCMT0802..	VCGW0802..						
...-SVPB$^{R}_{L}$11-...	-	-	VBMT1103..	VBGW1103..						
...-SVPB$^{R}_{L}$16-...	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..						

Recommended Cutting Conditions ➡ **F92~F93**
Applicable Sleeves ➡ **F84~F86**

Dynamic Bar [VB□□, VC□□ Insert]

A-SVUC(B)-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



Inner hole dia. (ø3) for A12M-SVUC□08-16AE
Inner hole dia. (ø3) for A16Q-SVUB□11-20AE
Inner hole dia. (ø3) for A20R-SVUB□11-25AE
Straight hole dia. (ø5) of A32S-SVUB□16-40AE

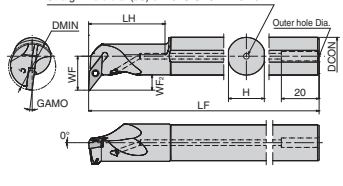


Fig. 1

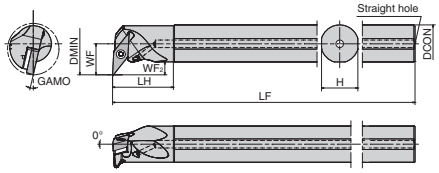


Fig. 2

Shank Dia. DCON	Outer hole Dia.	Straight hole Dia.
ø12	ø4	-
ø16	ø5	
ø20		
ø25	-	ø5
ø32		

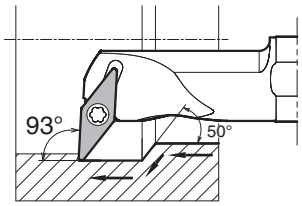
* No shim for SVUC□L08 / SVUB□L11.

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SVUC(B)-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



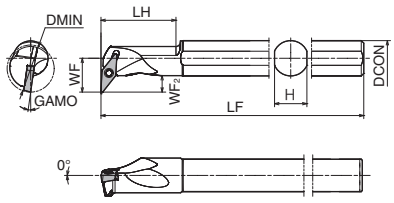


Fig. 3

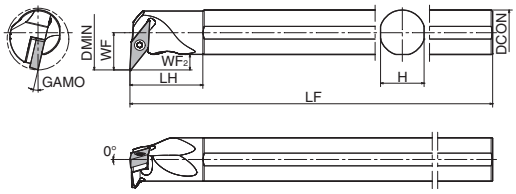


Fig. 4

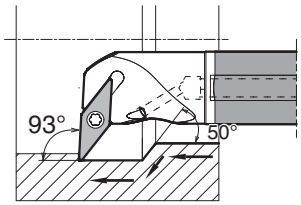
* No shim for SVUC□L08 / SVUB□L11.

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

E-SVUC(B)-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



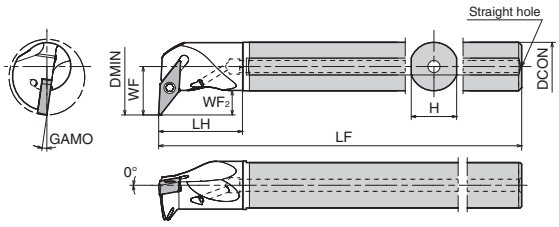


Fig. 5

Shank Dia. DCON	Straight hole Dia.
ø12	ø4
ø16	
ø20	ø6
ø25	

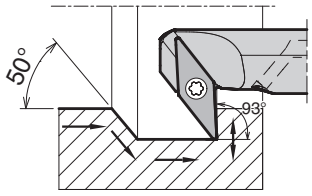
* Shim is attached only for SVUBR16

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

A-SVZC(B)-AE Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5.5



Inner hole dia. (ø3) for A12M-SVZC□08-16AE
Inner hole dia. (ø3) for A16Q-SVZB□11-20AE
Inner hole dia. (ø3) for A20R-SVZB□11-25AE
Straight hole dia. (ø5) of A32S-SVZB□16-40AE

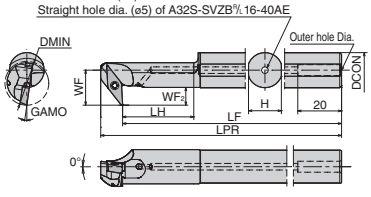


Fig. 6

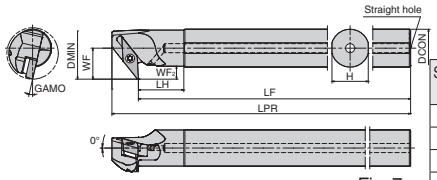


Fig. 7

Shank Dia. DCON	Outer hole Dia.	Straight hole Dia.
ø12	ø4	-
ø16	ø5	
ø20		
ø25	-	ø5
ø32		

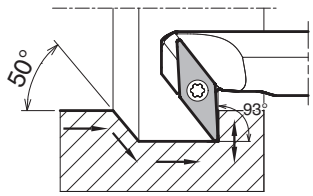
* No shim for SVZC□L08 / SVZB□L11

• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

S-SVZC(B)-A Steel Bar (Back Boring)

Max. Overhang Length L/D=~4



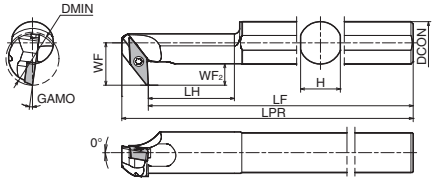


Fig. 8

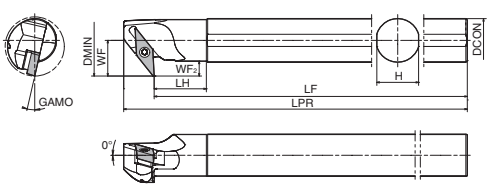


Fig. 9

* No shim for SVZC□L08 / SVZB□L11

• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LPR	LF	LH	WF	WF_2	GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A12M-SVUC$^{R/L}$08-16AE	●	●	16	12	11	-	150	25.5	11.5	5.5	8°	0.4	Yes	Fig. 1	SB-2050TR	FT-6
	A16Q-SVUB$^{R/L}$11-20AE	●	●	20	16	15		180	32.5	16	8					SB-2570TR	FT-8
	A20R-SVUB$^{R/L}$11-25AE	●	●	25	20	19		200	40.5	18		7°					
	A25S-SVUB$^{R/L}$16-34AE	●	●	34	25	24		250	40	20.5	8.5	13°			Fig. 2	SB-40125TRN	FT-15
	A32S-SVUB$^{R/L}$16-40AE	●	●	40	32	31			84	28	12	9°			Fig. 1		
Steel	S12M-SVUC$^{R/L}$08-16A	●	●	16	12	11	-	150	25.5	11.5	5.5	8°	0.4	No	Fig. 3	SB-2050TR	FT-6
	S16Q-SVUB$^{R/L}$11-20A	●	●	20	16	15		180	32.5	16	8					SB-2570TR	FT-8
	S20R-SVUB$^{R/L}$11-25A	●	●	25	20	19		200	40.5	18		7°					
	S25S-SVUB$^{R/L}$16-34A	●	●	34	25	24		250	40	20.5	8.5	13°			Fig. 4	SB-40125TRN	FT-15
	S32S-SVUB$^{R/L}$16-40A	●	●	40	32	31			84	28	12	9°			Fig. 3		
Carbide	E12Q-SVUCR08-18A	●		18	12	11	-	180	23	11.5	5.5	8°	0.4	Yes	Fig. 5	SB-2050TR	FT-6
	E16X-SVUBR11-25A	●		25	16	15		220	28	16	8					SB-2570TR	FT-8
	E20S-SVUBR11-29A	●		29	20	19		250	32	18		7°					
	E25T-SVUBR16-34A	●		34	25	24		300	38	21	8.5	13°				SB-40125TRN	FT-15
Excellent Bar	A12M-SVZC$^{R/L}$08-16AE	●	●	16	12	11	150	142.5	25.5	11.5	5.5	8°	0.4	Yes	Fig. 6	SB-2050TR	FT-6
	A16Q-SVZB$^{R/L}$11-20AE	●	●	20	16	15	180	170	32.5	16	8					SB-2570TR	FT-8
	A20R-SVZB$^{R/L}$11-25AE	●	●	25	20	19	200	190	40.5	18		7°					
	A25S-SVZB$^{R/L}$16-34AE	●	●	34	25	24	250	232.5	30	20.5	8.5	13°			Fig. 7	SB-40125TRN	FT-15
	A32S-SVZB$^{R/L}$16-40AE	●	●	40	32	31			72.5	28	12	9°			Fig. 6		
Steel	S12M-SVZC$^{R/L}$08-16A	●	●	16	12	11	150	142.5	25.5	11.5	5.5	8°	0.4	No	Fig. 8	SB-2050TR	FT-6
	S16Q-SVZB$^{R/L}$11-20A	●	●	20	16	15	180	170	32.5	16	8					SB-2570TR	FT-8
	S20R-SVZB$^{R/L}$11-25A	●	●	25	20	19	200	190	40.5	18		7°					
	S25S-SVZB$^{R/L}$16-34A	●	●	34	25	24	250	232.5	30	20.5	8.5	13°			Fig. 9	SB-40125TRN	FT-15
	S32S-SVZB$^{R/L}$16-40A	●	●	40	32	31			72.5	28	12	9°			Fig. 8		

Spare Parts (See Page **P25** for spare parts of old products.)

Description	Spare Parts: Shim	Spare Parts: Shim Screw	Spare Parts: Wrench (for Shim Screw)
□25□-SVUB$^{R/L}$16-34A□ □32S-SVUB$^{R/L}$16-40A□ □25S-SVZB$^{R/L}$16-34A□ □32S-SVZB$^{R/L}$16-40A□	SVN-32N (*SVN-32S)	SS-4N	LW-4

· For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).

Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Finishing / Precision	Finishing - Medium	Low Feed / Precision	Non-ferrous Metals
See Page	-	B89, B92	B89, B92	B89	B89, B92	B90	B89	B90, B91	-	B93
Insert / Toolholder Description	CK	VF	PP	GP	HQ	$^{R/L}$-F	$^{R/L}$-FSF	$^{R/L}$-Y	F$^{R/L}$-USF	AP
...-SVUC$^{R/L}$08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVUB$^{R/L}$11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VB□T1103..	-	-
...-SVUB$^{R/L}$16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..
...-SVZC$^{R/L}$08-...	-	VCMT0802..	VCMT0802..	-	VCMT0802..	-	-	-	-	-
...-SVZB$^{R/L}$11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VB□T1103..	-	-
...-SVZB$^{R/L}$16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..

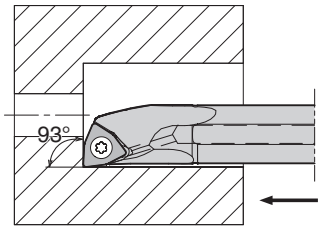
Applications	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
See Page	B93	B93	C28	C17
Insert / Toolholder Description	$^{R/L}$-A3	AH	PCD	CBN
...-SVUC$^{R/L}$08-...	-	-	VCMT0802..	VCGW0802..
...-SVUB$^{R/L}$11-...	-	-	VBMT1103..	VBGW1103..
...-SVUB$^{R/L}$16-...	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..
...-SVZC$^{R/L}$08-...	-	-	VCMT0802..	VCGW0802..
...-SVZB$^{R/L}$11-...	-	-	VBMT1103..	VBGW1103..
...-SVZB$^{R/L}$16-...	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..

Recommended Cutting Conditions ➡ **F92~F93**
Applicable Sleeves ➡ **F84~F86**

● : Std. Item

S/A-SWUB(P)-AE Excellent Bar (Boring)

Max. Overhang Length L/D=~5.5



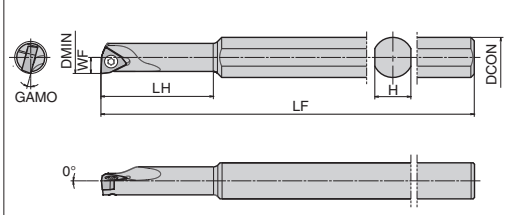
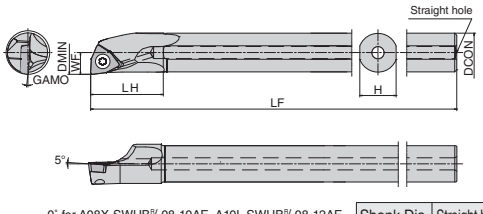


Fig. 1



0° for A08X-SWUB$^{R/L}$08-10AE, A10L-SWUB$^{R/L}$08-12AE

Fig. 2

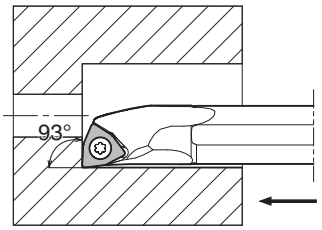
Shank Dia. DCON	Straight hole Dia.
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-SWUB(P)-A Steel Bar (Boring)

Max. Overhang Length L/D=~4



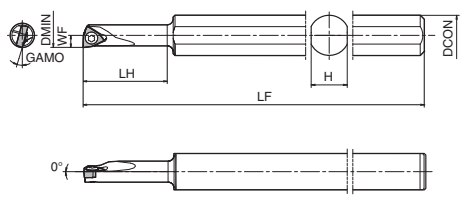
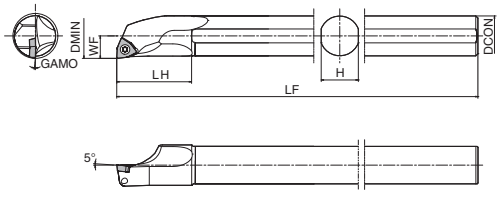


Fig. 3



0° for S08X-SWUB$^{R/L}$08-10A, S10L-SWUB$^{R/L}$08-12A

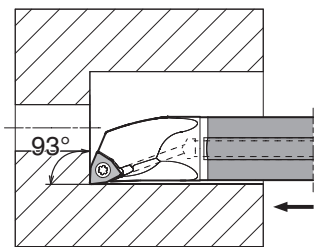
Fig. 4

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

C/E-SWUB(P)-A(N) Carbide Shank Bar (Boring)

Max. Overhang Length L/D=~7



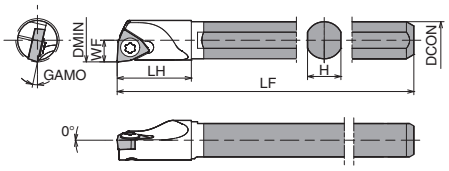
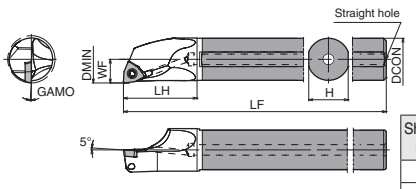


Fig. 5



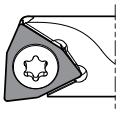
0° for E08L-SWUB$^{R/L}$08-10A, E10N-SWUB$^{R/L}$08-12A, E10N-SWUB$^{R/L}$08-12A-2/3, E10N-SWUB$^{R/L}$08-12A-1/2

Fig. 6

Shank Dia. DCON	Straight hole Dia.
ø5	-
ø6	
ø7	
ø8	ø3
ø10	
ø12	ø4
ø16	
ø20	ø6

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.



...-SWUB$^{R/L}$06-... Insert mounting side

• Right-hand shown

Toolholder Dimensions

	Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	GAMO	Std. Corner-R(RE)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	S10H-SWUB$^{R}_{L}$06-06AE	●	●	6	10	9	100	21	3	15°	0.2	No	Fig. 1	SB-2035TR	FT-6
	S10H-SWUB$^{R}_{L}$06-07AE	●	●	7				25	3.5	13°					
	S10H-SWUB$^{R}_{L}$08-08AE	●	●	8				28	4	15°					
	A08X-SWUB$^{R}_{L}$08-10AE	●	●	10	8	7	120	16	5	13°		Yes	Fig. 2	SB-2050TR	
	A10L-SWUB$^{R}_{L}$08-12AE	●	●	12	10	9	140	20	6	10°					
	A12M-SWUP$^{R}_{L}$11-14AE	●	●	14	12	11	150	24	7	4°	0.4			SB-2545TR	FT-8
	A16Q-SWUP$^{R}_{L}$11-18AE	●	●	18	16	15	180	30	9	1°					
	A16Q-SWUP$^{R}_{L}$16-18AE	●	●							3.5°	0.8			SB-4065TR	FT-15
	A20R-SWUP$^{R}_{L}$16-22AE	●	●	22	20	19	200	36	11	2°					
Steel	S10H-SWUB$^{R}_{L}$06-06A	●	●	6	10	9	100	21	3	15°	0.2	No	Fig. 3	SB-2035TR	FT-6
	S10H-SWUB$^{R}_{L}$06-07A	●	●	7				25	3.5	13°					
	S10H-SWUB$^{R}_{L}$08-08A	●	●	8				28	4	15°					
	S08X-SWUB$^{R}_{L}$08-10A	●	●	10	8	7	120	16	5	13°			Fig. 4	SB-2050TR	
	S10L-SWUB$^{R}_{L}$08-12A	●	●	12	10	9	140	20	6	10°					
	S12M-SWUP$^{R}_{L}$11-14A	●	●	14	12	11	150	24	7	4°	0.4			SB-2545TR	FT-8
	S16Q-SWUP$^{R}_{L}$11-18A	●	●	18	16	15	180	30	9	1°					
	S16Q-SWUP$^{R}_{L}$16-18A	●	●							3.5°	0.8			SB-4065TR	FT-15
	S20R-SWUP$^{R}_{L}$16-22A	●	●	22	20	19	200	36	11	2°					
Carbide	C05H-SWUB$^{R}_{L}$06-06AN	●	●	6	5	4.4	100	9	3	15°	0.2	No	Fig. 5	SB-2035TR	FT-6
	C06J-SWUB$^{R}_{L}$06-07AN	●	●	7	6	5.4	110	10	3.5	13°					
	C07K-SWUB$^{R}_{L}$08-08AN	●	●	8	7	6.4	125	11	4	15°					
	E08L-SWUB$^{R}_{L}$ 08-10AN	●	●	10	8	7	140	14	5	13°		Yes	Fig. 6	SB-2050TR	
	E10N-SWUB$^{R}_{L}$08-12AN	●	●	12	10	9	160	18	6	10°					
	E10N-SWUBR 08-12AN2/3	●					105								
	E10N-SWUBR 08-12AN1/2	●					80								
	E12Q-SWUP$^{R}_{L}$ 11-14A	●	●	14	12	11	180	23	7	4°	0.4			SB-2545TR	FT-8
	E12Q-SWUPR 11-14A-2/3	●					120								
	E12Q-SWUPR 11-14A-1/2	●					90								
	E16X-SWUP$^{R}_{L}$ 11-18A	●	●	18	16	15	220	28	9	1°					
	E16X-SWUPR 11-18A-2/3	●					145								
	E16X-SWUPR 11-18A-1/2	●					110								
	E16X-SWUP$^{R}_{L}$ 16-18A	●	●				220			3.5°	0.8			SB-4065TR	FT-15
	E16X-SWUPR 16-18A-2/3	●					145								
	E16X-SWUPR 16-18A-1/2	●					110								
	E20S-SWUP$^{R}_{L}$ 16-22A	●	●	22	20	19	250	32	11	2°					
	E20S-SWUPR 16-22A-2/3	●					165								
	E20S-SWUPR 16-22A-1/2	●					125								

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing	Finishing - Medium	Finishing	Finishing	Cast Iron	Non-ferrous Metals	Hard Materials
See Page	B97	B97	B99	B97	B99	B97, B98	B98	B98, B99	C29	C18
Insert / Toolholder Description	CF	$^{R}_{L}$-PF	GP	$^{R}_{L}$-DP	HQ	$^{R}_{L}$-F	$^{R}_{L}$-P	Without Chipbreaker	PCD	CBN
...-SWUB$^{R}_{L}$06-...	WBGT0601..	WBGT0601..	-	WBMT0601..	-	WB□T0601..	-	WBGW0601..	WBMT0601..	WBGW0601..
...-SWUB$^{R}_{L}$08-...	-	WBGT0802..	-	WBMT0802..	-	WB□T0802..	WBET0802..	WBGW0802..	WBMT0802..	WBGW0802..
...-SWUP$^{R}_{L}$11-...	-	-	WPMT1102..	-	WPMT1102..	-	-	WPGW1102..	WPMT1102..	-
...-SWUP$^{R}_{L}$16-...	-	-	WPMT1603..	-	WPMT1603..	-	-	WPGW1603..	-	-

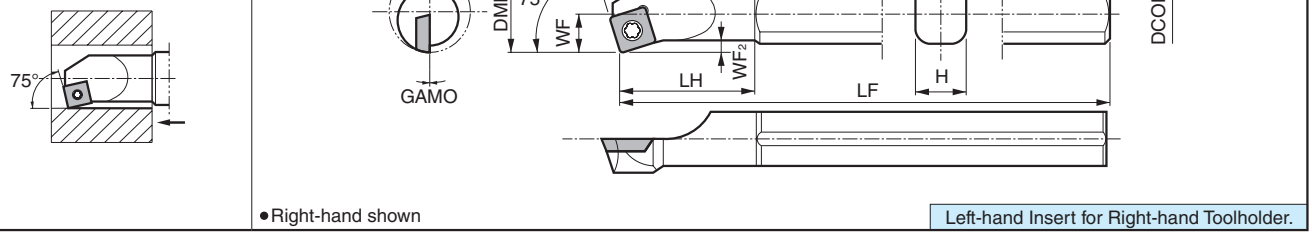
Recommended Cutting Conditions ➡ F92~F93
Applicable Sleeves ➡ F83~F86

● : Std. Item

Boring Bar [SP□□ Insert]

S-SSKP (Boring)

Max. Overhang Length L/D=~3



●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

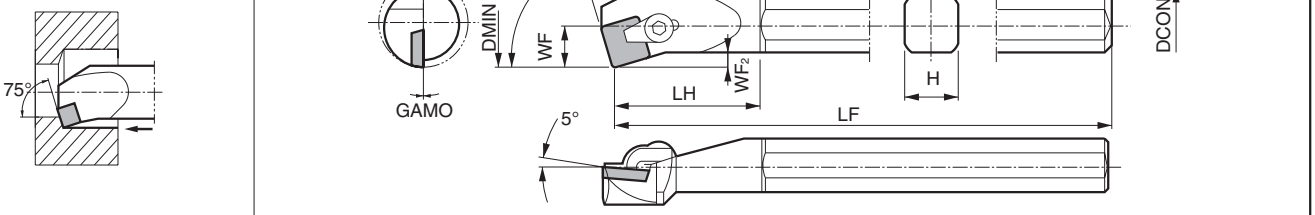
Description	Stock		Min. Bore Dia.	Dimension (mm)						GAMO	Std. Corner-R(RE)	Spare Parts	
												Clamp Screw	Wrench
	R	L	DMIN	DCON	H	LF	LH	WF	WF_2				
S16Q -SSKPR09-20	●		20	16	14	180	30	10	2.0	-3°	0.8	SB-4TR	FT-15

Applicable Inserts

Applications	Finishing										
See Page	**B75**										
Insert / Toolholder Description	L 										
...-SSKP[R/L]09...	SPGH0903..										

S-CSKP (Boring)

Max. Overhang Length L/D=~3



●Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)						GAMO	Std. Corner-R(RE)	Spare Parts		
												Clamp Set	Wrench	
	R	L	DMIN	DCON	H	LF	LH	WF	WF_2					
S16N -CSKPR09-20	●		20	16	14	160	40	10	2.0	0°	0.8	CPS-2	FH-2.5	-
S20Q -CSKPR09-27	●		27	20	18	180	45	13.5	3.5					
S25X -CSKPR12-34	●		34	25	23	220	60	17	4.5	0°	0.8	CPS-3	-	LW-3

Applicable Inserts

Applications	Medium	Medium	Finishing - Medium	Cast Iron	Cast Iron	Non-ferrous Metals				
See Page	**B75**	**B75**	**B75**	**B75**	**B113**	**C29**				
Insert / Toolholder Description	G 	**Standard** 	[R/L] 	**Without Chipbreaker** 	**Ceramic** 	**PCD** 				
...-CSKPR09-...	SPMR0903..	SPMR0903..	SPGR0903..	SPGN0903..	SPGN0903..	-				
...-CSKPR12-...	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..				

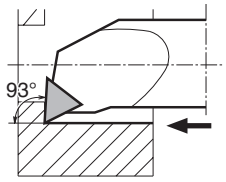
Recommended Cutting Conditions ➔ **F92~F93**
Applicable Sleeves ➔ **F85~F86**

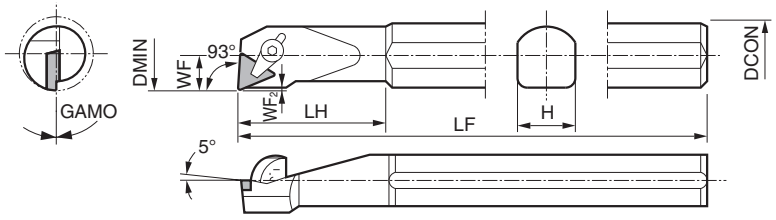
● : Std. Item

Boring Bar [TP□□ Insert]

S-CTUP (Boring)

Max. Overhang Length L/D=~3





● Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)						GAMO	Std. Corner-R(RE)	Spare Parts					
												Clamp Set		Wrench		Shim	Shim Screw
	R	L	DMIN	DCON	H	LF	LH	WF	WF_2								
S12L-CTUPR 09-16	●		16	12	11	140	32	8	0.5	0°	0.4	CPS-1	-	FH-2	-	-	-
S16N-CTUP$^{R}_{L}$11-20	●	●	20	16	14	160	30	10	0.5	0°	0.4	-	CPS-2	FH-2.5	-	-	-
S20Q-CTUP$^{R}_{L}$11-27	●	●	27	20	18	180	40	13.5	1.3								
S25X-CTUP$^{R}_{L}$16-34	●	●	34	25	23	220	60	17	1.0	0°	0.8	-	CPS-3	-	LW-3	-	-
S32S-CTUP$^{R}_{L}$16-43	●	●	43	32	30	250	70	21.5								KPT-32	SP3X10
S40X-CTUP$^{R}_{L}$16-50	●	●	50	40	37	315	80	25									

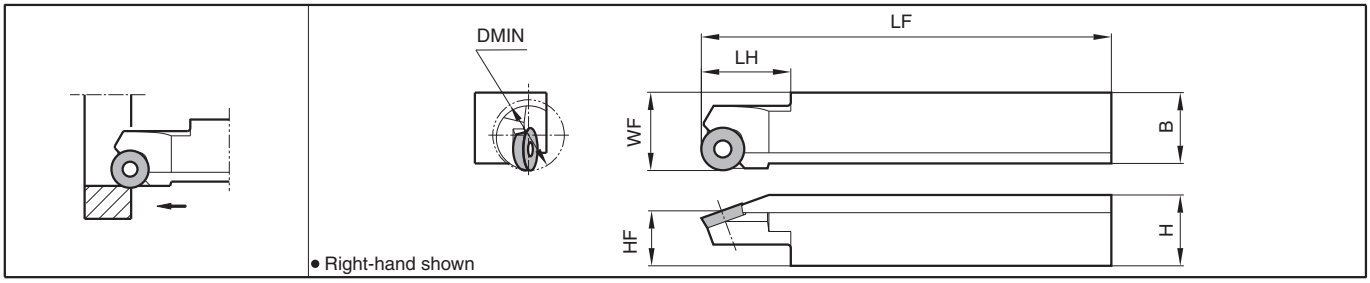
Applicable Inserts

Applications	Finishing	Finishing - Medium	Medium	Medium	Finishing	Finishing - Medium	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials
See Page	**B87**	**B87**	**B87**	**B87**	**B87**	**B88**	**B88**	**B113**	**C29**	**C18**
Insert / Toolholder Description	**GP**	**HQ**	**G**	**Standard**	**$^{R}_{L}$-F**	**$^{R}_{L}$-□**	**Without Chipbreaker**	**Ceramic**	**PCD**	**CBN**
										
...-CTUPR09-...	-	-	TPMR0902..	-	TPGR0902..	-	TPGN0902..	TPGN0902..	-	-
...-CTUP$^{R}_{L}$11-...	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	-	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
...-CTUP$^{R}_{L}$16-...	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	-	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..

Recommended Cutting Conditions **F92~F93**
Applicable Sleeves **F84~F86**

● : Std. Item

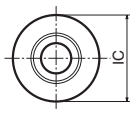
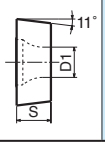
SRCP-B (Boring)



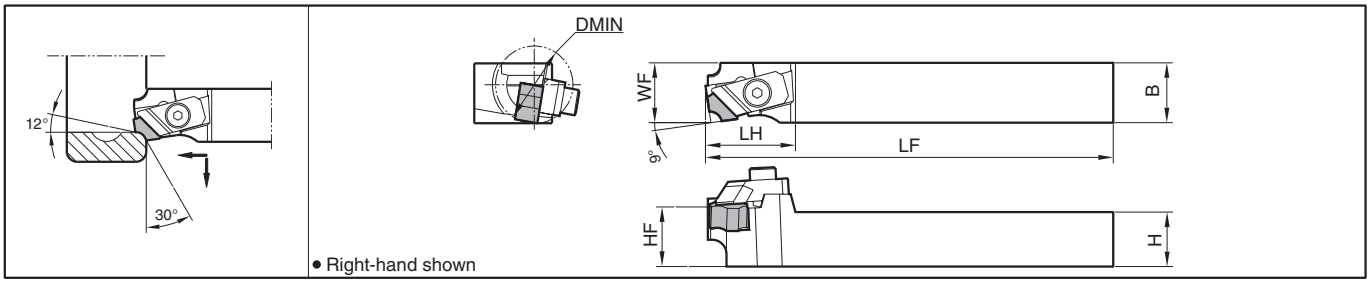
Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) H	HF	B	LF	LH	WF	Spare Parts: Clamp Screw	Spare Parts: Wrench		Applicable Inserts B103
SRCP R/L	2020B-12-A20	●	●	20	20	15.5	20	125	25	22	SB-4TR	FT-15	-	RPMT1203M0-BB
	2525B-16-A32	●		32	25	20	25	150	31	27	SB-5090TR	-	LTW-20	RPMT1604M0-BB

Applicable Inserts

Insert			Description	Dimension (mm) IC	S	D1
			RPMT 1203M0-BB	12.0	3.18	4.4
			RPMT 1604M0-BB	16.0	4.76	5.5

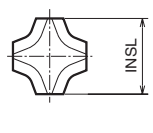
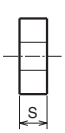
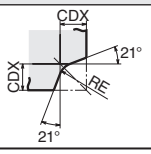
CBSN-B (Internal Round Chamfering)



Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) H	HF	B	LF	LH	WF	Spare Parts: Clamp Set	Spare Parts: Wrench		Applicable Inserts B103
CBSNR	2020B-12-A20	●		20	20	21	20	125	32	20	CP-RCR	LW-5		SNMF1204○○-21
	2525B-12-A20	●			25	26	25	150		25				

Applicable Inserts

Insert				Description	Dimension (mm) INSL	S	CDX	RE
				SNMF 120406-21	12.70	4.76	1.5	0.6
				SNMF 120410-21			3.0	1.0
				SNMF 120416-21			3.1	1.6
				SNMF 120421-21			3.2	2.1
				SNMF 120426-21			3.3	2.6

● : Std. Item

Identification System for Interchangeable Heads

Interchangeable Head	Clamping System	Insert Shape	Hand of Tool	Min. Bore Dia.
	P : Pin Lock (Lever Lock) S : Screw Clamp	C : 80° Rhombic D : 55° Rhombic T : 60° Triangle	R : Right-hand L : Left-hand	

H	A	32	P	C	L	N	R	12	-	40

Type of Head

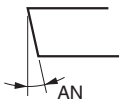
A	Steel head with Coolant Hole

Applicable Adapter Diameter

Cutting Edge Angle

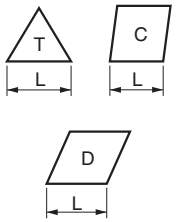
F	L	U
90°	95°	93°

Insert Relief Angle

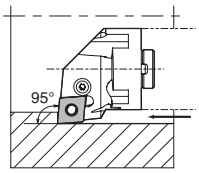


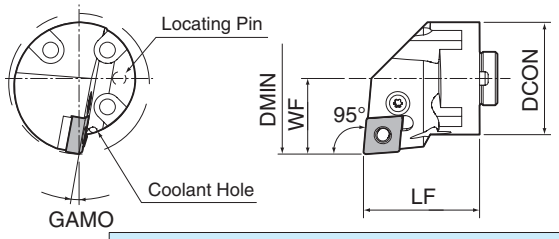
C : 7° Positive
N : 0° Negative

Insert Size



HA-PCLN12 (Boring / Internal Facing, with Coolant Hole)





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)			GAMO	Std. Corner-R(RE)	Spare Parts						Applicable Boring Adapter ➡F68
									Lever	Lock Screw	Shim	Shim Pin	*Punch	*Wrench	
	R	L	DMIN	DCON	LF	WF									
HA32PCLNR/L12-40	●	●	40	32	41	22	10°	0.8	LL-2K	LS-2P	LC-4K	LSP-3K	*PC-2K	DTPM-15	AD32U
HA40PCLNR/L12-50	●	●	50	40		27									AD40V
HA50PCLNR/L12-63	●	●	63	50		35									AD50W

* Punch (*PC-2K) : Not included. Purchase separately.
Included wrench is L type.

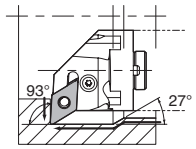
Applicable Inserts

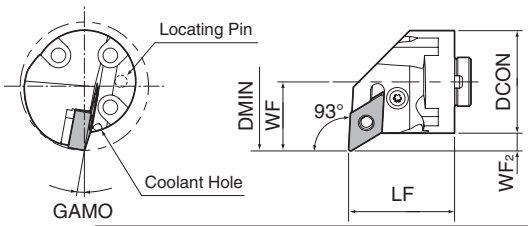
Toolholder Description	Insert Description		See Page			
			Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PCLNR/L12-40	CN□A	1204..	B16~B22	B106	C23	C6,C7
HA40PCLNR/L12-50	CN□G					
HA50PCLNR/L12-63	CN□M					

Recommended Cutting Conditions ➡F92~F93

● : Std. Item

HA-PDUN15 (Copying, with Coolant Hole)





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	LF	WF	WF_2	GAMO	Std. Corner-R(RE)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	*Punch	*Wrench	Applicable Boring Adapter ➡F68
HA32PDUNR/L15-43	●	●	43	32	41	25	9	12°	0.8	LL-3K	LS-3P	LD-4K43 (LD-4K)	LSP-3K	*PC-2K	DTPM-15	AD32U
HA40PDUNR/L15-50	●	●	50	40		27	7	10°								AD40V
HA50PDUNR/L15-63	●	●	63	50		35	10									AD50W

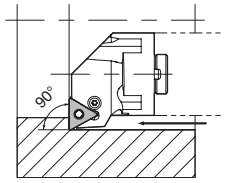
* Punch (*PC-2K) : Not included. Purchase separately.
Included wrench is L type.
* Shim : LD-4K43 is attached to Toolholder. When using DN□□1506 Insert, purchase LD-4K separately.

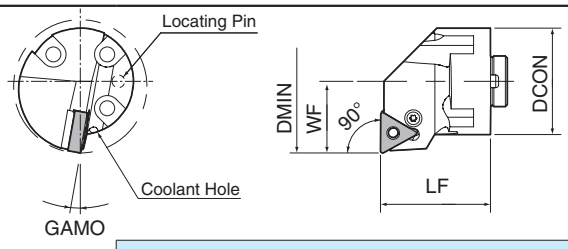
Applicable Inserts

Toolholder Description	Insert Description Shim:LD-4K43		Insert Description Shim:LD-4K		See Page Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PDUNR/L15-43	DN□A	1504..	DN□A	1506..	B23~B30	B107	C23	C8,C9
HA40PDUNR/L15-50	DN□G		DN□G					
HA50PDUNR/L15-63	DN□M		DN□M					

Recommended Cutting Conditions ➡F92~F93

HA-PTFN16 (Boring, with Coolant Hole)





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	LF	WF	GAMO	Std. Corner-R(RE)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	*Punch	*Wrench	Applicable Boring Adapter ➡F68
HA32PTFNR/L16-40	●	●	40	32	41	22	10°	0.8	LL-1K	LS-1P	LT-3K	LSP-2K	*PC-2K	DTPM-10	AD32U
HA40PTFNR/L16-50	●	●	50	40		27									AD40V
HA50PTFNR/L16-63	●	●	63	50		35	8°								AD50W

* Punch (*PC-2K) : Not included. Purchase separately.
Included wrench is L type.

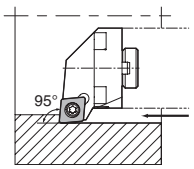
Applicable Inserts

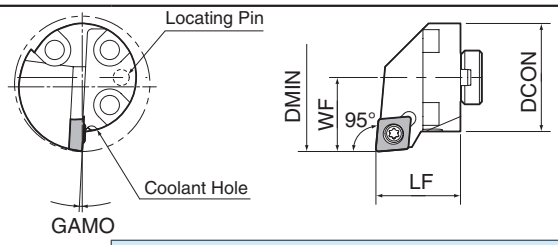
Toolholder Description	Insert Description		See Page Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PTFNR/L16-40	TN□A	1604..	B36~B43	B111	C23	C11
HA40PTFNR/L16-50	TN□G					
HA50PTFNR/L16-63	TN□M					

Recommended Cutting Conditions ➡F92~F93

● : Std. Item

HA-SCLC09 (Boring / Internal Facing, with Coolant Hole)





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

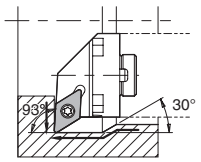
Description	Stock		Min. Bore Dia.	Dimension (mm)			GAMO	Std. Corner-R(RE)	Spare Parts		Applicable Boring Adapter ➡F68	Applicable Inserts
	R	L	DMIN	DCON	LF	WF			Clamp Screw	Wrench		
HA32SCLCR/L09-40	●	●	40	32	25	22	3°	0.8	SB-3580TR	FT-15	AD32U	CC..09T3..

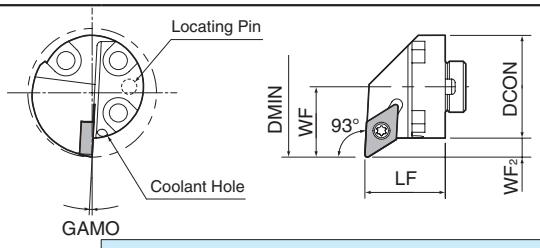
Applicable Inserts

Insert Description	See Page		
	Cermet / Coated Carbide / Carbide	PCD	CBN
CC..09T3..	B53~B55,B57~B60	C24, C25	C14

Recommended Cutting Conditions ➡F92~F93

HA-SDUC11 (Copying, with Coolant Hole)





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)				GAMO	Std. Corner-R(RE)	Spare Parts		Applicable Boring Adapter ➡F68	Applicable Inserts
	R	L	DMIN	DCON	LF	WF	WF_2			Clamp Screw	Wrench		
HA32SDUCR/L11-40	●	●	40	32	25	22	6	3°	0.8	SB-3580TR	FT-15	AD32U	DC..11T3..

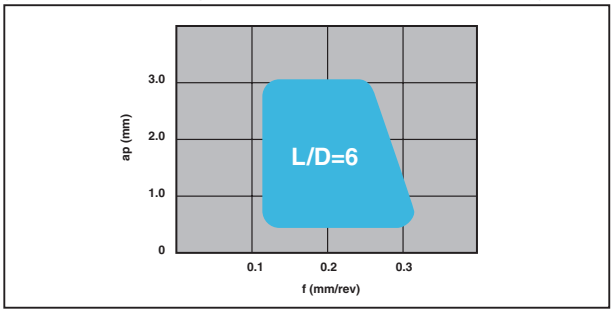
Applicable Inserts

Insert Description	See Page		
	Cermet / Coated Carbide / Carbide	PCD	CBN
DC..11T3..	B62~B71	C25	C15

Recommended Cutting Conditions ➡F92~F93

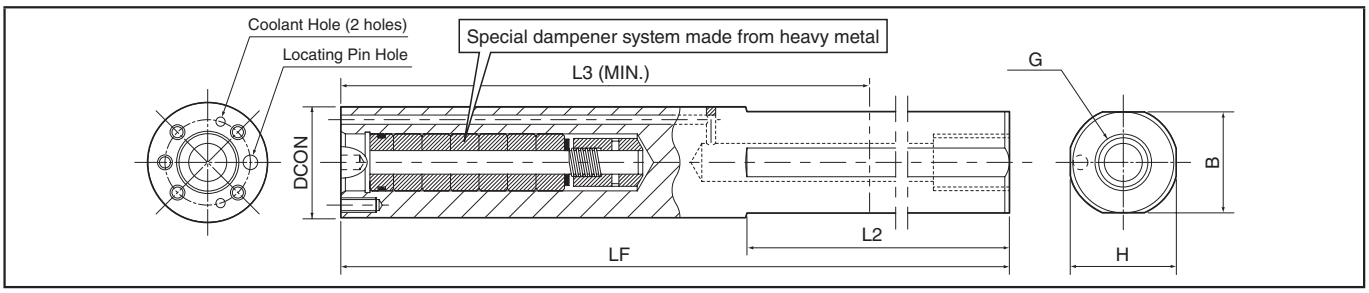
Possible machining area (Guide-Line for Overhang Length of AD Bars)

(SCM435 Vc=150m/min ap=0.5~3mm f=0.1~0.3mm/rev TNMG160408)



● : Std. Item

Boring Adapter (with Coolant Hole / Anti-vibration Dampener System)



Dimensions

Description	Stock	Dimension (mm)							Spare Parts		
									Clamp Bolt		Wrench (sold separately)
		DCON	H	B	LF	L2	L3 (MIN.)	G			
AD 32U	●	32	31	29	310	200	200	Rp3/8	HH5X20 (3 pcs)	HH5X30 (1 pcs)	LW-4
AD 40V	●	40	39	37	360	248	228				
AD 50W	●	50	47	47	410	280	276		HH6X20 (3 pcs)	HH6X30 (1 pcs)	LW-5

Note) L3 (MIN.) dimension indicates the minimum length in case of the back end of boring adapter is cut for use.
Do not shorten it to less than L3 (MIN.).

Combination of Boring Adapter and Interchangeable Head

Interchangeable Head Description		Boring Adapter			
		Base Description	Clamp Bolt		Wrench
HA32	**PCLN$^{R}_{L}$ 12-40**	AD32U	HH5X20	HH5X30	LW-4
	PDUN$^{R}_{L}$15-43				
	PTFN$^{R}_{L}$ 16-40				
	SCLC$^{R}_{L}$ 09-40		HH5X20		
	SDUC$^{R}_{L}$11-40				
HA40	**PCLN$^{R}_{L}$ 12-50**	AD40V	HH5X20	HH5X30	
	PDUN$^{R}_{L}$15-50				
	PTFN$^{R}_{L}$ 16-50				
HA50	**PCLN$^{R}_{L}$ 12-63**	AD50W	HH6X20	HH6X30	LW-5
	PDUN$^{R}_{L}$15-63				
	PTFN$^{R}_{L}$ 16-63				

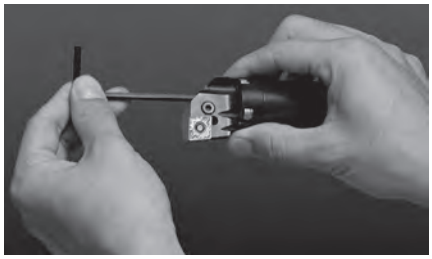
How to change heads



1. No head attached



2. Align hole positions



3. Tighten 3 bolts to attach the head

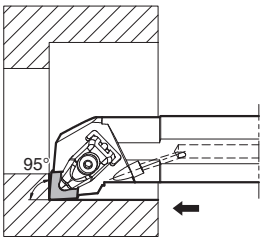
For lever lock type Interchangeable head, use 2 short bolts for upper side and 1 long bolt for lower side. HA32 SCLC$^{R}_{L}$09-40 and HA32 SDUC$^{R}_{L}$11-40 use HH5X20 for all 3 bolts.

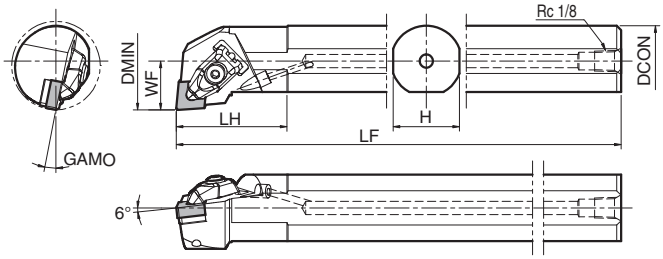
● : Std. Item

Boring Bar [CN□□ Negative Insert]

A-DCLN (Boring / Internal Facing)

Max. Overhang Length L/D=~3





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	GAMO	Std. Corner-R(RE)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
A25R-DCLN$^{R}_{L}$12-32	●	●	32	25	23	200	42	17	11°	0.8	CP-3D	CS-3D	SP-3D	DC-42	SB-4085TR	DN10	LW-3	FT-15
A32S-DCLN$^{R}_{L}$12-40	●	●	40	32	30	250	50	22	11°									
A40T-DCLN$^{R}_{L}$12-50	●	●	50	40	37	300	60	27	14°							DN20		

* Not applicable to high-pressure coolant

Applicable Inserts

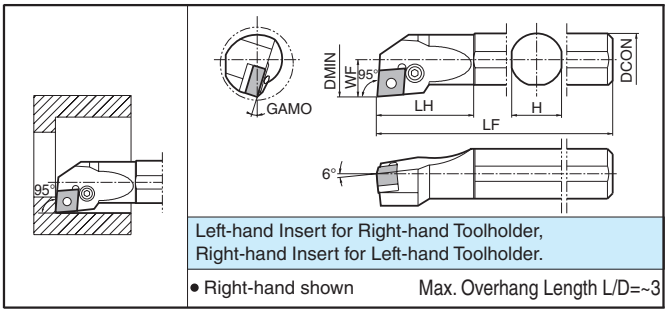
Applications	Finishing	Finishing - Medium	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing
See Page	B16	B16	B16	B16	B16	B16	B17	B17	B17	B17
Insert	WF (Wiper)	WE (Wiper)	PP	GP	PQ	HQ	CQ	CJ	GS	PG
Toolholder Description										
...-DCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..
Applications	Medium - Roughing	Medium - Roughing / High Feed Rate	Roughing	Roughing	Single-sided / Roughing / High Feed Rate	Medium	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing
See Page	B17	B18	B18	B18	B19	B22	B19	B19	B19	B19
Insert	PS	PT	Standard	PH	PX	$^{R}_{L}$	XF	XP	XQ	XS
Toolholder Description										
...-DCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMM1204..	CNGG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..
Applications	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
See Page	B20	B20	B20	B21	B21	B21	B21	B21	B21	B21
Insert	MQ	MS	MU	KQ	KG	KH	C	ZS	GC	Without Chipbreaker
Toolholder Description										
...-DCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMA1204.. CNGA1204..
Applications	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Heat-resistant Alloys	Hard Materials			
See Page	B106	B22	B22	C23	B20	B20	C6,C7			
Insert	Ceramic	$^{R}_{L}$-A3	AH	PCD	SQ	SG	CBN			
Toolholder Description										
...-DCLN$^{R}_{L}$12-...	CNMA1204.. CNGA1204..	CNGG1204..	CNMG1204.. CNGG1204..	CNMM1204..	CNMG1204..	CNMG1204..	CNGA1204.. CNGM1204..			

Recommended Cutting Conditions ➔ F92~F93

● : Std. Item

Boring Bar [CN□□ Negative Insert]

S-PCLN○○ (Boring / Internal Facing)

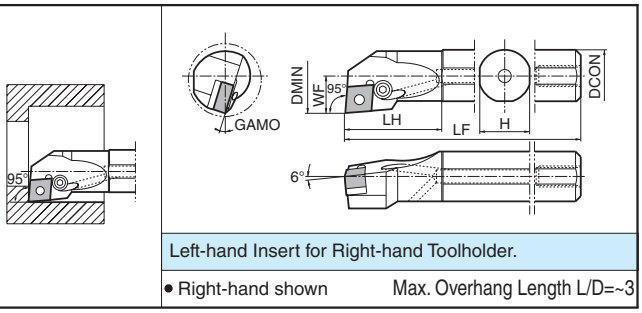


Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

• Right-hand shown Max. Overhang Length L/D=~3

A-PCLN09

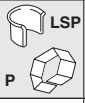
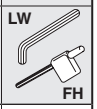
(Boring / Internal Facing, with Coolant Hole)
Twin-Hole Bar



Left-hand Insert for Right-hand Toolholder.

• Right-hand shown Max. Overhang Length L/D=~3

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts					
											Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
	R	L	DMIN	DCON	H	LF	LH	WF								
S16M -PCLN$^{R}_{L}$09-20	●	●	20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q -PCLN$^{R}_{L}$09-27	●	●	27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LC-32N	LSP-1	PC-1	
S25R -PCLN$^{R}_{L}$09-32	●	●	32	25	24	200	42	15.7	15°							
S25R -PCLN$^{R}_{L}$12-32	●	●	32	25	24	200	42	16.3	16°	0.8	LL-2N	LS-2N	LC-42N$^{R}_{L}$	LSP-2	PC-2	LW-3
S32S -PCLN$^{R}_{L}$12-40	●	●	40	32	30	250	50	21	10°							
S40T -PCLN$^{R}_{L}$12-50	●	●	50	40	37	300	60	25								
A16M -PCLNR09 -20	●		20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
A20Q -PCLNR09 -27	●		27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LC-32N	LSP-1	PC-1	
A25R -PCLNR09 -32	●		32	25	24	200	42	15.7	15°							

· LC-42NR for Right-hand Toolholder, LC-42NL for Left-hand Toolholder.

Applicable Inserts

Applications	Finishing	Finishing - Medium	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing
See Page	**B16**	**B16**	**B16**	**B16**	**B16**	**B16**	**B17**	**B17**	**B17**	**B17**
Insert / Toolholder Description	**WF** (Wiper)	**WE** (Wiper)	**PP**	**GP**	**PQ**	**HQ**	**CQ**	**CJ**	**GS**	**PG**
...-PCLN$^{R}_{L}$09-...	-	-	-	CNMG0904..	-	CNMG0904..	-	-	CNMG0904..	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..
Applications	Medium - Roughing	Medium - Roughing / High Feed Rate	Roughing	Roughing	Single-sided / Roughing / High Feed Rate	Finishing	Medium	Soft Steel / Small ap	Soft Steel / Finishing	Soft Steel / Medium
See Page	**B17**	**B18**	**B18**	**B18**	**B19**	**B22**	**B22**	**B19**	**B19**	**B19**
Insert / Toolholder Description	**PS**	**PT**	**Standard**	**PH**	**PX**	**$^{R}_{L}$-S**	**$^{R}_{L}$**	**XF**	**XP**	**XQ**
...-PCLN$^{R}_{L}$09-...	-	-	-	-	-	CNGG0904..	CNGG0904..	-	-	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMM1204..	-	CNGG1204..	CNMG1204..	CNMG1204..	CNMG1204..
Applications	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
See Page	**B19**	**B20**	**B20**	**B20**	**B21**	**B21**	**B21**	**B21**	**B21**	**B21**
Insert / Toolholder Description	**XS**	**MQ**	**MS**	**MU**	**KQ**	**KG**	**KH**	**C**	**ZS**	**GC**
...-PCLN$^{R}_{L}$09-...	-	-	-	-	-	-	-	-	-	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..
Applications	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Heat-resistant Alloys	Hard Materials		
See Page	**B21**	**B106**	**B22**	**B22**	**C23**	**B20**	**B20**	**C6,C7**		
Insert / Toolholder Description	Without Chipbreaker	**Ceramic**	**$^{R}_{L}$-A3**	**AH**	**PCD**	**SQ**	**SG**	**CBN**		
...-PCLN$^{R}_{L}$09-...	-	-	-	-	-	-	-	-		
...-PCLN$^{R}_{L}$12-...	CNMA1204.. CNGA1204..	CNMA1204.. CNGA1204..	CNGG1204..	CNMG1204.. CNGG1204..	CNMM1204..	CNMG1204..	CNMG1204..	CNGA1204.. CNGM1204..		

Recommended Cutting Conditions ➔ **F92~F93**

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A16M-PCLN$^{R}_{L}$09-20	SHC1640-70, SHC1650-95	SJS-8
A20Q-PCLN$^{R}_{L}$09-27	SHC2040-70, SHC2050-95	
A25R-PCLN$^{R}_{L}$09-32	SHC2540-70, SHC2550-95	

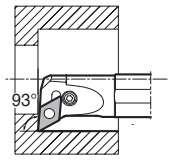
· For Coolant Sleeve, Coolant Joint See Page ➔ **F85~F86**.

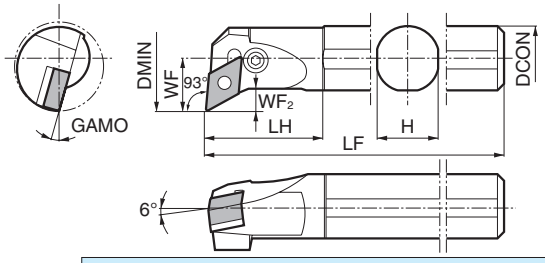
● : Std. Item

Boring Bar [DN11 Small Negative Insert]

S-PDUN11 (Boring / Internal Facing)

Max. Overhang Length L/D=~3



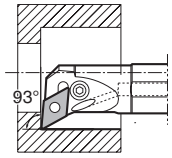


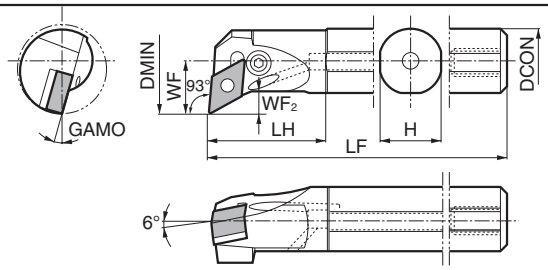
• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

A-PDUN11 Twin-Hole Bar (Boring / Internal Facing, with Coolant Hole)

Max. Overhang Length L/D=~3





• Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	WF_2	GAMO	Std. Corner-R(RE)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S20Q -PDUN$^{R}_{L}$11-27	●	●	27	20	19	180	35	16	7.6	17°	0.4	LL-1DN	LS-1SN	LD-32N	LSP-1	PC-1	FH-2.5
S25R -PDUN$^{R}_{L}$11-32	●	●	32	25	24	200	40	17	7.6	15°							
S32S -PDUN$^{R}_{L}$11-40	●	●	40	32	31	250	45	22	8.5	12°							
A20Q -PDUNR11-27	●		27	20	19	180	35	16	7.6	17°	0.4	LL-1DN	LS-1SN	LD-32N	LSP-1	PC-1	FH-2.5
A25R -PDUNR11-32	●		32	25	24	200	40	17	7.6	15°							
A32S -PDUNR11-40	●		40	32	31	250	45	22	8.5	12°							

Applicable Inserts

Applications	Finishing	Finishing - Medium	Medium - Roughing	Finishing	Medium
See Page	**B23**	**B24**	**B24**	**B30**	**B30**
Insert / Toolholder Description	**GP**	**HQ**	**GS**	$^{R}_{L}$**-S**	$^{R}_{L}$
...-PDUN$^{R}_{L}$11-...	DNMG1104..	DNMG1104..	DNMG1104..	DNGG1104..	DNGG1104..

Recommended Cutting Conditions **F92~F93**

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A20Q -PDUNR11-27	SHC2040-70, SHC2050-95	SJS-8
A25R -PDUNR11-32	SHC2540-70, SHC2550-95	
A32S -PDUNR11-40	-	

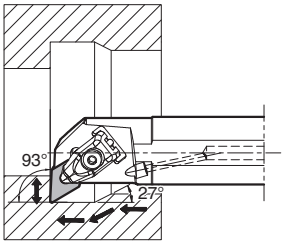
· For Coolant Sleeve, Coolant Joint See Page **F85~F86**.

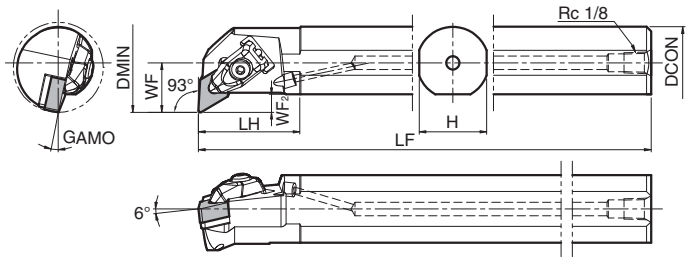
● : Std. Item

Boring Bar [DN15 Negative Insert]

A-DDUN (Boring / Copying)

Max. Overhang Length L/D=~3





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)						GAMO	Std. Corner-R(RE)	Spare Parts							
												Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
	R	L	DMIN	DCON	H	LF	LH	WF	WF_2										
A32S-DDUNR/L15-40	●	●	40	32	30	250	45	22	8	12°	0.8	CP-3D	CS-3D	SP-3D	DD-42 *DD-42-16	SB-4085TR	DN10	LW-3	FT-15
A40T- DDUNR/L15-50	●	●	50	40	37	300	55	27	8.5										
A50U-DDUNR/L15-63	●	●	63	50	47	350	65	35	10.5								DN20		

* When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim (DD-42-16) with * mark and use it in order to prevent workpiece and shim from interfering each other.
* Not applicable to high-pressure coolant

Applicable Inserts

Applications	* Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate
See Page	**B23**	**B23**	**B23**	**B24**	**B24**	**B24**	**B25**	**B25**	**B25**
Insert	**WF (Wiper)**	**PP**	**PQ**	**CQ**	**CJ**	**GS**	**PG**	**PS**	**PT**
Toolholder Description									
...-DDUNR/L15-...	DNMX1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..
...-PD□NR/L15-...									

Applications	Roughing	Roughing	Single-sided / Roughing / High Feed Rate	Medium	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing
See Page	**B26**	**B26**	**B26**	**B30**	**B26**	**B26**	**B26**	**B27**	**B28**
Insert	**Standard**	**PH**	**PX**	R/L	**XP**	**XQ**	**XS**	**MQ**	**MS**
Toolholder Description									
...-DDUNR/L15-...	DNMG1504..	DNMG1504..	DNMM1504..	DNGG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..
...-PD□NR/L15-...									

Applications	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
See Page	**B28**	**B27**	**B29**	**B29**	**B29**	**B29**	**B29**	**B29**	**B107**
Insert	**MU**	**TK**	**KQ**	**KG**	**KH**	**C**	**ZS**	**GC**	**Ceramic**
Toolholder Description									
...-DDUNR/L15-...	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNMG1504..	DNGA1504..
...-PD□NR/L15-...									

Applications	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Heat-resistant Alloys	Hard Materials
See Page	**B30**	**B30**	**C23**	**B28**	**B28**	**C8,C9**
Insert	R/L**-A3**	**AH**	**PCD**	**SQ**	**SG**	**CBN**
Toolholder Description						
...-DDUNR/L15-...	DNGG1504..	DNMG1504.. DNGG1504..	DNMM1504..	DNMG1504..	DNMG1504..	DNGA1504.. DNGM1504..
...-PD□NR/L15-...						

* When using the insert with WF chipbreaker, tool edge offset or program corrections are required. R35
WF chipbreaker can not be used for S-PDQN15 toolholder.

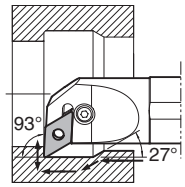
Recommended Cutting Conditions F92~F93

● : Std. Item

Boring Bar [DN15 Negative Insert]

S-PDUN15 (Copying)

Max. Overhang Length L/D=~3



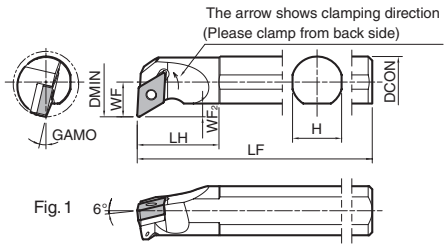


Fig. 1

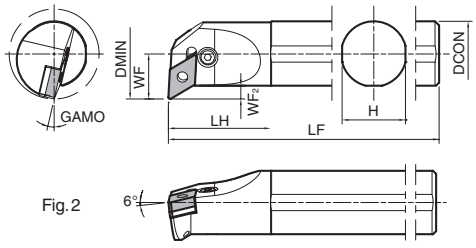


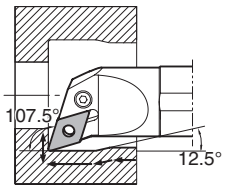
Fig. 2

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-PDQN15 (Copying)

Max. Overhang Length L/D=~3



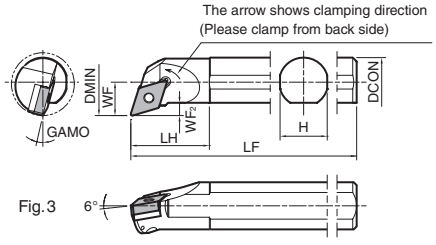


Fig. 3

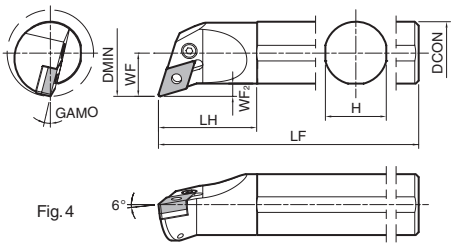


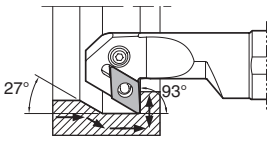
Fig. 4

• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

S-PDZN15 (Back Boring)

Max. Overhang Length L/D=~3



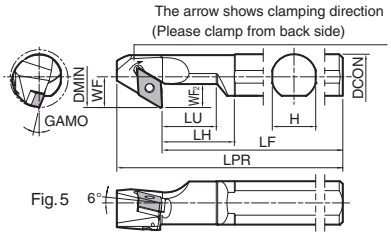


Fig. 5

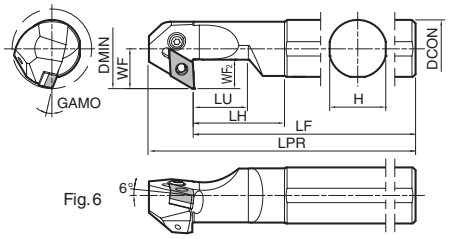


Fig. 6

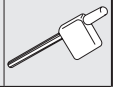
• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)								GAMO	Std. Corner-R(RE)	Drawing	Applicable Inserts	
	R	L	DMIN	DCON	H	LPR	LF	LH	LU	WF	WF_2					
S25R -PDUNR/L15-32	●	●	32	25	24		200	40		17	6.5	13°	0.8	Fig. 1	DN□A DN□G DN□M DNMX	1504..
S32S -PDUNR/L15-44	●	●	44	32	31	-	250	50	-	22				Fig. 2		
S40T -PDUNR/L15-54	●	●	54	40	39		300	65		27	7.5	12°				
S25R -PDQNR/L15-32	●	●	32	25	24		200	40		17	6.5	13°	0.8	Fig. 3	DN□A DN□G DN□M	1504..
S32S -PDQNR/L15-44	●	●	44	32	31	-	250	50	-	22				Fig. 4		
S40T -PDQNR/L15-54	●	●	54	40	39		300	65		27	7.5	12°				
S25R -PDZNR/L15-32	●	●	32	25	24	225	200	40	30	17	13	13°	0.8	Fig. 5	DN□A DN□G DN□M DNMX	1504..
S32S -PDZNR/L15-44	●	●	44	32	31	275	250	50		22	16			Fig. 6		
S40T -PDZNR/L15-54	●	●	54	40	39	325	300	65	50	27		12°				

Spare Parts

Toolholder Description	Spare Parts									
	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Lock Pin	Shim	Shim Screw	Wrench (for Shim Screw)
										
S25R - PD□NR/L15-32	-	-	-	-	-	LW-3	PP-4	PD-42	SB-2050TR	FT-6
S32S - PD□NR/L15-44	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2		-	-	-	-
S40T - PD□NR/L15-54										

· Shim

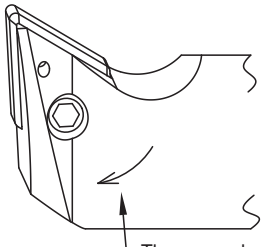
When using inserts whose corner-R(RE) is greater than 1.6mm for S25R-PD□NR/L15-32, use shim modified by additional processing in order to prevent workpiece and shim from interfering each other.
When using inserts whose corner-R(RE) is greater than 1.6mm for S32S-PD□NR/L15-44 and S40T-PD□NR/L15-54, please purchase a shim with
* mark and use it in order to prevent workpiece and shim from interfering each other.

● : Std. Item

Boring Bar [DN15 Negative Insert]

How to change S25R-PD□N$^{R}_{L}$15-32 inserts

· Please replace S25R-PD□N$^{R}_{L}$15-32 insert from the back side



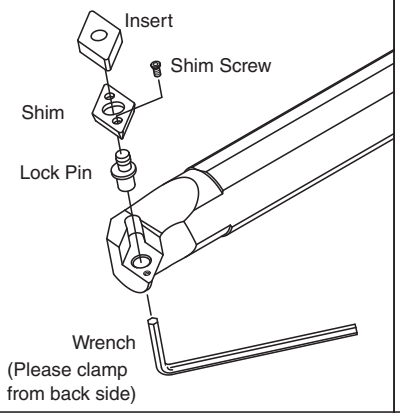
The arrow shows clamping direction

Recommended torque for insert clamp 3.5N·m (for LW-3)

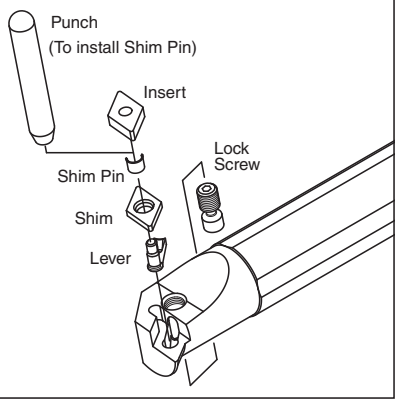
Back side of toolholder

How to assemble spare parts

· S25R-PD□N$^{R}_{L}$15-32 (Pin Lock)



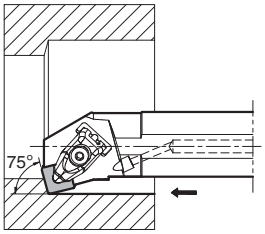
· S32S-PD□N$^{R}_{L}$15-44 (Lever Lock)
· S40T-PD□N$^{R}_{L}$15-54 (Lever Lock)

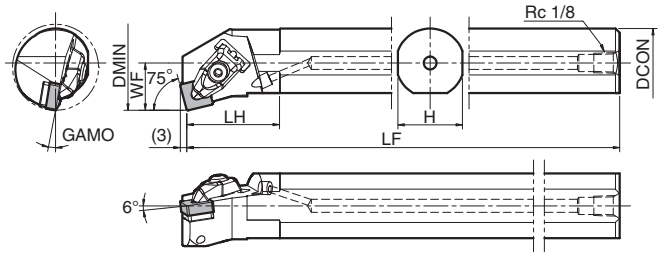


Boring Bar [SN12 Negative Insert]

A-DSKN (Boring)

Max. Overhang Length L/D=~3





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts							
											Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
	R	L	DMIN	DCON	H	LF	LH	WF										
A25R-DSKN$^{R}_{L}$12-32	●	●	32	25	23	200	43	17	11°	0.8	CP-3D	CS-3D	SP-3D	DS-42	SB-4085TR	DN10	LW-3	FT-15
A32S-DSKN$^{R}_{L}$12-40	●	●	40	32	30	250	43	22	11°									
A40T- DSKN$^{R}_{L}$12-50	●	●	50	40	37	300	53	27	11°							DN20		

* Not applicable to high-pressure coolant

Applicable Inserts

Applications	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Roughing	Roughing	Single-sided / Roughing / High Feed Rate	Finishing - Roughing
See Page	**B32**	**B32**	**B32**	**B32**	**B32**	**B33**	**B33**	**B35**
Insert	**PQ**	**PG**	**PS**	**PT**	**Standard**	**PH**	**PX**	$^{R}_{L}$-□
Toolholder Description								
...-DSKN$^{R}_{L}$12-...	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMM1204..	SNGG1204..
Applications	Medium-Roughing / Low Cutting Force	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron
See Page	**B35**	**B33**	**B33**	**B33**	**B34**	**B34**	**B34**	**B34**
Insert	$^{R}_{L}$**-25R**	**XP**	**XQ**	**XS**	**MQ**	**MS**	**C**	**KG**
Toolholder Description								
...-DSKN$^{R}_{L}$12-...	SNGG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..	SNMG1204..
Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Heat-resistant Alloys	Hard Materials	
See Page	**B34**	**B34**	**B34**	**B35**	**B109**	**B34**	**C10**	
Insert	**KH**	**ZS**	**GC**	**Without Chipbreaker**	**Ceramic**	**SG**	**CBN**	
Toolholder Description								
...-DSKN$^{R}_{L}$12-...	SNMG1204..	SNMG1204..	SNMG1204..	SN□A1204..	SN□A1204..	SNMG1204..	SNGA1204..	

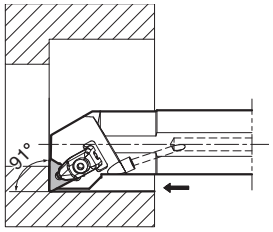
Recommended Cutting Conditions ➡ **F92~F93**

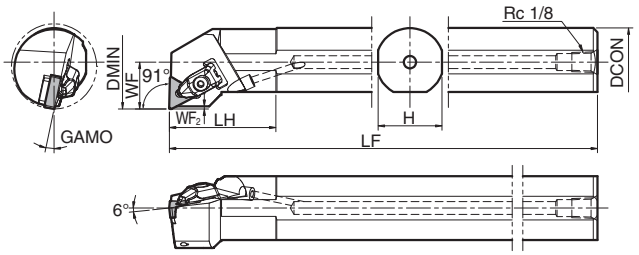
● : Std. Item

Boring Bar [TN□□ Negative Insert]

A-DTFN (Boring)

Max. Overhang Length L/D=~3





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	WF_2	GAMO	Std. Corner-R(RE)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
																		for Clamp	 for Shim
A25R-DTFN$^{R}_{L}$16-32	●	●	32	25	23	200	42	17	0.8	12°	0.8	CP-2D	CS-2D	SP-2D	DT-32	SB-3080TR	DN10	LW-2.5	FT-10
A32S-DTFN$^{R}_{L}$16-40	●	●	40	32	30	250	50	22	1.2	12°									
A40T- DTFN$^{R}_{L}$22-50	●	●	50	40	37	300	60	27	1.5	12°		CP-3D	CS-3D	SP-3D	DT-42	SB-4085TR	DN20	LW-3	FT-15

* Not applicable to high-pressure coolant

Applicable Inserts

Applications	* Finishing	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate
See Page	**B36**	**B36**	**B36**	**B36**	**B36**	**B36**	**B36**	**B36**	**B37**	**B37**
Insert / Toolholder Description	**WF** (Wiper)	**PP**	**GP**	**PQ**	**HQ**	**CQ**	**GS**	**PG**	**PS**	**PT**
...-DTFN$^{R}_{L}$16-...	TNMX1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
...-DTFN$^{R}_{L}$22-...	-	-	-	-	-	TNMG2204..	-	-	TNMG2204..	-

Applications	Medium - Roughing / High Feed Rate	Roughing	Finishing	Medium - Roughing	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing
See Page	**B37**	**B37**	**B42**	**B42, B43**	**B38**	**B38**	**B38**	**B39**	**B39**	**B39**
Insert / Toolholder Description	**GT**	**Standard**	$^{R}_{L}$**-S**	$^{R}_{L}$-□	**XP**	**XQ**	**XS**	**MQ**	**MS**	**MU**
...-DTFN$^{R}_{L}$16-...	TNMG1604..	TNMG1604..	TNGG1604..	TNGG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
...-DTFN$^{R}_{L}$22-...	-	TNMG2204..	-	TNGG2204..	-	-	-	-	-	-

Applications	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals
See Page	**B39**	**B40**	**B40**	**B40**	**B40**	**B40**	**B40**	**B40**	**B111**	**B41**
Insert / Toolholder Description	$^{R}_{L}$**-ST**	**KQ**	**KG**	**KH**	**C**	**ZS**	**GC**	**Without Chipbreaker**	**Ceramic**	$^{R}_{L}$**-A3**
...-DTFN$^{R}_{L}$16-...	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMA1604.. TNGA1604..	TNGA1604..	TNGG1604..
...-DTFN$^{R}_{L}$22-...	-	-	-	-	-	-	-	-	-	-

Applications	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Hard Materials
See Page	**B41**	**C23**	**B39**	**C11**
Insert / Toolholder Description	**AH**	**PCD**	**SG**	**CBN**
...-DTFN$^{R}_{L}$16-...	TN_G1604..	TNMM1604..	TNMG1604..	TNGA1604..
...-DTFN$^{R}_{L}$22-...	-	-	TNMG2204..	-

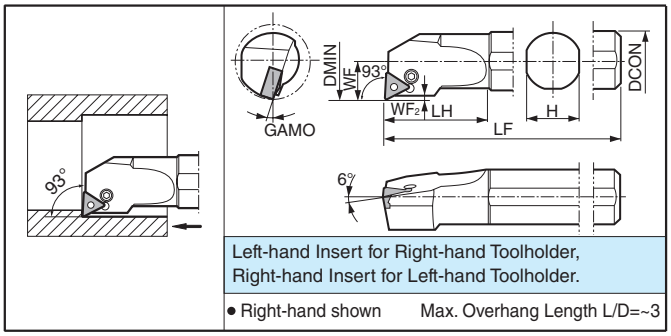
* When using the insert with WF chipbreaker, tool edge offset or program corrections are required. **R35**

Recommended Cutting Conditions **F92~F93**

● : Std. Item

Boring Bar [TN□□ Negative Insert]

S-PTUN○○ (Boring)

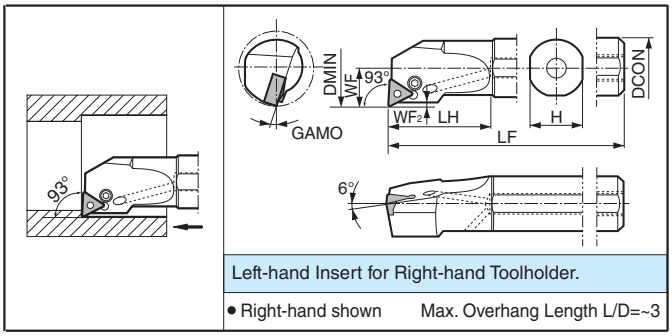


Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

● Right-hand shown Max. Overhang Length L/D=~3

A-PTUN11

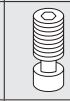
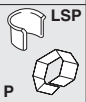
Twin-Hole Bar
(Boring, with Coolant Hole)



Left-hand Insert for Right-hand Toolholder.

● Right-hand shown Max. Overhang Length L/D=~3

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)						GAMO	Std. Corner-R(RE)	Spare Parts					
												Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
	R	L	DMIN	DCON	H	LF	LH	WF	WF_2								
S16M-PTUN$^{R}_{L}$11-20	●	●	20	16	15	150	34	11	0.3	18°	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
S20Q-PTUN$^{R}_{L}$11-25	●	●	25	20	19	180	37	13.2	0.2	17°							
S25R-PTUN$^{R}_{L}$11-32	●	●	32	25	24	200	42	15.7	0.3	16°							
S16M-PTUN$^{R}_{L}$16-20	●	●	20	16	15	150	34	11	1.3	18°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q-PTUN$^{R}_{L}$16-25	●	●	25	20	19	180	37	13.2	1.3	17°							
S25R-PTUN$^{R}_{L}$16-30	●	●	30	25	24	200	42	15.5	1.3	13°							
S32S-PTUN$^{R}_{L}$16-40	●	●	40	32	30	250	50	22	0.7	13°		LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
S40T-PTUN$^{R}_{L}$16-50	●	●	50	40	37	300	60	27	0.6	11°							
A16M-PTUNR11-20	●		20	16	15	150	34	11	0.3	18°	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
A20Q-PTUNR11-25	●		25	20	19	180	37	13.2	0.2	17°							
A25R-PTUNR11-32	●		32	25	24	200	42	15.7	0.3	16°							

· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

Applications	Finishing	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Medium - Roughing / High Feed Rate
See Page	**B36**	**B36**	**B36**	**B36**	**B36**	**B36**	**B36**	**B37**	**B37**	**B37**
Insert / Toolholder Description	**PP** 	**GP** 	**PQ** 	**HQ** 	**CQ** 	**GS** 	**PG** 	**PS** 	**PT** 	**GT** 
...-PTUN$^{R}_{L}$11-...	-	TNMG1104..	-	TNMG1104..	-	TNMG1104..	-	-	-	-
...-PTUN$^{R}_{L}$16-...	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
Applications	Roughing	Finishing	Medium - Roughing	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing
See Page	**B37**	**B42**	**B42, B43**	**B38**	**B38**	**B38**	**B39**	**B39**	**B39**	**B39**
Insert / Toolholder Description	**Standard** 	**$^{R}_{L}$-S** 	**$^{R}_{L}$-□** 	**XP** 	**XQ** 	**XS** 	**MQ** 	**MS** 	**MU** 	**$^{R}_{L}$-ST** 
...-PTUN$^{R}_{L}$11-...	-	TNGG1104..	TNGG1104..	-	-	-	-	-	-	-
...-PTUN$^{R}_{L}$16-...	TNMG1604..	TNGG1604..	TNGG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
Applications	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals
See Page	**B40**	**B40**	**B40**	**B40**	**B40**	**B40**	**B40**	**B111**	**B41**	**B41**
Insert / Toolholder Description	**KQ** 	**KG** 	**KH** 	**C** 	**ZS** 	**GC** 	**Without Chipbreaker** 	**Ceramic** 	**$^{R}_{L}$-A3** 	**AH** 
...-PTUN$^{R}_{L}$11-...	-	-	-	-	-	-	-	-	-	-
...-PTUN$^{R}_{L}$16-...	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMA1604.. TNGA1604..	TNGA1604..	TNGG1604..	TN_G1604..

Applications	Non-ferrous Metals	Heat-resistant Alloys	Hard Materials
See Page	**C23**	**B39**	**C11**
Insert / Toolholder Description	**PCD** 	**SG** 	**CBN**
...-PTUN$^{R}_{L}$11-...	-	-	-
...-PTUN$^{R}_{L}$16-...	TNMM1604..	TNMG1604..	TNGA1604..

Recommended Cutting Conditions ➔ **F92~F93**

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A16M-PTUN$^{R}_{L}$11-20	SHC1640-70, SHC1650-95	SJS-8
A20Q-PTUN$^{R}_{L}$11-25	SHC2040-70, SHC2050-95	
A25R-PTUN$^{R}_{L}$11-32	SHC2540-70, SHC2550-95	

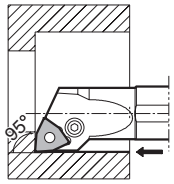
· For Coolant Sleeve, Coolant Joint See Page ➔ **F85~F86**

● : Std. Item

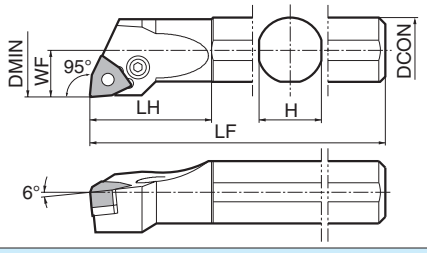
Boring Bar [WN06 Small Negative Insert]

S-PWLN06 (Boring / Internal Facing)

Max. Overhang Length L/D=~3





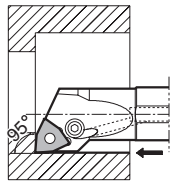


• Right-hand shown

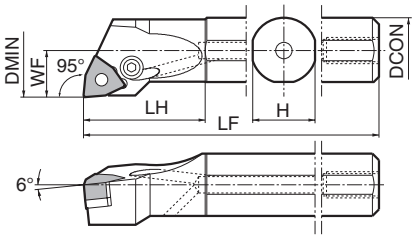
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

A-PWLN06 Twin-Hole Bar (Boring / Internal Facing, with Coolant Hole)

Max. Overhang Length L/D=~3



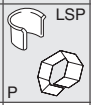




• Right-hand shown

Left-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts					
											Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
	R	L	DMIN	DCON	H	LF	LH	WF								
S16M -PWLN$^{R}_{L}$06-20	●	●	20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q -PWLN$^{R}_{L}$06-27	●	●	27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LW-32N	LSP-1	PC-1	
S25R -PWLN$^{R}_{L}$06-32	●	●	32	25	24	200	42	15.7	15°							
A16M -PWLNR06-20	●		20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
A20Q -PWLNR06-27	●		27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LW-32N	LSP-1	PC-1	
A25R -PWLNR06-32	●		32	25	24	200	42	15.7	15°							

Applicable Inserts

Applications	Finishing	Finishing - Medium	Medium - Roughing	Finishing	Medium					
See Page	**B46**	**B46**	**B47**	**B49**	**B49**					
Insert / Toolholder Description	**GP** 	**HQ** 	**GS** 	$^{R}_{L}$**-S** 	$^{R}_{L}$ 					
...-PWLN$^{R}_{L}$06-...	WNMG0604..	WNMG0604..	WNMG0604..	WNGG0604..	WNGG0604..					

Recommended Cutting Conditions ➡ **F92~F93**

Applicable Coolant Sleeve / Joint

Toolholder Description	Applicable Coolant Sleeve	Applicable Coolant Joint
A16M-PWLNR06-20	SHC1640-70, SHC1650-95	SJS-8
A20M-PWLNR06-27	SHC2040-70, SHC2050-95	
A25R-PWLNR06-32	SHC2540-70, SHC2550-95	

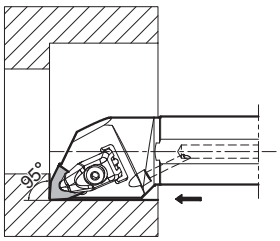
· For Coolant Sleeve, Coolant Joint See Page ➡ **F85~F86**

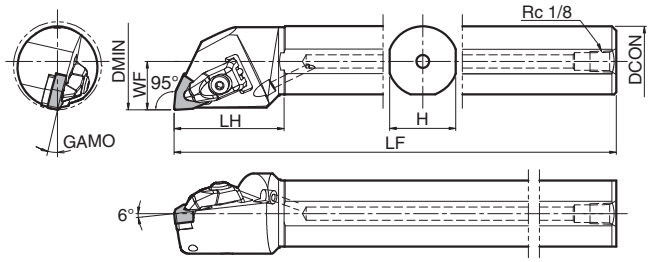
● : Std. Item

Boring Bar [WN08 Negative Insert]

A-DWLN (Boring / Internal Facing)

Max. Overhang Length L/D=~3





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts							
											Clamp	Screw	Spring	Shim	Shim Screw	Nozzle	Wrench	Wrench (sold separately)
	R	L	DMIN	DCON	H	LF	LH	WF										
A25R-DWLN$^{R/L}$08-32	●	●	32	25	23	200	50	17	13°	0.8	CP-3D	CS-3D	SP-3D	DW-42	SB-4085TR	DN10	LW-3	FT-15
A32S-DWLN$^{R/L}$08-40	●	●	40	32	30	250	50	22	13°									
A40T- DWLN$^{R/L}$08-50	●	●	50	40	37	300	60	27	13°							DN20		

* Not applicable to high-pressure coolant

Applicable Inserts

Applications	Finishing	Finishing - Medium	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Roughing
See Page	**B46**	**B46**	**B46**	**B46**	**B47**	**B47**	**B47**	**B47**	**B47**	**B47**	**B47**
Insert / Toolholder Description	**WF** (Wiper)	**WE** (Wiper)	**PP**	**PQ**	**CQ**	**CJ**	**GS**	**PG**	**PS**	**PT**	Standard
...-DWLN$^{R/L}$08 -...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..

Applications	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
See Page	**B48**	**B48**	**B48**	**B48**	**B48**	**B48**	**B49**	**B49**	**B49**	**B49**	**B49**
Insert / Toolholder Description	**XP**	**XQ**	**XS**	**MQ**	**MS**	**MU**	C(GC)	**KQ**	**KG**	**KH**	**ZS**
...-DWLN$^{R/L}$08 -...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..

Applications	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Hard Materials
See Page	**B49**	**C23**	**B48**	**C13**
Insert / Toolholder Description	**AH**	**PCD**	**SG**	**CBN**
...-DWLN$^{R/L}$08 -...	WNGG0804..	WNMM0804..	WNMG0804..	WNGA0804..

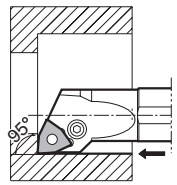
Recommended Cutting Conditions ➔ **F92~F93**

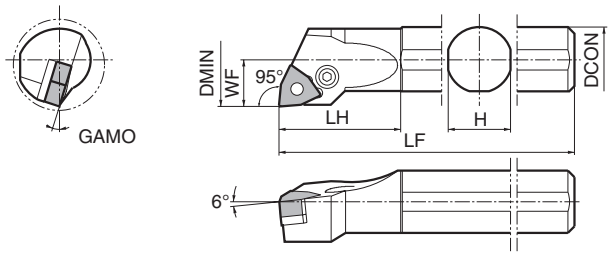
● : Std. Item

Boring Bar [WN08 Negative Insert]

S-PWLN08 (Boring / Internal Facing)

Max. Overhang Length L/D=~3





• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

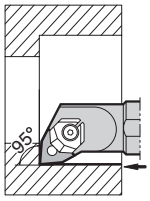
Toolholder Dimensions

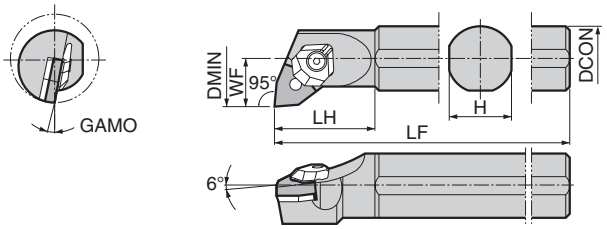
Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts					
											Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
	R	L	DMIN	DCON	H	LF	LH	WF								
S32S -PWLN$^{R}_{L}$08-40	●	●	40	32	30	250	50	22	10°	0.8	LL-2N	LS-2N	LW-42N$^{R}_{L}$	LSP-2	PC-2	LW-3
S40T -PWLN$^{R}_{L}$08-50	●	●	50	40	37	300	60	27								

· Shim : LW-42NR for Right-hand Toolholder, LW-42NL for Left-hand Toolholder.

S-WWLN08-E Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5

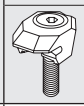
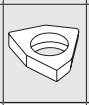
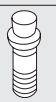
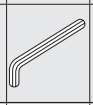




• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts					
											Clamp Set	Wrench	Shim	Shim Pin	Wrench	
	R	L	DMIN	DCON	H	LF	LH	WF								
S25S -WWLN$^{R}_{L}$08-28E	●	●	28	25	24		36	14	13°				WWP-42			
S25S -WWLN$^{R}_{L}$08-34E	●	●	34	25	24	250	40	17	11°	1.2	WCS-8	LW-3	*WWP -42-16	WP5X11	LW-2	
S32S -WWLN$^{R}_{L}$08-40E	●	●	40	32	30		50	20	10°							

· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

Applicable Inserts

Applications	Finishing	Finishing - Medium	Finishing	Finishing - Medium	Finishing - Medium	Finishing - Medium	Medium - Roughing	Medium - Roughing	Medium - Roughing	Medium - Roughing / High Feed Rate	Roughing
See Page	B46	B46	B46	B46	B47	B47	B47	B47	B47	B47	B47
Insert / Toolholder Description	WF (Wiper) 	WE (Wiper) 	PP 	PQ 	CQ 	CJ 	GS 	PG 	PS 	PT 	Standard 
...-PWLN$^{R}_{L}$08 -...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..
...-WWLN$^{R}_{L}$08 -...											
Applications	Soft Steel / Finishing	Soft Steel / Medium	Soft Steel / Roughing	Stainless Steel / Finishing	Stainless Steel / Medium-Roughing	Stainless Steel / Medium-Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron
See Page	B48	B48	B48	B48	B48	B48	B49	B49	B49	B49	B49
Insert / Toolholder Description	XP 	XQ 	XS 	MQ 	MS 	MU 	C(GC) 	KQ 	KG 	KH 	ZS 
...-PWLN$^{R}_{L}$08 -...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..
...-WWLN$^{R}_{L}$08 -...											

Applications	Non-ferrous Metals	Non-ferrous Metals	Heat-resistant Alloys	Hard Materials
See Page	B49	C23	B48	C13
Insert / Toolholder Description	AH 	PCD 	SG 	CBN
...-PWLN$^{R}_{L}$08 -...	WNGG0804..	WNMM0804..	WNMG0804..	WNGA0804..
...-WWLN$^{R}_{L}$08 -...				

Recommended Cutting Conditions F92~F93

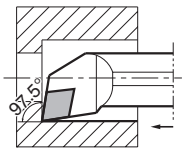
● : Std. Item

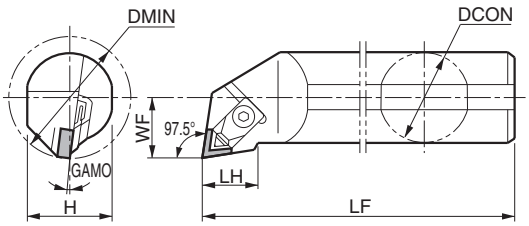
· In wedge lock, use of ceramic insert other than silicon nitride insert is not recommended due to strong restrain force.

Boring Bars for Ceramic Tools [EN□□, SN□□ Insert]

S-CELN (Boring / Internal Facing)

Max. Overhang Length L/D=~3





● Right-hand shown

Applicable Inserts

Cast Iron / Hard Materials
B107
Ceramic

ENGN1307..

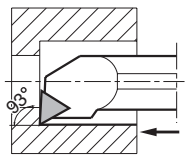
Toolholder Dimensions

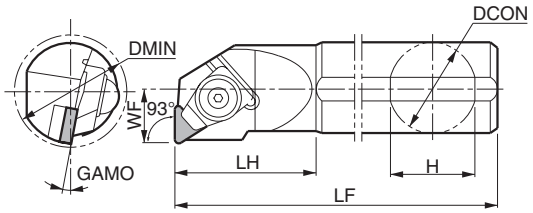
Recommended Cutting Conditions F92~F93

Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts				
	R	L	DMIN	DCON	H	LF	LH	WF			Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
															
S40T-CELNR13-50	●		50	40	37	300	32	27	12°	0.8	CB-16	CE-010	LW-4	SP-341P	M3X8

Boring Bars for CBN Tools [TNMN Insert]

S-CTUN-A (Boring)





● Right-hand shown

Applicable Inserts

Hard Materials / Cast Iron	Cast Iron / Hard Materials
C19	B111
CBN(KBN900)	Ceramic
	
TNMN1103..	TNGN1103..

Recommended Cutting Conditions F92~F93

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)					GAMO	Std. Corner-R(RE)	Spare Parts			
	R	L	DMIN	DCON	H	LF	LH	WF			Clamp Set	Wrench	Shim	Shim Screw
														
S25X-CTUNR11-30A	●		30	25	24	220	40	15	10°	0.8	CE-360S	LW-4	SP-210A	BH3X6

● : Std. Item

EZH Sleeves

Sleeve Description				Applicable Inserts				Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length with coolant hole)	EZH-HP (Adjustable overhang length)	EZH-ST	Sleeve Shank Dia. DCON (mm)	EZB	EZBT/EZBF EZVB/EZG EZFG/EZT	EZ Bar PLUS	Shank Dia. DCON (mm)	
-	-	EZH 01712ST-80	12	EZB_ ...017...	-	-	1.7	(General purpose)
		02012ST-80		EZB_ ...020...			2	
		02512ST-80		EZB_ ...025...	EZ_ _ ...025-...		2.5	
		03012ST-80		EZB_ ...030...	EZ_ _ ...030-...		3	
		03512ST-80		EZB_ ...035...	EZ_ _ ...035-...		3.5	
		04012ST-80		EZB_ ...040...	EZ_ _ ...040-...		4	
		05012ST-80		EZB_ ...050...	EZ_ _ ...050-...		5	
		06012ST-80		EZB_ ...060...	EZ_ _ ...060-...		6	
		07012ST-80		EZB_ ...070...	EZ_ _ ...070-...		7	
-	EZH 01716HP-100	EZH 01716ST-100	16	EZB_ ...017...	-	-	1.7	(General purpose)
	02016HP-100	02016ST-100		EZB_ ...020...			2	
	02516HP-100	02516ST-100		EZB_ ...025...	EZ_ _ ...025-...		2.5	
	03016HP-100	03016ST-100		EZB_ ...030...	EZ_ _ ...030-...		3	
	03516HP-100	03516ST-100		EZB_ ...035...	EZ_ _ ...035-...		3.5	
	04016HP-100	04016ST-100		EZB_ ...040...	EZ_ _ ...040-...		4	
	04516HP-100	-		EZB_ ...045...	-	_045X- ...-050EZP	4.5	
	05016HP-100	05016ST-100		EZB_ ...050...	EZ_ _ ...050-...	_050X- ...-060EZP	5	
	06016HP-100	06016ST-100		EZB_ ...060...	EZ_ _ ...060-...	_060X- ...-070EZP	6	
	07016HP-100	07016ST-100		EZB_ ...070...	EZ_ _ ...070-...	_070X- ...-080EZP	7	
	-	08016ST-100		EZB_ ...080...	-	_080X- ...-100EZP	8	
EZH 01719CT-120	EZH 01719HP-120	EZH 01719ST-120	19.05	EZB_ ...017...	-	-	1.7	Citizen Machinery
02019CT-120	02019HP-120	02019ST-120		EZB_ ...020...			2	
02519CT-120	02519HP-120	02519ST-120		EZB_ ...025...	EZ_ _ ...025-...		2.5	
03019CT-120	03019HP-120	03019ST-120		EZB_ ...030...	EZ_ _ ...030-...		3	
03519CT-120	03519HP-120	03519ST-120		EZB_ ...035...	EZ_ _ ...035-...		3.5	
04019CT-120	04019HP-120	04019ST-120		EZB_ ...040...	EZ_ _ ...040-...		4	
04519CT-120	04519HP-120	-		EZB_ ...045...	-	_045X- ...-050EZP	4.5	
05019CT-120	05019HP-120	05019ST-120		EZB_ ...050...	EZ_ _ ...050-...	_050X- ...-060EZP	5	
06019CT-120	06019HP-120	06019ST-120		EZB_ ...060...	EZ_ _ ...060-...	_060X- ...-070EZP	6	
07019CT-120	07019HP-120	07019ST-120		EZB_ ...070...	EZ_ _ ...070-...	_070X- ...-080EZP	7	
08019CT-120	08019HP-120	08019ST-120		EZB_ ...080...	-	_080X- ...-100EZP	8	
EZH 01720CT-120	EZH 01720HP-120	EZH 01720ST-120	20	EZB_ ...017...	-	-	1.7	Eguro Tsugami Citizen Machinery (General purpose)
02020CT-120	02020HP-120	02020ST-120		EZB_ ...020...			2	
02520CT-120	02520HP-120	02520ST-120		EZB_ ...025...	EZ_ _ ...025-...		2.5	
03020CT-120	03020HP-120	03020ST-120		EZB_ ...030...	EZ_ _ ...030-...		3	
03520CT-120	03520HP-120	03520ST-120		EZB_ ...035...	EZ_ _ ...035-...		3.5	
04020CT-120	04020HP-120	04020ST-120		EZB_ ...040...	EZ_ _ ...040-...		4	
04520CT-120	04520HP-120	-		EZB_ ...045...	-	_045X- ...-050EZP	4.5	
05020CT-120	05020HP-120	05020ST-120		EZB_ ...050...	EZ_ _ ...050-...	_050X- ...-060EZP	5	
06020CT-120	06020HP-120	06020ST-120		EZB_ ...060...	EZ_ _ ...060-...	_060X- ...-070EZP	6	
07020CT-120	07020HP-120	07020ST-120		EZB_ ...070...	EZ_ _ ...070-...	_070X- ...-080EZP	7	
08020CT-120	08020HP-120	08020ST-120		EZB_ ...080...	-	_080X- ...-100EZP	8	
EZH 01722CT-135	EZH 01722HP-135	EZH 01722ST-135	22	EZB_ ...017...	-	-	1.7	Star Micronics Nomura DS Tsugami
02022CT-135	02022HP-135	02022ST-135		EZB_ ...020...			2	
02522CT-135	02522HP-135	02522ST-135		EZB_ ...025...	EZ_ _ ...025-...		2.5	
03022CT-135	03022HP-135	03022ST-135		EZB_ ...030...	EZ_ _ ...030-...		3	
03522CT-135	03522HP-135	03522ST-135		EZB_ ...035...	EZ_ _ ...035-...		3.5	
04022CT-135	04022HP-135	04022ST-135		EZB_ ...040...	EZ_ _ ...040-...		4	
04522CT-135	04522HP-135	-		EZB_ ...045...	-	_045X- ...-050EZP	4.5	
05022CT-135	05022HP-135	05022ST-135		EZB_ ...050...	EZ_ _ ...050-...	_050X- ...-060EZP	5	
06022CT-135	06022HP-135	06022ST-135		EZB_ ...060...	EZ_ _ ...060-...	_060X- ...-070EZP	6	
07022CT-135	07022HP-135	07022ST-135		EZB_ ...070...	EZ_ _ ...070-...	_070X- ...-080EZP	7	
08022CT-135	08022HP-135	08022ST-135		EZB_ ...080...	-	_080X- ...-100EZP	8	
EZH 01725.0CT-135	EZH 01725.0HP-135	EZH 01725.0ST-135	25	EZB_ ...017...	-	-	1.7	Eguro Tsugami Citizen Machinery (General purpose)
02025.0CT-135	02025.0HP-135	02025.0ST-135		EZB_ ...020...			2	
02525.0CT-135	02525.0HP-135	02525.0ST-135		EZB_ ...025...	EZ_ _ ...025-...		2.5	
03025.0CT-135	03025.0HP-135	03025.0ST-135		EZB_ ...030...	EZ_ _ ...030-...		3	
03525.0CT-135	03525.0HP-135	03525.0ST-135		EZB_ ...035...	EZ_ _ ...035-...		3.5	
04025.0CT-135	04025.0HP-135	04025.0ST-135		EZB_ ...040...	EZ_ _ ...040-...		4	
04525.0CT-135	04525.0HP-135	-		EZB_ ...045...	-	_045X- ...-050EZP	4.5	
05025.0CT-135	05025.0HP-135	05025.0ST-135		EZB_ ...050...	EZ_ _ ...050-...	_050X- ...-060EZP	5	
06025.0CT-135	06025.0HP-135	06025.0ST-135		EZB_ ...060...	EZ_ _ ...060-...	_060X- ...-070EZP	6	
07025.0CT-135	07025.0HP-135	07025.0ST-135		EZB_ ...070...	EZ_ _ ...070-...	_070X- ...-080EZP	7	
08025.0CT-135	08025.0HP-135	08025.0ST-135		EZB_ ...080...	-	_080X- ...-100EZP	8	
EZH 01725.4CT-120	EZH 01725.4HP-120	EZH 01725.4ST-120	25.4	EZB_ ...017...	-	-	1.7	Citizen Machinery
02025.4CT-120	02025.4HP-120	02025.4ST-120		EZB_ ...020...			2	
02525.4CT-120	02525.4HP-120	02525.4ST-120		EZB_ ...025...	EZ_ _ ...025-...		2.5	
03025.4CT-120	03025.4HP-120	03025.4ST-120		EZB_ ...030...	EZ_ _ ...030-...		3	
03525.4CT-120	03525.4HP-120	03525.4ST-120		EZB_ ...035...	EZ_ _ ...035-...		3.5	
04025.4CT-120	04025.4HP-120	04025.4ST-120		EZB_ ...040...	EZ_ _ ...040-...		4	
04525.4CT-120	04525.4HP-120	-		EZB_ ...045...	-	_045X- ...-050EZP	4.5	
05025.4CT-120	05025.4HP-120	05025.4ST-120		EZB_ ...050...	EZ_ _ ...050-...	_050X- ...-060EZP	5	
06025.4CT-120	06025.4HP-120	06025.4ST-120		EZB_ ...060...	EZ_ _ ...060-...	_060X- ...-070EZP	6	
07025.4CT-120	07025.4HP-120	07025.4ST-120		EZB_ ...070...	EZ_ _ ...070-...	_070X- ...-080EZP	7	
08025.4CT-120	08025.4HP-120	08025.4ST-120		EZB_ ...080...	-	_080X- ...-100EZP	8	

· Choose sleeves (DCB) to meet with DCON dimension of bar.
· Adjustment Pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT / HP sleeves.
· Machine manufacturers in random order.

EZH Sleeves and Applicable Inserts / Toolholders

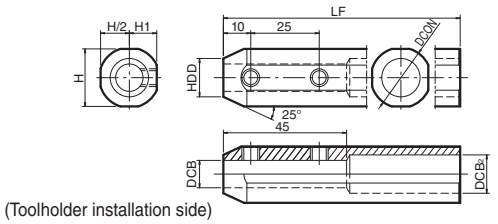
Shank Size (Hole Dia.: mm)		017 (1.7mm)	020 (2mm)	025 (2.5mm)	03 (3mm)	035 (3.5mm)
EZH-CT sleeve (Internal coolant) EZH-HP sleeve description (Adjustable overhang length)		EZH 01716HP-100	EZH 02016HP-100	EZH 02516HP-100	EZH 03016HP-100	EZH 03516HP-100
		01719CT/HP-120	02019CT/HP-120	02519CT/HP-120	03019CT/HP-120	03519CT/HP-120
		01720CT/HP-120	02020CT/HP-120	02520CT/HP-120	03020CT/HP-120	03520CT/HP-120
		01722CT/HP-135	02022CT/HP-135	02522CT/HP-135	03022CT/HP-135	03522CT/HP-135
		01725.0CT/HP-135	02025.0CT/HP-135	02525.0CT/HP-135	03025.0CT/HP-135	03525.0CT/HP-135
		01725.4CT/HP-120	02025.4CT/HP-120	02525.4CT/HP-120	03025.4CT/HP-120	03525.4CT/HP-120
EZH-ST sleeve description		EZH 01712ST-80	EZH 02012ST-80	EZH 02512ST-80	EZH 03012ST-80	EZH 03512ST-80
		01716ST-100	02016ST-100	02516ST-100	03016ST-100	03516ST-100
		01719ST-120	02019ST-120	02519ST-120	03019ST-120	03519ST-120
		01720ST-120	02020ST-120	02520ST-120	03020ST-120	03520ST-120
		01722ST-135	02022ST-135	02522ST-135	03022ST-135	03522ST-135
		01725.0ST-135	02025.0ST-135	02525.0ST-135	03025.0ST-135	03525.0ST-135
		01725.4ST-120	02025.4ST-120	02525.4ST-120	03025.4ST-120	03525.4ST-120
EZ Bars			EZB R/L 020020HP-	EZB R/L 025025HP-	EZB R/L 030030HP-	EZB R/L 035035HP-
	Boring	EZBR 020017ST-	EZBR 025020ST-	EZBR 030025ST-	EZBR 035030ST-	EZBR 040035ST-
		EZBR 020017-...NB	EZBR 025020-...NB	EZBR 030025-...NB	EZBR ...030-...NB	EZBR 040035-...NB
					EZBFR 030030-008	
					EZVBR 035030-	
	Internal Grooving				EZGR 030030-	
	Face Grooving					
	Internal Threading			EZTR 030025-	EZTR 035030-	EZTR 040035-
EZ Bar PLUS						

Shank Size (Hole Dia.: mm)		04 (4mm)	045 (4.5mm)	05 (5mm)	06 (6mm)	07 (7mm)	08 (8mm)
EZH-CT sleeve (Internal coolant) EZH-HP sleeve description (Adjustable overhang length)		EZH 04016HP-100	EZH 04516HP-100	EZH 05016HP-100	EZH 06016HP-100	EZH 07016HP-100	
		04019CT/HP-120	04519CT/HP-120	05019CT/HP-120	06019CT/HP-120	07019CT/HP-120	EZH 08019CT/HP-120
		04020CT/HP-120	04520CT/HP-120	05020CT/HP-120	06020CT/HP-120	07020CT/HP-120	08020CT/HP120
		04022CT/HP-135	04522CT/HP-135	05022CT/HP-135	06022CT/HP-135	07022CT/HP-135	08022CT/HP-135
		04025.0CT/HP-135	04525.0CT/HP-135	05025.0CT/HP-135	06025.0CT/HP-135	07025.0CT/HP-135	08025.0CT/HP-135
		04025.4CT/HP-120	04525.4CT/HP-120	05025.4CT/HP-120	06025.4CT/HP-120	07025.4CT/HP-120	08025.4CT/HP-120
EZH-ST sleeve description		EZH 04012ST-80		EZH 05012ST-80	EZH 06012ST-80	EZH 07012ST-80	
		04016ST-100		05016ST-100	06016ST-100	07016ST-100	EZH 08016ST-100
		04019ST-120		05019ST-120	06019ST-120	07019ST-120	08019ST-120
		04020ST-120		05020ST-120	06020ST-120	07020ST-120	08020ST-120
		04022ST-135		05022ST-135	06022ST-135	07022ST-135	08022ST-135
		04025.0ST-135		05025.0ST-135	06025.0ST-135	07025.0ST-135	08025.0ST-135
		04025.4ST-120		05025.4ST-120	06025.4ST-120	07025.4ST-120	08025.4ST-120
EZ Bars		EZB R/L 040040HP-	EZB R/L 045045HP-	EZB R/L 050050HP-	EZB R/L 060060HP-	EZB R/L 070070HP-	EZB R/L 080080HP-
	Boring	EZBR 045040ST-		EZBR 055050ST-	EZBR 065060ST-	EZBR 075070ST-	
		EZBR ...040-...NB		EZBR ...050-...NB	EZBR ...060-...NB	EZBR ...070-...NB	
		EZBFR 040040-008		EZBFR 050050-015	EZBFR 060060-015		
		EZVBR 045040-		EZVBR 055050-	EZVBR 065060-		
		EZBTR 040040-		EZBTR 050050-			
	Internal Grooving	EZG R/L 040040-		EZG R/L 050050-	EZG R/L 060060-	EZG R/L ...070-...	
	Face Grooving	EZFG R/L 050040-		EZFG R/L 060050-		EZFG R/L 080070-	
	Internal Threading	EZTR 050040-		EZTR 060050-	EZTR 070060-	EZTR 080070-	
EZ Bar PLUS			S/C045X-SCLCR03-050EZP	S/C050X-SCLCR03-060EZP	S/C060X-SCLCR04-070EZP	S/C070X-SCLCR04-080EZP	S/C080X-SCLCR06-100EZP
						S/C070X-STLBR06-080EZP	S/C080X-STLPR09-100EZP
				S/C050X-SWUBR06-060EZP	S/C060X-SWUBR06-070EZP	S/C070X-SWUBR08-080EZP	
Boring Bars		C04-....		C05-....	C06-....	C07-....	C/E08-....
					S06-....		A/S08-....

Note 1) When attaching 2-Edge Tip-Bars to EZH-CT/HP Sleeve (Adjustable overhang length), detach Adjustable Pin.
Overhang length of bar is not adjustable.

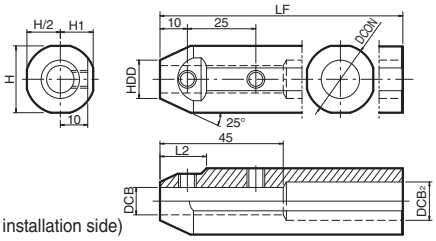
Sleeves for Boring Bars

SHA sleeves (Applicable Toolholders F86)



(Toolholder installation side)

Fig. 1



(Toolholder installation side)

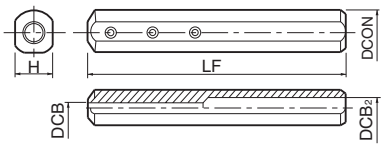
Fig. 2

Description		Stock	Dimension (mm)								Drawing	Spare Parts		Applicable Machine Manufacturer
			DCB	DCON	HDD	DCB_2	H	H1	LF	L2		Screw	Wrench	
SHA	**0820-120**	●	8	20	14	12	19	9.25	120	-	Fig. 1	HS6X4P	LW-3	Eguro Tsugami Citizen Machinery
	1020-120	●	10											
SHA	**0825.0-135**	●	8	25	14	14	24	11.5	135	17	Fig. 2			
	1025.0-135	●	10											
	1225.0-135	●	12		16									
SHA	**0819-120**	●	8	19.05	14	12	18	8.75	120	-	Fig. 1	HS6X4P	LW-3	Citizen Machinery
	1019-120	●	10											
SHA	**0820-120**	●	8	20	14	12	19	9.25	120	-	Fig. 1			
	1020-120	●	10											
SHA	**0825.4-120**	●	8	25.4	14	14	24.4	12	120	17	Fig. 2			
	1025.4-120	●	10											
	1225.4-120	●	12		16									
SHA	**0822-125**	●	8	22	14	14	21	10	125	-	Fig. 1	HS6X4P	LW-3	Star Micronics Nomura DS
	1022-125	●	10											
	1222-125	●	12		16									
SHA	**0823-120**	●	8	23	14	14	22	10.5	120	16	Fig. 2	HS6X4P	LW-3	Nomura DS
	1023-120	●	10											
	1223-120	●	12		16									

* Length of DCB···45mm (All of SHA sleeves)
· Choose sleeves (DCB) to meet with DCON dimension of toolholder.
· Machine manufacturers in random order.

● : Std. Item

Sleeves for Boring Bars

Shape	Description		Stock	Dimension (mm) DCON	DCB	DCB_2	H	LF	Spare Parts Screw	Spare Parts Wrench
 (Toolholder installation side)	SH	0416-100	●	16	4	5	14	100	HS4X4	LW-2
		0516-100	●		5	6				
		0616-100	●		6	7				
		0716-100	●		7	8				
	SH	0820-120	●	20	8	9	18	120	HS4X4	LW-2
		1020-120	●		10	11				
		1225-150	●	25	12	13	23	150	HS5X5	LW-2.5
		1632-180	●	32	16	18	30	180		
		2032-180	●		20	22				

Coolant Sleeve Dimensions

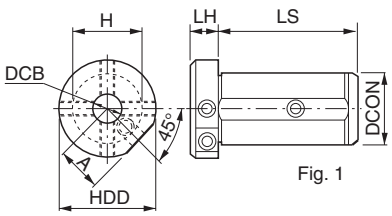


Fig. 1

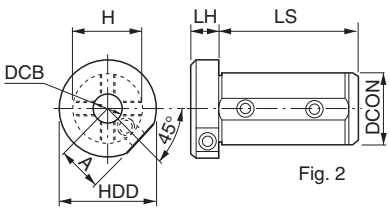


Fig. 2

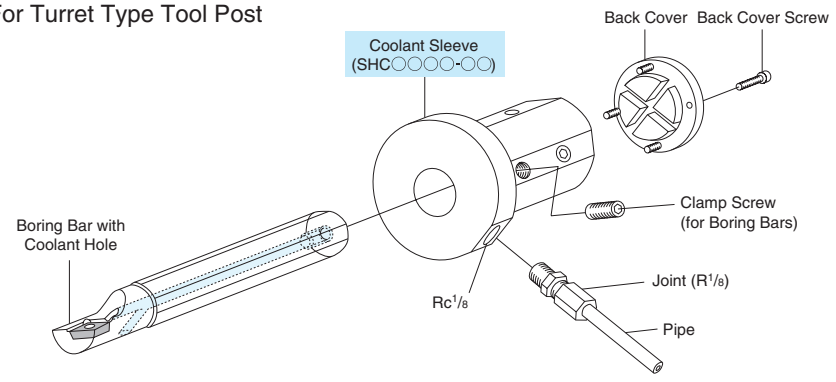
Accessories
- Back Cover / SHL-4···SHC○○40-70
  SHL-5···SHC○○50-95
- Back Cover Screw
- Shank Clamp Screw

(Note) To stabilize the toolholder and to prevent coolant leaks, tighten all 4 screws of coolant sleeve securely.

Description			Stock	Dimension (mm) DCON	HDD	DCB	LS	LH	H	A	Drawing	Spare Parts Front Screw	Wrench	Back Screw	Wrench	Back Cover	Back Cover Screw	Wrench
SHC	0840-70		●	40	56	8	70	16	38	27	Fig. 1	HS6X22	LW-3	HS6X14	LW-3	SHL-4	HH3X6	LW-2.5
	1040-70		●			10												
	1240-70		●			12					Fig. 2	HS10X10	LW-5	HS10X10	LW-5			
	1640-70		●			16												
	2040-70		●			20					Fig. 1	HS10X10	LW-5	HS6X6	LW-3			
	2540-70		●			25												
SHC	0850-95		●	50	65	8	95	16	47	30.5	Fig. 1	HS6X22	LW-3	HS6X14	LW-3	SHL-5	HH3X12	LW-2.5
	1050-95		●			10												
	1250-95		●			12					Fig. 2	HS10X10	LW-5	HS10X10	LW-5			
	1650-95		●			16												
	2050-95		●			20												
	2550-95		●			25												

How to Install

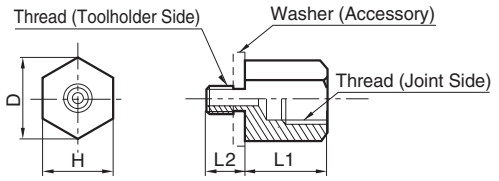
(1) For Turret Type Tool Post



● : Std. Item

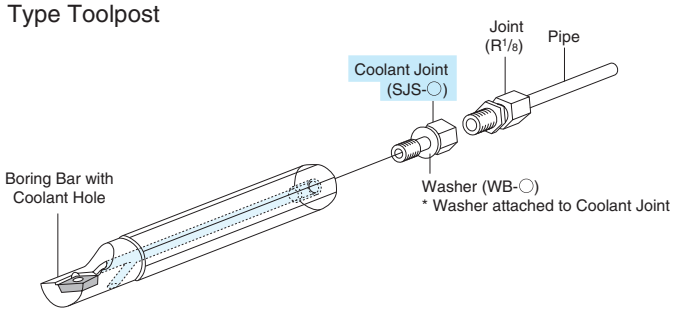
Sleeves for Boring Bars

Coolant Joint Dimensions *This Coolant Joint is not applicable for Dynamic Bar



Description	Stock	Dimension (mm) D	L1	L2	H	Thread (Toolholder Side)	Thread (Joint Side)	Spare Parts Washer
SJS-5	●	15	15	7	13	**M5XP0.8**	**Rc1/8 (PT1/8)**	WB-5
SJS-6	●			9		**M6XP1.0**		WB-6
SJS-8	●			13		**M8XP1.25**		WB-8

(2) For Gang Type Toolpost



List of toolholders and applicable joints

Toolholder Description	Applicable Coolant Joint
A08-...-○○E	SJS-5
A10-...-○○E	
A12-...-○○E	SJS-6
A16-...-○○E	SJS-8
A20-...-○○E	
A25-...-○○E	
E08-...-○○	SJS-5
E10-...-○○	
E12-...-○○	SJS-6
E16-...-○○	SJS-8
E20-...-○○	

*This Coolant Joint is not applicable for Dynamic Bar

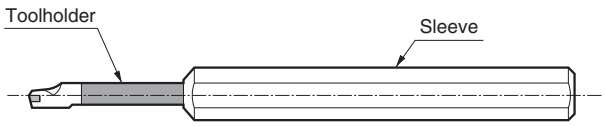
SHA / SH / SHC Sleeves and Applicable Toolholders

Shank Size (Hole Dia.: mm)	04 (4mm)	05 (5mm)	06 (6mm)	07 (7mm)	08 (8mm)	10 (10mm)	12 (12mm)	16 (16mm)	20 (20mm)	25 (25mm)
Sleeve Description	SH0416-100	SH0516-100	SH0616-100	SH0716-100	SH0820-120	SH1020-120	SH1225-150	SH1632-180	SH2032-180	
					SHA0819-120	SHA1019-120				
					SHA0820-120	SHA1020-120				
					SHA0822-125	SHA1022-125	SHA1222-125			
					SHA0823-120	SHA1023-120	SHA1223-120			
					SHA0825.0-135	SHA1025.0-135	SHA1225.0-135			
					SHA0825.4-120	SHA1025.4-120	SHA1225.4-120			
					SHC0840-70	SHC1040-70	SHC1240-70	SHC1640-70	SHC2040-70	SHC2540-70
					SHC0850-95	SHC1050-95	SHC1250-95	SHC1650-95	SHC2050-95	SHC2550-95
Boring Bar Description					A08.-...	A10.-...	A12.-...	A16.-...	A20.-...	A25.-...
	C04.-...	C05.-...	C06.-...	C07.-...	C08.-...	C10.-...	C12.-...	C16.-...	C20.-...	C25.-...
					E08.-...	E10.-...	E12.-...	E16.-...	E20.-...	E25.-...
			S06.-...		S08.-...	S10.-...	S12.-...	S16.-...	S20.-...	S25.-...
Internal Grooving Toolholder Description			SIGC□/L0806-WH		SIGC□/L1008-WH-L85	SIGCR1210-WH-L95	SIGC□/L0812-EH	SIGC□/L1016-EH		
					SIGCR1008-WH-L100	SIGC□/L1210-WH-L110		SIGC□/L1216-EH		
					SIGE□/L0808A-EH	SIGE□/L1010B-EH	SIGE□/L1412C-EH	SIGE□/L1616C-EH	SIGE□/L2020D-EH	SIGE□/L2525E-EH
						SIGE□/L1210B-EH	SIGE□/L1612C-EH			KIGBA□/L3525-16
					SIGE□/L0808A-WH	SIGE□/L1010B-WH	SIGE□/L1412C-WH	KGDI□/L...16B-	KGDI□/L2520B-	KGDI□/L3225B-
						SIGE□/L1210B-WH	SIGE□/L1612C-WH			
					SIGER1008B-WH-90	SIGER1210B-WH-90	SIGER1412C-WH-90			
							GIV□/L1412-1SE	GIV□/L1216-1SS	GIV□/L1420-1S	GIV□/L2025-1B
							GIV□/L1612-1AE	GIV□/L2016-1BE	GIV□/L1620-1A	GIV□/L2025-2B
								GIV□/L2016-2BE	GIV□/L2520-1CE	GIV□/L3225-1CE
								GIV□/L1616-1AW	GIV□/L2720-2CE	GIV□/L3225-2CE
									GIV□/L2020-1BW	GIV□/L2525-1CW
									GIV□/L2020-2BW	GIV□/L2525-2CW
Internal Threading Toolholder Description							SINR0612S-06E	SINR0816S-08E	SIN□/L2420S-16	CIN□/L3025S-16
								SIN□/L1216S-11E	SINR2420S-22	CINR3025S-22
								SIN□/L1516S-11		
								SIN□/L1616S-16		
								SIN□/L2016S-16		

* For SHA sleeves, please see page **F84**. For SH / SHC sleeves, please see page **F85**.

● : Std. Item

C...-AS (Assembly List)

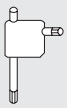
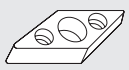
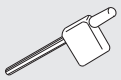


Assembly configuration

Assembly (Discontinued Description)	Toolholder (Discontinued Description)	Alternative Toolholder (Dynamic Bar)	Sleeve Description	Remarks
C04G- SCLCR03-05-AS	C04G- SCLCR03-05	C04G- SCLCR03-05AN	SH0416-100	-
SCLCL03-05-AS	SCLCL03-05	SCLCL03-05AN		
C05H- SCLCR03-06-AS	C05H- SCLCR03-06	C05H- SCLCR03-06AN	SH0516-100	
SCLCL03-06-AS	SCLCL03-06	SCLCL03-06AN		
C05H- SWUBR06-06-AS	C05H- SWUBR06-06	C05H- SWUBR06-06AN	SH0516-100	
SWUBL06-06-AS	SWUBL06-06	SWUBL06-06AN		
C06J- SCLCR04-07-AS	C06J- SCLCR04-07	C06J- SCLCR04-07AN	SH0616-100	
SCLCL04-07-AS	SCLCL04-07	SCLCL04-07AN		
C06J- SWUBR06-07-AS	C06J- SWUBR06-07	C06J- SWUBR06-07AN	SH0616-100	
SWUBL06-07-AS	SWUBL06-07	SWUBL06-07AN		
C07K- SCLCR04-08-AS	C07K- SCLCR04-08	C07K- SCLCR04-08AN	SH0716-100	
SCLCL04-08-AS	SCLCL04-08	SCLCL04-08AN		
C07K- SWUBR08-08-AS	C07K- SWUBR08-08	C07K- SWUBR08-08AN	SH0716-100	
SWUBL08-08-AS	SWUBL08-08	SWUBL08-08AN		
C08L- STUPR08-10-AS	C08L- STUPR08-10	E08L- STLPR08-10AN	SH0820-120	Difference of alternative toolholder No coolant hole → With coolant hole Front cutting edge angle 3° → 5°
C10N- STUPR09-12-AS	C10N- STUPR09-12	E10N- STLPR09-12AN	SH1020-120	
C10N- STUPR11-12-AS	C10N- STUPR11-12	E10N- STLPR11-12AN		
C12Q- STUPR09-16-AS	C12Q- STUPR09-16	E12Q- STLPR09-16A	SH1225-150	
C12Q- STUPR11-14-AS	C12Q- STUPR11-14	E12Q- STLPR11-14A		
C12Q- STUPR11-16-AS	C12Q- STUPR11-16			
C16X- STUPR11-18-AS	C16X- STUPR11-18	E16X- STLPR11-18A	SH1632-180	
C16X- STUPR11-20-AS	C16X- STUPR11-20			
C20S- STUPR11-25-AS	C20S- STUPR11-25	E20S- STLPR11-22A	SH2032-180	
C20S- STUPR16-25-AS	C20S- STUPR16-25	E20S- STLPR16-25A		

* **"AS"** indicates an assembly of toolholder and sleeve.
You can purchase the toolholder and sleeve and assemble them to make the corresponding assembly part.

Former Parts List (Boring Bar)

Description (Previous Description)	Spare Parts				
	Clamp Screw	Wrench	Shim	Shim Screw	Wrench
					
S32S-SVJB$^{R}_{L}$16-40E **S40T-SVJB$^{R}_{L}$16-50E**	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S25X-SVPB$^{R}_{L}$16-34E **S32S-SVPB$^{R}_{L}$16-40E**					
S25X-SVUB$^{R}_{L}$16-34E **S32S-SVUB$^{R}_{L}$16-40E**					
S25X-SVZB$^{R}_{L}$16-34E **S32S-SVZB$^{R}_{L}$16-40E**					

- S32S-SVJB$^{R}_{L}$16-40E and S40T-SVJB$^{R}_{L}$16-50E have been shifted to A32S-SVJB$^{R}_{L}$16-40AE and A40T-SVJB$^{R}_{L}$16-50AE respectively. See Page F54
- S25X-SVPB$^{R}_{L}$16-34E and S32S-SVPB$^{R}_{L}$16-40E have been shifted to A25S-SVPB$^{R}_{L}$16-31AE and A32S-SVPB$^{R}_{L}$16-40AE respectively. See Page F56
- S25X-SVUB$^{R}_{L}$16-34E and S32S-SVUB$^{R}_{L}$16-40E have been shifted to A25S-SVUB$^{R}_{L}$16-34AE and A32S-SVUB$^{R}_{L}$16-40AE respectively. See Page F59
- S25X-SVZB$^{R}_{L}$16-34E and S32S-SVZB$^{R}_{L}$16-40E have been shifted to A25S-SVZB$^{R}_{L}$16-34AE and A32S-SVZB$^{R}_{L}$16-40AE respectively. See Page F59

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	See Page	Coolant Hole	Description	See Page
Excellent Bar	CC..	No	S08X-SCLC$^{R}_{L}$06-10E	Yes	A08X-SCLC$^{R}_{L}$06-10AE	F41	No	S08X-SCLC$^{R}_{L}$06-10A	F41
			S10H-SCLC$^{R}_{L}$03-05E	No	S10H-SCLC$^{R}_{L}$03-05AE		-	-	-
			S10H-SCLC$^{R}_{L}$03-06E		S10H-SCLC$^{R}_{L}$03-06AE				
			S10J-SCLC$^{R}_{L}$04-07E		S10H-SCLC$^{R}_{L}$04-07AE				
			S10J-SCLC$^{R}_{L}$04-08E		S10H-SCLC$^{R}_{L}$04-08AE				
		Yes	A08H-SCLC$^{R}_{L}$06-10E	Yes	A08X-SCLC$^{R}_{L}$06-10AE		No	S08X-SCLC$^{R}_{L}$06-10A	F41
	CP..	No	S10M-SCLP$^{R}_{L}$08-12E	Yes	A10L-SCLP$^{R}_{L}$08-12AE	F43	No	S10L-SCLP$^{R}_{L}$08-12A	F43
			S12M-SCLP$^{R}_{L}$08-14E		A12M-SCLP$^{R}_{L}$08-14AE			S12M-SCLP$^{R}_{L}$08-14A	
			S12M-SCLP$^{R}_{L}$09-16E		A12M-SCLP$^{R}_{L}$09-16AE			S12M-SCLP$^{R}_{L}$09-16A	
			S16Q-SCLP$^{R}_{L}$09-18E		A16Q-SCLP$^{R}_{L}$09-18AE			S16Q-SCLP$^{R}_{L}$09-18A	
			S16R-SCLP$^{R}_{L}$09-20E						
			S20X-SCLP$^{R}_{L}$09-25E		A20R-SCLP$^{R}_{L}$09-22AE			S20R-SCLP$^{R}_{L}$09-22A	
		Yes	A10X-SCLP$^{R}_{L}$08-12E	Yes	A10L-SCLP$^{R}_{L}$08-12AE	F43	No	S10L-SCLP$^{R}_{L}$08-12A	F43
			A12X-SCLP$^{R}_{L}$08-14E		A12M-SCLP$^{R}_{L}$08-14AE			S12M-SCLP$^{R}_{L}$08-14A	
			A12X-SCLP$^{R}_{L}$09-16E		A12M-SCLP$^{R}_{L}$09-16AE			S12M-SCLP$^{R}_{L}$09-16A	
			A16M-SCLP$^{R}_{L}$09-18E		A16Q-SCLP$^{R}_{L}$09-18AE			S16Q-SCLP$^{R}_{L}$09-18A	
			A16M-SCLP$^{R}_{L}$09-20E						
			A20Q-SCLP$^{R}_{L}$09-25E		A20R-SCLP$^{R}_{L}$09-22AE			S20R-SCLP$^{R}_{L}$09-22A	
	DC..	No	S10M-SDUC$^{R}_{L}$07-14E	Yes	A10L-SDUC$^{R}_{L}$07-14AE	F45	No	S10L-SDUC$^{R}_{L}$07-14A	F45
			S12M-SDUC$^{R}_{L}$07-16E		A12M-SDUC$^{R}_{L}$07-16AE			S12M-SDUC$^{R}_{L}$07-16A	
			S16Q-SDUC$^{R}_{L}$07-20E		A16Q-SDUC$^{R}_{L}$07-20AE			S16Q-SDUC$^{R}_{L}$07-20A	
			S16Q-SDUC$^{R}_{L}$11-25E		A16Q-SDUC$^{R}_{L}$11-23AE			S16Q-SDUC$^{R}_{L}$11-23A	
			S20Q-SDUC$^{R}_{L}$11-32E		A20R-SDUC$^{R}_{L}$11-27AE			S20R-SDUC$^{R}_{L}$11-27A	
		No	S10M-SDZC$^{R}_{L}$07-14E	Yes	A10L-SDZC$^{R}_{L}$07-14AE	F47	No	S10L-SDZC$^{R}_{L}$07-14A	F47
			S12M-SDZC$^{R}_{L}$07-16E		A12M-SDZC$^{R}_{L}$07-16AE			S12M-SDZC$^{R}_{L}$07-16A	
			S16Q-SDZC$^{R}_{L}$07-20E		A16Q-SDZC$^{R}_{L}$07-20AE			S16Q-SDZC$^{R}_{L}$07-20A	
			S16Q-SDZC$^{R}_{L}$11-25E		A16Q-SDZC$^{R}_{L}$11-23AE			S16Q-SDZC$^{R}_{L}$11-23A	
			S20Q-SDZC$^{R}_{L}$11-32E		A20R-SDZC$^{R}_{L}$11-27AE			S20R-SDZC$^{R}_{L}$11-27A	
	TB..	No	S06H-STUB$^{R}_{L}$06-08E	No	S06H-STLB$^{R}_{L}$06-08AE	F51	No	S06H-STLB$^{R}_{L}$06-08A	F51
	TP..	No	S08K-STUP$^{R}_{L}$08-10E	Yes	A08X-STLP$^{R}_{L}$08-10AE	F51	No	S08X-STLP$^{R}_{L}$08-10A	F51
			S10M-STUP$^{R}_{L}$09-12E		A10L-STLP$^{R}_{L}$09-12AE			S10L-STLP$^{R}_{L}$09-12A	
			S10M-STUP$^{R}_{L}$11-12E		A10L-STLP$^{R}_{L}$11-12AE			S10L-STLP$^{R}_{L}$11-12A	
			S12M-STUP$^{R}_{L}$09-16E		A12M-STLP$^{R}_{L}$09-16AE			S12M-STLP$^{R}_{L}$09-16A	
			S12M-STUP$^{R}_{L}$11-14E		A12M-STLP$^{R}_{L}$11-14AE			S12M-STLP$^{R}_{L}$11-14A	
			S12M-STUP$^{R}_{L}$11-16E						
			S16R-STUP$^{R}_{L}$11-18E		A16Q-STLP$^{R}_{L}$11-18AE			S16Q-STLP$^{R}_{L}$11-18A	
			S16R-STUP$^{R}_{L}$11-20E						
			S20X-STUP$^{R}_{L}$11-25E		A20R-STLP$^{R}_{L}$11-22AE			S20R-STLP$^{R}_{L}$11-22A	
			S20X-STUP$^{R}_{L}$16-25E		A20R-STLP$^{R}_{L}$16-25AE		-	-	-
			S25X-STUP$^{R}_{L}$16-32E		A25S-STLP$^{R}_{L}$16-27AE		No	S25S-STLP$^{R}_{L}$16-27A	F51
		Yes	A08H-STUP$^{R}_{L}$08-10E	Yes	A08X-STLP$^{R}_{L}$08-10AE	F51	No	S08X-STLP$^{R}_{L}$08-10A	F51
			A10X-STUP$^{R}_{L}$09-12E		A10L-STLP$^{R}_{L}$09-12AE			S10L-STLP$^{R}_{L}$09-12A	
			A10X-STUP$^{R}_{L}$11-12E		A10L-STLP$^{R}_{L}$11-12AE			S10L-STLP$^{R}_{L}$11-12A	
			A12X-STUPR09-16E		A12M-STLPR09-16AE			S12M-STLPR09-16A	
			A12X-STUP$^{R}_{L}$11-14E		A12M-STLP$^{R}_{L}$11-14AE			S12M-STLP$^{R}_{L}$11-14A	
			A12X-STUPR11-16E		A12M-STLPR11-14AE			S12M-STLPR11-14A	
			A16M-STUP$^{R}_{L}$11-18E		A16Q-STLP$^{R}_{L}$11-18AE			S16Q-STLP$^{R}_{L}$11-18A	
			A16M-STUP$^{R}_{L}$11-20E						
			A20Q-STUP$^{R}_{L}$11-25E		A20R-STLP$^{R}_{L}$11-22AE			S20R-STLP$^{R}_{L}$11-22A	
			A20Q-STUP$^{R}_{L}$16-25E		A20R-STLP$^{R}_{L}$16-25AE		-	-	-
			A25R-STUP$^{R}_{L}$16-32E		A25S-STLP$^{R}_{L}$16-27AE		No	S25S-STLP$^{R}_{L}$16-27A	F51
	VB..	No	S20R-SVJB$^{R}_{L}$11-25E	Yes	A20R-SVJB$^{R}_{L}$11-25AE	F54	No	S20R-SVJB$^{R}_{L}$11-25A	F54
			S25S-SVJB$^{R}_{L}$11-30E		A25S-SVJB$^{R}_{L}$11-30AE			S25S-SVJB$^{R}_{L}$11-30A	
			S32S-SVJB$^{R}_{L}$16-40EN		A32S-SVJB$^{R}_{L}$16-40AE			S32S-SVJB$^{R}_{L}$16-40A	
			S40T-SVJB$^{R}_{L}$16-50EN		A40T-SVJB$^{R}_{L}$16-50AE			S40T-SVJB$^{R}_{L}$16-50A	

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	See Page	Coolant Hole	Description	See Page
Excellent Bar	VB..	No	S12M-SVPB$^{R}_{L}$11-20E	Yes	A12M-SVPB$^{R}_{L}$11-18AE	F56	No	S12M-SVPB$^{R}_{L}$11-18A	F56
			S16Q-SVPB$^{R}_{L}$11-25E		A16Q-SVPB$^{R}_{L}$11-22AE			S16Q-SVPB$^{R}_{L}$11-22A	
			S25X-SVPB$^{R}_{L}$16-34EN		A25S-SVPB$^{R}_{L}$16-31AE			S25S-SVPB$^{R}_{L}$16-31A	
			S32S-SVPB$^{R}_{L}$16-40EN		A32S-SVPB$^{R}_{L}$16-40AE			S32S-SVPB$^{R}_{L}$16-40A	
		No	S16Q-SVUB$^{R}_{L}$11-20E	Yes	A16Q-SVUB$^{R}_{L}$11-20AE	F59	No	S16Q-SVUB$^{R}_{L}$11-20A	F59
			S20R-SVUB$^{R}_{L}$11-25E		A20R-SVUB$^{R}_{L}$11-25AE			S20R-SVUB$^{R}_{L}$11-25A	
			S25X-SVUB$^{R}_{L}$16-34EN		A25S-SVUB$^{R}_{L}$16-34AE			S25S-SVUB$^{R}_{L}$16-34A	
			S32S-SVUB$^{R}_{L}$16-40EN		A32S-SVUB$^{R}_{L}$16-40AE			S32S-SVUB$^{R}_{L}$16-40A	
		No	S16Q-SVZB$^{R}_{L}$11-20E	Yes	A16Q-SVZB$^{R}_{L}$11-20AE	F59	No	S16Q-SVZB$^{R}_{L}$11-20A	F59
			S20R-SVZB$^{R}_{L}$11-25E		A20R-SVZB$^{R}_{L}$11-25AE			S20R-SVZB$^{R}_{L}$11-25A	
			S25X-SVZB$^{R}_{L}$16-34EN		A25S-SVZB$^{R}_{L}$16-34AE			S25S-SVZB$^{R}_{L}$16-34A	
			S32S-SVZB$^{R}_{L}$16-40EN		A32S-SVZB$^{R}_{L}$16-40AE			S32S-SVZB$^{R}_{L}$16-40A	
	VC..	No	S12M-SVJC$^{R}_{L}$08-16E	Yes	A12M-SVJC$^{R}_{L}$08-16AE	F54	No	S12M-SVJC$^{R}_{L}$08-16A	F54
			S16Q-SVJC$^{R}_{L}$08-20E		A16Q-SVJC$^{R}_{L}$08-20AE			S16Q-SVJC$^{R}_{L}$08-20A	
		No	S10M-SVPC$^{R}_{L}$08-16E	Yes	A10L-SVPC$^{R}_{L}$08-14AE	F56	No	S10L-SVPC$^{R}_{L}$08-14A	F56
		No	S12M-SVUC$^{R}_{L}$08-16E	Yes	A12M-SVUC$^{R}_{L}$08-16AE	F59	No	S12M-SVUC$^{R}_{L}$08-16A	F59
		No	S12M-SVZC$^{R}_{L}$08-16E	Yes	A12M-SVZC$^{R}_{L}$08-16AE	F59	No	S12M-SVZC$^{R}_{L}$08-16A	F59
	VP..	No	S12M-SVJP$^{R}_{L}$08-16E	Yes	A12M-SVJP$^{R}_{L}$08-16AE	F54	No	S12M-SVJP$^{R}_{L}$08-16A	F54
	WB..	No	S08K-SWUB$^{R}_{L}$08-10E	Yes	A08X-SWUB$^{R}_{L}$08-10AE	F61	No	S08X-SWUB$^{R}_{L}$08-10A	F61
			S10M-SWUB$^{R}_{L}$08-12E		A10L-SWUB$^{R}_{L}$08-12AE			S10L-SWUB$^{R}_{L}$08-12A	
			S10H-SWUB$^{R}_{L}$06-06E	No	S10H-SWUB$^{R}_{L}$06-06AE			S10H-SWUB$^{R}_{L}$06-06A	
			S10H-SWUB$^{R}_{L}$06-07E		S10H-SWUB$^{R}_{L}$06-07AE			S10H-SWUB$^{R}_{L}$06-07A	
			S10J-SWUB$^{R}_{L}$08-08E		S10H-SWUB$^{R}_{L}$08-08AE			S10H-SWUB$^{R}_{L}$08-08A	
	WP..	No	S12M-SWUP$^{R}_{L}$11-14E	Yes	A12M-SWUP$^{R}_{L}$11-14AE	F61	No	S12M-SWUP$^{R}_{L}$11-14A	F61
			S12M-SWUP$^{R}_{L}$11-16E						
			S16N-SWUP$^{R}_{L}$11-18E		A16Q-SWUP$^{R}_{L}$11-18AE			S16Q-SWUP$^{R}_{L}$11-18A	
			S16Q-SWUP$^{R}_{L}$16-20E		A16Q-SWUP$^{R}_{L}$16-18AE			S16Q-SWUP$^{R}_{L}$16-18A	
			S20R-SWUP$^{R}_{L}$16-25E		A20R-SWUP$^{R}_{L}$16-22AE			S20R-SWUP$^{R}_{L}$16-22A	
Steel Bar	CC..	No	S08X-SCLC$^{R}_{L}$06-10	No	S08X-SCLC$^{R}_{L}$06-10A	F41	-	-	-
	CP..	No	S10M-SCLP$^{R}_{L}$08-12	No	S10L-SCLP$^{R}_{L}$08-12A	F43	-	-	-
			S12M-SCLP$^{R}_{L}$08-14		S12M-SCLP$^{R}_{L}$08-14A				
			S12M-SCLP$^{R}_{L}$09-16		S12M-SCLP$^{R}_{L}$09-16A				
			S16N-SCLP$^{R}_{L}$09-18		S16Q-SCLP$^{R}_{L}$09-18A				
			S16Q-SCLP$^{R}_{L}$09-20						
			S20R-SCLP$^{R}_{L}$09-25		S20R-SCLP$^{R}_{L}$09-22A				
			S25S-SCLP$^{R}_{L}$09-30		S25S-SCLP$^{R}_{L}$09-27A				
	DC..	No	S16Q-SDUC$^{R}_{L}$07-14	No	S16Q-SDUC$^{R}_{L}$07-14A	F45	-	-	-
			S16Q-SDUC$^{R}_{L}$07-16						
			S20R-SDUC$^{R}_{L}$11-20		S20R-SDUC$^{R}_{L}$11-20A				
			S25X-SDUC$^{R}_{L}$11-25		S16Q-SDUC$^{R}_{L}$11-23A		No	S25S-SDUC$^{R}_{L}$11-32A	F45
		No	S16Q-SDZC$^{R}_{L}$07-14	No	S16Q-SDZC$^{R}_{L}$07-14A	F47	-	-	-
			S16Q-SDZC$^{R}_{L}$07-16						
			S20R-SDZC$^{R}_{L}$11-20		S20R-SDZC$^{R}_{L}$11-20A				
			S25X-SDZC$^{R}_{L}$11-25		S16Q-SDZC$^{R}_{L}$11-23A		No	S25S-SDZC$^{R}_{L}$11-32A	F47

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	See Page	Coolant Hole	Description	See Page
Steel Bar	TB..	No	S06H-STUBR/L06-08	No	S06H-STLBR/L06-08A	F51	-	-	-
	TP..	No	S08K-STUPR/L08-10	No	S08X-STLPR/L08-10A	F51	-	-	-
			S10M-STUPR/L09-12		S10L-STLPR/L09-12A				
			S12M-STUPR/L09-16		S12M-STLPR/L09-16A				
			S16Q-STUPR/L11-20		S16Q-STLPR/L11-18A				
			S20R-STUPR/L11-25		S20R-STLPR/L11-22A				
			S25X-STUPR/L16-32		S25S-STLPR/L16-27A				
	WB..	No	S10H-SWUBR/L06-06	No	S10H-SWUBR/L06-06A	F61	-	-	-
			S10H-SWUBR/L06-06-15						
			S10H-SWUBR/L06-07		S10H-SWUBR/L06-07A				
			S10J-SWUBR/L08-08		S10H-SWUBR/L08-08A				
			S10J-SWUBR/L08-08-20						
Carbide Shank Boring Bar	CC..	No	C04G-SCLCR/L03-05(A)	No	C04G-SCLCR/L03-05AN	F41	-	-	-
			C05H-SCLCR/L03-06(A)		C05H-SCLCR/L03-06AN				
			C06J-SCLCR/L04-07(A)		C06J-SCLCR/L04-07AN				
			C07K-SCLCR/L04-08(A)		C07K-SCLCR/L04-08AN				
			C08L-SCLCR/L06-10	Yes	E08L-SCLCR/L06-10AN				
		Yes	E08L-SCLCR/L06-10(A)				-	-	-
			E08L-SCLCR06-10A-2/3		E08L-SCLCR06-10AN2/3				
			E10N-SCLCR/L06-12A		E10N-SCLCR/L06-12AN				
			E10N-SCLCR06-12A-2/3		E10N-SCLCR06-12AN2/3				
	CP..	No	C10N-SCLPR/L08-12	Yes	E10N-SCLPR/L08-12AN	F43	-	-	-
			C10N-SCLPR08-12-1/2		E10N-SCLPR08-12AN1/2				
			C10N-SCLPR08-12-2/3		E10N-SCLPR08-12AN2/3				
			C12Q-SCLPR/L09-16		E12Q-SCLPR/L09-16A				
			C12Q-SCLPR09-16-1/2		E12Q-SCLPR09-16A-1/2				
			C12Q-SCLPR09-16-2/3		E12Q-SCLPR09-16A-2/3				
			C16X-SCLPR/L09-20		E16X-SCLPR/L09-18A				
			C16X-SCLPR09-20-1/2		E16X-SCLPR09-18A-1/2				
			C16X-SCLPR09-20-2/3		E16X-SCLPR09-18A-2/3				
			C20S-SCLPR/L09-25		E20S-SCLPR/L09-22A				
			C20S-SCLPR09-25-1/2		E20S-SCLPR09-22A-1/2				
			C20S-SCLPR09-25-2/3		E20S-SCLPR09-22A-2/3				
		Yes	E10N-SCLPR/L08-12(A)	Yes	E10N-SCLPR/L08-12AN	F43	-	-	-
			E10N-SCLPR08-12A-1/2		E10N-SCLPR08-12AN1/2				
			E10N-SCLPR08-12A-2/3		E10N-SCLPR08-12AN2/3				
			E12Q-SCLPR/L09-16		E12Q-SCLPR/L09-16A				
			E16X-SCLPR/L09-20		E16X-SCLPR/L09-18A				
			E20S-SCLPR/L09-25		E20S-SCLPR/L09-22A				
	DC..	No	C10N-SDUCR/L07-14	Yes	E10N-SDUCR/L07-14A	F45	-	-	-
			C12Q-SDUCR/L07-16		E12Q-SDUCR/L07-16A				
			C12Q-SDUCR/L11-20						
			C16X-SDUCR/L11-25		E16X-SDUCR/L11-23A				
			C20S-SDUCR/L11-32		E20S-SDUCR/L11-27A				
	TB..	No	C06J-STLBR/L06-08A	No	C06J-STLBR/L06-08AN	F51	-	-	-
			C10L-STUBR/L06-08		C06J-STLBR/L06-08AN				
	TP..	Yes	E08L-STLPR/L08-10A	Yes	E08L-STLPR/L08-10AN	F51	-	-	-
			E08L-STLPR/L09-10A		E08L-STLPR/L09-10AN				
			E10N-STLPR/L09-12A		E10N-STLPR/L09-12AN				
			E10N-STLPR09-12A-1/2		E10N-STLPR09-12AN1/2				
			E10N-STLPR09-12A-2/3		E10N-STLPR09-12AN2/3				
			E10N-STLPR/L11-12A		E10N-STLPR/L11-12AN				
			E10N-STLPR11-12A-1/2		E10N-STLPR11-12AN1/2				
			E10N-STLPR11-12A-2/3		E10N-STLPR11-12AN2/3				
		No	C08L-STUPR/L08-10	Yes	E08L-STLPR/L08-10AN	F51	-	-	-
			C10N-STUPR/L09-12		E10N-STLPR/L09-12AN				
			C10N-STUPR09-12-1/2		E10N-STLPR09-12AN1/2				
			C10N-STUPR09-12-2/3		E10N-STLPR09-12AN2/3				
			C10N-STUPR/L11-12		E10N-STLPR/L11-12AN				
			C10N-STUPR11-12-1/2		E10N-STLPR11-12AN1/2				
			C10N-STUPR11-12-2/3		E10N-STLPR11-12AN2/3				
			C12Q-STUPR/L09-16		E12Q-STLPR/L09-16A				
			C12Q-STUPR09-16-1/2		E12Q-STLPR09-16A-1/2				
			C12Q-STUPR09-16-2/3		E12Q-STLPR09-16A-2/3				
			C12Q-STUPR/L11-14		E12Q-STLPR/L11-14A				
			C12Q-STUPR11-14-1/2		E12Q-STLPR11-14A-1/2				
			C12Q-STUPR11-14-2/3		E12Q-STLPR11-14A-2/3				
			C12Q-STUPR/L11-16		E12Q-STLPR/L11-14A				
			C12Q-STUPR11-16-1/2		E12Q-STLPR11-14A-1/2				
			C12Q-STUPR11-16-2/3		E12Q-STLPR11-14A-2/3				

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Boring Bar

Boring Bar (Discontinued Description)				Alternative Toolholder					
				Dynamic Bar (1st Recommendation)			Dynamic Bar (2nd Recommendation)		
Shank type	Insert Shape	Coolant Hole	Description	Coolant Hole	Description	See Page	Coolant Hole	Description	See Page
Carbide Shank Boring Bar	TP..	No	C16X-STUP$^{R/L}$11-18	Yes	E16X-STLP$^{R/L}$11-18A	F51	-	-	-
			C16X-STUPR11-18-1/2		E16X-STLPR11-18A-1/2				
			C16X-STUPR11-18-2/3		E16X-STLPR11-18A-2/3				
			C16X-STUP$^{R/L}$11-20		E16X-STLP$^{R/L}$11-18A				
			C16X-STUPR11-20-1/2		E16X-STLPR11-18A-1/2				
			C16X-STUPR11-20-2/3		E16X-STLPR11-18A-2/3				
			C20S-STUP$^{R/L}$11-25		E20S-STLP$^{R/L}$11-22A				
			C20S-STUPR11-25-1/2		E20S-STLPR11-22A-1/2				
			C20S-STUPR11-25-2/3		E20S-STLPR11-22A-2/3				
			C20S-STUP$^{R/L}$16-25		E20S-STLP$^{R/L}$16-25A				
			C20S-STUPR16-25-1/2		E20S-STLPR16-25A-1/2				
			C20S-STUPR16-25-2/3		E20S-STLPR16-25A-2/3				
		Yes	E08L-STUP$^{R/L}$08-10	Yes	E08L-STLP$^{R/L}$08-10AN	F51	-	-	-
			E10N-STUP$^{R/L}$09-12		E10N-STLP$^{R/L}$09-12AN				
			E10N-STUP$^{R/L}$11-12		E10N-STLP$^{R/L}$11-12AN				
			E12Q-STUP$^{R/L}$09-16		E12Q-STLP$^{R/L}$09-16A				
			E12Q-STUP$^{R/L}$11-14		E12Q-STLP$^{R/L}$11-14A				
			E12Q-STUP$^{R/L}$11-16						
			E16X-STUP$^{R/L}$11-18		E16X-STLP$^{R/L}$11-18A				
			E16X-STUP$^{R/L}$11-20						
			E20S-STUPR11-25		E20S-STLPR11-22A				
			E20S-STUPR16-25		E20S-STLPR16-25A				
	WB..	No	C05H-SWUB$^{R/L}$06-06(A)	No	C05H-SWUB$^{R/L}$06-06AN	F61	-	-	-
			C06J-SWUB$^{R/L}$06-07(A)		C06J-SWUB$^{R/L}$06-07AN				
			C07K-SWUB$^{R/L}$08-08(A)		C07K-SWUB$^{R/L}$08-08AN				
			C08L-SWUB$^{R/L}$08-10	Yes	E08L-SWUB$^{R/L}$08-10AN				
			C10N-SWUB$^{R/L}$08-12		E10N-SWUB$^{R/L}$08-12AN				
			C10N-SWUBR08-12-1/2		E10N-SWUBR08-12AN1/2				
			C10N-SWUBR08-12-2/3		E10N-SWUBR08-12AN2/3				
		Yes	E08L-SWUB$^{R/L}$08-10A		E08L-SWUB$^{R/L}$08-10AN				
			E10N-SWUB$^{R/L}$08-12A		E10N-SWUB$^{R/L}$08-12AN				
			E10N-SWUBR08-12A-1/2		E10N-SWUBR08-12AN1/2				
			E10N-SWUBR08-12A-2/3		E10N-SWUBR08-12AN2/3				
	WP..	No	C12Q-SWUP$^{R/L}$11-14	Yes	E12Q-SWUP$^{R/L}$11-14A	F61	-	-	-
			C12Q-SWUPR11-14-1/2		E12Q-SWUPR11-14A-1/2				
			C12Q-SWUPR11-14-2/3		E12Q-SWUPR11-14A-2/3				
			C12Q-SWUP$^{R/L}$11-16		E12Q-SWUP$^{R/L}$11-14A				
			C12Q-SWUPR11-16-1/2		E12Q-SWUPR11-14A-1/2				
			C12Q-SWUPR11-16-2/3		E12Q-SWUPR11-14A-2/3				
			C16X-SWUP$^{R/L}$11-18		E16X-SWUP$^{R/L}$11-18A				
			C16X-SWUPR11-18-1/2		E16X-SWUPR11-18A-1/2				
			C16X-SWUPR11-18-2/3		E16X-SWUPR11-18A-2/3				
			C16X-SWUP$^{R/L}$16-20		E16X-SWUP$^{R/L}$16-18A				
			C16X-SWUPR16-20-1/2		E16X-SWUPR16-18A-1/2				
			C16X-SWUPR16-20-2/3		E16X-SWUPR16-18A-2/3				
			C20S-SWUP$^{R/L}$16-25		E20S-SWUP$^{R/L}$16-22A				
			C20S-SWUPR16-25-1/2		E20S-SWUPR16-22A-1/2				
			C20S-SWUPR16-25-2/3		E20S-SWUPR16-22A-2/3				

Note) The corresponding replacements may be different from the conventional parts in minimum processing diameter or applicable insert size. Make sure of their specifications by referring to the catalog or other documents.

Recommended Cutting Conditions - Boring (Positive Insert : Cutting Dia. under 10mm)

[ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grades	Corner-R (RE)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
*P	Low-carbon Steel Low-carbon Alloy	HB ≤ 300	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 70 - 110 30 - 60 - 90	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.04 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	PR1725	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing - Medium	Continuous Interruption	CF	PR1725	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	Medium-carbon Steel Medium-carbon Alloy	HB ≤ 300	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 70 - 110 30 - 60 - 90	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.04 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	PR1725	0.1 0.2	40 - 80 - 120 40 - 70 - 120	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing - Medium	Continuous Interruption	CF	PR1725	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	High-carbon Alloy	HB ≤ 280	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 70 - 110 30 - 60 - 90	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.04 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	PR1725	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing - Medium	Continuous Interruption	CF	PR1725	0.1 0.2	40 - 80 - 120 40 - 70 - 100	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
M	Stainless Steel (Austenitic related)	HB ≤ 220	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 60 - 80 30 - 60 - 80	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.03 - 0.05 0.02 - 0.05 - 0.07
			Finishing	Continuous Interruption	F	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing - Medium	Continuous Interruption	CF	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	Stainless Steel (Precipitation Hardening)	HB ≤ 300	Finishing (Solid Type)	Continuous Interruption	EZB-F EZB-H	PR1225	0.05 0.15	30 - 60 - 80 30 - 60 - 80	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.01 - 0.03 - 0.05 0.02 - 0.05 - 0.07
			Finishing	Continuous Interruption	F	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing - Medium	Continuous Interruption	CF	PR1225 PR1535	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.15 - 0.25 0.05 - 0.15 - 0.25	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
K	Gray Cast Iron	HB ≤ 250	Finishing (Solid Type)	Continuous Interruption	(VNB) (VNB-NB)	KW10	0.03 0.2	30 - 60 - 100 30 - 60 - 100	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F	KW10	0.1 0.2	30 - 60 - 100 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing - Medium	Continuous Interruption	Without Chipbreaker	KW10	0.2 0.4	30 - 60 - 100 30 - 60 - 80	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	Nodular Cast Iron	HB ≤ 270	Finishing (Solid Type)	Continuous Interruption	(VNB) (VNB-NB)	KW10	0.03 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F, U	KW10	0.1 0.2	30 - 60 - 80 30 - 60 - 80	0.05 - 0.08 - 0.1 0.05 - 0.1 - 0.15	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
			Finishing - Medium	Continuous Interruption	Without Chipbreaker	KW10	0.2 0.4	30 - 60 - 100 30 - 60 - 80	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys	HB ≤ 100	High Speed Finishing (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.05	150 - 200 - 300	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			Finishing (Long Tool Life)	Continuous Interruption	F, U	PDL025	0.1 0.2	100 - 150 - 200 100 - 150 - 200	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
			Finishing	Continuous Interruption	F, U	KW10	0.1 0.2	100 - 150 - 200 100 - 150 - 200	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
S	Titanium Alloys	HB ≤ 400	Precision Finishing (Rainbow Surface Gloss)	Continuous Interruption	Without Chipbreaker	KPD001	0.1 0.2	100 - 120 - 150 70 - 100 - 120	0.05 - 0.1 - 0.3 0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F, U	KW10	0.1 0.2	20 - 40 - 60 20 - 40 - 60	0.05 - 0.2 - 0.5 0.05 - 0.2 - 0.5	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
	Heat-resistant Alloys	HB ≤ 350	Finishing (Solid Type)	Continuous Interruption	(VNB)	KW10	0.2 0.2	10 - 30 - 50 10 - 30 - 50	0.05 - 0.1 - 0.3 0.05 - 0.1 - 0.3	0.03 - 0.05 - 0.1 0.03 - 0.05 - 0.08
			Finishing	Continuous Interruption	F, U	KW10	0.2 0.2	10 - 30 - 50 10 - 30 - 50	0.05 - 0.2 - 0.4 0.05 - 0.2 - 0.4	0.03 - 0.05 - 0.1 0.03 - 0.05 - 0.1
H	Hardened Steel Hard Materials	40~50 HRC	Finishing	Continuous Interruption	(VNB)	PR930	0.2 0.2	30 - 50 - 70 30 - 50 - 70	0.05 - 0.1 - 0.4 0.05 - 0.1 - 0.2	0.01 - 0.02 - 0.05 0.01 - 0.02 - 0.03
		45~68 HRC	Finishing	Continuous Interruption	ME MES	KBN05M	0.2 0.4	60 - 100 - 140 60 - 80 - 120	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2	0.02 - 0.05 - 0.1 0.02 - 0.05 - 0.1

* Please use it with PR1725 set to Vc=150m/min or below for machining of free-cutting steel such as small size SUM. For ap and f, refer to specs for low carbon steels.

Recommended Cutting Conditions

Recommended Cutting Conditions - Boring (Positive Insert : Cutting Dia. 10mm or over)

[ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Applications	Recommended Chipbreaker	Recommended Insert Grades	Corner-R (RE)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
*P	Low-carbon Steel Low-carbon Alloy	HB ≤ 300	Precision Finishing	Continuous Interruption	F, U	TN620 PR1725	0.1 0.2	250 - 300 - 350 120 - 170 - 220	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15 0.03 - 0.1 - 0.15
			Finishing	Continuous Interruption	XP	PV710 CA525	0.4 0.4	200 - 250 - 300 150 - 200 - 250	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing - Medium	Continuous Interruption	XQ	PV710 CA525	0.4 0.4	150 - 200 - 250 100 - 150 - 200	0.5 - 1.0 - 2.0 0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Medium	Continuous Interruption	Standard	PV720 CA525	0.8 0.8	100 - 150 - 200 80 - 120 - 150	1.0 - 1.5 - 2.5 1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.3 0.1 - 0.15 - 0.2
	Medium-carbon Steel Medium-carbon Alloy	HB ≤ 300	Precision Finishing	Continuous Interruption	F, U	TN620 PR1725	0.2 0.4	150 - 200 - 250 120 - 140 - 170	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15 0.03 - 0.1 - 0.15
			Finishing	Continuous Interruption	PP	PV710 CA525	0.4 0.4	150 - 200 - 250 120 - 180 - 200	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing - Medium	Continuous Interruption	HQ	PV710 CA525	0.4 0.4	120 - 180 - 220 100 - 150 - 200	0.5 - 1.0 - 2.0 0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Medium	Continuous Interruption	Standard	PV720 CA525	0.8 0.8	100 - 150 - 200 80 - 120 - 150	1.0 - 1.5 - 2.5 1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.3 0.1 - 0.15 - 0.2
	High-carbon Alloy	HB ≤ 280	Precision Finishing	Continuous Interruption	F, U	TN620 PR1725	0.2 0.4	120 - 150 - 180 110 - 130 - 160	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15 0.03 - 0.1 - 0.15
			Finishing	Continuous Interruption	PP	PV710 CA525	0.4 0.4	120 - 150 - 180 100 - 120 - 150	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing - Medium	Continuous Interruption	HQ	PV710 CA525	0.4 0.4	120 - 150 - 180 100 - 120 - 150	0.5 - 1.0 - 2.0 0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.25 0.1 - 0.15 - 0.2
			Medium	Continuous Interruption	Standard	CA515 CA525	0.8 0.8	100 - 120 - 150 80 - 100 - 120	1.0 - 1.5 - 2.5 1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.3 0.1 - 0.15 - 0.2
M	Stainless Steel (Austenitic related)	HB ≤ 220	Finishing	Continuous Interruption	MQ	CA6525 PR1535	0.4 0.8	120 - 150 - 180 100 - 120 - 150	0.2 - 0.5 - 0.8 0.2 - 0.5 - 0.8	0.05 - 0.08 - 0.1 0.05 - 0.08 - 0.1
			Medium	Continuous Interruption	Standard	CA6525 PR1535	0.4 0.8	120 - 150 - 180 100 - 120 - 150	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
	Stainless Steel (Precipitation Hardening)	HB ≤ 300	Finishing	Continuous Interruption	MQ	CA6525 PR1535	0.4 0.8	80 - 100 - 120 60 - 80 - 100	0.2 - 0.7 - 1.0 0.2 - 0.7 - 1.0	0.05 - 0.1 - 0.15 0.05 - 0.1 - 0.15
			Medium	Continuous Interruption	Standard	CA6525 PR1535	0.4 0.8	80 - 100 - 120 60 - 80 - 100	0.5 - 1.0 - 1.5 0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
K	Gray Cast Iron	HB ≤ 250	High Speed Finishing	Continuous Interruption	Without Chipbreaker	KBN475 PT600M	0.4 0.8	400 - 500 - 600 200 - 250 - 350	0.05 - 0.2 - 0.5 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15 0.05 - 0.1 - 0.15
			Finishing (Gloss Oriented)	Continuous Interruption	Standard	PV7005 TN620	0.8 0.8	200 - 250 - 300 120 - 180 - 230	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing	Continuous Interruption	Standard	CA310 CA315	0.4 0.8	150 - 180 - 200 100 - 150 - 180	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Medium	Continuous Interruption	Standard	CA310 CA315	0.8 0.8	100 - 150 - 200 80 - 120 - 150	0.5 - 1.0 - 2.0 0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2 0.05 - 0.1 - 0.15
	Nodular Cast Iron	HB ≤ 270	High Speed Finishing	Continuous Interruption	Without Chipbreaker	KBN60M PT600M	0.4 0.8	200 - 300 - 400 150 - 200 - 250	0.05 - 0.2 - 0.5 0.2 - 0.5 - 1.0	0.03 - 0.05 - 0.1 0.05 - 0.1 - 0.15
			Finishing (Gloss Oriented)	Continuous Interruption	Standard	PV7005 TN620	0.8 0.8	150 - 200 - 250 120 - 150 - 200	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Finishing	Continuous Interruption	Standard	CA310 CA315	0.4 0.8	120 - 150 - 180 100 - 120 - 150	0.2 - 0.5 - 1.0 0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.2
			Medium	Continuous Interruption	Standard	CA315 CA320	0.8 0.8	100 - 120 - 150 80 - 100 - 120	0.5 - 1.0 - 2.0 0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.2 0.05 - 0.1 - 0.15
N	Non-ferrous Metals Copper Alloy Aluminum Aluminum Alloys	HB ≤ 100	High Speed Finishing (Rainbow Surface Gloss)	Continuous	Without Chipbreaker	KPD001	0.2	200 - 400-1,000	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			Finishing (Long Tool Life)	Continuous Interruption	F, U	PDL025	0.4 0.4	100 - 200 - 400 100 - 200 - 400	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
			Finishing	Continuous Interruption	F, U	KW10	0.4 0.4	100 - 200 - 400 100 - 200 - 400	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
S	Titanium Alloys	HB ≤ 400	Precision Finishing (Rainbow Surface Gloss)	Continuous Interruption	Without Chipbreaker	KPD001	0.2 0.4	100 - 120 - 150 70 - 100 - 120	0.05 - 0.1 - 0.3 0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1 0.03 - 0.07 - 0.1
			Finishing	Continuous Interruption	F, U	KW10	0.2 0.4	30 - 50 - 70 30 - 50 - 70	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
	Heat-resistant Alloys	HB ≤ 350	Finishing	Continuous Interruption	F, U	KW10	0.4 0.4	10 - 30 - 50 10 - 30 - 50	0.05 - 0.5 - 1.0 0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2 0.03 - 0.1 - 0.2
			Finishing	Continuous Interruption	MQ	PR1310	0.4 0.8	40 - 60 - 80 40 - 60 - 80	0.1 - 0.3 - 0.5 0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1 0.03 - 0.05 - 0.1
H	Hardened Steel Hard Materials	40~50 HRC	Finishing	Continuous Interruption	HQ Standard	CA515	0.8 0.8	60 - 80 - 100 30 - 50 - 70	0.05 - 0.3 - 0.5 0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1 0.05 - 0.08 - 0.1
		45~68 HRC	Finishing	Continuous Interruption	ME MET	KBN05M	0.4 0.8	100 - 140 - 180 90 - 120 - 160	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	0.02 - 0.07 - 0.1 0.02 - 0.07 - 0.1
			Medium	Continuous	Without Chipbreaker (Negative)	KBN900	0.8	60 - 80 - 100	0.3 - 0.7 - 1.0	0.03 - 0.1 - 0.15

* When machining free-cutting steel such as SUM, please use PR1725 for Vc=200m/min or under and use PV720 / CA515, etc.

System Tip-Bars Recommended Cutting Conditions

Recommended Cutting Conditions (VNB-S)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)						VNB01-S type VNB015-S type		VNB02-S type ~ VNB04-S type		Remarks
	MEGA COAT	PVD Coated Carbide	Carbide	CBN	PCD						
	PR1225	PR930	KW10	KBN510	KPD001	KPD010	ap (mm), f (mm/rev)				
							ap	f	ap	f	
Carbon Steel / Alloy Steel	★ 30~120	☆ 30~100					~0.1	~0.01	~0.2	~0.03	Coolant
Stainless Steel	★ 30~100	☆ 30~80					~0.1	~0.01	~0.2	~0.02	

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (VNB / VNB-NB / VNBT)

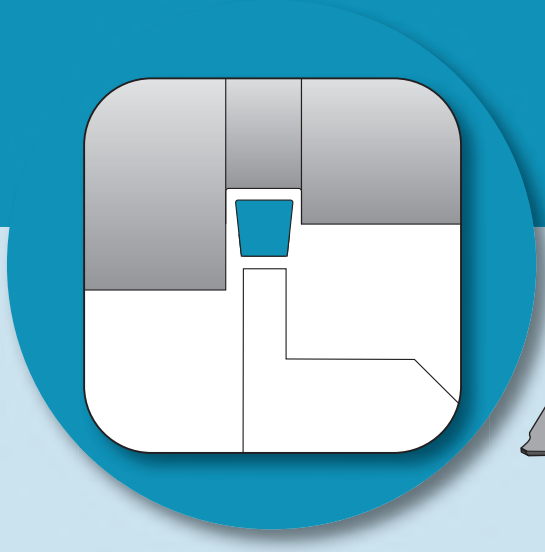
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)						VNB02 type		VNB03 type		VNB04 VNBT04 type		VNB05 VNB06 VNB07 VNBT05 type		Remarks
	MEGA COAT	PVD Coated Carbide	Carbide	CBN	PCD										
	PR1225	PR930	KW10	KBN510	KPD001	KPD010	ap (mm), f (mm/rev)								
							ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	★ 30~120	☆ 30~100					~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	★ 30~100	☆ 30~80					~0.3	~0.02	~0.4	~0.03	~0.45	~0.05	~0.5	~0.07	
Non-ferrous Metals			☆ ~100		★ ~300	☆ ~300	~0.3	~0.05	~0.4	~0.06	~0.45	~0.1	~0.5	~0.15	

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (VNBX-S)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)							VNBX01-S type VNBX015-S type		VNBX02-S type ~ VNBX04-S type		Remarks
	PVD Coated Carbide			Carbide	CBN	PCD						
	PR630	PR915	PR930	KW10	KBN510	KPD001	KPD010	ap (mm), f (mm/rev)				
								ap	f	ap	f	
Carbon Steel / Alloy Steel			★ 30~100					~0.1	~0.01	~0.2	~0.03	Coolant
Stainless Steel			★ 30~80					~0.1	~0.01	~0.2	~0.02	

★ : 1st Recommendation



Grooving

G1~G120

External Grooving G2~G48

Summary of External Grooving		G2
KGBA / KGBAS / KGBA-JCT		G9
KGB / KGBS will be switched to KGBA / KGBAS		G11
KGBF-F / KGBFS / S-KGBF / KGBF-JCT		G15
KTGF-F / KTGF		G18
S-KTGF	Sleeve Holder	G19
KGD (Integral Type)		G24
KGD (Integral Type for Automatic Lathe)		G25
KGD-JCT (Integral Type / Coolant-through Holders)		G26
KGD-JCT (Integral Type for Automatic Lathe / Coolant-through Holders)		G28
KGD-S (0° Separate Type)		G30
KGDS-S (90° Separate Type)		G31
KGM (For automatic lathe)		G42
KGM-T		G43
KGMM / KGMS		G44
KGMU		G45
KGH / KGHS		G46
KGA		G47
KGMW (For Aluminum Wheel)		G48

Internal Grooving G49~G73

Summary of Internal Grooving		G49
EZG	EZ Bars	G51
VNG	System Tip-Bars	G53
SIGC		G57
SIGE-EH / SIGE-WH / SIGE-WH-90		G60
GIV / GIV-E / GIV-W		G64
KIGBA		G66
KGDI		G68
KIGH		G70
KIGM-8 / KIGMU-8		G71
KGIA		G72
KIGM-V Applicable Inserts		G73

Face Grooving G74~G110

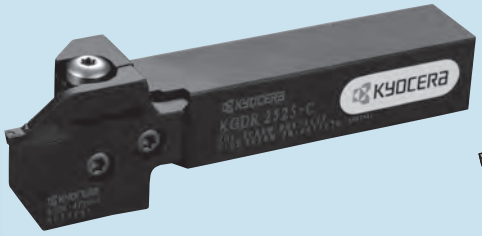
Summary of Face Grooving		G74
EZFG		G78
VNFG	System Tip-Bars	G80
TWFG / TWFGT	Twin-Bars	G82
KGDF (0° Separate Type)		G88
KGDF-Z (Integral Type)		G92
KGDF (90° Separate Type)		G93
GFVS-AA / GFVT-AA		G98
GFV		G100
GFVS / GFVT		G102
KFMS		G106
KFMS-8		G108
KFTB-S		G109
GIFV (Boring Bar Type)		G110

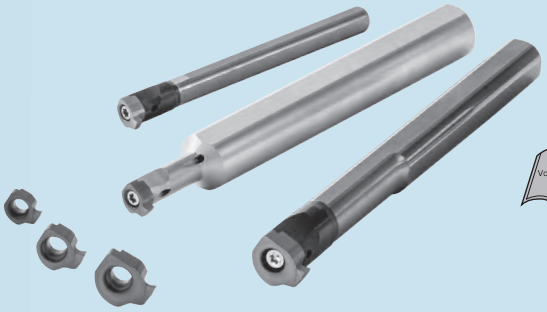
Technical Information G111~G120

Recommended Cutting Conditions	G111
Guide for Grooving	G118

Alternative Toolholder Reference Table for Grooving Toolholder G120







Summary of External Grooving

KGD Grooving (External Grooving & Turning) (G20 ~ G37)

· Integral Type

Type	KGD
Edge Width (mm)	2.0 ~ 8.0
Max. Grooving Depth (mm)	6 ~ 30
See Page	G24

· Integral Type (Coolant-through Holders)

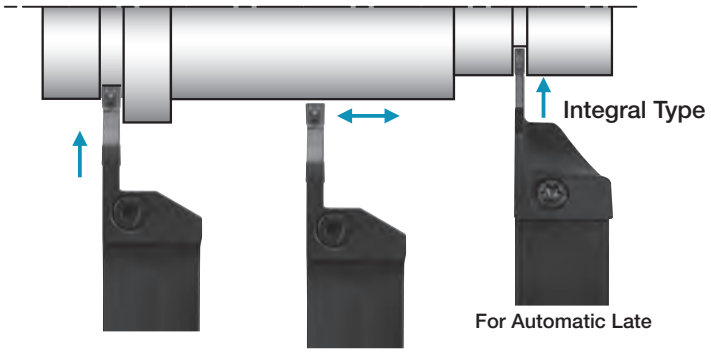
Type	KGD-JCT
Edge Width (mm)	3.0 ~ 5.0
Max. Grooving Depth (mm)	6 ~ 25
See Page	G26

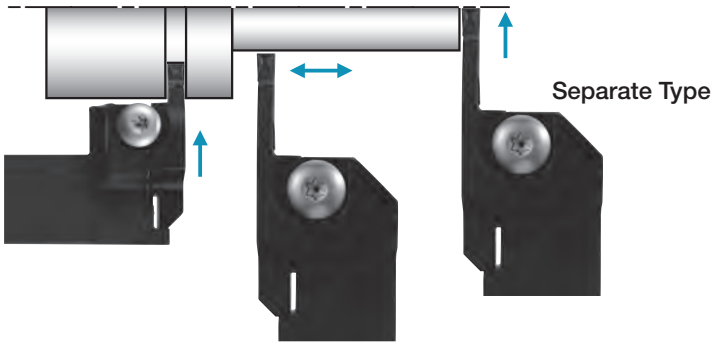
· Integral Type for Automatic Lathe

Type	KGD
Edge Width (mm)	2.0 ~ 4.0
Max. Grooving Depth (mm)	10 ~ 25.5
See Page	G25

· Integral Type for Automatic Lathe (Coolant-through Holders)

Type	KGD-JCT
Edge Width (mm)	2.0 ~ 4.0
Max. Grooving Depth (mm)	12 ~ 16
See Page	G28





· Separate Type

Type	* KGDS-S
Edge Width (mm)	3.0
Max. Grooving Depth (mm)	10
See Page	G31

* The separate type toolholders can accept all the blades if their hand is matching.

· Separate Type

Type	* KGD-S
Edge Width (mm)	2.0 ~ 5.0
Max. Grooving Depth (mm)	10 ~ 25
See Page	G30

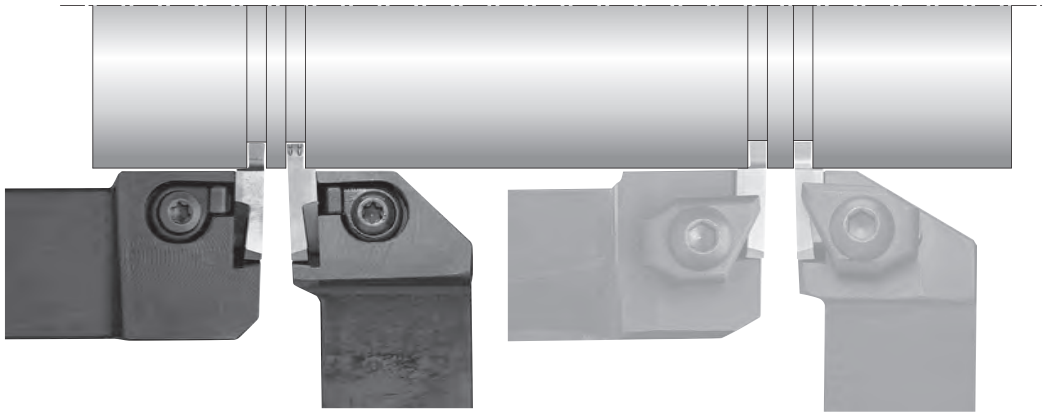
* The separate type toolholders can accept all the blades if their hand is matching.

Low Cutting Force	Low Feed	General purpose	High Feed	Copying
GS	**GL**	**GM**	**PH**	**CM**

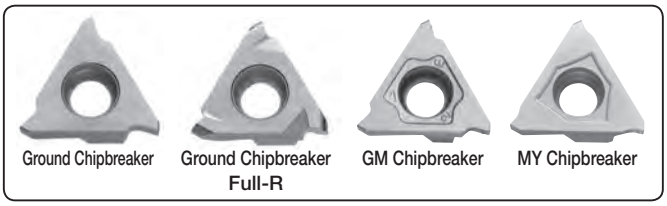


External Grooving (G6 ~ G11, G46, G47)

Shallow Grooving (Grooving Depth: ~5mm)



Type	KGBAS	KGBA (-JCT)	KGBS	KGB
Edge Width (mm)	0.33 ~ 4.8	0.33 ~ 4.8	0.33 ~ 4.8	0.33 ~ 4.8
Max. Grooving Depth (mm)	0.8 ~ 5.0	0.8 ~ 5.0	0.8 ~ 5.0	0.8 ~ 5.0
See Page	G9	G9, G10	G11	G11

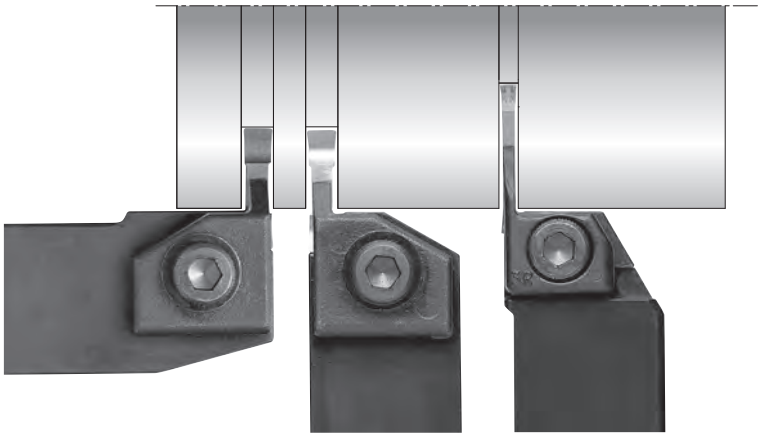


* These shallow groove types of the previous system will be switched to the system on the left.

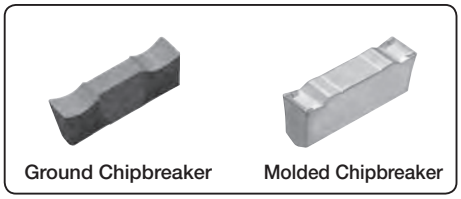
KGBS ⟶ KGBAS
KGB ⟶ KGBA

Edge Shape	General (Square)	Full-R (Round)	GM Chipbreaker	MY Chipbreaker
				

Deep Grooving (Grooving Depth : ~25mm)



Type	KGHS	KGH	KGA
Edge Width (mm)	4.0 ~ 8.0	4.0 ~ 12.0	3.0 ~ 5.0
Max. Grooving Depth (mm)	13	13 ~ 17	20 ~ 25
See Page	G46	G46	G47

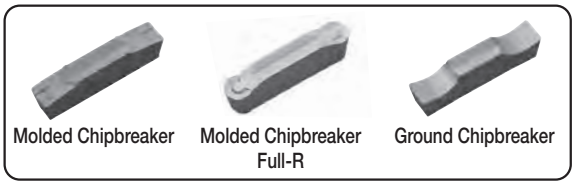


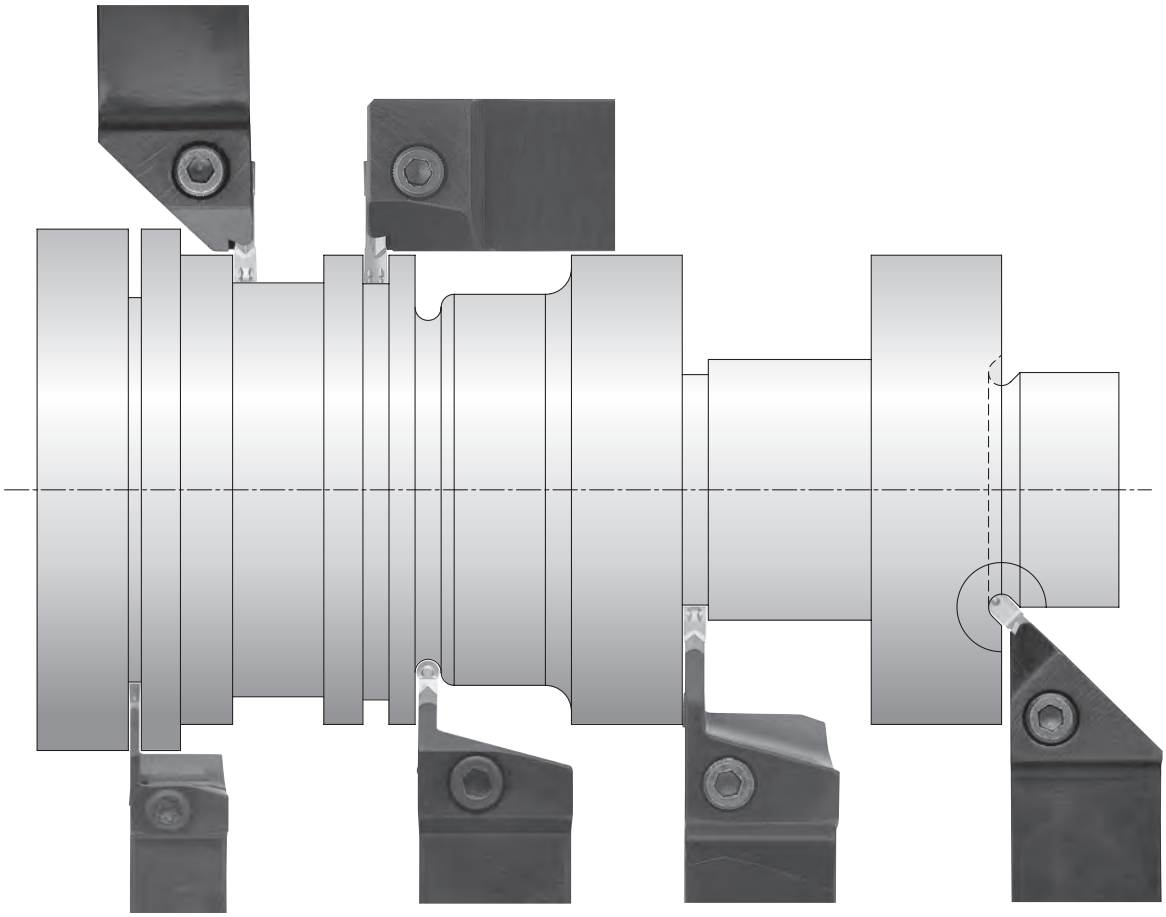
Summary of External Grooving

KGM Grooving (External Grooving & Turning) (G38 ~ G45)

Type	KGMM
Edge Width (mm)	3.0 ~ 5.0
Max. Grooving Depth (mm)	4.8
See Page	**G44**

KGMS
3.0 ~ 5.0
4.8
G44



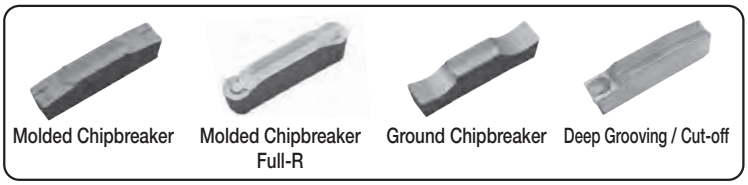


Type	KGM
Edge Width (mm)	1.5 ~ 4.0
Max. Grooving Depth (mm)	10 ~ 16
See Page	**G42**

KGM
3.0 ~ 8.0
9 ~ 25
G42

KGM-T
2.0 ~ 6.0
17 ~ 30
G43

KGMU
3.0 ~ 5.0
3.5 ~ 4.5
G45





External Grooving of Precision Parts (G15 ~ G17, G18, G19, G25, G28, G29, G42)

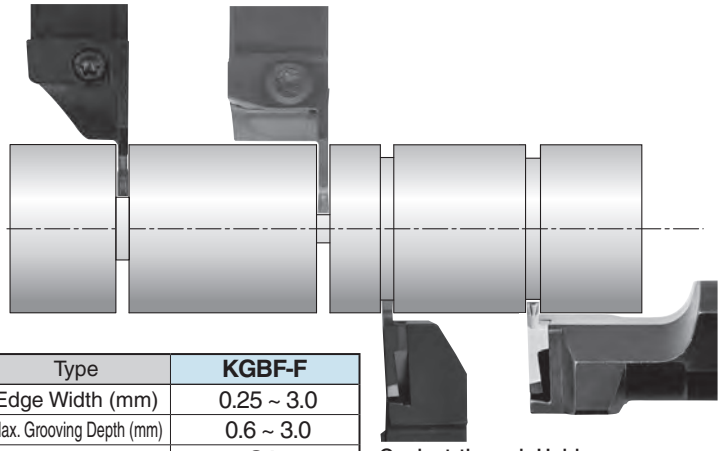
For Automatic Lathe

· Coolant-through Holders

Type	KGD
Edge Width (mm)	2.0 ~ 4.0
Max. Grooving Depth (mm)	10 ~ 25.5
See Page	G25

Type	KGD-JCT
Edge Width (mm)	2.0 ~ 4.0
Max. Grooving Depth (mm)	12 ~ 16
See Page	G28

Type	KGM
Edge Width (mm)	1.5 ~ 4.0
Max. Grooving Depth (mm)	10 ~ 16
See Page	G42





Molded Chipbreaker

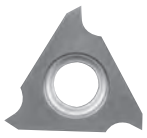


Ground Chipbreaker

Type	KGBF-F
Edge Width (mm)	0.25 ~ 3.0
Max. Grooving Depth (mm)	0.6 ~ 3.0
See Page	G15

· Coolant-through Holders

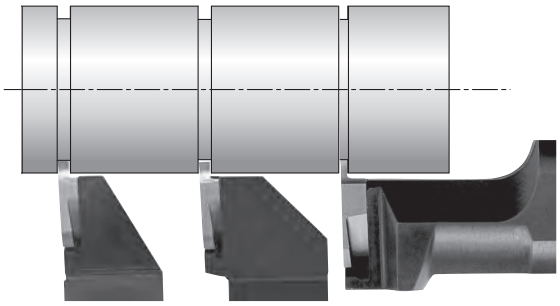
Type	KGBFS	KGBF-JCT	S-KGBF
Edge Width (mm)	0.25 ~ 3.0	0.25 ~ 3.0	0.25 ~ 3.0
Max. Grooving Depth (mm)	0.6 ~ 3.0	0.6 ~ 3.0	0.6 ~ 3.0
See Page	G16	G17	G15



Ground Chipbreaker



GL Chipbreaker



Type	KTGF-F	KTGF
Edge Width (mm)	0.33 ~ 2.5	
Max. Grooving Depth (mm)	0.8 ~ 2.5	
See Page	G18	

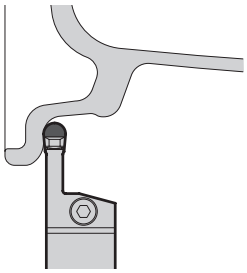
S-KTGF
0.33 ~ 2.5
0.8 ~ 2.5
G19



Ground Chipbreaker

For Aluminum Wheel External Grooving

(External / Facing / Copying) (G48)



Type	KGMW
Edge Width (mm)	6.0 ~ 8.0
Max. Grooving Depth (mm)	25
See Page	G48



1-edge PCD

Grooving Inserts

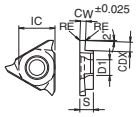
Applicable Inserts

(mm)

Description	IC	S	D1
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

		MEGACOAT Cermet	Cermet			MEGA COAT NANO	MEGA COAT	PVD Coated Carbide			Carbide
		PV7040	TC40N	TN90		PR1625	PR1215	PR1115	PR905	PR930	KW10
P	Carbon Steel / Alloy Steel	●				◕	●	◔		◔	
M	Stainless Steel					◕	●	◔		◔	
K	Cast Iron						◕		◔		◔
N	Non-ferrous Metals										◕
S	Titanium Alloys										◕
H	Hard Materials (~40HRC)						●	○		○	
	Hard Materials (40HRC~)										

Classification of usage
◕ :Continuous~Light Interruption / 1st Choice
◔ :Continuous~Light Interruption / 2nd Choice
● :Continuous / 1st Choice
○ :Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) CW	CDX	RE	Applicable Toolholders
 	GBA32R/L 033-005 *1	0.33	0.8	0.05	KGBAR/L...16 (JCT) KGBASL/R...16 KIGBAL/R...16 (Internal)
	050-005 *2	0.50	1.0		
			1.2		
	075-005	0.75	2.0		
	095-005	0.95			
	100-005	1.00			
	110-005	1.10			
	120-005	1.20			
	125-020	1.25		0.2	
	130-020	1.30			
	140-020	1.40	2.5		
	145-020	1.45	2.0		
			2.5		
	150-020	1.50	2.0		
			2.5		
	160-020	1.60			
	170-020	1.70			
	175-020	1.75	2.0		
			2.5		
	200-020	2.00			
	225-020	2.25			
	250-020	2.50			
	300-020	3.00			
	GBA43R/L 125-010	1.25	2.0	0.1	KGBAR/L...22-15 (JCT) KGBASL/R...22-15 KIGBAL/R...22 (Internal)
	125-020			0.2	
	140-020	1.40	3.5		
	145-020	1.45	2.0		
			3.5		
	150-010	1.50		0.1	
	150-020			0.2	
	170-020	1.70			
	175-020	1.75			
	185-020	1.85			
	195-020	1.95			
	200-010	2.00		0.1	
	200-020			0.2	
	225-020	2.25			
	230-020	2.30			
	250-010	2.50	5.0	0.1	★1
	250-030		4.0	0.3	★2
			5.0		★1
	265-030	2.65	4.0		★2
			5.0		★1
	280-030	2.80	4.0		★2
			5.0		★1
	300-010	3.00		0.1	
	300-030		4.0	0.3	★2
			5.0		★1
	325-030	3.25			★2
	330-030	3.30	4.0		
			5.0		★1
	350-010	3.50		0.1	
	350-030			0.3	KGBAR/L...22-35 (JCT) KGBASL/R...22-35 KIGBAL/R...22 (Internal)
	400-010	4.00	5.0	0.1	
	400-040			0.4	
	430-040	4.30			
	450-040	4.50			
	480-040	4.80			

See Page for Applicable Toolholders: G9 ~ G11, G66 (Internal)

· CDX shows available grooving depth.

Recommended Cutting Conditions ➔ G111

*1. The edge width tolerance of GBA32R/L033-005 : $0.33^{+0.02}_{-0.03}$
*2. The edge width tolerance of GBA32R/L050-005 : $0.50^{+0.05}_{-0}$

★Applicable Toolholders
1:KGBAR/L...22-25T5, KGBAR/L...22-25 (JCT), KGBASL/R...22-25T5, KIGBAL/R...22
2:KGBAR/L...22-25T5, KGBAR/L...22-25 (JCT), KGBASL/R...22-25T5, KGBASL/R...22-25, KIGBAL/R...22

Inserts are sold in 10 piece boxes

● : Std. Item
▲ : To be replaced by a new product

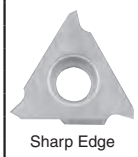
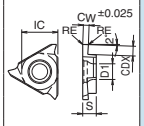
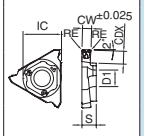
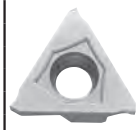
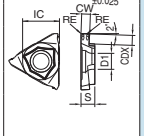
Applicable Inserts

P	Carbon Steel / Alloy Steel	●	○	● NEW	●	◔
M	Stainless Steel			●	●	◔
K	Cast Iron					
N	Non-ferrous Metals					
S	Titanium Alloys					
H	Hard Materials (~40HRC)				●	○
	Hard Materials (40HRC~)					

Classification of usage
●:Continuous~Light Interruption / 1st Choice
◔:Continuous~Light Interruption / 2nd Choice
●:Continuous / 1st Choice
○:Continuous / 2nd Choice

(mm)

Description	IC	S	D1
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) CW	CDX	RE	Cermet TN620 R	Cermet TN620 L	Cermet TN6020 R	Cermet TN6020 L	MEGACOAT NANO PR1625 R	MEGACOAT NANO PR1625 L	MEGACOAT PR1215 R	MEGACOAT PR1215 L	PVD Coated Carbide PR930 R	PVD Coated Carbide PR930 L	Applicable Toolholders	See Page for Applicable Toolholders
NEW  Sharp Edge		GBA32R/L 050-005F *	0.50	1.0	0.05	●	●									KGBAR/L...16 KGBASR/L...16 KIGBAR/L...16 (Internal)	G9 ~ G11 G66 (Internal)
		075-005F	0.75	2.0		●	●										
		095-005F	0.95			●	●										
		100-005F	1.00			●	●										
		125-020F	1.25		0.2	●	●										
		145-020F	1.45			●	●										
		150-020F	1.50			●	●										
		175-020F	1.75			●	●										
		200-020F	2.00	2.5		●	●										
		250-020F	2.50			●	●										
		GBA43R/L 125-020F	1.25	2.0	0.2	●	●									KGBAR/L...22-15 (JCT) KGBASR/L...22-15 KIGBAR/L...22 (Internal)	
		145-020F	1.45			●	●										
		150-020F	1.50	3.5		●	●										
		175-020F	1.75			●	●										
		185-020F	1.85			●	●										
		200-020F	2.00			●	●										
		230-020F	2.30			●	●										
		250-030F	2.50	4.0	0.3	●	●									★2	
		265-030F	2.65			●	●										
		280-030F	2.80			●	●										
		300-030F	3.00			●	●										
		330-030F	3.30			●	●										
		350-030F	3.50	5.0		●	●									KGBAR/L...22-35 (JCT) KGBASR/L...22-35 KIGBAR/L...22 (Internal)	
		400-040F	4.00		0.4	●											
		430-040F	4.30			●											
		450-040F	4.50			●											
		480-040F	4.80			●											
NEW  Molded Chipbreaker GM Chipbreaker 		GBA43R/L 140-010GM	1.40	3.5	0.1	●	●			●	●	●	●			KGBAR/L...22-15 (JCT) KGBASR/L...22-15 KIGBAR/L...22 (Internal)	
		150-020GM	1.50		0.2	●	●			●	●	●	●				
		175-020GM	1.75			●	●			●	●	●	●				
		185-020GM	1.85			●	●			●	●	●	●				
		200-020GM	2.00			●	●			●	●	●	●				
		230-020GM	2.30			●	●			●	●	●	●				
		250-030GM	2.50	5.0	0.3	●	●			●	●	●	●			KGBAR/L...22-25 (JCT) KGBAR/L...22-25T5 KGBASR/L...22-25T5 KIGBAR/L...22 (Internal)	
		265-030GM	2.65			●	●			●	●	●	●				
		300-030GM	3.00			●	●			●	●	●	●				
		330-030GM	3.30			●	●			●	●	●	●				
		350-030GM	3.50			●	●			●	●	●	●			KGBAR/L...22-35 (JCT) KGBASR/L...22-35 KIGBAR/L...22 (Internal)	
		400-040GM	4.00		0.4	●	●			●	●	●	●				
 Molded Chipbreaker MY Chipbreaker 		GBA43R/L 175-020MY	1.75	3.5	0.2			●	●			●	●	●	●	KGBAR/L...22-15 (JCT) KGBASR/L...22-15 KIGBAR/L...22 (Internal)	
		185-020MY	1.85					●	●			●	●	●	●		
		200-020MY	2.00					●	●			●	●	●	●		
		230-020MY	2.30					●	●			●	●	●	●		
		250-030MY	2.50	4.0	0.3			●	●							★2	
				5.0								●	●	●	●	★1	
		265-030MY	2.65	4.0				●	●							★2	
				5.0								●	●	●		★1	
		300-030MY	3.00	4.0				●	●							★2	
				5.0								●	●	●	●	★1	
		330-030MY	3.30	4.0				●								★2	
				5.0								●	●	●		★1	
		350-030MY	3.50	5.0				●	●			●	●	●	●	KGBAR/L...22-35 (JCT) KGBASR/L...22-35 KIGBAR/L...22 (Internal)	
		400-040MY	4.00		0.4			●	●			●	●	●	●		

· CDX shows available grooving depth.

Recommended Cutting Conditions ➔ G111

* The edge width tolerance of GBA32R/L050-005F : 0.50 $^{+0.05}_{0}$

★Applicable Toolholders

1:KGBAR/L...22-25T5, KGBAR/L...22-25 (JCT), KGBASR/L...22-25T5, KIGBAR/L...22
2:KGBAR/L...22-25T5, KGBAR/L...22-25 (JCT), KGBASR/L...22-25T5, KGBASR/L...22-25, KIGBAR/L...22

● Rake Angle (α) after Installment of GBA-GM insert

α	Insert Description
10°	GBA43R/L150-020GM
15°	GBA43R/L175-020GM ~ GBA43R/L265-030GM
12°	GBA43R/L300-030GM ~ GBA43R/L400-040GM

α indicates the rake angle at the center of the edge width, after installing insert.

● Rake Angle (α) after Installment of GBA-MY insert

α	Insert Description
15°	GBA43R/L175-020MY ~ GBA43R/L350-030MY
14°	GBA43R/L400-040MY

α indicates the rake angle at the center of the edge width, after installing insert.

● : Std. Item

Inserts are sold in 10 piece boxes

Grooving Inserts

Applicable Inserts

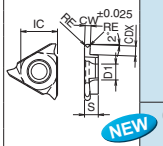
(mm)

Description	IC	S	D1
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

		Carbon Steel / Alloy Steel	Stainless Steel	Cast Iron	Non-ferrous Metals	Titanium Alloys	Hard Materials (~40HRC)	Hard Materials (40HRC~)
P	Carbon Steel / Alloy Steel	●	○		●	●	◔	
M	Stainless Steel				●	●	◔	
K	Cast Iron							◔
N	Non-ferrous Metals							●
S	Titanium Alloys							●
H	Hard Materials (~40HRC)					●	○	
	Hard Materials (40HRC~)							

Classification of usage
●:Continuous~Light Interruption / 1st Choice
◔:Continuous~Light Interruption / 2nd Choice
●:Continuous / 1st Choice
○:Continuous / 2nd Choice

See Page for Applicable Toolholders

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) CW	CDX	RE	MEGACOAT Cermet PV7040 R	PV7040 L	Cermet TN620 R	TN620 L	TN90 R	TN90 L	MEGA COAT NANO PR1625 R	PR1625 L	MEGA COAT PR1215 R	PR1215 L	PVD Coated Carbide PR1115 R	PR1115 L	PR905 R	PR905 L	PR930 R	PR930 L	Carbide KW10 R	KW10 L	Applicable Toolholders
 Full-R RF : Sharp Edge	GBA32R	200-100R	2.00	2.5	1.00							●		●		▲								KGBAR...16 (JCT) KGBASL...16 KIGBAL...16 (Internal)
		300-150R	3.00		1.50							●		●		▲								
Full-R (Round) 	GBA43R/L	100-050R	1.00	2.0	0.50	●	●			●	●	●	●	●	●					●	●	●	●	KGBAR/L...22-15 (JCT) KGBASL/R...22-15 KIGBAL/R...22 (Internal)
		150-075R	1.50	3.5	0.75	●	●			●	●	●	●	●	●			●		●	●	●	●	
		200-100R	2.00		1.00	●	●			●	●	●	●	●	●			●	●	●	●	●	●	
		250-125R	2.50	4.0	1.25					●		●	●	●	●					●	●	●	●	★2
		300-150R	3.00		1.50					●	●	●	●	●	●			●	●	●	●	●	●	
		400-200R	4.00	5.0	2.00					●		●	●	●	●					●	●	●	●	KGBAR/L...22-35 (JCT) KGBASL/R...22-35 KIGBAL/R...22 (Internal)
NEW	GBA43R/L	100-050RF	1.00	2.0	0.50			●	●															KGBAR/L...22-15 (JCT) KGBASL/R...22-15
		150-075RF	1.50	3.5	0.75			●	●															
		200-100RF	2.00		1.00			●	●															KIGBAL/R...22 (Internal)
		250-125RF	2.50	4.0	1.25			●	●															★2
		300-150RF	3.00		1.50			●	●															
		400-200RF	4.00	5.0	2.00			●																KGBAR/L...22-35 (JCT) KGBASL/R...22-35 KIGBAL/R...22 (Internal)

G9 ~ G11 G66 (Internal)

· CDX shows available grooving depth.

Recommended Cutting Conditions ➔ G111

★Applicable Toolholders
2:KGBAR/L...22-25T5, KGBASL/R...22-25T5, KGBAR/L...22-25, KGBASL/R...22-25, KIGBAL/R...22

Applicable Inserts

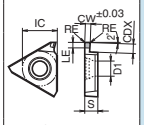
(mm)

Description	IC	S	D1
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

		Carbon Steel / Alloy Steel	Stainless Steel	Cast Iron	Non-ferrous Metals	Titanium Alloys	Hard Materials (~40HRC)	Hard Materials (40HRC~)
P	Carbon Steel / Alloy Steel							
M	Stainless Steel							
K	Cast Iron							
N	Non-ferrous Metals				●	●		
S	Titanium Alloys							
H	Hard Materials (~40HRC)							
	Hard Materials (40HRC~)			○		●		

Classification of usage
●:Continuous~Light Interruption / 1st Choice
◔:Continuous~Light Interruption / 2nd Choice
●:Continuous / 1st Choice
○:Continuous / 2nd Choice

See Page for Applicable Toolholders

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) CW	CDX	RE	CBN KBN510 R	KBN510 L	KBN525 R	KBN525 L	PCD KPD001 R	KPD001 L	KPD010 R	KPD010 L	Applicable Toolholders
 1-edge	GBA32R	125-010	1.25	2.0	0.1							●		KGBAR...16 (JCT) KGBASL...16 KIGBAL...16 (Internal)
		150-010	1.50							●		●		
 GBA32 LE=1.7 GBA43 LE=1.9	GBA43R/L	125-010	1.25	2.0	0.1							●	●	KGBAR/L...22-15 (JCT) KGBASL/R...22-15 KIGBAL/R...22 (Internal)
		125-020			0.2	●		●	●					
		150-010	1.50	3.5	0.1					●	●	●	●	
		150-020			0.2	●	●	●	●					
		200-010	2.00		0.1					●	●	●	●	
		200-020			0.2	●	●	●	●					
		250-010	2.50	4.0	0.1					●	●	●	●	★2
		250-020			0.2	●		●	●					
		300-010	3.00		0.1					●	●	●	●	
		300-020			0.2	●		●	●					

G9 ~ G11 G66 (Internal)

· CDX shows available grooving depth.

Recommended Cutting Conditions ➔ G111

★Applicable Toolholders
2:KGBAR/L...22-25T5, KGBAR/L...22-25 (JCT), KGBASL/R...22-25T5, KGBASL/R...22-25, KIGBAL/R...22

GBA inserts applicable for KGBA / KGBAS toolholders and KGB / KGBS toolholders.

● Rake Angle (α) after Installment of GBA insert

GBA32R/L○○○-○○○ α	GBA32R/L○○○-○○○ Insert Grades	GBA43R/L○○○-○○○ α	GBA43R/L○○○-○○○ Insert Grades	GBA43R/L○○○-○○○R (Full-R) α	GBA43R/L○○○-○○○R (Full-R) Insert Grades	Full-R Description
10°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625,PR905 KPD001,KPD010	0°	KBN510, KBN525	10°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625,PR905	050R~150R
		10°	TN620,TC40N,TN90,PV7040 PR930,PR1115,PR1215,PR1625,PR905 KPD001, KPD010	14°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625,PR905	200R
20°	KW10	20°	KW10		KW10	050R~200R

· For GM Chipbreaker and MY Chipbreaker, See page **G7**.

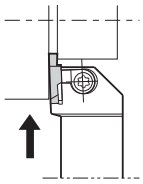
Inserts are sold in 10 piece boxes

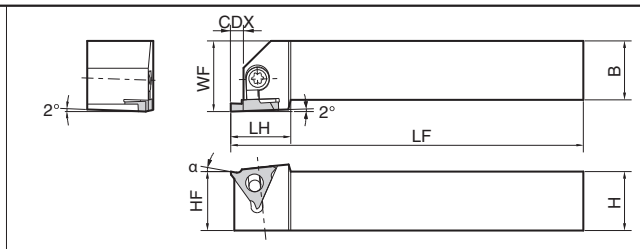
CBN & PCD Inserts are sold in 1 piece boxes

●: Std. Item
▲: To be replaced by a new product

External Shallow Grooving Toolholders

KGBA





• Right-hand shown

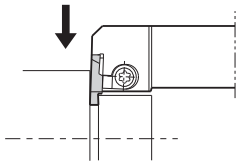
Right-hand Insert for Right-hand Toolholder,
Left-hand Insert for Left-hand Toolholder.

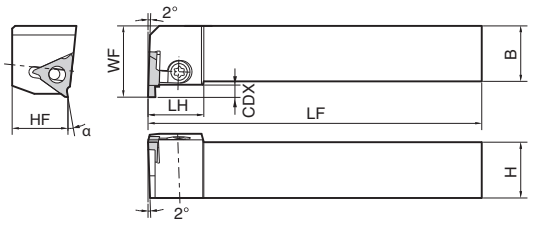
Alternative Toolholder Reference Table

KGBA ←	(KGB)
KGBA$^{R}_{L}$ ...22-15	KGB$^{R}_{L}$ ...22-15
KGBA$^{R}_{L}$ ...22-25	KGB$^{R}_{L}$ ...22-25
KGBA$^{R}_{L}$ ...22-35	KGB$^{R}_{L}$ ...22-35
KGBA$^{R}_{L}$ ...22-25T5	KGB$^{R}_{L}$ ...22-25 (Available grooving depth has a limit)

· Short shank type is not available for KGB / KGBS.

KGBAS





• Right-hand shown

Left-hand Insert for Right-hand Toolholder,
Right-hand Insert for Left-hand Toolholder.

Alternative Toolholder Reference Table

KGBAS ←	(KGBS)
KGBAS$^{R}_{L}$ ...22-15	KGBS$^{R}_{L}$ ...22-15
KGBAS$^{R}_{L}$ ...22-25	KGBS$^{R}_{L}$ ...22-25
KGBAS$^{R}_{L}$ ...22-35	KGBS$^{R}_{L}$ ...22-35
KGBAS$^{R}_{L}$ ...22-25T5	KGBS$^{R}_{L}$ ...22-25 (Available grooving depth has a limit)

Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	CDX	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts ➡ G6 ~ G8
KGBA$^{R}_{L}$	2020K-16	●	●	20	20	20	125	24	25	2.5	LGBA-16$^{R}_{L}$S	FT-15	GBA32$^{R}_{L}$ type
	2525M-16	●	●	25	25	25	150		30				
	2020K22-15	●	●	20	20	20	125	25.5	25	4.0	LGBA-22$^{R}_{L}$S		GBA43$^{R}_{L}$ type
	2525M22-15	●	●	25	25	25	150		30				
	2020K22-25	●	●	20	20	20	125	25.5	25	4.5			
	2525M22-25	●	●	25	25	25	150		30				
	2020K22-25T5	●	●	20	20	20	125	25.5	25	5.5			
	2525M22-25T5	●	●	25	25	25	150		30				
	2020K22-35	●	●	20	20	20	125	25.5	25				
	2525M22-35	●	●	25	25	25	150		30				
	2020H22-15*	●		20	20	20	100	25.5	25	4.0			
	2020H22-25*	●								4.5			
	2020H22-35*	●								5.5			
KGBAS$^{R}_{L}$	2020K-16	●	●	20	20	20	125	25	25	2.5	LGBA-16$^{L}_{R}$S	FT-15	GBA32$^{L}_{R}$ type
	2525M-16	●	●	25	25	25	150		30				
	2020K22-15	●	●	20	20	20	125	25	27	4.0	LGBA-22$^{L}_{R}$S		GBA43$^{L}_{R}$ type
	2525M22-15	●	●	25	25	25	150		32				
	2020K22-25	●	●	20	20	20	125	25	27	4.5			
	2525M22-25	●	●	25	25	25	150		32				
	2020K22-25T5	●	●	20	20	20	125	25	27	5.5			
	2525M22-25T5	●	●	25	25	25	150		32				
	2020K22-35	●	●	20	20	20	125	25	27				
	2525M22-35	●	●	25	25	25	150		32				

· CDX shows the distance from the toolholder to the cutting edge. Available Groove Depth : "CDX" of Insert.

* mark indicates short shank type

· Clamp Set : KGBA$^{R}_{L}$...LGBA-○○RS for Right-hand Toolholder and LGBA-○○LS for Left-hand Toolholder.
KGBAS$^{R}_{L}$...LGBA-○○LS for Right-hand Toolholder and LGBA-○○RS for Left-hand Toolholder.

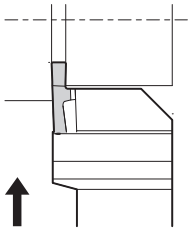
· See Page **G7** and **G8** for Applicable Insert & Rake Angle (α) after Installment of Insert.

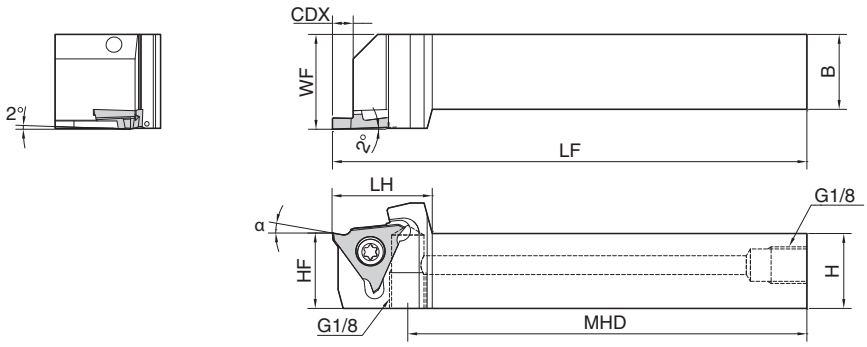
External Grooving Toolholders KGBA Short Shank types are available

For NC lathe and HSK tooling, KGBAR2020K-○○ (Overall length 125mm) short shank type KGBAR2020H22-○○ (Overall length 100mm) is available.
No longer required for the users to cut the shank portion.

● : Std. Item

KGBA-JCT (Coolant-through Holders) NEW





● Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock		Dimension (mm)									Spare Parts				Applicable Inserts
													Clamp Screw	Wrench		Plug	
		R	L	H	HF	B	LF	LH	WF	CDX	MHD						➔ G6~G8
KGBA R/L	2020K-16JCT	●	●	20	20	20	125	24.0	25	2.5	107.5		SB-4085TR	FT-15	-	HSG1/8X8.0	GBA32 R/L type
	2525K-16JCT	●	●	25	25	25			30								
	2020K22-15JCT	●	●	20	20	20		26.5	25	4	105		SB-5085TR	-	LTW-20		GBA43 R/L type
	2525K22-15JCT	●	●	25	25	25			30								
	2020K22-25JCT	●	●	20	20	20			25	5.5							
	2525K22-25JCT	●	●	25	25	25			30								
	2020K22-35JCT	●	●	20	20	20			25								
	2525K22-35JCT	●	●	25	25	25			30								

· CDX shows the distance from the toolholder to the cutting edge. Available Groove Depth : "CDX" of Insert.

· KGBA-JCT Toolholder is Screw Clamp Type

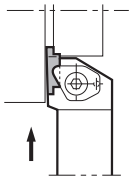
· See Page **G7** and **G8** for Applicable Insert & Rake Angle (α) after Installment of Insert.

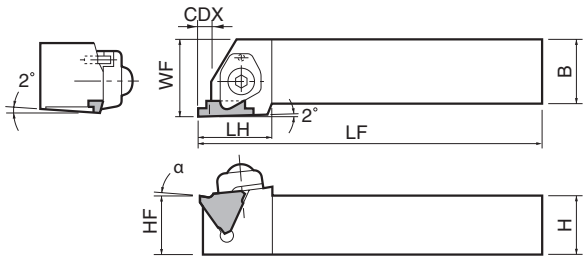
· Please see page **G27** for piping parts of coolant-through holders.

● : Std. Item

External Shallow Grooving Toolholders [for GBA Insert]

KGB (Will be switched to KGBA ➡ G9)

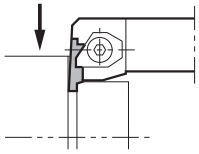


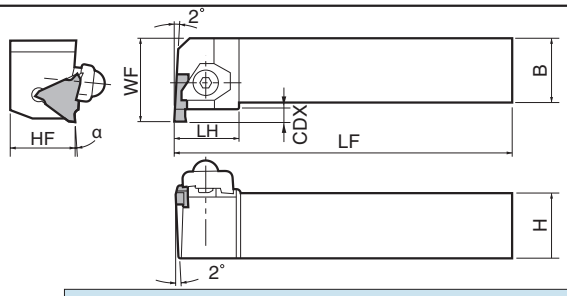


• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

KGBS (Will be switched to KGBAS ➡ G9)





• Right-hand shown

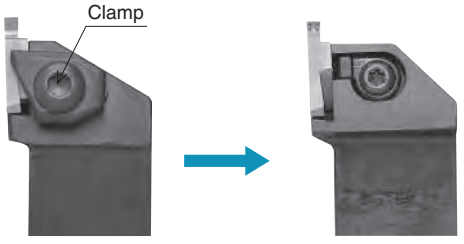
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	CDX	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench	Applicable Inserts ➡ G6~G8
KGB$^{R}_{L}$	2020K-16	▲	▲	20	20	20	125	24	25	2.5	CGB$^{R}_{L}$	BH6X25	SP-6	LW-4	GBA32$^{R}_{L}$ type
	2525M-16	▲	▲	25	25	25	150		30						
	2020K22-15	▲	▲	20	20	20	125	25.5	25	4.0					GBA43$^{R}_{L}$ type
	2525M22-15	▲	▲	25	25	25	150		30						
	2020K22-25	▲	▲	20	20	20	125	25.5	25	4.5					
	2525M22-25	▲	▲	25	25	25	150		30						
	2020K22-35	▲	▲	20	20	20	125	25.5	25	5.5					
	2525M22-35	▲	▲	25	25	25	150		30						
KGBS$^{R}_{L}$	2020K-16	▲	▲	20	20	20	125	25	25	2.5	CGB$^{L}_{R}$	BH6X25	SP-6	LW-4	GBA32$^{L}_{R}$ type
	2525M-16	▲	▲	25	25	25	150		30						
	2020K22-15	▲	▲	20	20	20	125	25	27	4.0					GBA43$^{L}_{R}$ type
	2525M22-15	▲	▲	25	25	25	150		32						
	2020K22-25	▲	▲	20	20	20	125	25	27	4.5					
	2525M22-25	▲	▲	25	25	25	150		32						
	2020K22-35	▲	▲	20	20	20	125	25	27	5.5					
	2525M22-35	▲	▲	25	25	25	150		32						

· CDX shows the distance from the toolholder to the cutting edge. Available Groove Depth : "CDX" of Insert.

· Clamp : KGB$^{R}_{L}$ ... CGBR for Right-hand Toolholder and CGBL for Left-hand Toolholder.
KGBS$^{R}_{L}$ ... CGBL for Right-hand Toolholder and CGBR for Left-hand Toolholder.



KGB Toolholder ➡ KGBA Toolholder

* KGB / KGBS toolholder will be switched to KGBA / KGBAS.
Better Chip flow.

▲ : To be replaced by a new product

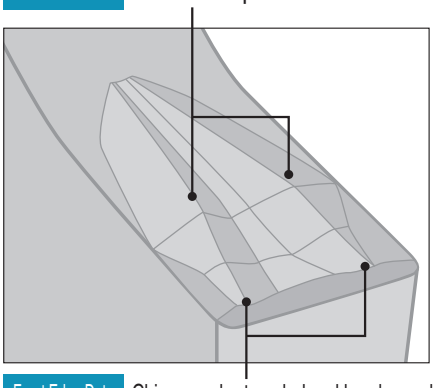
GBF

High Precision with Edge Width Tolerance of ±0.02mm
High Efficiency MEGACOAT Coating Technology for Long Tool Life

1 Stable Chip Control with GL Chipbreaker

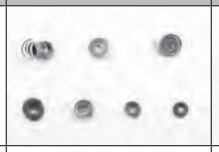
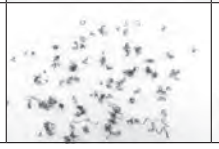
GL Chipbreaker controls chips stable at both grooving and turning.
(Turning is not recommended for GBF32R075-005GL)

Twin Dots Stable Chip Control



Front Edge Dots Chips are short, curled and break evenly in low feed machining.
Prevents chip clogging.

Chip Control Comparison (Internal evaluation)

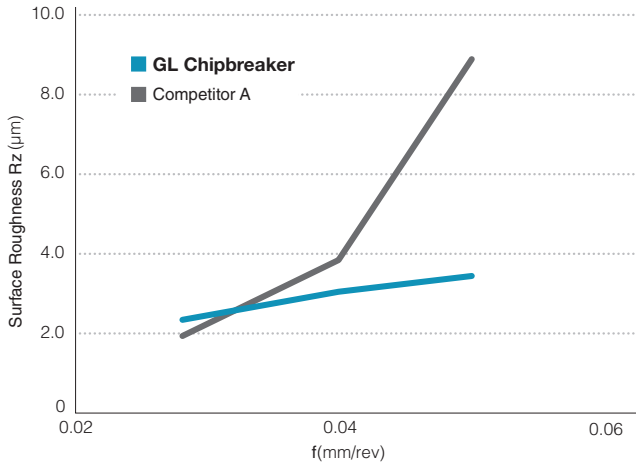
	GL Chipbreaker	Competitor A
Grooving f = 0.05 mm/rev d = 1.5 mm		
Turning f = 0.04 mm/rev ap = 0.2 mm		

Cutting Conditions : Vc = 80 m/min, Edge Width1 mm
Workpiece Material : SUS304

2 Good Surface Finish

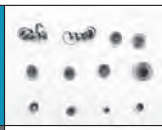
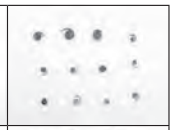
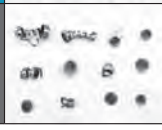
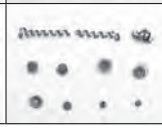
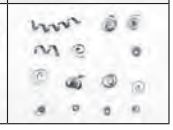
GL Chipbreaker controls chips stable at high feed machining,
Good surface finish of side wall

Surface Roughness Comparison (Internal evaluation)



Cutting Conditions : Vc = 80 m/min, d = 1.5 mm, f = 0.03~0.05 mm/rev, Edge Width1 mm
Workpiece Material : SCM415

Chip Control Comparison (Internal evaluation)

	f = 0.03	f = 0.04	f = 0.05
GL Chipbreaker			
Competitor A (Molded Chipbreaker)			

For Automatic Lathe Great for High Pressure Coolant Grooving Toolholders

Discharges coolant from the top of the insert. Provides excellent chip control and long tool life

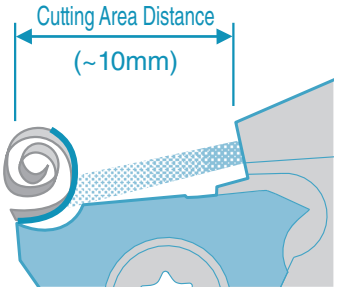


Coolant Hole

Ample supply of coolant to the cutting edge Prevents coolant stream spreading which slows the coolant flow

Direction of Supply

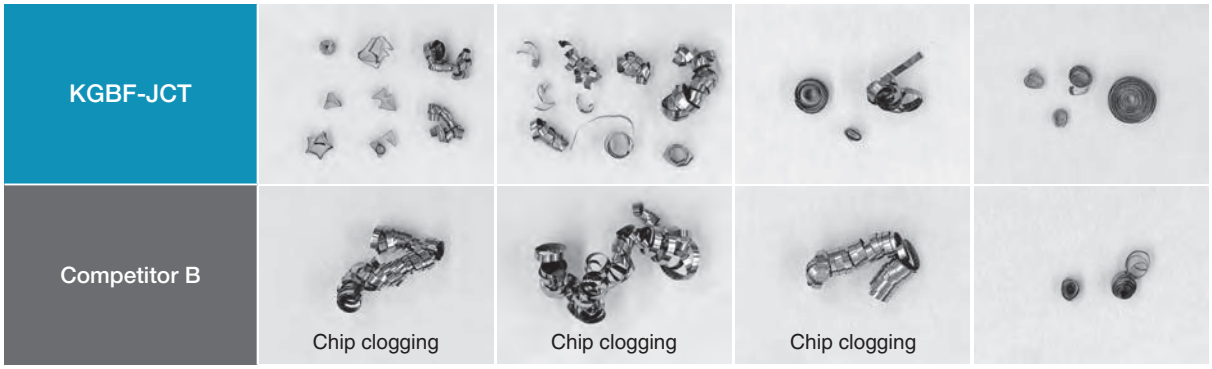
Sufficient coolant between the chipbreaker and the chips Stable chip curls and sufficient cooling of the insert



1 Excellent Chip Control

Chip Control Comparison (Internal evaluation)

KGBF-JCT provided much better chip control with reducing chip clogging

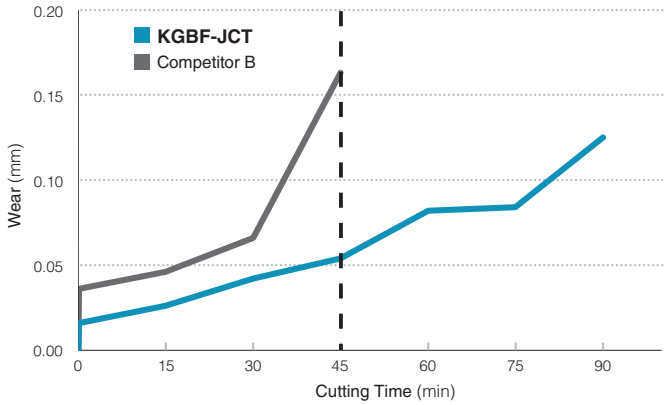


Cutting Conditions : Vc = 100 m/min, d = 2.5 mm, GBF32R200-010 PR1535, KGBFR1625H-16FJCT
Workpiece Material : TAB6400 (Ti-6Al-4V) External coolant + Internal coolant (1.5MPa) External Grooving

2 Superior Cooling Action Improves Tool Life

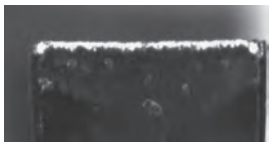
Wear Resistance Comparison (Internal evaluation)

KGBF-JCT Showed Superior Wear Resistance

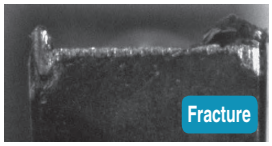


Cutting edge condition

KGBF-JCT



Competitor B



Cutting Conditions : Vc = 150 m/min, d = 1.8 mm, f = 0.06 mm/rev, GBF32R100-005GL PR1535, KGBFR1625H-16FJCT
Workpiece Material : SUS304 External coolant + Internal coolant External Grooving

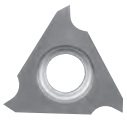
GBF / GBF-GL

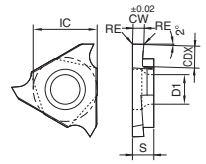
(mm)

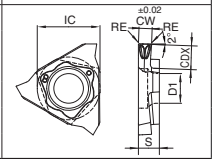
Description	IC	S	D1
GBF32_	9.525	3.18	4.4

P	Carbon Steel / Alloy Steel	●	◔	
M	Stainless Steel	○	●	
K	Cast Iron			●
N	Non-ferrous Metals			●
S	Titanium Alloys			●
H	Hard Materials (~40HRC)			
	Hard Materials (40HRC~)			

Classification of usage
- ● : Continuous~Light Interruption / 1st Choice
- ◔ : Continuous~Light Interruption / 2nd Choice
- ● : Continuous / 1st Choice
- ○ : Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) CW	CDX	RE	MEGACOAT PR1215 R	MEGACOAT PR1215 L	MEGACOAT NANO PR1535 R	MEGACOAT NANO PR1535 L	Carbide GW15 R	Carbide GW15 L	Applicable Toolholders	See Page for Applicable Toolholders
	GBF32R/L 025-000F	0.25	0.6	0.00	●	●	●	●	●	●	KGBFR/L...16F S...KGBFL/-16 KGBFSR/L...16 KGBFR/-...-16FJCT	G15 G16 G17
	025-005			0.05	●	●	●	●	●	●		
	030-000F	0.30	0.8	0.00	●	●	●	●	●	●		
	030-005			0.05	●	●	●	●	●	●		
	033-000F*1	0.33		0.00	●	●	●	●	●	●		
	033-005 *1			0.05	●	●	●	●	●	●		
	043-000F*2	0.43	1.0	0.00	●	●	●	●	●	●		
	043-005 *2			0.05	●	●	●	●	●	●		
	050-000F	0.50	1.2	0.00	●	●	●	●	●	●		
	050-005			0.05	●	●	●	●	●	●		
	053-000F*3	0.53		0.00	●	●	●	●	●	●		
	053-005 *3			0.05	●	●	●	●	●	●		
	065-000F	0.65		0.00	●	●	●	●	●	●		
	065-005			0.05	●	●	●	●	●	●		
	075-000F	0.75	2.0	0.00	●	●	●	●	●	●		
	075-005			0.05	●	●	●	●	●	●		
	080-000F	0.80		0.00	●	●	●	●	●	●		
	080-005			0.05	●	●	●	●	●	●		
	095-000F	0.95		0.00	●	●	●	●	●	●		
	095-005			0.05	●	●	●	●	●	●		
	100-000F	1.00		0.00	●	●	●	●	●	●		
	100-005			0.05	●	●	●	●	●	●		
	110-000F	1.10		0.00	●	●	●	●	●	●		
	110-005			0.05	●	●	●	●	●	●		
	120-000F	1.20		0.00	●	●	●	●	●	●		
	120-005			0.05	●	●	●	●	●	●		
	125-000F	1.25		0.00	●	●	●	●	●	●		
	125-005			0.05	●	●	●	●	●	●		
	125-010			0.1	●	●	●	●	●	●		
	130-000F	1.30		0.00	●	●	●	●	●	●		
	130-005			0.05	●	●	●	●	●	●		
	130-010			0.1	●	●	●	●	●	●		
	140-000F	1.40	2.7	0.00	●	●	●	●	●	●		
	140-005			0.05	●	●	●	●	●	●		
	140-010			0.1	●	●	●	●	●	●		
	145-000F	1.45		0.00	●	●	●	●	●	●		
	145-005			0.05	●	●	●	●	●	●		
	145-010			0.1	●	●	●	●	●	●		
	150-000F	1.50		0.00	●	●	●	●	●	●		
	150-005			0.05	●	●	●	●	●	●		
	150-010			0.1	●	●	●	●	●	●		
	165-000F	1.65		0.00	●	●	●	●	●	●		
	165-005			0.05	●	●	●	●	●	●		
	165-010			0.1	●	●	●	●	●	●		
	170-000F	1.70	3.0	0.00	●	●	●	●	●	●		
	170-005			0.05	●	●	●	●	●	●		
	170-010			0.1	●	●	●	●	●	●		
	175-000F	1.75		0.00	●	●	●	●	●	●		
	175-005			0.05	●	●	●	●	●	●		
	175-010			0.1	●	●	●	●	●	●		
	200-000F	2.00		0.00	●	●	●	●	●	●		
	200-005			0.05	●	●	●	●	●	●		
	200-010			0.1	●	●	●	●	●	●		
	225-005	2.25		0.05	●	●	●	●	●	●		
	225-010			0.1	●	●	●	●	●	●		
	250-005	2.50		0.05	●	●	●	●	●	●		
	250-010			0.1	●	●	●	●	●	●		
	300-005	3.00		0.05	●	●	●	●	●	●		
	300-010			0.1	●	●	●	●	●	●		
 Molded Chipbreaker	GBF32R 075-005GL	0.75	2.0	0.05	●		●					
	095-005GL	0.95	2.0	0.05	●		●					
	100-005GL	1.00	2.0	0.05	●		●					
	150-010GL	1.50	2.7	0.10	●		●					
	200-010GL	2.00	3.0	0.10	●		●					
	300-010GL	3.00	3.0	0.10	●		●					





Max. Cutting Dia. : See Page **G17**

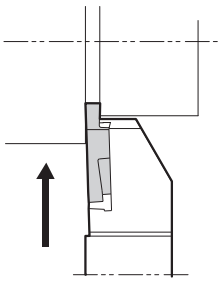
*1 Edge width tolerance of GBF32R/L033-000F/005 : $0.33^{+0.015}_{-0.025}$
*2 Edge width tolerance of GBF32R/L043-000F/005 : $0.43^{+0.015}_{-0.025}$
*3 Edge width tolerance of GBF32R/L053-000F/005 : $0.53^{+0.015}_{-0.025}$

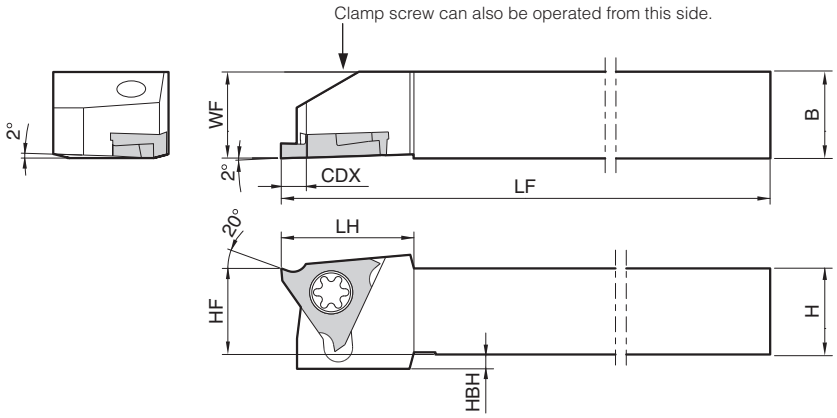
Recommended Cutting Conditions ➔ **G112**

● : Std. Item

Inserts are sold in 10 piece boxes

KGBF-F (without offset)





• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

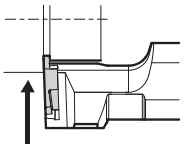
Toolholder Dimensions

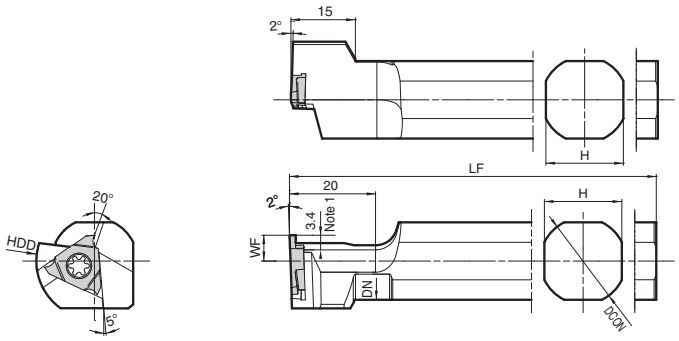
Description		Stock		Dimension (mm)						Spare Parts	
										Clamp Screw	Wrench
		R	L	H=HF	HBH	B=WF	LF	LH	*CDX		
KGBF R/L	1010JX-16F	●	●	10	4	10	120	18.5	3	SB-4070TRW	FT-8
	1212JX-16F	●	●	12	2	12					
	1616JX-16F	●	●	16	-	16					
	2020JX-16F	●	●	20	-	20					

* CDX shows the distance from the toolholder to the cutting edge. Available Groove Depth : "CDX" of Insert.

Applicable Inserts ➡ G14

S-KGBF (External Sleeve Holder)





• Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Note 1) CDX shows available grooving depth.

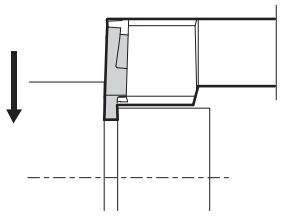
Toolholder Dimensions

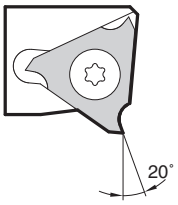
Description	Stock	Dimension (mm)						Spare Parts	
								Clamp Screw	Wrench
	L	DCON	LF	WF	DN	HDD	H		
S16F-KGBFL16	●	16	85	6	15	27	15	SB-4070TRW	FT-8
S19G-KGBFL16	●	19.05	90		18		17		
S19K-KGBFL16	●		120						
S20G-KGBFL16	●	20	90		19		18		
S20K-KGBFL16	●		120						
S22K-KGBFL16	●	22			21		20		
S25.0H-KGBFL16	●	25	100	10	24	32	23		
S25K-KGBFL16	●	25.4	120						

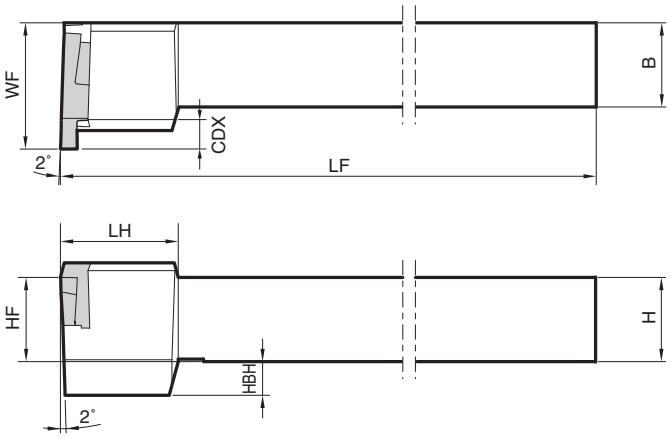
● : Std. Item

Applicable Inserts ➡ G14

KGBFS







• Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

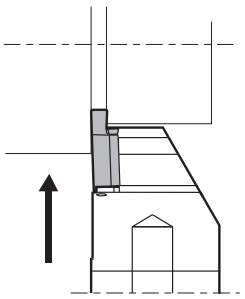
Description		Stock		Dimension (mm)							Spare Parts	
											Clamp Screw	Wrench
		R	L	H=HF	HBH	B	LF	LH	WF	CDX*1		
KGBFS R/L	1010JX-16	●	●	10	4	10	120	14	15	3	SB-4070TRW	FT-8
	1212JX-16	●	●	12	2	12			16			
	1616JX-16	●	●	16	-	16			20			

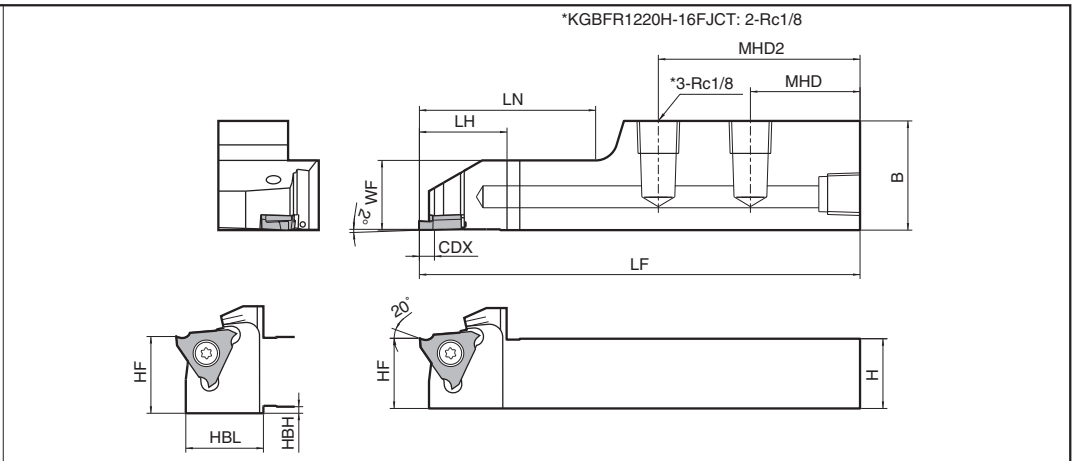
*1 CDX shows the distance from the toolholder to the cutting edge. Available Groove Depth : "CDX" of Insert.
Please check cautions on **G17** for the maximum workpiece diameter.

Applicable Inserts ➡ **G14**

● : Std. Item

KGBF-JCT (Coolant-through Holders)





● Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description		Stock		Dimension (mm)										Spare Parts		
														Clamp Screw	Wrench	Plug
		R	L	H=HF	HBH	B	LF	HBL	LH	LN	WF	CDX*1	MHD	MHD2			
KGBFR	1220H-16FJCT	●		12	1.5	20	100	20	20	28	12	3	35	-	SB-4070TRW	FT-8	GP-1
	1625H-16FJCT	●		16	-	25	100	-	20	40	16	3	25	46			
	2025H-16FJCT	●		20	-	25	100	-	20	40	20	3	25	46			

*1 CDX shows the distance from the toolholder to the cutting edge. Available Groove Depth : "CDX" of Insert.
Please see page **H14** and **H15** for piping parts of coolant-through holders.

Cautions

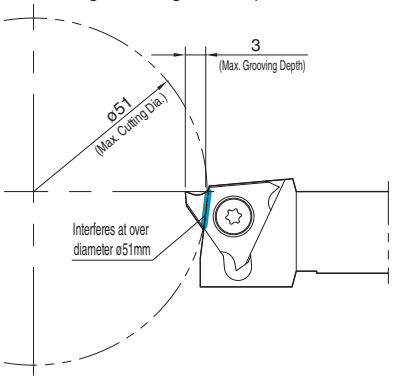
Compatibility with GBF and GBA

1 GBF will fit KGBA / KGBAS toolholders
Caution : The maximum groove depth for KGBA / KGBAS toolholders is 2.5 mm
2 GBA inserts will also fit KGBF-F toolholders
Caution : The rake angle after installation in the toolholder is 11˚

KGBF-F toolholder with GBF Insert Maximum Machining Diameter

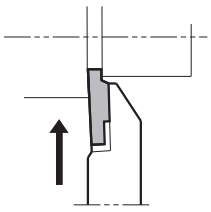
3 mm groove depth is available on workpiece diameters up to ø51mm
2.7 mm groove depth is available on workpiece diameters up to ø100mm,
2.5 mm or less groove depth is available on workpiece diameters up to ø200mm
The workpiece will interfere with the holder at maximum cutting diameters or larger.

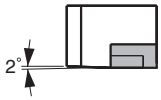
Machining at 3mm groove depth



● : Std. Item

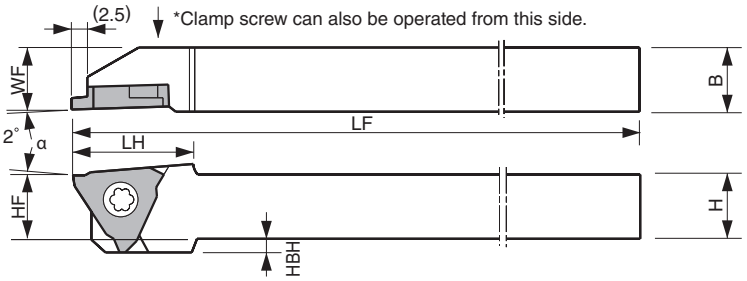
KTGF-F (without offset)





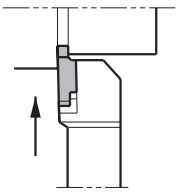
α	Insert Grades
20°	PR1115, PR1215 PR930, KW10
11°	KPD001
6°	TC40N

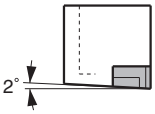
• Right-hand shown



Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

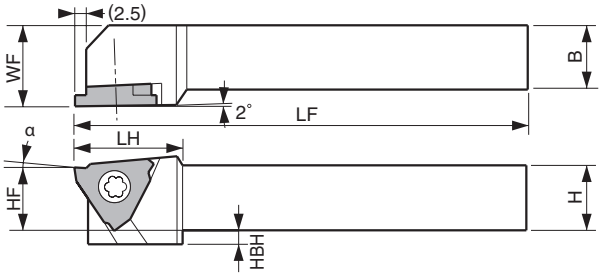
KTGF (with offset)





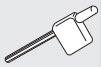
α	Insert Grades
20°	PR1115, PR1215 PR930, KW10
11°	KPD001
6°	TC40N

• Right-hand shown



Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

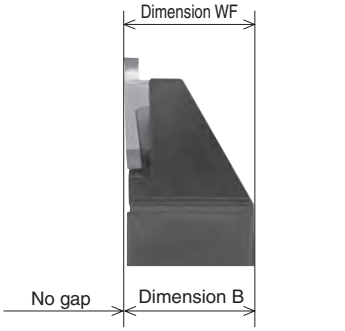
Toolholder Dimensions

Description		Stock		Dimension (mm)									Spare Parts				
													Clamp Screw	Wrench			
		R	L	H	HBH	HF	B	LF	LH	WF							
KTGF$^{R}_{L}$	1010JX-16F	▲	▲	10	2	10	10	120	18.5	10			SB-4070TRW	FT-8			
	1212JX-16F	▲	▲	12	-	12	12			12							
	1616JX-16F	▲	▲	16		16	16			16							
KTGF$^{R}_{L}$	1212F-16F	▲	▲	12	-	12	12	85	18.5	12			SB-4070TRW	FT-8			
KTGF$^{R}_{L}$	1010F-16	▲	▲	10	4	10	10	80	18.5	12			SB-4070TRS	FT-10			
	1212H-16	▲	▲	12	2	12	12	100		16							
	1616H-16	▲	▲	16	-	16	16	100		20							
	2020K-16	▲	▲	20		20	20	125	20	25							
	2525M-16	▲	▲	25		25	25	150		32							

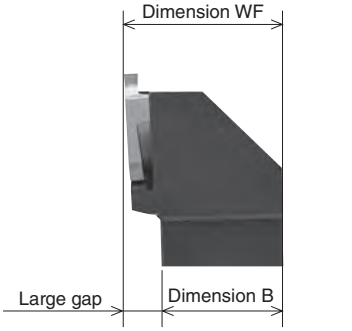
KTGF-F / KTGF Selection Reference

Q : When is it recommended to use "Without Offset" of KTGF-F toolholders for external grooving?

A : When operating the automatic lathe, the toolholder comes very close to the chuck.
In such cases, the "With Offset" toolholder sometimes interferes with the chuck due to the large gap between B and WF dimensions as shown below.
It is necessary to use “Without Offset” in such cases.



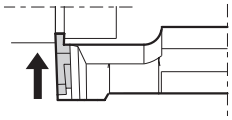
KTGF-F (without offset)

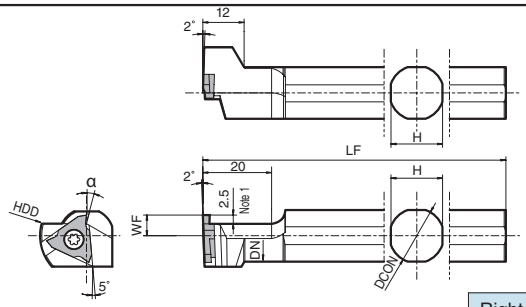


KTGF (with offset)

▲ : To be replaced by a new product

S-KTGF (External Sleeve Holder)





α	Insert Grades
20°	PR1115, PR1215 PR930, KW10
11°	KPD001
6°	TC40N

● Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Note 1) CDX shows available grooving depth.

Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts	
								Clamp Screw	Wrench
	L	DCON	LF	WF	DN	HDD	H		
S12F-KTGFL16	▲	12	80	6	11.0	27	11	SB-4070TRS	FT-10
S14H-KTGFL16	▲	14	100		13.0		13		
S15F-KTGFL16	▲	15.875	85		14.6		15		
S16F-KTGFL16	▲	16							
S19G-KTGFL16	▲	19.05	90		17.6		17		
S19K-KTGFL16	▲		120						
S20G-KTGFL16	▲	20	90		18.6		18		
S20K-KTGFL16	▲		120						
S25.0H-KTGFL16	▲	25	100	10	23.6	37	23		
S25K-KTGFL16	▲	25.4	120						

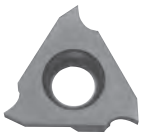
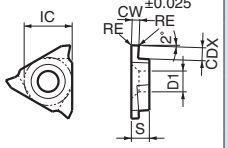
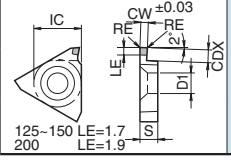
Applicable Inserts

(mm)

Description	IC	S	D1
TGF32_	9.525	3.18	4.6

P	Carbon Steel / Alloy Steel	● ○
M	Stainless Steel	● ○
K	Cast Iron	●
N	Non-ferrous Metals	● ●
S	Titanium Alloys	● ●
H	Hard Materials (~40HRC)	● ○
	Hard Materials (40HRC~)	

Classification of usage
●: Continuous~Light Interruption / 1st Choice
○: Continuous~Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) CW	CDX	RE	Cermet TC40N R	L	MEGA COAT PR1215 R	L	PVD Coated Carbide PR930 R	L	Carbide KW10 R	L	PCD KPD001 R	L	Applicable Toolholders	See Page for Applicable Toolholders
 	TGF32R/L 033-005	0.33	0.8	0.05			▲		▲		▲				KTGFR/L...16F KTGFR/L...16 S...KTGFL/-16	G18 G19
	050-005	0.50	1.2		▲		▲	▲	▲	▲	▲					
	075-010	0.75	2.0	0.1	▲		▲	▲	▲	▲	▲					
	095-010	0.95			▲		▲	▲	▲	▲	▲					
	100-010	1.00			▲		▲	▲	▲	▲	▲					
	120-010	1.20					▲	▲								
	125-010	1.25			▲		▲	▲	▲	▲	▲					
	140-010	1.40					▲	▲								
	145-010	1.45			▲		▲	▲	▲	▲	▲					
	150-010	1.50			▲		▲	▲	▲	▲	▲					
	175-010	1.75			▲		▲	▲	▲	▲	▲					
	200-010	2.00	2.5		▲		▲	▲	▲	▲	▲					
	250-010	2.50			▲		▲	▲	▲	▲	▲					
 1-edge 	TGF32R 125-010	1.25	2.0	0.1									▲			
	150-010	1.50											▲			
	200-010	2.00	2.5										▲			

· CDX shows available grooving depth.

Recommended Cutting Conditions ➡ G113

▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

CBN & PCD Inserts are sold in 1 piece boxes

Features

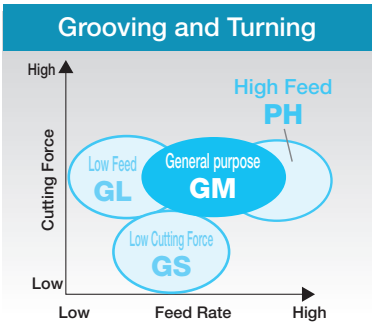
1 Various insert lineup

Smooth chip control
➡ Chipbreakers for a wide variety of workpiece materials are available

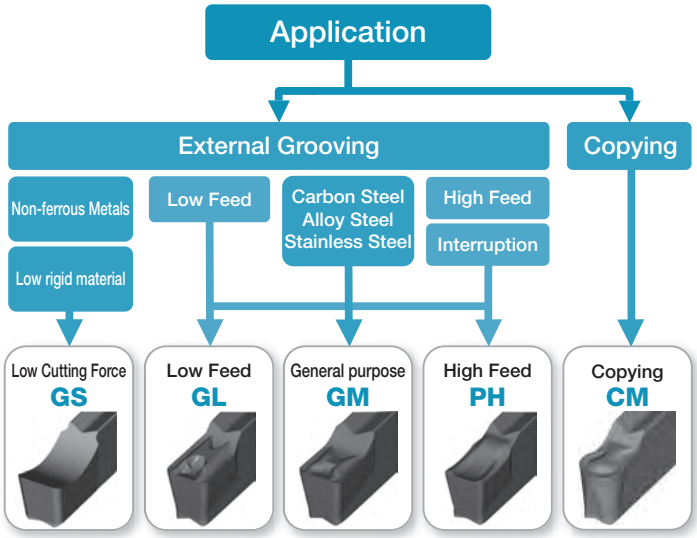
High precision edge preparation
➡ High precision molding technology with tolerance ±0.03mm (Edge width 2, 3, 4mm types)

Highly-reputed MEGACOAT coating technology
➡ Long tool life and high efficiency machining achieved by superior oxidation resistance and wear resistance.

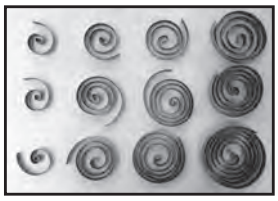
Application Map



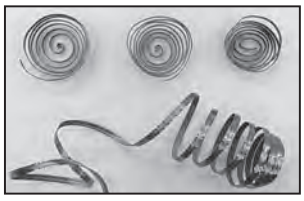
Chipbreaker Selection



Chip Control Comparison (SCM415 Vc=150m/min, f=0.15mm/rev)


GM Chipbreaker


Competitor A

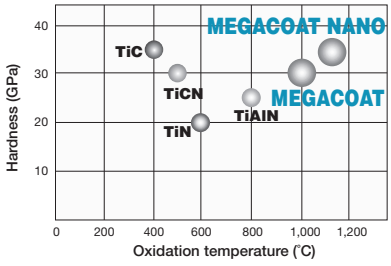

Competitor B

Smooth chip control

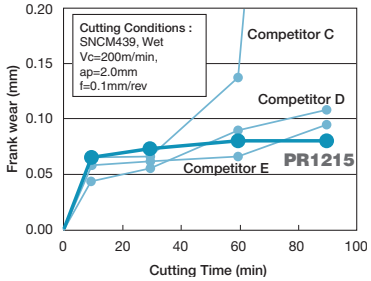
⬇

Less chip biting troubles

Excellent coating properties



Wear Resistance Comparison



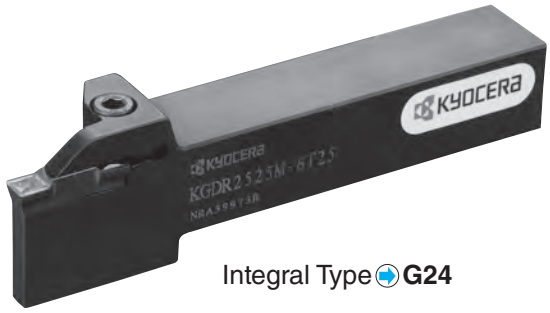
PR1225:
1st choice for cut-off, grooving and turning

PR1215:
With superior wear resistance, recommended for grooving and cut-off under the stable conditions as well as machining of cast iron.

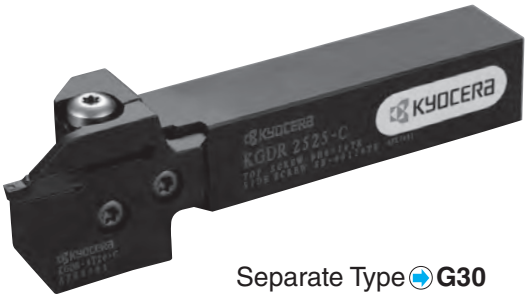
PR1535:
1st Recommendation for stainless steel and titanium alloy machining

2 Toolholder

Integral Type and Separate Type (Toolholder + Blade) are available



Integral Type G24

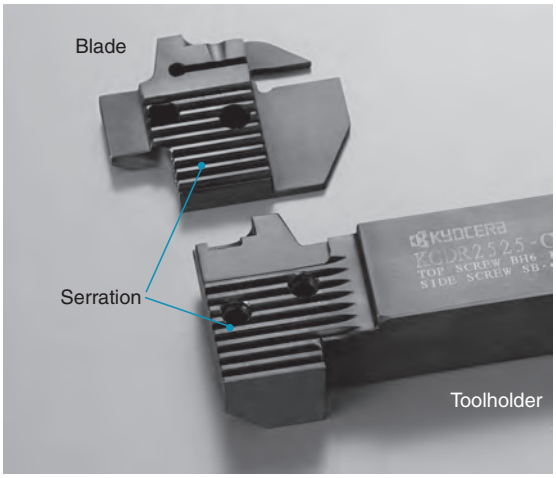


Separate Type G30

High rigidity separate type toolholder

Adaptable to wide applications by changing blades

Deals with various edge widths and cutting depths by changing the blade and toolholder combination.
Even if the blade is broken, you only need to replace the broken part.

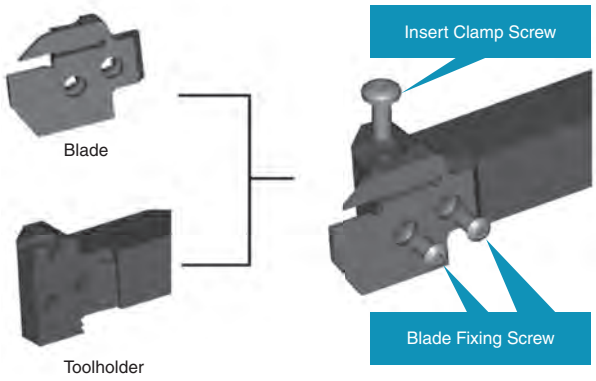


Toolholders for High Pressure Coolant G26

Added coolant-through holder KGD-JCT with superior chip control and long tool life

Structure of toolholder unit (Toolholder + Blade)

KGD-S (0° Separate Type) G30

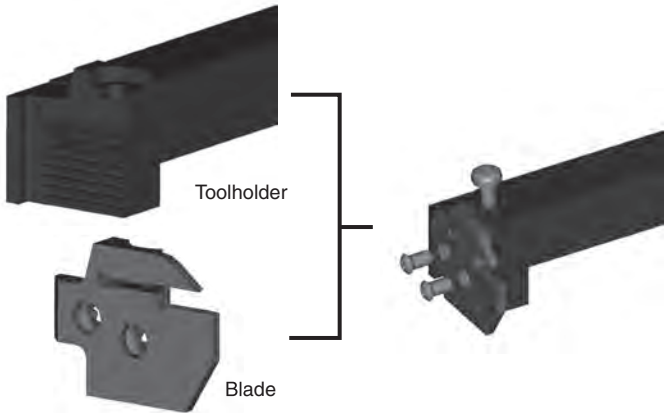


*** Note for the toolholder and blade combination of 0˚ Separate Type**

Toolholder (KGD$^{R}_{L}$ ○○○○ -C)
+
Blade (KGD$^{R}_{L}$- ○T○○ -C)

⇒Right-hand Blade for Right-hand Toolholder,
Left-hand Blade for Left-hand Toolholder.

KGDS-S (90° Separate Type) G31



*** Note for the toolholder and blade combination of 90˚ separate type**

Toolholder (KGDS$^{R}_{L}$ ○○○○ -C)
+
Blade (KGD$^{L}_{R}$- ○T○○ -C)

⇒Left-hand Blade for Right-hand Toolholder,
Right-hand Blade for Left-hand Toolholder.

Inserts for Grooving and Cut-off

GDM / GDMS / GDG

Classification of usage									
●:Continuous-Light Interruption / 1st Choice ◔:Continuous-Light Interruption / 2nd Choice ●:Continuous / 1st Choice ○:Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	●	○		◔	◔		
	M	Stainless Steel			◔	◔	◔		
	K	Cast Iron					◔		
	N	Non-ferrous Metals						◔	
	S	Titanium Alloys			◔			◔	
	H	Hard Materials (~40HRC)				○			
		Hard Materials (40HRC~)							

Insert			Description		Dimension (mm)					Cermet		MEGACOAT NANO	MEGACOAT		Carbide	See Page for Applicable Toolholders
					CW	Tolerance	RE	INSL	S	TN620	TN90	PR1535	PR1225	PR1215	GW15	
Grooving and Turning	General purpose		GDM	2420N-020GM	2.4	±0.03	0.2	20	4.3	●	●	●	●	●		G24 ~ G31
				3020N-020GM	3.0					●	●	●	●	●		
				3020N-040GM			0.4			●	●	●	●	●		
				4020N-020GM	4.0		0.2			●	●	●	●	●		
				4020N-040GM			0.4			●	●	●	●	●		
				4020N-080GM			0.8			●	●	●	●	●		
				5020N-040GM	5.0	±0.04	0.4			●	●	●	●	●		G24 G30 G31
				5020N-080GM			0.8			●		●	●	●		
				6020N-040GM	6.0		0.4			●	●	●	●	●		
				6020N-080GM			0.8			●	●	●	●	●		
				8030N-080GM	8.0	±0.05		30	5.5			●	●	●		G24
	General purpose 1-edge		GDMS	2220N-020GM	2.2	±0.03	0.2	20	4.3	●	●	●	●	●		G24 ~ G31
				3020N-040GM	3.0		0.4			●		●	●	●		
				4020N-040GM	4.0					●	●	●	●	●		
				5020N-080GM	5.0	±0.04	0.8			●		●	●	●		G24 G30 G31
				6020N-080GM	6.0					●		●	●	●		
	Low Feed		GDM	2420N-020GL	2.4	±0.03	0.2	20	4.3	●	●	●	●	●		G24 ~ G31
				3020N-020GL	3.0					●	●	●	●	●		
				3020N-040GL			0.4			●	●	●	●	●		
				4020N-020GL	4.0		0.2			●	●	●	●	●		
				4020N-040GL			0.4			●		●	●	●		
				5020N-040GL	5.0	±0.04				●	●	●	●	●		G24 G30 G31
				6020N-040GL	6.0					●		●	●	●		
Grooving	Low Cutting Force		GDG	2520N-020GS	2.5	±0.02	0.2	20	4.3	●	●	●	●	●	●	G24 ~ G31
				3020N-020GS	3.0					●	●	●	●	●	●	
				3520N-020GS	3.5					●		●	●	●	●	
				4020N-040GS	4.0		0.4			●	●	●	●	●	●	
				5020N-040GS	5.0					●	●	●	●	●	●	G24 G30 G31
				6020N-040GS	6.0					●		●	●	●	●	
				8030N-040GS	8.0			30	5.5	●		●	●	●	●	G24
Full-R / Copying			GDM	3020N-150R-CM	3.0	±0.03	1.5	20	4.3	●	●	●	●	●		G24 ~ G31
				4020N-200R-CM	4.0		2.0			●	●	●	●	●		
				5020N-250R-CM	5.0	±0.04	2.5	*21		●	●	●	●	●		G24 G30 G31
				6020N-300R-CM	6.0		3.0			●		●	●	●		
Grooving / Cut-off	High Feed		GDM	2020N-020PH	2.0	±0.03	0.2	20	4.3			●	●	●		G24 ~ G31
				3020N-030PH	3.0		0.3					●	●	●		
				4020N-030PH	4.0							●	●	●		
	High Feed 1-edge		GDMS	2020N-020PH	2.0	±0.03	0.2	20				●	●	●		
				3020N-030PH	3.0		0.3					●	●	●		
				4020N-030PH	4.0							●	●	●		

*GDM50/60-CM differs from other descriptions in length (INSL) to avoid interference of a toolholder with workpiece.

Recommended Cutting Conditions ➔ G34, G35

Inserts Identification System

(1) Series	(2) Tolerance Symbol	(3) No. of edge	(4) Edge Width	(5) Insert Length	(6) Hand of Tool	(7) Corner-R(RE)	(8) Chipbreaker Symbol
GD	M : M Class G : G Class	No Indication : 2-edge S : 1-edge	20 : 2mm 30 : 3mm 40 : 4mm	20 : 20mm 30 : 30mm	N : Neutral	020 : 0.2mm 040 : 0.4mm 150R : 1.5mm (Full-R)	GM : Grooving and Turning GL : Low Feed GS : Low Cutting Force CM : Copying PH : High Feed NB : Without Chipbreaker

Example: GDMS30 20N-040GM

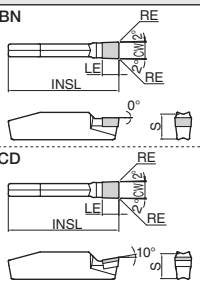
Inserts are sold in 10 piece boxes

● : Std. Item

Inserts for Grooving

GDGS (CBN / PCD)

Classification of usage					
◕:Continuous~Light Interruption / 1st Choice ◔:Continuous~Light Interruption / 2nd Choice ●:Continuous / 1st Choice ○:Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel			
	M	Stainless Steel			
	K	Cast Iron			
	N	Non-ferrous Metals			●
	S	Titanium Alloys			●
	H	Hard Materials (~40HRC)			
		Hard Materials (40HRC~)	●		
		Sintered Steel		●	

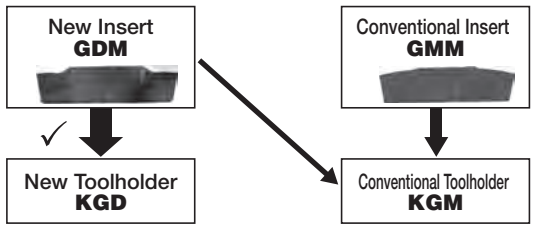
Insert			Description	Dimension (mm) CW	CW Tolerance	RE	INSL	S	LE	MEGA COAT CBN KBN05M	CBN KBN570	PCD KPD001	See Page for Applicable Toolholders
Grooving	 1-edge	CBN / PCD 	GDGS 2020N-020NB	2.0	±0.03	0.2	20	4.3	2.9	●	●	●	G24 ~ G31
			3020N-020NB	3.0		0.2						●	
			3020N-040NB			0.4				●	●		
			4020N-020NB	4.0		0.2						●	
			4020N-040NB			0.4				●	●		
			5020N-020NB	5.0		0.2						●	G24 G30 G31
			5020N-040NB			0.4				●	●		
			6020N-020NB	6.0		0.2						●	
			6020N-040NB			0.4				●			

Recommended Cutting Conditions ➡ G34, G35

Note for the toolholder and insert combination of KGD (new) and KGM (conventional)

● Insert setting angle for grooving toolholders

KGD : 0°	Conventional tools KGM : 5°
	

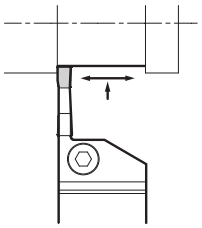


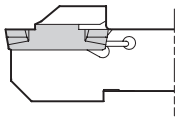
Installing conventional inserts to the new toolholder is not recommended.

● : Std. Item

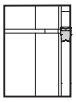
CBN & PCD Inserts are sold in 1 piece boxes

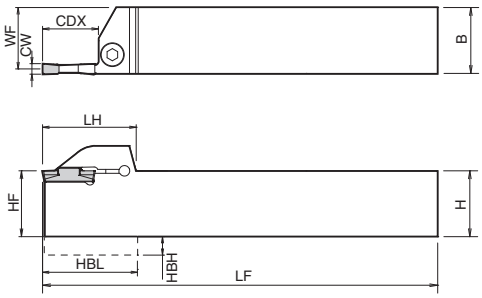
KGD (Integral Type)





KGD$^{R/L}$1216JX-3T06
KGD$^{R/L}$1216JX-4T06
shows above figure





● Right-hand shown

Toolholder Dimensions

Width (mm)	Max. depth of cut (mm)	Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	HBL	WF	CDX	Edge Width CW(mm) MIN.	Edge Width CW(mm) MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
2	6	KGD$^{R/L}$	1616H-2T06	●	●	16	16	4.0	16	100	27.7	28.0	15.2	6	2.0	3.0	HH5X16	LW-4
			2020K-2T06	●	●	20	20	-	20	125	28.0	-	19.2					
			2525M-2T06	●	●	25	25		25	150			24.2				HH5X25	
	10	KGD$^{R/L}$	1616H-2T10	●	●	16	16	4.0	16	100	30.2	30.5	15.2	10			HH5X16	
			2020K-2T10	●	●	20	20	-	20	125	30.5	-	19.2					
			2525M-2T10	●	●	25	25		25	150			24.2				HH5X25	
	17	KGD$^{R/L}$	1616H-2T17	●	●	16	16	4.0	16	100	31.2	31.5	15.2	17			HH5X16	
			2012K-2T17	●	●	20	20	-	12	125	32.5	-	11.2					
			2020K-2T17	●	●				20				19.2					
			2525M-2T17	●	●	25	25		25	150			24.2				HH5X25	
2.4	17	KGD$^{R/L}$	2012K-2.4T17	●	●	20	20	-	12	125	32.5	-	11.0	17	2.4	3.0	HH5X16	LW-4
			2020K-2.4T17	●	●				20				19.0					
3	6	KGD$^{R/L}$	1216JX-3T06	●	●	12	12	2.0	16	120	19.5	19	14.8	6	3.0	4.0	SE-50125TR	LTW-20
			1616H-3T06	●	●	16	16	4.0		100	27.7	28.0					HH5X16	LW-4
			2020K-3T06	●	●	20	20	-	20	125	28.0	-	18.8					
			2525M-3T06	●	●	25	25		25	150			23.8				HH5X25	
	10	KGD$^{R/L}$	1616H-3T10	●	●	16	16	4.0	16	100	30.2	30.5	14.8	10			HH5X16	
			2020K-3T10	●	●	20	20	-	20	125	30.5	-	18.8					
			2525M-3T10	●	●	25	25		25	150			23.8				HH5X25	
	20	KGD$^{R/L}$	1616H-3T20	●	●	16	16	4.0	16	100	34.2	34.5	14.8	20			HH5X16	
			2012K-3T20	●	●	20	20	-	12	125	34.5	-	10.8					
			2020K-3T20	●	●				20				18.8					
			2525M-3T20	●	●	25	25		25	150	35.5		23.8				HH5X25	
4	6	KGD$^{R/L}$	1216JX-4T06	●	●	12	12	2.0	16	120	19.5	19	14.3	6	4.0	5.0	SE-50125TR	LTW-20
	10	KGD$^{R/L}$	2020K-4T10	●	●	20	20	-	20	125	30.5	-	18.3	10			HH5X16	LW-4
			2525M-4T10	●	●	25	25		25	150			23.3				HH5X25	
	20	KGD$^{R/L}$	2020K-4T20	●	●	20	20		20	125	34.5		18.3	20			HH5X16	
			2525M-4T20	●	●	25	25		25	150	35.5		23.3				HH5X25	
	25	KGD$^{R/L}$	2525M-4T25	●	●	25	25		25	150	40.5		23.3	25				
5	10	KGD$^{R/L}$	2020K-5T10	●	●	20	20	-	20	125	30.5	-	17.8	10	5.0	6.0	HH5X16	LW-4
			2525M-5T10	●	●	25	25		25	150			22.8				HH5X25	
	17	KGD$^{R/L}$	2020K-5T17	●	●	20	20		20	125	37.5		17.8	17				
			2525M-5T17	●	●	25	25		25	150			22.8					
	25	KGD$^{R/L}$	2525M-5T25	●	●	25	25		25	150	40.5		22.8	25				
6	15	KGD$^{R/L}$	2525M-6T15	●	●	25	25	-	25	150	32.5	-	22.4	15	6.0	6.0	HH5X25	LW-4
	30	KGD$^{R/L}$	2525M-6T30	●	●	25	25		25	150	45.5		22.4	30				
8	25	KGD$^{R/L}$	2525M-8T25	●	●	25	25	7.0	25	150	43.3	44.2	22.0	25	8.0	8.0	HH6X25	LW-5
			3232P-8T25	●	●	32	32	-	32	170		-	29.0				HH6X25	

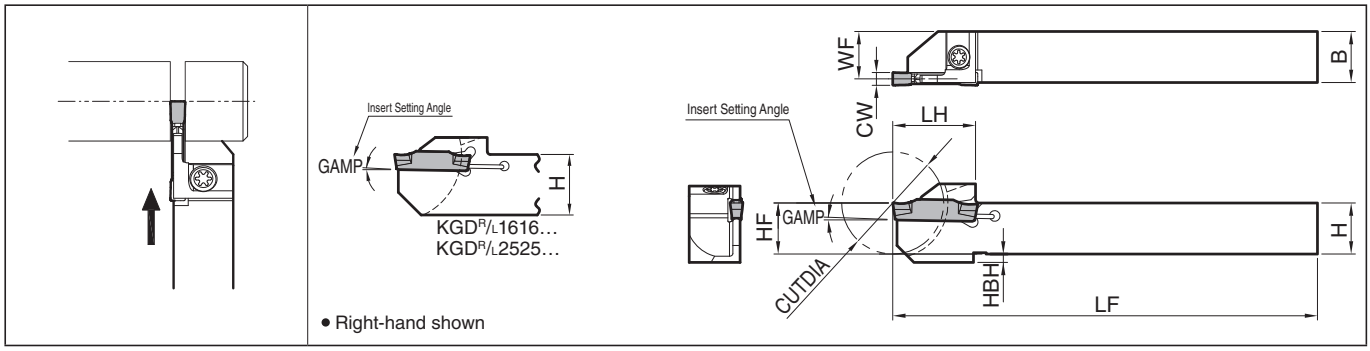
Note) 1. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)
2. Recommended tightening torque of clamp bolt : 6.5N·m (HH5X○○), 8.0N·m (HH6X25), 2.5N·m (SE-50125TR)
3. Above toolholders are applicable to Cut-off, too.

Applicable Inserts ➡ G22, G23

● : Std. Item

KGD (Integral Type for Automatic Lathe)

Edge Width : 2.0~4.0mm



Toolholder Dimensions

Description		Stock R	Stock L	Cutting Dia. CUTDIA	Dimension (mm) H	HF	HBH	B	LF	LH	WF	Angle GAMP	Edge Width CW(mm) MIN.	MAX.	Spare Parts: Clamp Screw	Spare Parts: Wrench
KGDR/L	1010JX-2	●	●	20	10	10	2	10	120	18	9.2	1°	2.0	3.0	SB-40120TR	LTW-15S
	1212F-2	●	●	24	12	12		12	85	19.5	11.2					
	1212JX-2	●	●						120							
	1616JX-2	●	●	32	16	16	-	16		24.5	15.2					
	2012K-2D34	●	●	34	20	20		12	125	32.5	11.2	0°			HH5X16	LW-4
	2020K-2D34	●	●					20			19.2					
	2525K-2D34	●	●		25	25		25			24.2					
KGDR/L	1010JX-2.4	●	●	20	10	10	2	10	120	18	9	1°	2.4	3.0	SB-40120TR	LTW-15S
	1212F-2.4	●	●	24	12	12		12	85	19.5	11					
	1212JX-2.4	●	●						120							
	1616JX-2.4	●	●	32	16	16	-	16		24.5	15					
	2012K-2.4D34	●	●	34	20	20		12	125	32.5	11	0°			HH5X16	LW-4
	2020K-2.4D34	●	●					20			19					
	2525K-2.4D34	●	●		25	25		25			24					
KGDR/L	1212JX-3	●	●	24	12	12	2	12	120	19.5	10.8	1°	3.0	3.0	SB-40120TR	LTW-15S
	1616JX-3	●	●	32	16	16	-	16		24.5	14.8			4.0	SE-50125TR	LTW-20
	1616JX-3D38	●	●	38						29						
	1913K-3D38	●	●		19	19		13	125		11.8					
	2012JX-3D42	●	●	42	20	20		12	120	31	10.8					
	2012JX-3D51	●	●	51						36						
	2020JX-3D42	●	●	42				20		31	18.8					
	2020JX-3D51	●	●	51						36						
	2525K-3D51	●	●		25	25		25	125	41.5	23.8	0°			HH5X16	LW-4

Note) 1. 4mm width Insert cannot be installed in KGDR/L1212JX-3

2. Recommended tightening torque of clamp screw : 2.0N·m (SB-40120TR), 2.5N·m (SE-50125TR), 6.5N·m (HH5X16)

3. When machining the material greater than ø36mm with KGDR/L...-3D38, KGDR/L...-3D42 and KGDR/L...-3D51 toolholders, please use 1-edge inserts. Maximum cuttinng diameter for 2-edge inserts is ø36mm.

Applicable Inserts ➡ G22, G23

Toolholder Identification System

K G D	R	1616	JX	-	3	T	06			
	Toolholder Hand	Shank Size	Toolholder Length		Applicable Inserts		Max. depth of cut			
	R : Right-hand L : Left-hand	16 x 16mm	120mm		GDM / GDMS 3~4mm		06 : 6mm			

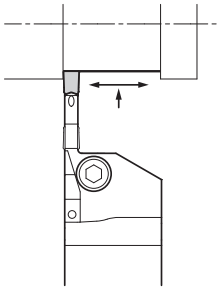
Cutting Dia. CUTDIA 38mm → D38 (Integral Type for Automatic Lathe)

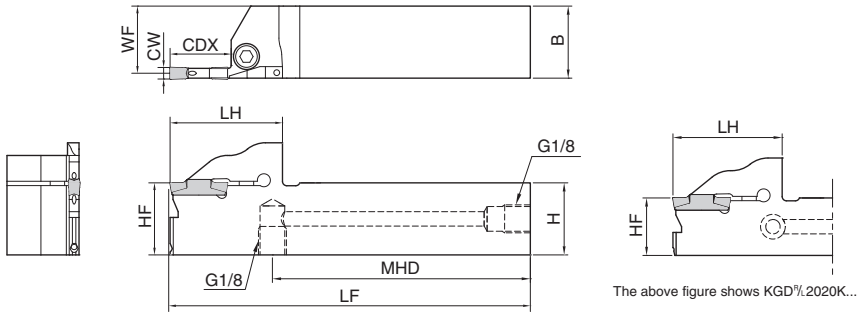
06 (Integral Type)

K G D KGDS	R	2020	X	-	3	T	10	S	(Separate Type / Unit Description)	
	Toolholder Hand	Shank Size	Toolholder Type		Applicable Inserts		Max. depth of cut			
	R : Right-hand L : Left-hand	20 x 20mm	Unit Description		GDM / GDMS 3~4mm		10 : 10mm			

● : Std. Item

KGD-JCT (Coolant-through Holders)





The above figure shows KGD$^{R}_{L}$2020K...

● Right-hand shown

Toolholder Dimensions

Pressure Resistance : ~15MPa

Width (mm)	Max. depth of cut (mm)	Description		Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	CDX	MHD	Edge Width CW (mm) MIN.	MAX.	Spare Parts: Clamp Bolt	Wrench	Plug
3	6	KGD$^{R}_{L}$	2020K-3T06JCT	●	●	20	20	20	125	31.5	18.8	6	96.2	3.0	4.0	HH5X16	LW-4	HSG1/8X8.0
			2525K-3T06JCT	●	●	25	25	25			23.8		96.5			HH5X25		
	10		2020K-3T10JCT	●	●	20	20	20		34.0	18.8	10	94.2			HH5X16		
			2525K-3T10JCT	●	●	25	25	25			23.8		94.5			HH5X25		
	20		2020K-3T20JCT	●	●	20	20	20		38.0	18.8	20	90.2			HH5X16		
			2525K-3T20JCT	●	●	25	25	25		39.0	23.8		89.5			HH5X25		
4	10	KGD$^{R}_{L}$	2020K-4T10JCT	●	●	20	20	20	125	34.0	18.3	10	94.2	4.0	5.0	HH5X16	LW-4	HSG1/8X8.0
			2525K-4T10JCT	●	●	25	25	25			23.3		94.5			HH5X25		
	20	KGD$^{R}_{L}$	2020K-4T20JCT	●	●	20	20	20		38.0	18.3	20	90.2			HH5X16		
			2525K-4T20JCT	●	●	25	25	25		39.0	23.3		89.5			HH5X25		
	25	KGD$^{R}_{L}$	2525K-4T25JCT	●	●	25	25	25		44.0	23.3	25	84.5					

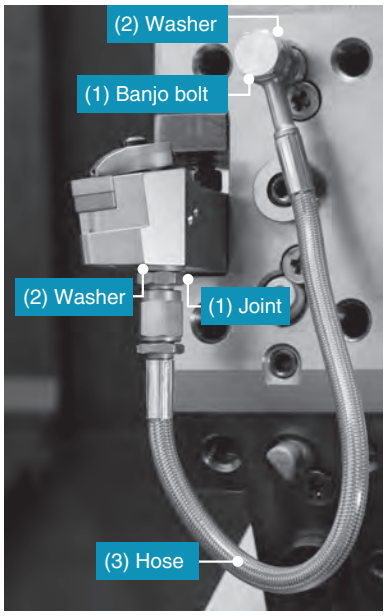
Please see page **G27** for piping parts of coolant-through holders.

Applicable Inserts ➡ **G22, G23**

● : Std. Item

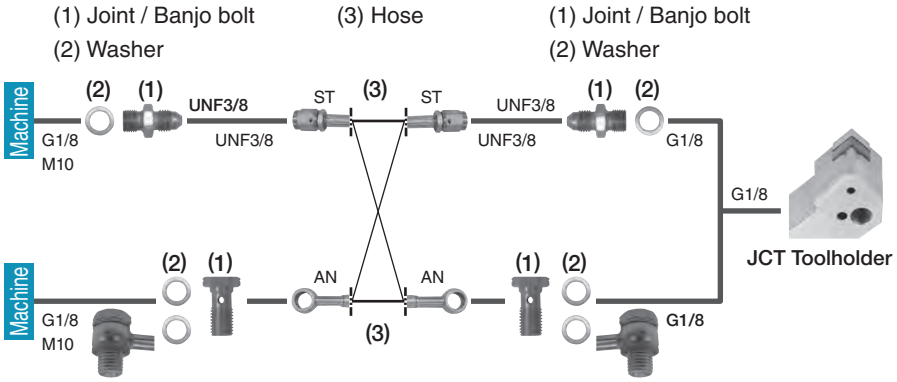
Easy Coolant Connections

Easy Connection with High Pressure Hose and Joint



- **Even without a high pressure pump, internal coolant can be used at a normal pressure.**
- **Banjo bolt available for angled hose connection Can be used in a variety of machines**

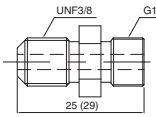
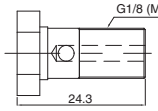
<Piping Installation Guide>



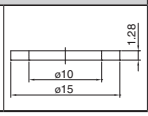
Piping Parts

Optional Piping Parts Available
Choose among (1)(2)(3) based on the machine spec and piping configuration
(1) Joint / Banjo bolt x 2 (2) Washer x 2-4 (3) Hose x 1

(1) Joint / Banjo bolt — Pressure Resistance : ~30MPa

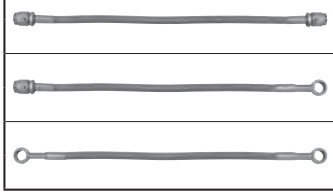
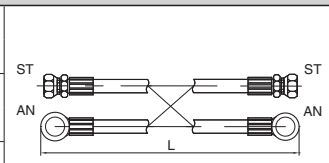
Shape		Description	Stock	Thread Standard Thread connection to the machine
		**J-G1/8-UNF3/8**	●	**G1/8**
		J-M10X1.5-UNF3/8	●	**M10X1.5**
Banjo bolt (for angled hose) 		**BB-G1/8**	●	**G1/8**
		BB-M10X1.5	●	**M10X1.5**

(2) Washer — Pressure Resistance : ~30MPa

Shape		Description	Stock
		**WS-10**	●

*Use 2 washers for a banjo bolt

(3) Hose — Pressure Resistance : ~30MPa

Shape		Description	Stock	Thread Standard		Dimension (mm) L
		**HS-ST-ST-200**	●	**UNF3/8**	**UNF3/8**	**200**
		HS-ST-ST-250	●			**250**
		HS-ST-AN-200	●	**UNF3/8**	- (Banjo bolt)	**200**
		HS-ST-AN-250	●			**250**
		HS-AN-AN-200	●	- (Banjo bolt)	- (Banjo bolt)	**200**
		HS-AN-AN-250	●			**250**

Cautions

1. Make sure machine door is completely closed before use of these parts.
2. Use appropriate seal for the male thread of the piping parts and make sure the connection is secure. Use plugs to seal off unused coolant holes.
3. Connect and fasten the coolant hose firmly.
4. The use of copper washers may cause leakage but will have no effect on the performance.
5. Commercial piping parts can be used if the thread standards are same. Check the pressure resistance before use.
6. Regularly changing the coolant filter is recommended.

Great for High Pressure Coolant Cut-off Toolholders

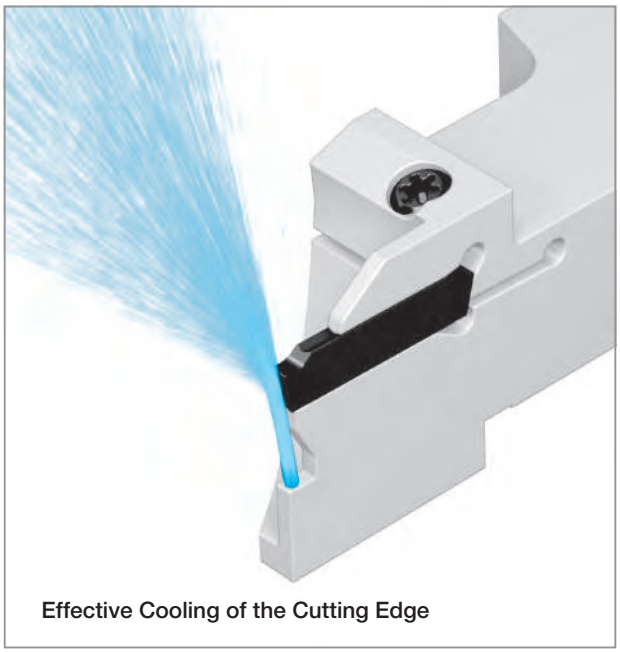
KGD-JCT (for automatic lathe) NEW

Cut-off Holders for High Pressure Coolant with Long Tool Life

The Optimized Coolant Hole Position Effectively Cools the Cutting Edge

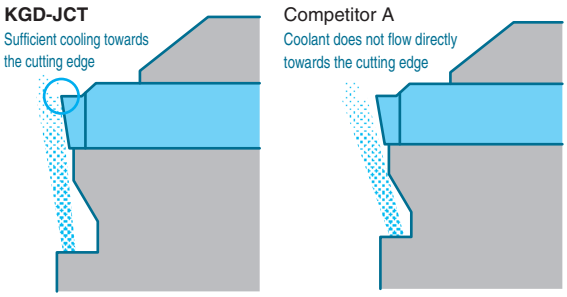
1 Optimized Coolant Hole Position

2 Discharge Coolant towards the Flank Face of the Insert

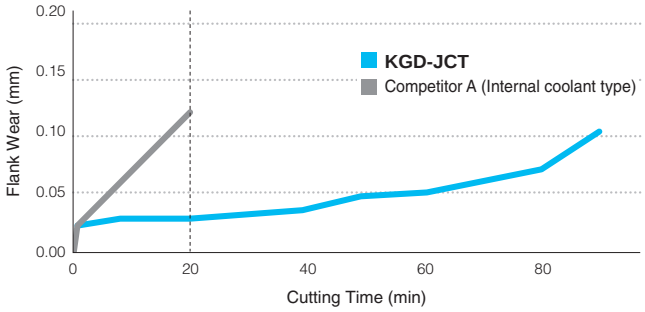


Effective Cooling of the Cutting Edge

Coolant Discharging (Image)



Wear Resistance Comparison (Internal evaluation)



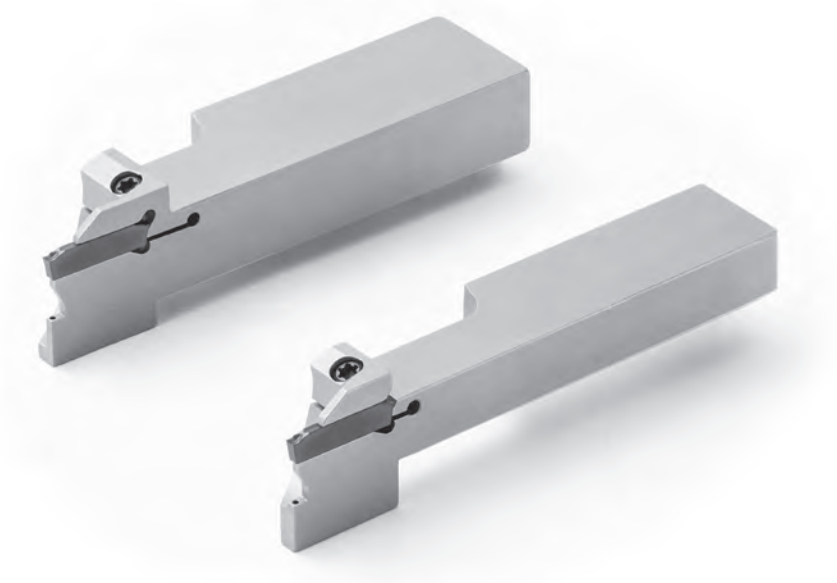
Cutting Conditions : Vc=80m/min, f=0.06mm/rev (~2mm : f=0.02mm/rev), KGDR1625H-2JCT, GDM2020N-015PF PR1535 (Edge Width : 2.0mm) Workpiece Material : SUS304 (ø25)
Internal coolant (1.5MPa) Cut-off

Cutting edge condition (after machining 20min)

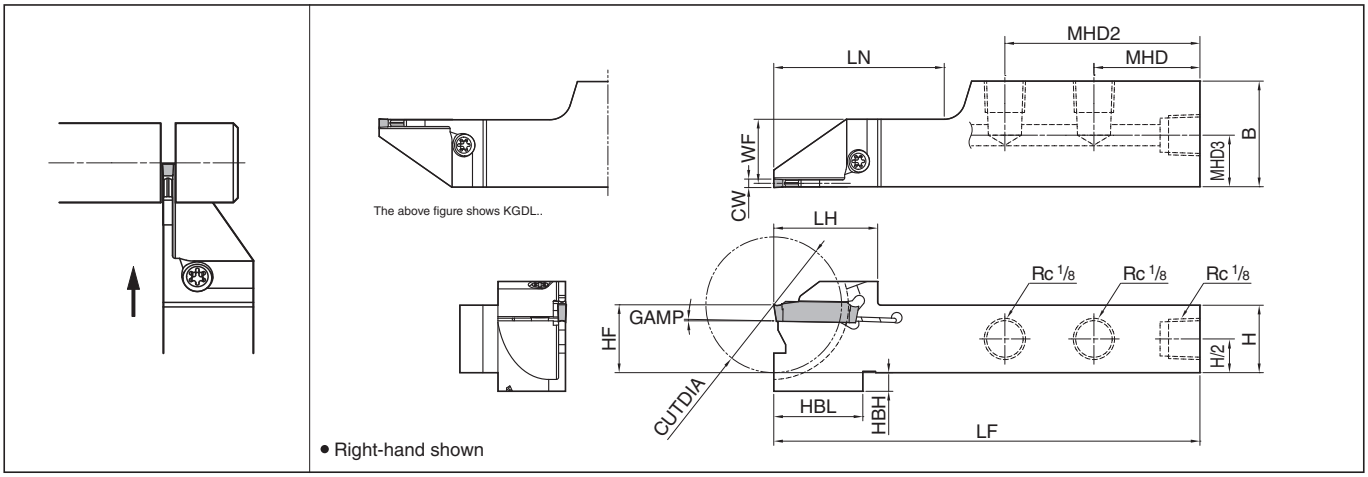




High density and high speeds coolant provides effective cooling of the cutting edge
Superior cooling action improves tool life



KGD-JCT (for automatic lathe) NEW



Toolholder Dimensions

Description	Stock	Cutting Dia.	Dimension (mm)											Angle	Edge Width CW (mm)		Applicable Inserts
		CUTDIA	H=HF	HBH	B	LF	LH	HBL	LN	WF	MHD	MHD2	MHD3	GAMP	MIN.	MAX.	G22, G23
KGDR 1220H-2JCT	●	24	12	8.5	20	100	19.5	21	44	11.2	35	-	8.4	1°	2.0	3.0	GDM type GDG type (GDMS type) (GDGS type)
KGDL 1220H-2JCT	●							21.5					7.7				
KGDR 1625H-2JCT	●	32	16	4.5	25		24.5	21	40	15.2	25	46	12.2				
KGDL 1625H-2JCT	●												7.7				
KGDR 1220H-2.4JCT	●	24	12	8.5	20	100	19.5	21	44	11	35	-	8.4	1°	2.4	3.0	
KGDL 1220H-2.4JCT	●							21.5					7.7				
KGDR 1625H-2.4JCT	●	32	16	4.5	25		24.5	21	40	15	25	46	12.2				
KGDL 1625H-2.4JCT	●												7.7				
KGDR 1220H-3JCT	●	24	12	8.5	20	100	19.5	21	44	10.8	35	-	8.6	1°	3.0	3.0	
KGDL 1220H-3JCT	●							21.5					7.7				
KGDR 1625H-3JCT	●	32	16	4.5	25		24.5	21	40	14.8	25	46	12.2			4.0	
KGDL 1625H-3JCT	●												7.7				

Recommended Cutting Conditions G34, G35

Spare Parts

Clamp Screw	Wrench	Plug
		
SB-40120TR	LTW-15S	GP-1

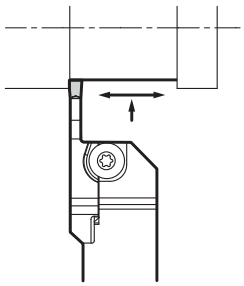
Toolholder Identification System

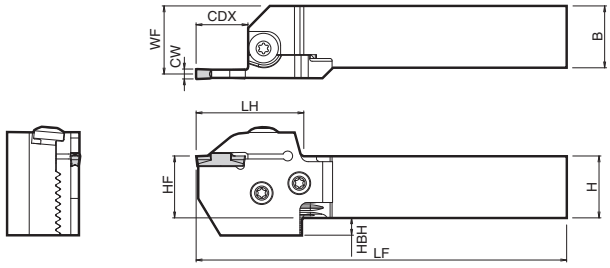
K G D **R** **1220** **H** - **2** **JCT**

Toolholder Hand	Shank Size	Toolholder Length	Applicable Inserts	Others
R : Right-hand L : Left-hand	12 × 20 mm	100 mm	GDM/GDMS 2~3 mm	Coolant-through Holders

● : Std. Item

KGD-S (0° Separate Type)





• Right-hand shown (Right-hand Blade and Right-hand Toolholder)

Toolholder Dimensions (Blade + Toolholder)

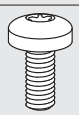
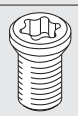
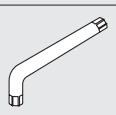
Shank Angle	Width (mm)	Max. depth of cut (mm)	Shank Size (mm)	Unit Description (Standard Stock Description)	Stock R	Stock L	Blade Description G32	Toolholder Description G32	Dimension (mm) H	HF	HBH	B	LF	LH	WF	CDX	Edge Width CW(mm) MIN.	MAX.
0°	2	17	□20	KGDR/L 2020X-2T17S	●	-	KGDR/L-2T17-C	KGDR/L2020-C	20	20	12	20	122	40	23.4	17	2.0	3.0
			□25	2525X-2T17S	●	●		KGDR/L2525-C	25	25	7	25	147		28.4			
			□32	No unit description ➡				KGDR/L3232-C	32	32	-	32	167		35.4			
	3	10	□20	KGDR/L 2020X-3T10S	●	-	KGDR/L-3T10-C	KGDR/L2020-C	20	20	12	20	115	33	23.0	10	3.0	4.0
			□25	2525X-3T10S	●	-		KGDR/L2525-C	25	25	7	25	140		28.0			
			□32	No unit description ➡				KGDR/L3232-C	32	32	-	32	160		35.0			
		20	□20	KGDR/L 2020X-3T20S	●	●	KGDR/L-3T20-C	KGDR/L2020-C	20	20	12	20	125	43	23.0	20		
			□25	2525X-3T20S	●	●		KGDR/L2525-C	25	25	7	25	150		28.0			
			□32	3232X-3T20S	●	-		KGDR/L3232-C	32	32	-	32	170		35.0			
	4	10	□20	KGDR/L 2020X-4T10S	●	-	KGDR/L-4T10-C	KGDR/L2020-C	20	20	12	20	115	33	22.5	10	4.0	5.0
			□25	2525X-4T10S	●	-		KGDR/L2525-C	25	25	7	25	140		27.5			
			□32	No unit description ➡				KGDR/L3232-C	32	32	-	32	160		34.5			
		20	□20	KGDR/L 2020X-4T20S	●	-	KGDR/L-4T20-C	KGDR/L2020-C	20	20	12	20	125	43	22.5	20		
			□25	2525X-4T20S	●	●		KGDR/L2525-C	25	25	7	25	150		27.5			
			□32	3232X-4T20S	●	-		KGDR/L3232-C	32	32	-	32	170		34.5			
		25	□20	KGDR/L 2020X-4T25S	●	●	KGDR/L-4T25-C	KGDR/L2020-C	20	20	12	20	130	48	22.5	25		
			□25	2525X-4T25S	●	●		KGDR/L2525-C	25	25	7	25	155		27.5			
			□32	3232X-4T25S	●	-		KGDR/L3232-C	32	32	-	32	175		34.5			
	5	10	□20	KGDR/L 2020X-5T10S	●	●	KGDR/L-5T10-C	KGDR/L2020-C	20	20	12	20	115	33	22.0	10	5.0	6.0
			□25	2525X-5T10S	●	-		KGDR/L2525-C	25	25	7	25	140		27.0			
			□32	No unit description ➡				KGDR/L3232-C	32	32	-	32	160		34.0			
		25	□20	No unit description ➡			KGDR/L-5T25-C	KGDR/L2020-C	20	20	12	20	130	48	22.0	25		
			□25	KGDR/L 2525X-5T25S	●	●		KGDR/L2525-C	25	25	7	25	155		27.0			
			□32	3232X-5T25S	●	-		KGDR/L3232-C	32	32	-	32	175		34.0			

Applicable Inserts ➡ **G22, G23**

Note) 1. When using the toolholder in normal mounting position, the lower jaw of toolholder may interfere with the tool presetter.
2. The toolholder and blade descriptions are printed on the toolholder body. (Unit description is not printed.)
KGD-S : **Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.**
The toolholder is applicable for all blade with suitable hand.
3. When the unit description is not available (No unit description) and/or stock status is "-", please purchase toolholder and blade separately.
4. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

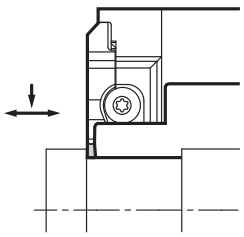
Spare Parts
(Common with separate types)

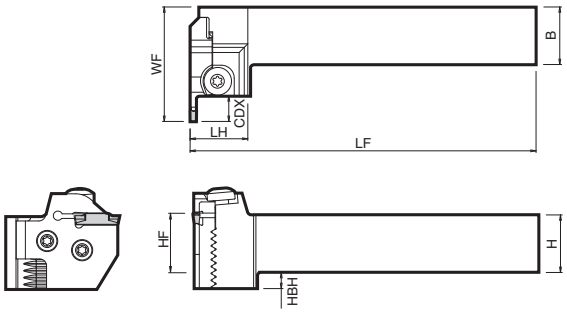
* The parts are included in the toolholder and unit.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Spare Parts: Clamp Screw (for Blade)	Spare Parts: Wrench
			
KGDR/L.....S	BH6X10TR	SB-60120TR	LTW-25

● : Std. Item

KGDS-S (90° Separate Type)





• Right-hand shown (Left-hand Blade and Right-hand Toolholder)

Toolholder Dimensions (Blade + Toolholder)

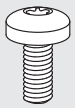
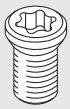
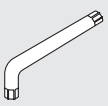
Shank Angle	Width (mm)	Max. depth of cut (mm)	Shank Size (mm)	Blade Description ➡ G32	Toolholder Description ➡ G32	Unit Description (Standard Stock Description)	Stock R	Stock L	Dimension (mm) H	HF	HBH	B	LF	LH	WF	CDX	Edge Width CW(mm) MIN.	MAX.
90°	2	17	□20	KGD$^{L}_{R}$-2T17-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	20	12	20	125	27.7	56.7	17	2.0	3.0
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	25	7	25	150					
	3	10	□20	KGD$^{L}_{R}$-3T10-C	KGDS$^{R}_{L}$2020-C	KGDS$^{R}_{L}$ 2020X-3T10S	●	●	20	20	12	20	125		49.7	10	3.0	4.0
			□25		KGDS$^{R}_{L}$2525-C	2525X-3T10S	●	●	25	25	7	25	150					
		20	□20	KGD$^{L}_{R}$-3T20-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	20	12	20	125		59.7	20		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	25	7	25	150					
	4	10	□20	KGD$^{L}_{R}$-4T10-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	20	12	20	125		49.7	10	4.0	5.0
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	25	7	25	150					
		20	□20	KGD$^{L}_{R}$-4T20-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	20	12	20	125		59.7	20		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	25	7	25	150					
		25	□20	KGD$^{L}_{R}$-4T25-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	20	12	20	125		64.7	25		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	25	7	25	150					
	5	10	□20	KGD$^{L}_{R}$-5T10-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	20	12	20	125		49.7	10	5.0	6.0
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	25	7	25	150					
		25	□20	KGD$^{L}_{R}$-5T25-C	KGDS$^{R}_{L}$2020-C	-	-	-	20	20	12	20	125		64.7	25		
			□25		KGDS$^{R}_{L}$2525-C	-	-	-	25	25	7	25	150					

Note) 1. When using the toolholder in normal mounting position, the lower jaw of toolholder may interfere with the tool presetter.
2. The toolholder and blade descriptions are printed on the toolholder body. (Unit description is not printed.)
KGDS-S : **Left-hand Blade for Right-hand Toolholder, Right-hand Blade for Left-hand Toolholder.**
The toolholder is applicable for all blade with suitable hand.
3. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡ G22, G23

Spare Parts (Common with separate types)

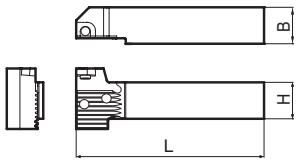
* The parts are included in the toolholder and unit.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
			
KGDS$^{R}_{L}$.....S	BH6X10TR	SB-60120TR	LTW-25

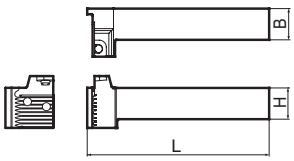
● : Std. Item

Toolholder

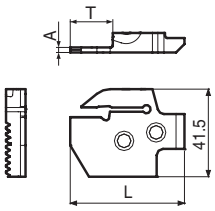
KGD-C (0° Separate Type)

Shape of 0° type Right-hand shown	Toolholder Description		Stock		Dimension (mm)		
			R	L	L	B	H
	KGD R/L	2020-C	●	●	104	20	20
		2525-C	●	●	129	25	25
		3232-C	●	●	149	32	32

KGDS-C (90° Separate Type)

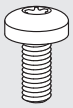
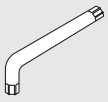
Shape of 90° type Right-hand shown	Toolholder Description		Stock		Dimension (mm)		
			R	L	L	B	H
	KGDS R/L	2020-C	●	●	122	20	20
		2525-C	●	●	147	25	25

Blade

Shape of Blade Right-hand shown	Blade Description		Stock		Dimension (mm)		
			R	L	L	T	A
	KGD R/L	-2T17-C	●	●	51.2	17.2	1.7
		-3T10-C	●	●	44.2	10.2	2.4
		-3T20-C	●	●	53.2	20.2	
		-4T10-C	●	●	44.2	10.2	3.4
		-4T20-C	●	●	54.2	20.2	
		-4T25-C	●	●	59.2	25.2	
		-5T10-C	●	●	44.2	10.2	4.4
		-5T25-C	●	●	59.2	25.2	

Spare Parts (Common with separate types)

* The parts are included in the toolholder.

Unit Description	Spare Parts		
	Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
			
KGD R/L...S KGDS R/L...S	BH6X10TR	SB-60120TR	LTW-25

● : Std. Item

Setting the insert and the blade

Setting the insert

1. Use compressed air or other measures to remove chips from the insert mounting part (Ref. to Fig. 1).
2. Put the insert into the toolholder and push it makes contact with the back end of toolholder's surface (Ref. to Fig. 1 and 2).
3. Keeping the insert fit to the surface, tighten the insert clamp screw at an appropriate torque.
4. Make sure that there is no gap between the insert and the back end of the toolholder's surface and that the insert is set straight. (Ref. to Fig. 2 and 3)

Clamp Screw (for Automatic Lathe)	Recommended tightening torque : 2.0N·m (SB-40120TR) 2.5N·m (SE-50125TR)
Clamp Bolt	Recommended tightening torque : 6.5N·m (Width 2 ~ 6mm) 8.0N·m (Width 8mm)

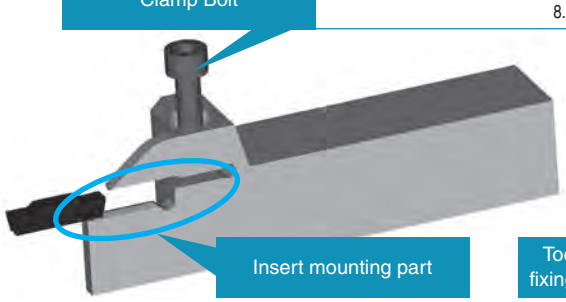


Fig. 1

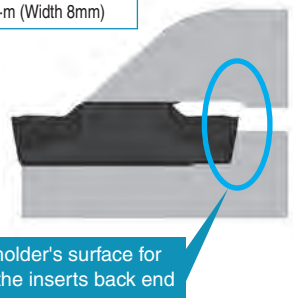


Fig. 2

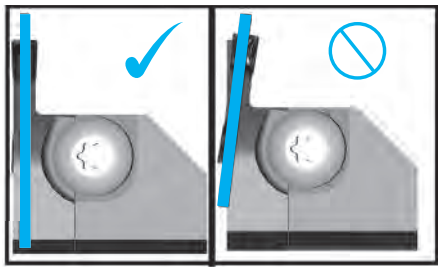


Fig. 3

Setting the blade (Separate type toolholder)

1. Use compressed air or other measures to remove chips and dust from the serration part (Ref. to Fig. 1).
2. Mate and fit the serrations of the blade and toolholder, and also fit the blade end to the toolholder. (Ref. to Fig. 2)
3. Tighten the blade fixing screws at an appropriate torque. You can tighten them in any order. (Ref. to Fig. 2) (Recommended tightening torque : 8N·m)
4. Set the insert after setting the blade.

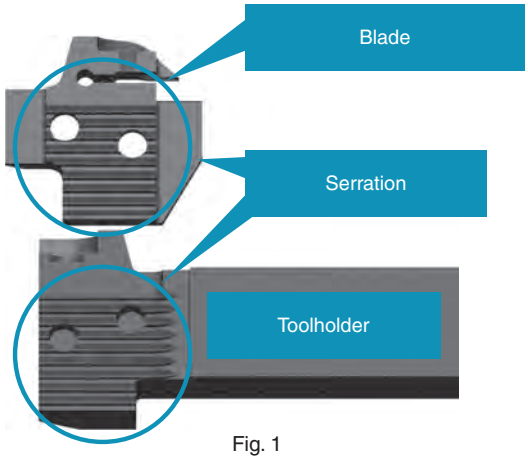


Fig. 1

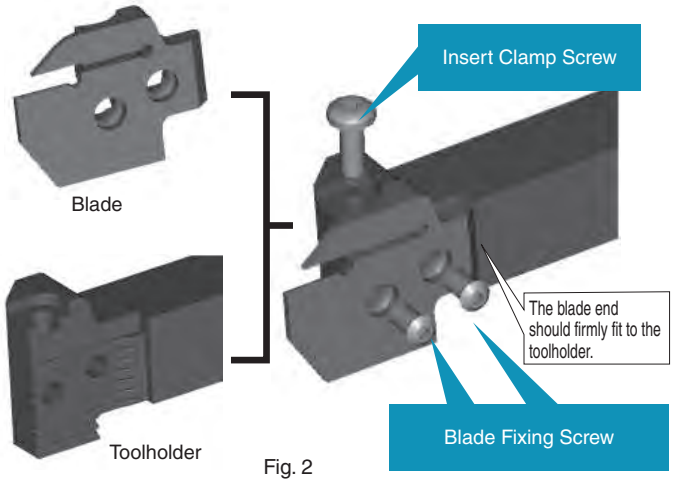
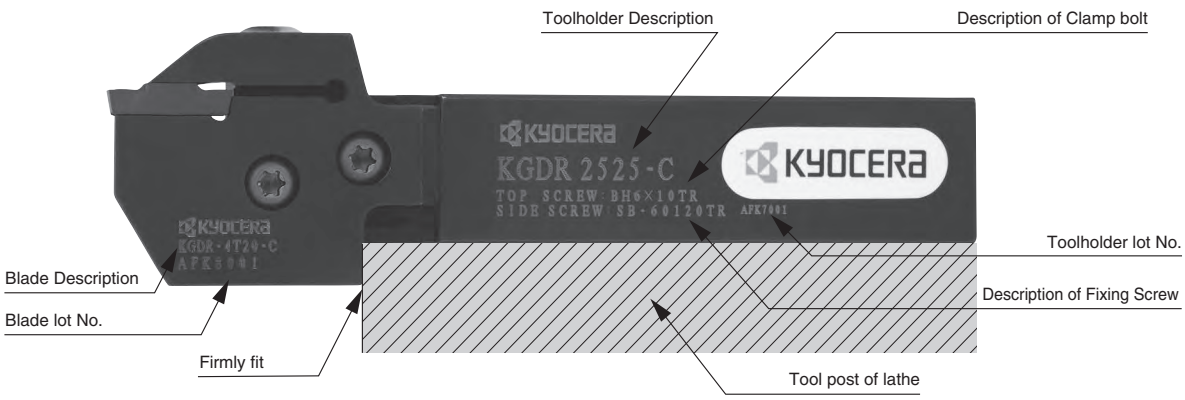


Fig. 2

Separate type Toolholder Identification System and the Setting to Lathe

- Firmly fit the lower jaw to the tool post of the lathe.



Recommended Cutting Conditions

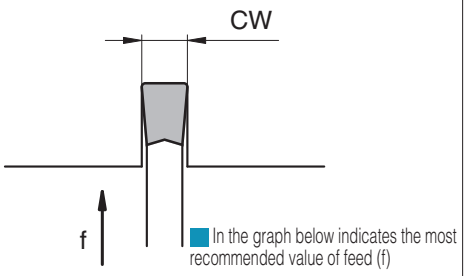
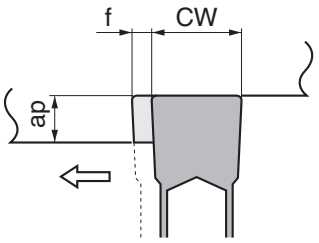
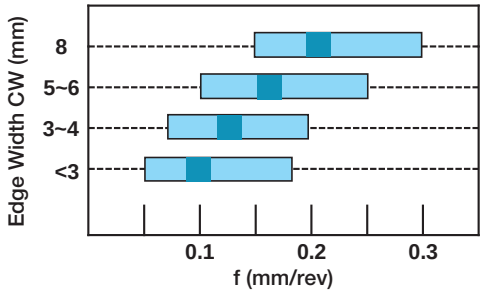
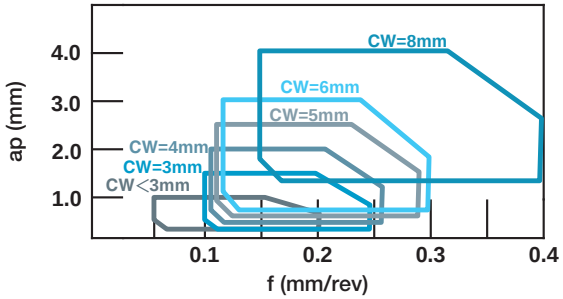
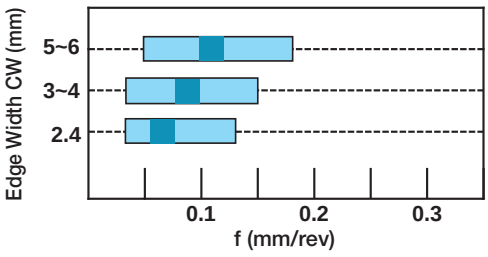
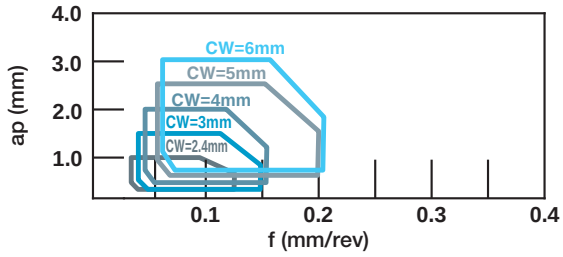
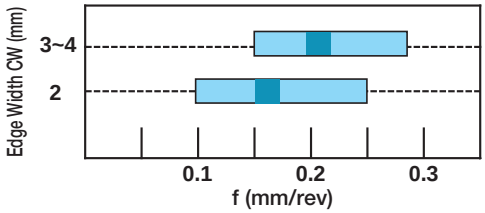
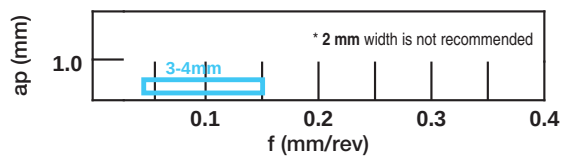
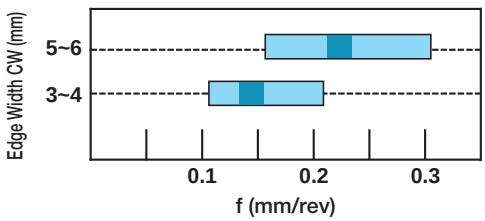
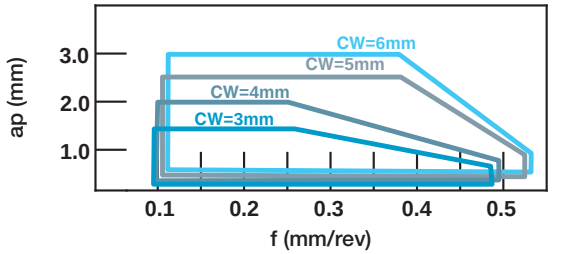
Recommended Cutting Conditions (Vc)

Workpiece Material	Chipbreaker	Recommended Insert Grades (Cutting Speed Vc: m/min)									Remarks
		Cermet		MEGACOAT NANO	MEGACOAT		Carbide	MEGACOAT CBN	CBN	PCD	
		TN620	TN90	PR1535	PR1225	PR1215	GW15	KBN05M	KBN570	KPD001	
Carbon Steel	GM GL CM PH GS	☆ 80~220	☆ 100~220	☆ 80~200	★ 80~200	☆ 100~200	-	-	-	-	Coolant
Alloy Steel		☆ 70~200	☆ 80~200	☆ 70~180	★ 70~180	☆ 80~180	-	-	-	-	
Stainless Steel		-	-	★ 60~150	☆ 60~150	☆ 60~150	-	-	-	-	
Cast Iron		-	-	-	-	★ 100~200	-	-	-	-	
Aluminum Alloys	GS NB	-	-	-	-	-	☆ 200~500	-	-	★ 150~2,000	
Brass		-	-	-	-	-	☆ 100~200	-	-	★ 200~800	
Hard Materials	NB	-	-	-	-	-	-	★ 80~150	-	-	
Sintered Steel		-	-	-	-	-	-	-	★ 100~250	-	

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (Feed Rate / ap)

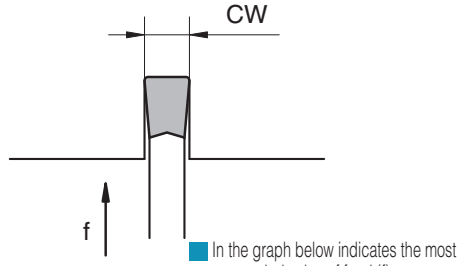
[Workpiece Material : S50C]

Chipbreaker	Grooving	Turning
		
GM (General purpose)		
GL (Low Feed)		
PH (High Feed)		
CM (Copying)		

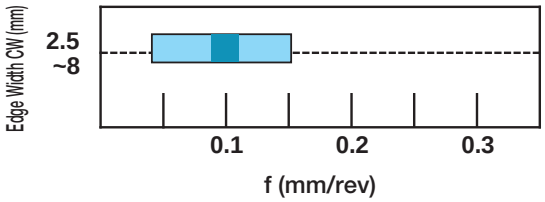
Note) 1. The above values are based on the condition that CDX of toolholder is 17 mm or less.
2. If the toolholder is not for the 8mm width insert and its dimension CDX is over 17mm, set the values for turning to 90% or less of those above.

Recommended Cutting Conditions (Feed Rate / ap) [Workpiece Material : S50C]

Chipbreaker — Grooving



GS(Low cutting force)

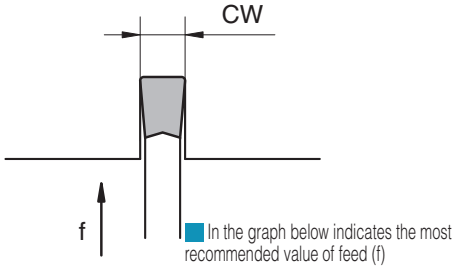


* When turning, keep ap less than or equal to the corner-R(RE).

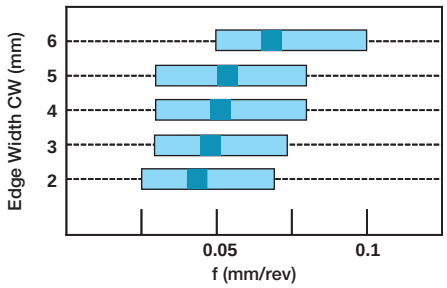
Note) 1. The above values are based on the condition that CDX of toolholder is 17 mm or less.

Recommended Cutting Conditions (Feed Rate)

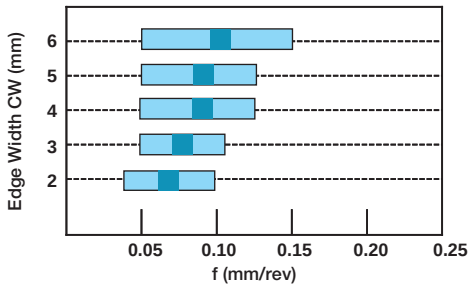
Workpiece Material / Insert Grades — Grooving



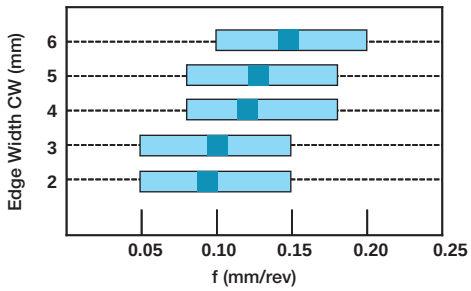
Hard Materials — KBN05M



Sintered Steel — KBN570



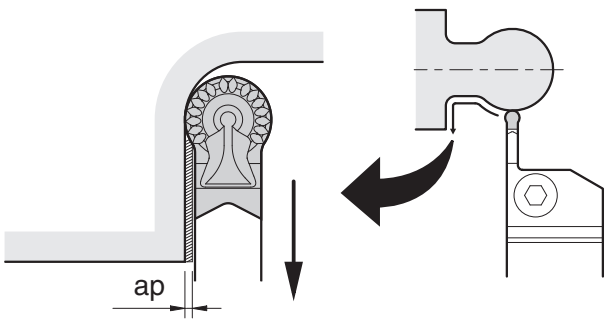
Non-ferrous Metals — KPD001



CM Chipbreaker [Cutting amount (ap) in back copying]

Max. ap in back copying

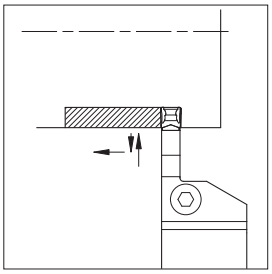
Description		Max. ap (ap : mm)				
		Toolholder Description				
		KGD…-2T…	KGD…-3T…	KGD…-4T…	KGD…-5T…	KGD…-6T…
GDM	3020N-150R-CM	0.24	0.20	-	-	-
	4020N-200R-CM	-	0.24	0.20	-	-
	5020N-250R-CM	-	-	0.30	0.20	-
	6020N-300R-CM	-	-	-	0.30	0.25



Guide for External Grooving

Point (I) (Turning after Grooving)

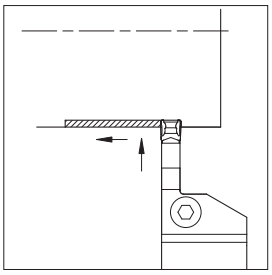
1) Grooving Depth 0.5mm or over : For roughing (Refer to Fig. 1)
Before turning, pull the tool back about 0.1mm after grooving, instead of turning subsequent to grooving.
(Failure to pull the tool back before traverse machining will result in an unbalanced load applied on only one side of the cutting edge.)



Before turning, pull the tool back about 0.1mm after grooving.
(Grooving Depth 0.5mm or over at roughing)

Fig. 1

2) Grooving Depth 0.5mm or under : For finishing (Refer to Fig. 2)
Turning subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Retention time is not necessary.)



Turning subsequent to grooving
(Grooving Depth 0.5mm or under at finishing)

Fig. 2

Point (II)

1) When widening the groove width (Refer to Fig. 3), apply the "Step Turning."
2) The widened groove and side walls should be finished last.
(For better chip control, ap 0.5mm or over is recommended.)

Note) If the workpiece is not supported at the center, reduce the feed rate when grooving towards center.

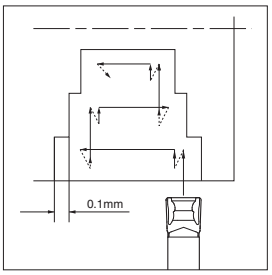
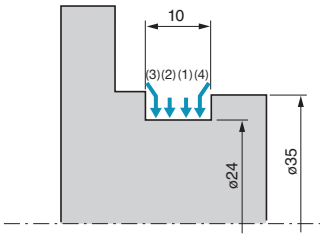


Fig. 3

Case Studies

SCr420H (Grooving)

·Gear
·Vc=113~164 m/min
·f=0.06 mm/rev
·Wet
·GDM4020N-040GM
(PR1225)
·KGDL2525X-3T10S



GM Chipbreaker (PR1225)	1,500 pcs/edge
Competitor K (PVD Coated Carbide)	250 pcs/edge

x6 longer life

· GM chipbreaker (PR1225) showed 6 times longer tool life than that of Competitor K.
· Good chip control without burned chips.



GM Chipbreaker

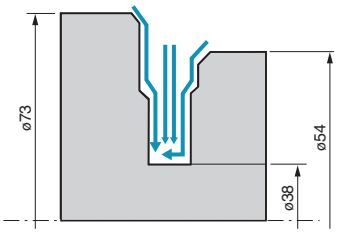


Competitor K

(User Evaluation)

SCM420 (Grooving / Turning)

·Gear
·Vc=170m/min
·f=0.15 mm/rev (Roughing)
0.10 mm/rev (Finishing)
·ap=0.2mm (Finishing)
·Wet
·GDM4020N-040GM
(PR1215)
·KGDR2525X-4T20S



GM Chipbreaker (PR1215)	250 pcs/edge
Competitor L (Roughing: PVD Coated Carbide) (Finishing: Cermet)	200 pcs/edge

· GM chipbreaker reduced occurrence rate of chip tangling (occurrence rate 80% ⇒ 10%), on the contrary the problem was persistent with Competitor L. Machining productivity is improved.



Smooth chip control **GM Chipbreaker (Finishing)**

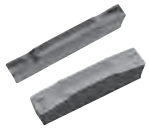
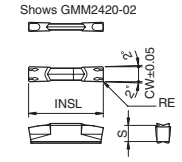
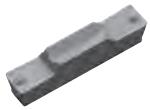
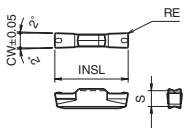
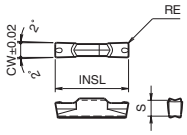
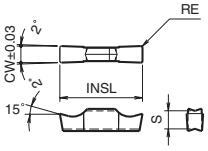
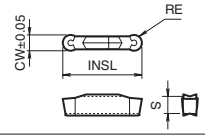
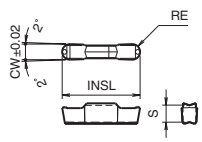
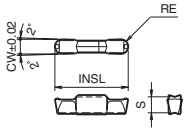


Chips easily tangled Competitor L (Finishing)

(User Evaluation)

GMM / GMG (Will be switched to GDM / GDG ➡ G22~G23)

Classification of usage			Carbon Steel / Alloy Steel			◔	●		
● : Continuous~Light Interruption / 1st Choice ◔ : Continuous~Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	M	Stainless Steel			●	◔			
	K	Cast Iron					●	◔	
	N	Non-ferrous Metals						●	
	S	Titanium Alloys						●	
	H	Hard Materials (~40HRC)			○	●			
		Hard Materials (40HRC~)							

Insert		Description		Dimension (mm)				Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	See Page for Applicable Toolholders
				CW	RE	INSL	S	TN90	CR9025	PR915	PR930	PR905	KW10	
 Chip Control Oriented / M Class		GMM	2420-020MW	2.4	0.2	20	4.3	▲	▲		▲	▲	▲	G42,G43
			3020-020MW	3.0	0.2			▲	▲	▲	▲	▲	▲	G42 ~ G44
			3020-040MW		0.4			▲	▲	▲	▲	▲	▲	
			4020-020MW	4.0	0.2			▲	▲		▲	▲		
			4020-040MW		0.4			▲	▲	▲	▲	▲	▲	
			4020-080MW		0.8			▲	▲	▲	▲	▲		
			5020-040MW	5.0	0.4			▲	▲		▲	▲	▲	
			5020-080MW		0.8			▲	▲	▲	▲	▲	▲	
			6020-040MW	6.0	0.4				▲	▲	▲	▲		G42,G43
			6020-080MW		0.8				▲		▲	▲	▲	
			8030-080MW	8.0	0.8	30	5.5		▲	▲	▲	▲	▲	G42,G71
 Sharp-Cutting Oriented / M Class		GMM	3020-020MS	3.0	0.2	20	4.3	▲	▲	▲	▲		▲	G42 ~ G44
			3020-040MS		0.4			▲	▲	▲	▲		▲	
			4020-040MS	4.0	0.4			▲	▲	▲	▲		▲	
			5020-040MS	5.0					▲	▲	▲		▲	
			6020-040MS	6.0									▲	G42,G43
 Sharp-Cutting Oriented / Precision Class		GMG	3020-000MS	3.0	0.0	20	4.3			▲	▲			G42 ~ G44
			3020-020MS		0.2			▲	▲	▲	▲		▲	
			3020-040MS		0.4			▲	▲	▲	▲		▲	
			4020-020MS	4.0	0.2			▲			▲		▲	
			4020-040MS		0.4			▲	▲		▲		▲	
			4020-080MS		0.8				▲	▲	▲			
			5020-040MS	5.0	0.4	20	4.3				▲		▲	
			5020-080MS		0.8						▲			
			6020-080MS	6.0	0.8	20	4.3						▲	G42,G43
 Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG	2520-030MG	2.5	0.3	20	4.3	▲			▲		▲	G42,G43
			3020-030MG	3.0				▲		▲	▲	▲	▲	G42 ~ G44
			3520-030MG	3.5							▲	▲		
			4020-040MG	4.0	0.4			▲	▲		▲	▲	▲	
			5020-040MG	5.0				▲			▲	▲	▲	
			6020-040MG	6.0							▲	▲		G42,G43
			8030-050MG	8.0	0.5	30	5.5	▲	▲		▲	▲	▲	G42,G71
 Chip Control Oriented / M Class Full-R / Copying		GMM	3020-150R	3.0	1.5	20	4.3	▲	▲	▲	▲	▲	▲	G42 ~ G44
			4020-200R	4.0	2.0			▲	▲	▲	▲	▲	▲	
			5020-250R	5.0	2.5				▲		▲	▲	▲	
			6020-300R	6.0	3.0			▲	▲		▲	▲	▲	G42,G43
 Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMG	3020-150R	3.0	1.5	20	4.3	▲	▲		▲		▲	G42 ~ G44
			4020-200R	4.0	2.0				▲		▲			
			5020-250R	5.0	2.5						▲			
 Undercutting Chip Control Oriented		GMG	3020-150RU	3.0	1.5	20	4.3		▲		▲			G42 ~ G45
			4020-200RU	4.0	2.0						▲			

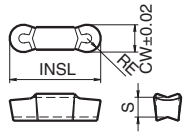
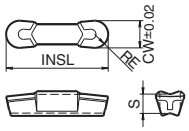
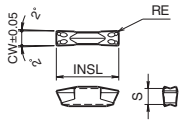
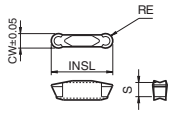
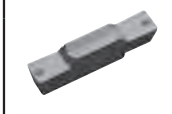
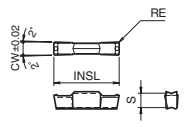
Recommended Cutting Conditions ➡ G117

Inserts are sold in 10 piece boxes

▲ : To be replaced by a new product

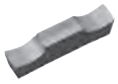
GMM / GMGA / FGG

Classification of usage								
● : Continuous~Light Interruption / 1st Choice ◔ : Continuous~Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel				●		
	M	Stainless Steel				◔		
	K	Cast Iron						●
	N	Non-ferrous Metals						●
	S	Titanium Alloys						●
	H	Hard Materials (~40HRC)				●		
		Hard Materials (40HRC~)						

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm)				Cermet	CVD Coated Carbide	PVD Coated Carbide		Carbide	See Page for Applicable Toolholders
			CW	RE	INSL	S	TN90	CR9025	PR915	PR930	KW10	
 Sharp-Cutting Oriented / Precision Class Full-R / Copying		**GMGA 6020-300R**	6.0	3.0	20	4.3					▲	**G42 G43**
 Sharp-Cutting Oriented / Precision Class Full-R / Copying		**GMGA 8030-400R**	8.0	4.0	30	5.5					▲	**G42 G71**
 Chip Control Oriented / M Class		**GMM 3014-04**	3.0	0.4	14	4.3	▲			▲		-
 Chip Control Oriented / M Class Full-R / Copying		**GMM 3014-15R**	3.0	1.5	14	4.3	▲					
 Chip Control Oriented / Precision Class Face Grooving		**FGG R/L 3020-02 4020-04 5020-04**	3.0 4.0 5.0	0.2 0.4 0.4	20	4.3	R L	R L ▲ ▲ ▲ ▲ ▲ ▲	R L	R L ▲ ▲ ▲ ▲	R L ▲ ▲ ▲ ▲ ▲ ▲	**G44**

Recommended Cutting Conditions ➔ G117

Features of Chipbreaker

Series	Insert	Features
GMM MW		Excellent chip evacuation at Grooving, Turning, Cut-off
GMG MG		Low cutting force with ground chipbreaker
GMG MS GMM MS		Grooving / Turning / Cut-off operations are minimum cutting force at Positive Edge
GMM MT		Small corner-R(RE) and minimize the core which remains in the center of the face
GMM TK		Large corner-R(RE) and stable performance at cut-off
GMM NB		Flat rake face and non-chipbreake It works well for brass

Edge Preparation

Edge Prep.	Chamfered + R-honed Corner-R(RE) = 0.05	Chamfered + R-honed Sharp Corner
		
MT Chipbreaker	**CR9025 / PR915**	**PR930 / KW10**
Edge Prep.	Chamfered + R-honed Corner-R(RE) = 0.2 ~ 0.3	Sharp Edge Corner-R(RE) = 0.2 ~ 0.3
		
TK Chipbreaker	**CR9025 / PR915**	**PR930 / KW10**
Edge Prep.	R-honed Corner-R(RE) = 0.05	Sharp Edge Sharp Corner
		
Without Chipbreaker (-NB)	**CR9025**	**PR930 / KW10**

· Sharp Edge Spec. can reduce cutting force by 40% less than that of chamfer edge.

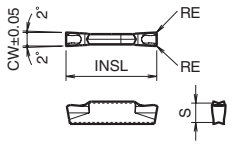
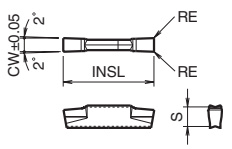
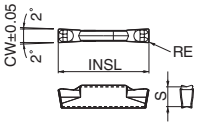
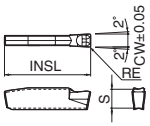
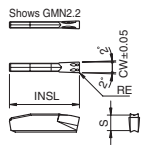
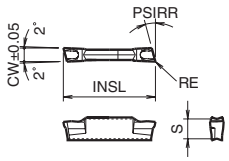
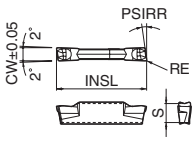
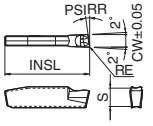
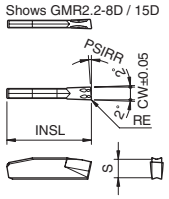
▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

GMM / GMN / GM$^{R}_{L}$

(Will be switched to GDM / GDG ➡ G22, G23, H18, H19)

Classification of usage							
● : Continuous-Light Interruption / 1st Choice ◔ : Continuous-Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	○		◔	●	
	M	Stainless Steel			●	◔	
	K	Cast Iron					●
	N	Non-ferrous Metals					●
	S	Titanium Alloys					●
	H	Hard Materials (~40HRC)			○	●	
		Hard Materials (40HRC~)					

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) CW	RE	INSL	S	Angle PSIR$^{R}_{L}$	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	Carbide KW10	See Page for Applicable Toolholders
 Deep Grooving / Cut-off Sharp-Cutting Oriented		GMM 1520-MT	1.5	0.0	20	4.3	-				▲	▲	G42
				0.05						▲			
		2020-MT	2.0	0.0							▲	▲	G42
				0.05					▲	▲			G43
		2520-MT	2.5	0.0							▲	▲	
				0.05						▲			
		3020-MT	3.0	0.0							▲	▲	G42~G44
				0.05					▲	▲			
 Deep Grooving / Cut-off Sharp-Cutting Oriented Without Chipbreaker		GMM 1520-NB	1.5	0.0	20	4.3	-				▲	▲	G42
		2020-NB	2.0	0.0							▲	▲	G42
		2520-NB	2.5	0.0							▲		G43
		3020-NB	3.0	0.0								▲	G42~G44
 Deep Grooving / Cut-off Stability Oriented		GMM 2020-TK	2.0	0.20	20	4.3	-			▲	▲	▲	G42
		2520-TK	2.5							▲	▲	▲	G43
		3020-TK	3.0	0.25					▲	▲	▲	▲	G42~G44
 Cut-off / Stability Oriented 1-edge		GMN 2-TK	2.0	0.20	20	4.3	-			▲	▲	▲	G42,G43
		3-TK	3.0	0.25					▲	▲	▲	▲	G42 ~ G44
		4-TK	4.0	0.30					▲	▲	▲	▲	
 Deep Grooving / Cut-off 1-edge		GMN 2.2	2.2	0.17	20	4.3	-	▲	▲		▲	▲	G42,G43
		3	3.0	0.20				▲	▲		▲	▲	G42 ~ G44
		4	4.0	0.25				▲	▲		▲	▲	
		5	5.0	0.80					▲		▲	▲	
		6	6.0	0.80					▲		▲	▲	G42,G43
								R L	R L	R L	R L	R L	
 Cut-off Sharp-Cutting Oriented With lead angle		GMM 1520$^{R}_{L}$-MT-15D	1.5	0	20	4.3	15°			▲	▲	▲	G42
				0.05						▲			
		2020$^{R}_{L}$-MT-15D	2.0	0					▲	▲	▲	▲	G42
				0.05					▲	▲			G43
		2520$^{R}_{L}$-MT-15D	2.5	0							▲		
				0.05						▲			
		3020$^{R}_{L}$-MT-15D	3.0	0							▲	▲	G42~G44
				0.05					▲	▲			
 Cut-off Stability Oriented With lead angle		GMM 2020R-TK-8D	2.0	0.20	20	4.3	8°			▲	▲	▲	G42
		2520R-TK-8D	2.5	0.20							▲		G43
		3020R-TK-8D	3.0	0.25					▲	▲	▲		G42~G44
 Cut-off / Stability Oriented 1-edge / Lead Angle		GMR 2-TK-8D	2.0	0.20	20	4.3	8°				▲	▲	G42,G43
		3-TK-8D	3.0	0.25						▲	▲	▲	G42 ~ G44
		4-TK-8D	4.0	0.30						▲	▲	▲	
 Cut-off / Sharp-Cutting Oriented 1-edge / Lead Angle		GM$^{R}_{L}$ 2.2-8D	2.2	0.17	20	4.3	8°	▲	▲		▲	▲	G42
		2.2-15D		0.00			15°	▲	▲		▲	▲	G43
		3-4D	3.0	0.20			4°	▲	▲ ▲		▲	▲	G42 ~ G44
		4-4D	4.0	0.25					▲ ▲		▲		

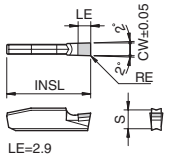
Recommended Cutting Conditions ➡ G117

▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

GMN

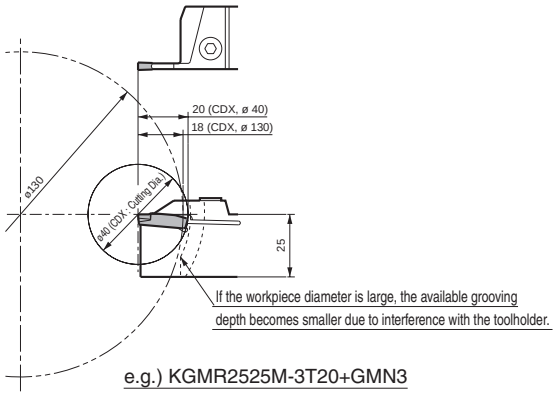
Classification of usage							See Page for Applicable Toolholders
◕ : Continuous~Light Interruption / 1st Choice ◔ : Continuous~Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel					
	M	Stainless Steel					
	K	Cast Iron					
	N	Non-ferrous Metals			●		
	S	Titanium Alloys			●		
	H	Hard Materials (~40HRC)					
		Hard Materials (40HRC~)	○	●			

Insert		Description	Dimension (mm)				CBN		PCD		See Page for Applicable Toolholders
			CW	RE	INSL	S	KBN510	KBN525	KPD001	KPD010	
 Deep Grooving 1-edge		GMN 2	2.0	0.2	20	4.3	▲	▲	▲	▲	G42,G43
				0.4							
		3	3.0	0.2					▲	▲	G42 G43 G44
				0.4			▲	▲			
		4	4.0	0.2					▲	▲	
				0.4			▲	▲			
		5	5.0	0.2					▲	▲	
				0.4			▲	▲			
		6	6.0	0.2						▲	G42,G43
				0.4			▲	▲			

Recommended Cutting Conditions G116

Available Cutting Diameter of KGM (for automatic lathe) / KGM-T

· There is a limit to available grooving depth depending on the workpiece diameter.



e.g.) KGMR2525M-3T20+GMN3

KGM (for automatic lathe) Possible Cutting Diameter and Available Grooving Depth Table

Toolholder Description		DCX (Cutting Dia.)															
KGM R/L	1010□-1.5...	-	-	-	-	-	-	-	18	21	26	38	76	∞			
	1212□-1.5...	-	-	-	-	23	27	37	71	∞	∞	∞	∞				
	1010□-2...	-	-	-	-	-	-	-	18	21	26	38	76				
	1212□-2...	-	-	-	-	23	27	37	71	∞							
	1616□-2...	30	37	47	68	89	131	∞	∞								
	1212□-2.5...	-	-	-	-	23	27	37	71		∞						
	1616□-2.5...	30	37	47	68	89	131	∞	∞								
	1616□-3...	30	37	47	68	89	131										
Available Grooving Depth CDX (mm)		15	14	13	12	11.5	11	10	9	8	7	6	5	4	3	2	1

KGM-T Possible Cutting Diameter and Available Grooving Depth Table (GMN, GM R/L when using 1-edge insert)

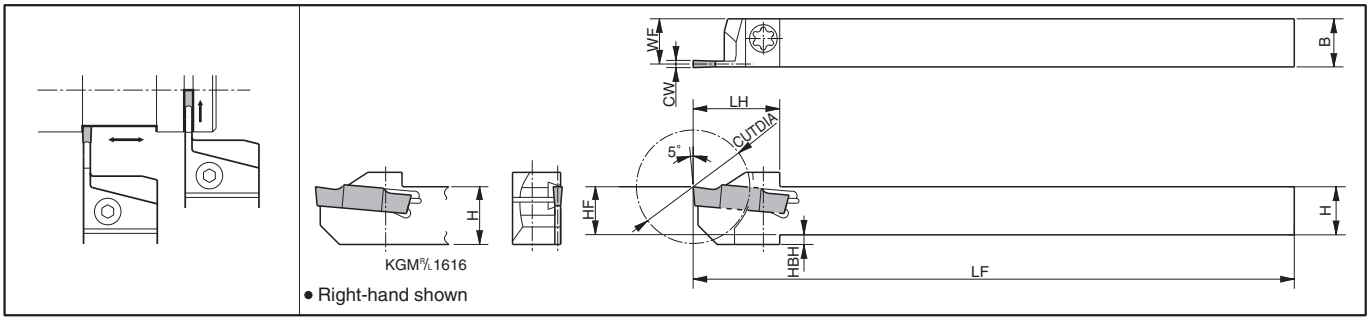
Toolholder Description		DCX (Cutting Dia.)												
KGM R/L	2012K-2T17 2020K-2T17 2525M-2T17	-	-	-	-	-	-	-	-	66	80	130	260	∞
	1616H-3T20	-	-	-	-	-	40	54	70	100	180	∞	∞	
	2012K-3T20 2020K-3T20 2525M-3T20 2020K-4T20 2525M-4T20	-	-	-	-	-	40	90	130	240	∞			
	2525M-4T25 2525M-5T25	-	-	50	140	240	∞	∞	∞	∞				
	3232P-5T25	-	-	50	280	600								
	2525M-6T30	100	300	∞	∞	∞								
Available Grooving Depth CDX (mm)		30	27	25	23	22	20	19	18	17	16	15	14	Under 13

▲ : To be replaced by a new product

CBN & PCD Inserts are sold in 1 piece boxes

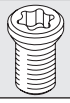
KGM (for Automatic Lathe) (Will be switched to KGD ➡ G25)

Edge Width : 1.5~4.0mm



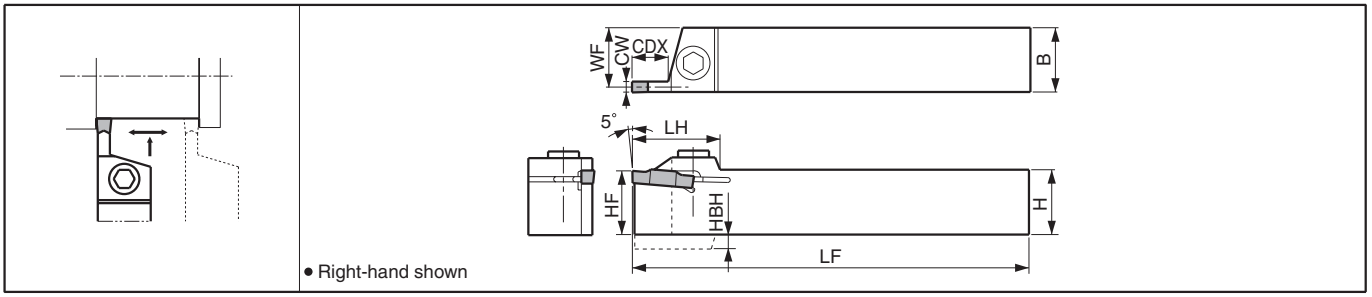
● Right-hand shown

Toolholder Dimensions

Description		Stock		Cutting Dia.	Dimension (mm)							Edge Width CW(mm)		Spare Parts	
														Clamp Screw	Wrench
		R	L	CUTDIA	H	HF	HBH	B	LF	LH	WF	MIN.	MAX.		
KGMR/L	1010JX-1.5	▲	▲	18	10	10	2	10	120	18	9.4	1.5	2.0	SE-40120TR	LTW-15S
	1212JX-1.5	▲	▲	23	12	12		12		19	11.4				
KGMR/L	1010JX-2	▲	▲	18	10	10	2	10	120	18	9.15	2.0	3.0	SE-40120TR	LTW-15S
	1212JX-2	▲	▲	23	12	12		12		19	11.15				
	1616JX-2	▲	▲	30	16	16	-	16		24.5	15.15			SE-50125TR	LTW-20
KGMR/L	1212JX-2.5	▲	▲	23	12	12	2	12	120	19	11	2.4	3.0	SE-40120TR	LTW-15S
	1616JX-2.5	▲	▲	30	16	16	-	16		24.5	15			SE-50125TR	LTW-20
KGMR/L	1616JX-3	▲	▲	30	16	16	-	16	120	24.5	14.8	3.0	4.0	SE-50125TR	LTW-20
KGMR	1212F-1.5-85	▲		23	12	12	2	12	85	19	11.4	1.5	2.0	SE-40120TR	LTW-15S
KGMR/L	1212F-2-85	▲	▲	23	12	12	2	12	85	19	11.15	2.0	3.0	SE-40120TR	LTW-15S
KGMR	1212F-2.5-85	▲		23	12	12	2	12	85	19	11	2.4	3.0	SE-40120TR	LTW-15S

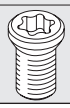
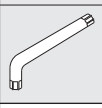
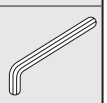
KGM (Will be switched to KGD ➡ G24, G30)

Edge Width : 3.0~8.0mm



● Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)								Edge Width CW(mm)		Spare Parts			
														Screw		Wrench	
		R	L	H	HF	HBH	B	LF	LH	WF	CDX	MIN.	MAX.				
KGMR/L	1212H-3	▲		12	12	4	12	100	27	10.8	9	3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	▲		16	16		16			14.8							
	2020K-3	▲	▲	20	20	-	20	125		18.8		3.0	4.0	-	HH5X16	-	LW-4
	2525M-3	▲	▲	25	25		25	150		23.8					HH5X25		
KGMR/L	2020K-4	▲		20	20	-	20	125	27	18.3	10	4.0	5.0	-	HH5X16	-	LW-4
	2525M-4	▲	▲	25	25		25	150		23.3					HH5X25		
KGMR	2020K-5	▲		20	20	-	20	125	27	17.8	10	5.0	6.0	-	HH5X16	-	LW-4
	2525M-5	▲		25	25		25	150		22.8					HH5X25		
KGMR/L	2525M-8	▲	▲	25	25	7.5	25	150	40	22.0	25	8.0	8.0	-	HH6X25	-	LW-5

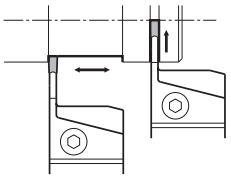
· CDX shows available grooving depth.

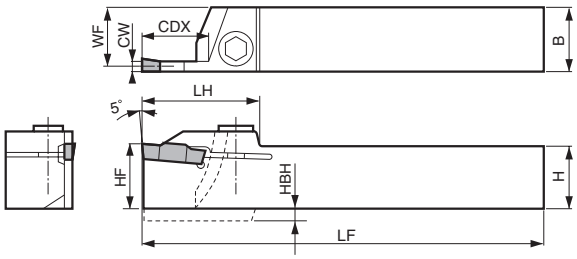
· 4mm width Insert can be installed in KGMR/L1212H-3, but is not recommended due to the toolholder's rigidity.

▲ : To be replaced by a new product

KGM-T (Deep Grooving Type) (Will be switched to KGD ➡ G24)

Edge Width : 2.0~6.0mm





• Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	CDX	Edge Width CW(mm) MIN.	Edge Width CW(mm) MAX.	Spare Parts: Screw	Spare Parts: Screw	Spare Parts: Wrench	Spare Parts: Wrench
KGM$^{R/L}$	2012K-2T17		▲	20	20	-	12	125	33	11.15	17	2.0	3.0	SB-5TR	-	LTW-20	-
	2020K-2T17	▲	▲				20			19.15				-	HH5X16	-	LW-4
	2525M-2T17	▲	▲	25	25		25	150		24.15					HH5X25		
KGM$^{R/L}$	1616H-3T20	▲		16	16	4	16	100	36	14.8	20	3.0	4.0	-	HH5X16	-	LW-4
	2012K-3T20		▲	20	20	-	12	125		10.8				SB-5TR	-	LTW-20	-
	2020K-3T20	▲	▲				20			18.8				-	HH5X16	-	LW-4
	2525M-3T20	▲	▲	25	25		25	150		23.8					HH5X25		
KGM$^{R/L}$	2020K-4T20	▲		20	20	-	20	125	36	18.3	20	4.0	5.0	-	HH5X16	-	LW-4
	2525M-4T20	▲		25	25		25	150		23.3					HH5X25		
	2525M-4T25	▲	▲						41		25						
KGM$^{R/L}$	2525M-5T25	▲	▲	25	25	-	25	150	42	22.8	25	5.0	6.0	-	HH5X25	-	LW-4
	3232P-5T25	▲		32	32		32	170		29.8							
KGM$^{R/L}$	2525M-6T30	▲		25	25	-	25	150	45	22.4	30	6.0	6.0	-	HH5X25	-	LW-4

· CDX shows the distance from the toolholder to the cutting edge. Ref. to the Table (**G41**) for the relationship between the available grooving depth and the cutting dia.
· When using GMG / GMM (2-edge) insert, set the groove depth under 15mm.

Applicable Inserts

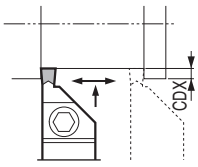
Applications	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Full-R / Copying	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving
See Page	G38	G38	G38	G38	G39	G40	G40	G40	G40	G40	G41
Insert / Toolholder Description	MW	MS	MG			MT	NB	TK	TK		CBN PCD
KGM$^{R/L}$...1.5	-	-	-	-	-	GMM1520..MT GMM2020..MT GMM1520$^{R/L}$..MT GMM2020$^{R/L}$..MT	GMM1520..NB GMM2020..NB	GMM2020..TK GMM2020$^{R/L}$..TK	GMN2..TK GM$^{R/L}$2..TK	-	-
KGM$^{R/L}$...2(T)	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2020..MT GMM2520..MT GMM3020..MT GMM2020$^{R/L}$..MT GMM2520$^{R/L}$..MT GMM3020$^{R/L}$..MT	GMM2020..NB GMM2520..NB GMM3020..NB	GMM2020..TK GMM2520..TK GMM3020..TK GMM2020$^{R/L}$..TK GMM2520$^{R/L}$..TK GMM3020$^{R/L}$..TK	GMN2..TK GMN3..TK GM$^{R/L}$2..TK GM$^{R/L}$3..TK	GMN2.2 GMN3 GM$^{R/L}$2.2 GM$^{R/L}$3	GMN2 GMN3
KGM$^{R/L}$...2.5	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2520..MT GMM3020..MT GMM2520$^{R/L}$..MT GMM3020$^{R/L}$..MT	GMM2520..NB GMM3020..NB	GMM2520..TK GMM3020..TK GMM2520$^{R/L}$..TK GMM3020$^{R/L}$..TK	GMN3..TK GM$^{R/L}$3..TK	GMN3 GM$^{R/L}$3	GMN3
KGM$^{R/L}$...3(T)	GMM3020..MW GMM4020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS	GMG3020..MG GMG3520..MG GMG4020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R	-	GMM3020..MT GMM3020$^{R/L}$..MT	GMM3020..NB	GMM3020..TK GMM3020$^{R/L}$..TK	GMN3..TK GMN4..TK GM$^{R/L}$3..TK GM$^{R/L}$4..TK	GMN3 GMN4 GM$^{R/L}$3 GM$^{R/L}$4	GMN3 GMN4
KGM$^{R/L}$...4(T)	GMM4020..MW GMM5020..MW	GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG4020..MG GMG5020..MG	GMG4020..R GMM4020..R GMG5020..R GMM5020..R	-	-	-	-	GMN4..TK GM$^{R/L}$4..TK	GMN4 GMN5 GM$^{R/L}$4	GMN4 GMN5
KGM$^{R/L}$...5(T)	GMM5020..MW GMM6020..MW	GMG5020..MS GMM5020..MS GMG6020..MS GMM6020..MS	GMG5020..MG GMG6020..MG	GMG5020..R GMM5020..R GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN5 GMN6	GMN5 GMN6
KGM$^{R/L}$...6T	GMM6020..MW	GMG6020..MS GMM6020..MS	GMG6020..MG	GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN6	GMN6
KGM$^{R/L}$...8	GMM8030..MW	-	GMG8030..MG	-	GMGA8030..R	-	-	-	-	-	-

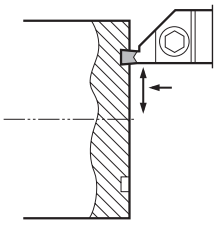
· If using a full-R insert, you need to modify the corner of insert adapter part of toolholder.

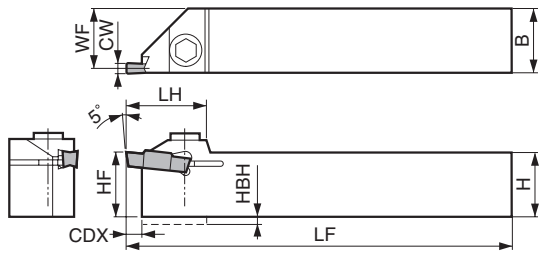
Recommended Cutting Conditions ➡ G117
Recommended Cutting Conditions of CBN / PCD ➡ G116

▲ : To be replaced by a new product

KGMM

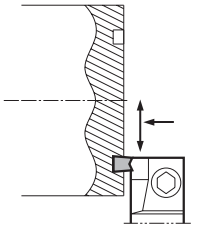


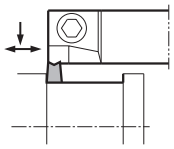


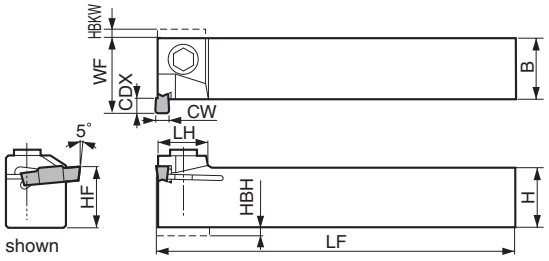


• Right-hand shown

KGMS

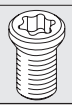
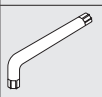
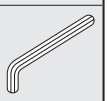






• Right-hand shown

Toolholder Dimensions

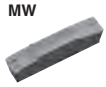
Description	Stock		Dimension (mm)									Edge Width CW(mm)		Spare Parts			
														Screw		Wrench	
	R	L	H	HF	HBH	B	LF	LH	WF	HBKW	CDX	MIN.	MAX.				
KGMMR 2525M-3	▲		25	25	-	25	150	25	23.8	-	4.8	3.0	5.0	-	HH5X25	-	LW-4
KGMSR 2525M-3	▲		25	25	-	25	150	17	30	-	4.8	3.0	5.0	-	HH5X25	-	LW-4

· CDX shows available grooving depth. (Ref. to the table **G45** for Face Grooving)

Applicable Inserts [External Grooving]

Applications	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Grooving	Grooving	Grooving	Grooving	Grooving	Grooving
See Page	**G38**	**G38**	**G38**	**G38**	**G40**	**G40**	**G40**	**G40**	**G40**	**G41**
Insert / Toolholder Description	**MW** 	**MS** 	**MG** 		**MT** 	**NB** 	**TK** 	**TK** 		**CBN PCD** 
KGMMR…3 KGMSR…3	GMM3020..MW GMM4020..MW GMM5020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG3020..MG GMG3520..MG GMG4020..MG GMG5020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R GMG5020..R GMM5020..R	GMM3020..MT	GMM3020..NB	GMM3020..TK	GMN3..TK GMN4..TK	GMN3 GMN4 GMN5	GMN3 GMN4 GMN5

Applicable Inserts [Face Grooving]

Applications	Grooving / Turning	Undercutting	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Grooving	Grooving	Grooving	Grooving
See Page	**G39**	**G38**	**G38**	**G38**	**G38**	**G38**	**G40**	**G40**	**G40**	**G40**
Insert / Toolholder Description			**MW** 	**MS** 	**MG** 		**MT** 	**NB** 	**TK** 	
KGMMR…3 KGMSR…3	FGG$^{R}_{L}$3020.. FGG$^{R}_{L}$4020.. FGG$^{R}_{L}$5020..	GMG3020..RU GMG4020..RU	GMM3020..MW GMM4020..MW GMM5020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG3020..MG GMG3520..MG GMG4020..MG GMG5020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R GMG5020..R GMM5020..R	GMM3020..MT	GMM3020..NB	GMM3020..TK	GMN3 GMN4 GMN5 GMN3..TK GMN4..TK

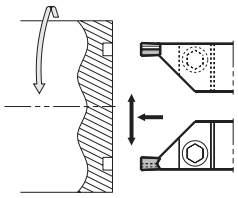
Recommended Cutting Conditions ➡ **G117**
Recommended Cutting Conditions of CBN / PCD ➡ **G116**

▲ : To be replaced by a new product

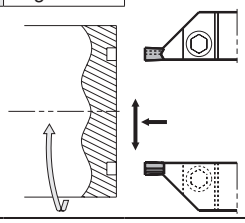
Selection of Insert & Toolholder (Face Grooving)

Case of KGMM

Toolholder	Right-hand
Insert	Left-hand

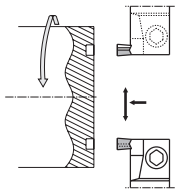


Toolholder	Right-hand
Insert	Right-hand



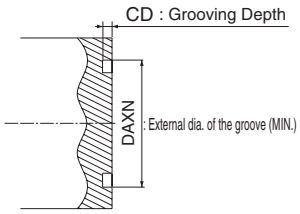
Case of KGMS

Toolholder	Right-hand
Insert	Left-hand



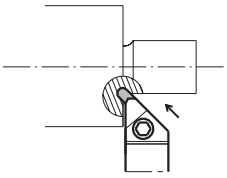
External dia. of the groove (MIN.) & Grooving Depth (Face Grooving)

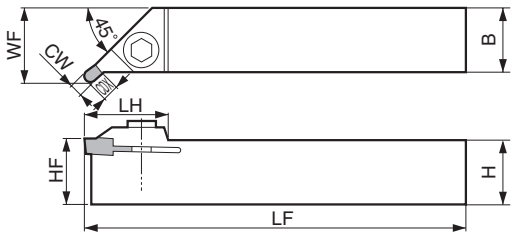
KGMM / KGMS (Common) (mm)



Description	DAXN	CD
GMG/GMM3020-○○○□□	ø100	4.8
GMG/GMM4020-○○○□□		
GMG/GMM5020-○○○□□		
FGGR/L3020-02	ø22	4.3
FGGR/L4020-04	ø28	4.8
FGGR/L5020-04	ø30	
GMG3020-150RU	ø22	4.3
GMG4020-200RU	ø28	4.8

KGMU (External Undercutting Toolholder)





• Right-hand shown

Toolholder Dimensions

Description	Stock		Dimension (mm)									Edge Width CW(mm)		Spare Parts			
														Clamp Bolt		Wrench	
	R	L	H	HF	B	LF	LH	WF	CDX			MIN.	MAX.				
KGMUR 2525M	▲		25	25	25	150	28.5	28.6	4.8			3.0	5.0 (6.0)	HH5X25		LW-4	

· CDX shows the distance from the toolholder to the cutting edge. Ref. to the table below for the available grooving depth.

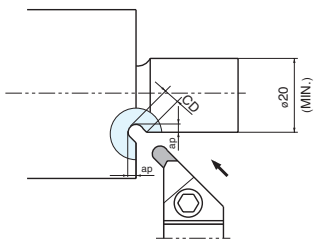
WF shows at GMM5020-RU. ( ) indicates external grooving inserts when installed.

Applicable Inserts

Applications	Undercutting		
See Page	G38		
Insert / Toolholder Description			
KGMUR 2525M	GMG3020..RU GMG4020..RU		

· External grooving inserts (grooving width 3mm~6mm) will be attached.
(In case of using GMG ○○20-○○○□□, GMM ○○20-○○○□□, GMN○ insert)

Undercut Depth CD

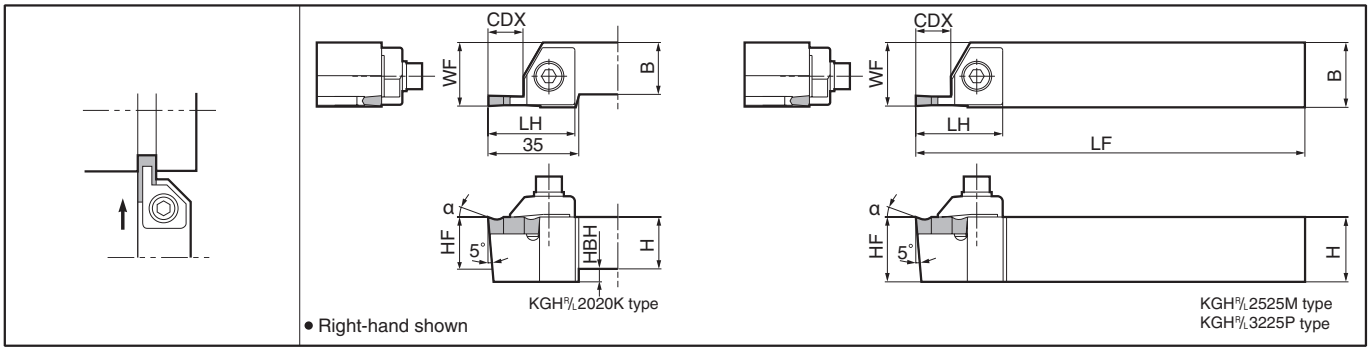


Description	Undercut Depth	Distance from the face of the workpiece
	CD (mm)	ap (mm)
GMG3020-150RU	3.5	1.8
GMG4020-200RU	4.0	1.9
GMG5020-250RU	4.5	2.1

* In case of undercutting for the diameter 100mm or over, Inserts for External Grooving GMG ○○20-○○○□□,GMM ○○20-○○○□□, GMN○ are also available.

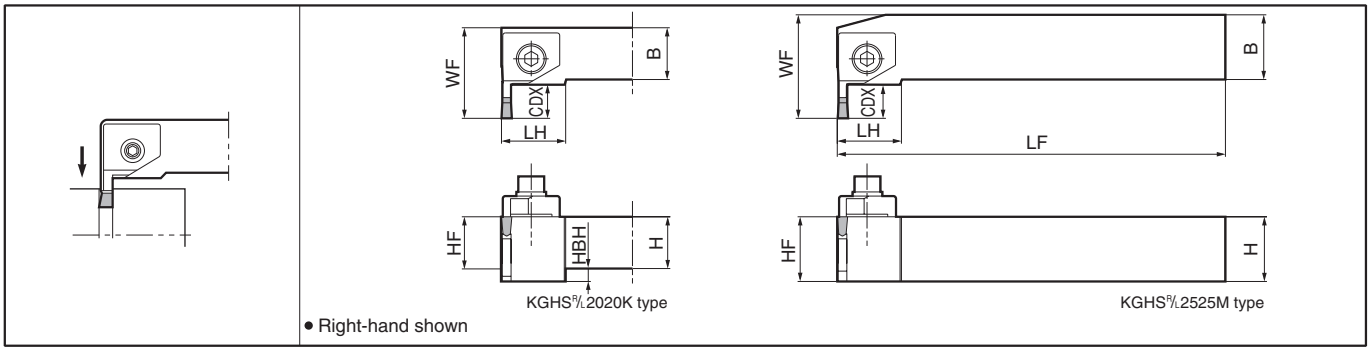
▲ : To be replaced by a new product

KGH



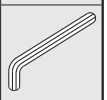
• Right-hand shown

KGHS



• Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)								Spare Parts				
												Clamp	Clamp Bolt	Washer	Spring	Wrench
		R	L	H	HF	HBH	B	LF	LH	WF	CDX					
KGH R/L	**2020K-4**	●	●	20	20	5	20	125	33.5	24.5-24.8	13	CGH-1 R/L	HH6X25	W-6	SP-6	LW-5
	2525M-4	●	●	25	25	-	25	150		24.5-24.8						
	2020K-5	●	●	20	20	5	20	125	33.5	25.0-25.8	13	CGH-1 R/L				
	2525M-5	●	●	25	25	-	25	150		25.0-25.8						
	3225P-5	●	●	32	32	-	25	170		25.0-25.8						
	2020K-7	●	●	20	20	7	20	125	33.5	24.5-25.0	13	CGH-2 R/L				
	2525M-7	●	●	25	25	-	25	150		24.5-25.0						
	2525M-10	●	●	25	25	-	25	150	41	25.5-26.5	17	CGH-3 R/L				
	3225P-10	●		32	32	-	25	170		25.5-26.5						
KGHS R/L	**2020K-4**	●	●	20	20	5	20	125	25	35	13	CGH-1L/R	HH6X25	W-6	SP-6	LW-5
	2525M-4	●	●	25	25	-	25	150		40						
	2020K-5	●	●	20	20	5	20	125	25	35	13	CGH-1L/R				
	2525M-5	●	●	25	25	-	25	150		40						

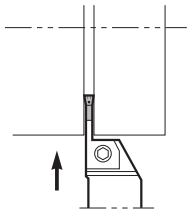
· CDX shows available grooving depth.
· WF of KGHR/L Toolholder depends on the insert's edge width.
· Clamp KGHR/L ... CGH-○R for Right-hand Toolholder and CGH-○L for Left-hand Toolholder.
KGHSR/L ... CGH-○L for Right-hand Toolholder and CGH-○R for Left-hand Toolholder.

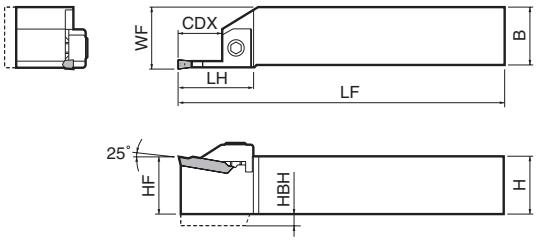
Rake Angle (α) after Installment of GH / GHU insert

When using GH○○○○-○○		When using GHU○○-○○	
α	Insert Grades	α	Insert Grades
0°	A65, A66N, PT600M	10°	TN60 CR9025
10°	TC40N		
20°	TN90, TC60M PR930 KW10		

● : Std. Item

KGA





• Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	CDX	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench
KGA R/L	2020K-3	▲	▲	20	20	5	20	125	37	21.5	20	CGA-3 R/L	HH6X20	SP-6	LW-5
	2525M-3	▲	▲	25	25	-	25	150		26.5					
	2020K-4	▲		20	20	5	20	125	37	21.5	20	CGA-4 R/L			
	2525M-4	▲		25	25	-	25	150		26.5					
	2020K-5	▲		20	20	5	20	125	42	21.5	25	CGA-5 R/L			
	2525M-5	▲		25	25	-	25	150		26.5					

· CDX shows available grooving depth.

· Clamp : CGA-○R for Right-hand Toolholder and CGA-○L for Left-hand Toolholder.

Applicable Inserts

(mm)

Description	INSL	S
GH4020-○○~GH8020-○○	20	7.5
GH10025-05~GH12025-05	25	
GHU○○-○○	20	
GA30 , GA40	25	5.0
GA50	30	

		Classification of usage
P	Carbon Steel / Alloy Steel	
M	Stainless Steel	
K	Cast Iron	● : Continuous~Light Interruption / 1st Choice
N	Non-ferrous Metals	◔ : Continuous~Light Interruption / 2nd Choice
S	Titanium Alloys	● : Continuous / 1st Choice
H	Hard Materials (~40HRC)	○ : Continuous / 2nd Choice
	Hard Materials (40HRC~)	

Insert		Description		Dimension (mm) CW	RE	Cermet TN60	Cermet TC40N	Cermet TC60M	CVD Coated Carbide CR9025	PVD Coated Carbide PR930	Carbide KW10	Ceramic A65	Ceramic A66N	Ceramic PT600M	Applicable Toolholders	See Page for Applicable Toolholders
Ground Chipbreaker		GH	4020-02	4.0	0.2		●	●		●	●				KGH R/L...4	G46
			4020-05		0.5		●	●		●	●	●	●	●	KGHS R/L...4	
			4520-02	4.5	0.2		●									
			4520-05		0.5		●									
			5020-02	5.0	0.2		●	●		●	●					
			5020-05		0.5		●	●		●	●	●	●	●		
			5520-02	5.5	0.2		●								KGH R/L...5	
			5520-05		0.5		●								KGHS R/L...5	
			6020-02	6.0	0.2		●	●		●	●					
			6020-05		0.5		●	●		●	●	●		●		
			6520-02	6.5	0.2		●									
			6520-05		0.5		●									
Ceramic			7020-02	7.0	0.2		●	●		●	●					
			7020-05		0.5		●	●		●	●	●				
			7520-02	7.5	0.2		●								KGH R/L...7	
			7520-05		0.5		●								KGHS R/L...7	
			8020-02	8.0	0.2		●	●		●	●					
			8020-05		0.5		●	●		●	●					
			10025-05	10.0	0.5					●	●				KGH R/L...10	
			12025-05	12.0	0.5			●		●	●					
Molded Chipbreaker		GHU	40-20	4.0	0.25	●			●						KGH R/L...4 KGHS R/L...4	G46
			50-20	5.0	0.30	●			●						KGH R/L...5 KGHS R/L...5	
			60-20	6.0	0.30	●			●							
		GA	30	3.0	0.20	▲			▲						KGA R/L...3	G47
			40	4.0	0.25	▲			▲						KGA R/L...4	
			50	5.0	0.30	▲			▲						KGA R/L...5	

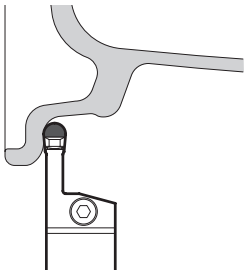
Ceramic insert is above shape.

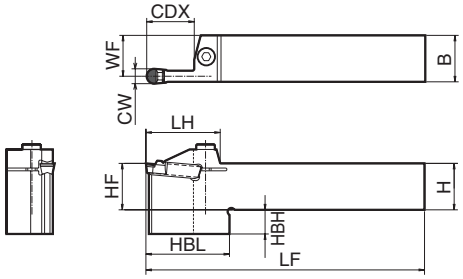
Recommended Cutting Conditions ➡ G113~G114

● : Std. Item
▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

KGMW (External / Facing / Copying)



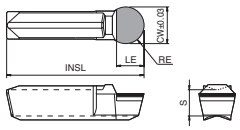
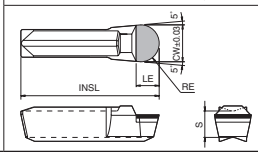


● Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	HBL	WF	CDX	Spare Parts: Clamp Bolt	Spare Parts: Wrench	Applicable Inserts
KGMW R/L	2525M-6	●	●	25	25	13	25	150	40	55	22.8	25	HH6X25	LW-5	GMGW6030-30R
	2525M-8	●	●								22				GMGW8030-40R GMGW8030-40R-HR

Applicable Inserts

Insert		Description		Dimension (mm) CW	RE	INSL	S	LE	No. of Edge	PCD KPD001
		GMGW	6030-30R	6	3	30	5.5	4.5	1	●
			8030-40R	8	4			6	1	●
		GMGW	8030-40R-HR	8	4	30	5.5	5	1	●

· GMGW inserts are exclusively used for KGMW toolholder. It cannot be used for other toolholder because of its different installation angle.
· GMGW inserts Edge Preparation : R-honed Cutting Edge.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) PCD KPD001	(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)
Aluminum Alloys	★ 150~2,700	(1) 0.05~0.3 (2) 0.2~0.8 (3) MAX. 3

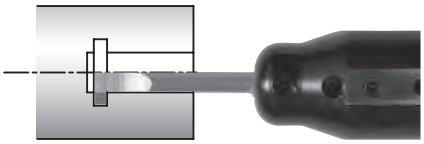
★ : 1st Recommendation

● : Std. Item

Summary of Internal Grooving

Small Dia. Internal Grooving ø3~ (G51, G53)

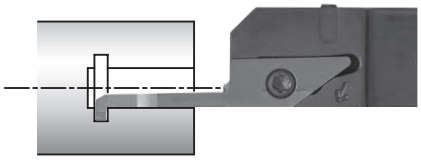
EZ Bars, System Tip-Bars



Type	EZG
Min. Bore Dia.	ø3 ~ ø8
Edge Width (mm)	0.5 ~ 2.0
Max. Grooving Depth (mm)	1.0 ~ 2.0
See Page	G51



EZ Bars



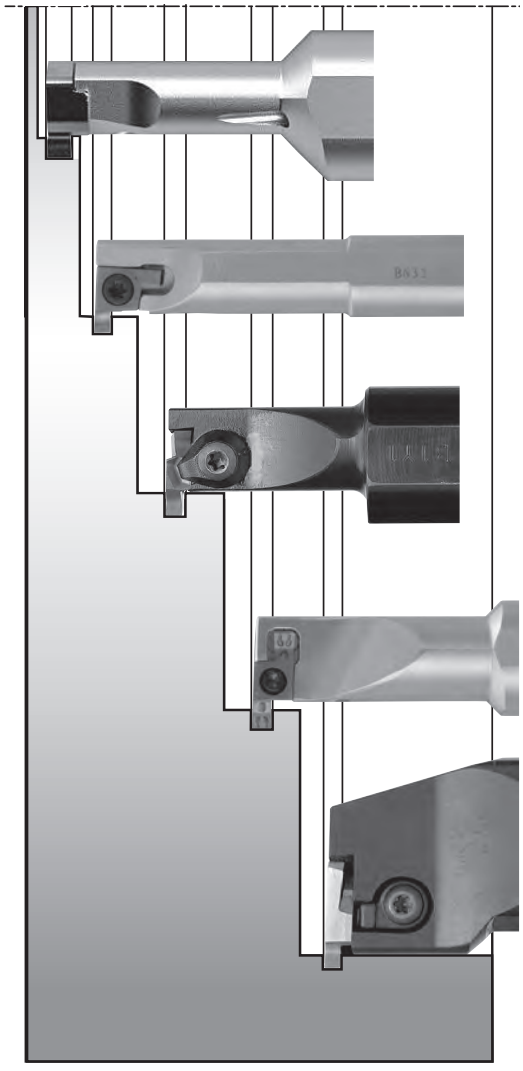
Type	VNG
Min. Bore Dia.	ø4 ~ ø7
Edge Width (mm)	1.0 ~ 2.0
Max. Grooving Depth (mm)	0.8 ~ 2.0
See Page	G53



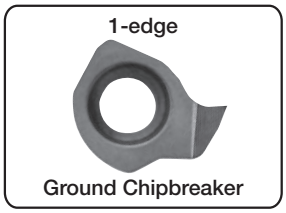
System Tip-Bars

Internal Grooving ø8~ (G57, G60, G64, G66)

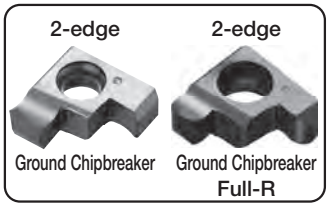
Shallow Grooving



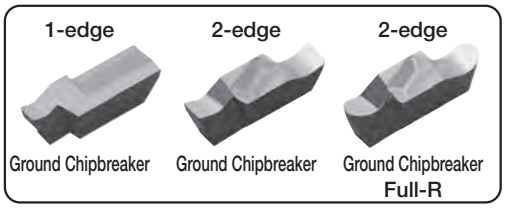
Type	SIGC
Min. Bore Dia.	ø8 ~ ø12
Edge Width (mm)	1.0 ~ 3.0
Max. Grooving Depth (mm)	1.0 ~ 3.0
See Page	G57



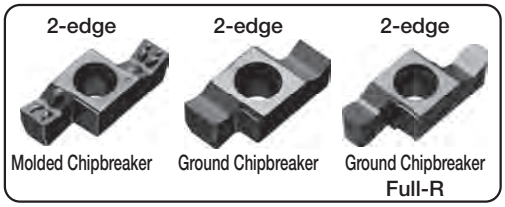
Type	SIGE
Min. Bore Dia.	ø8 ~ ø12
Edge Width (mm)	1.0 ~ 3.0
Max. Grooving Depth (mm)	1.5 ~ 2.2
See Page	G60



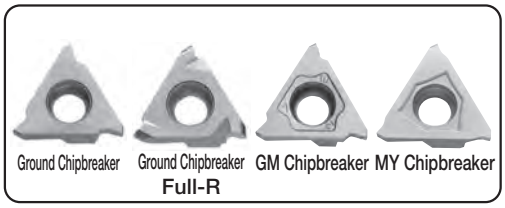
Type	GIV
Min. Bore Dia.	ø12 ~ ø40
Edge Width (mm)	1.0 ~ 5.0
Max. Grooving Depth (mm)	1.7 ~ 6.3
See Page	G64



Type	SIGE
Min. Bore Dia.	ø14 ~ ø40
Edge Width (mm)	1.0 ~ 5.0
Max. Grooving Depth (mm)	2.5 ~ 6.5
See Page	G60

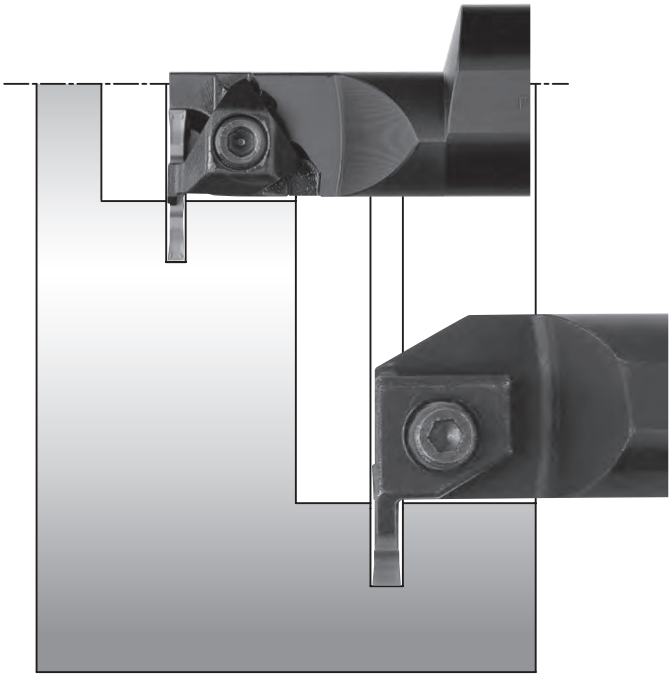


Type	KIGBA
Min. Bore Dia.	ø35 ~ ø40
Edge Width (mm)	0.33 ~ 4.8
Max. Grooving Depth (mm)	0.8 ~ 2.8
See Page	G66

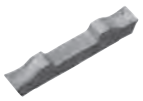


Summary of Internal Grooving

Deep Grooving (G70, G72)



Type	KGIA
Min. Bore Dia.	ø32 ~ ø66
Edge Width (mm)	3.0 ~ 5.0
Max. Grooving Depth (mm)	10 ~ 15
See Page	**G72**



Molded Chipbreaker

Type	KIGH
Min. Bore Dia.	ø45 ~ ø65
Edge Width (mm)	4.0 ~ 8.0
Max. Grooving Depth (mm)	12
See Page	**G70**

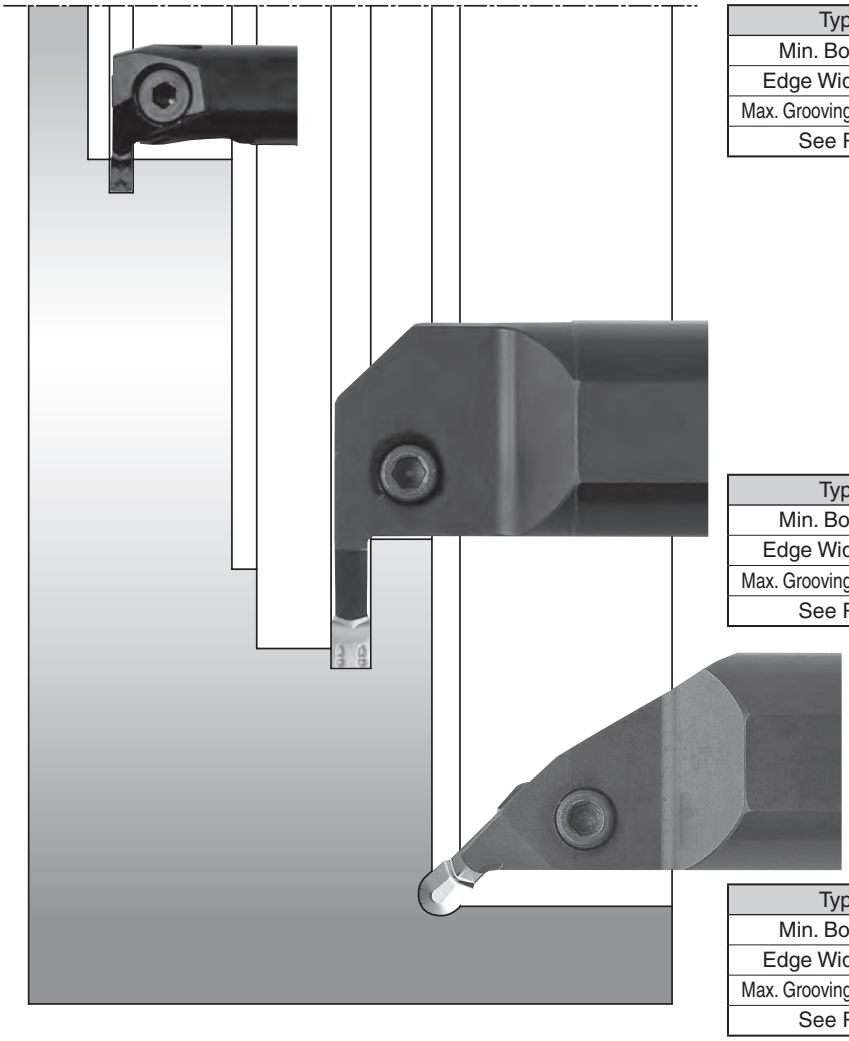


Ground Chipbreaker



Molded Chipbreaker

Internal Grooving & Turning ø20~ (G68, G71)



Type	KGDI
Min. Bore Dia.	ø18 ~ ø40
Edge Width (mm)	2.0 ~ 5.0
Max. Grooving Depth (mm)	4.5 ~ 11.0
See Page	**G68**



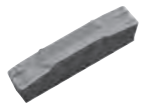
GMI Chipbreaker



Molded Chipbreaker
Full-R

Type	KIGM-8
Min. Bore Dia.	ø65
Edge Width (mm)	8.0
Max. Grooving Depth (mm)	20
See Page	**G71**

Type	KIGMU-8
Min. Bore Dia.	ø65
Edge Width (mm)	8.0
Max. Grooving Depth (mm)	2.2
See Page	**G71**



Molded Chipbreaker



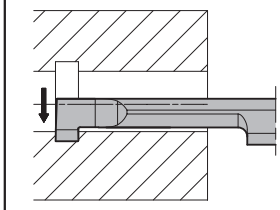
Ground Chipbreaker



Molded Chipbreaker
Full-R

Small Dia. Internal Grooving EZ Bars

EZG (Small Dia. Internal Grooving)



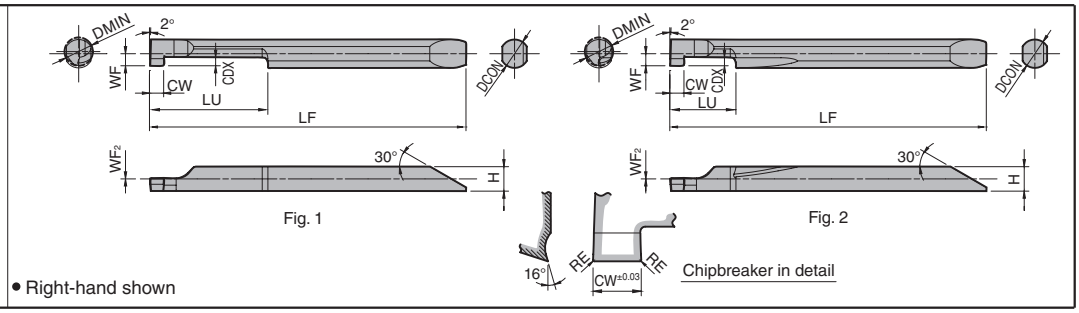


Fig. 1 Fig. 2

• Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)									Drawing	MEGACOAT PR1225		Carbide GW05	Applicable Sleeves EZH F26~F31
		DMIN	CW ±0.03	RE	DCON	H	LF	LU	WF	WF2	CDX		R	L	R	
EZGR/L	040040-050	4	0.5	±0.013 0.05	4	3.45	44.7	12	1.7	0	1	Fig. 2	●	●	●	EZH040..
	040040-100		1.0										●	●	●	
	040040-150		1.5										●	●	●	
	040040-200		2.0										●	●	●	
	050050-100	5	1.0		5	4.3	52.8	20	2.15		1.5	Fig. 1	●	●	●	EZH050..
	050050-150		1.5										●	●	●	
	050050-200		2.0										●	●	●	
	060060-100	6	1.0		6	5.15	60.7		2.65		2		●	●	●	EZH060..
	060060-150		1.5										●	●	●	
	060060-200		2.0										●	●	●	
	070070-100	7	1.0		7	6.2	63.7	25	3.05		2		●	●	●	EZH070..
	070070-150		1.5										●	●	●	
	070070-200		2.0										●	●	●	
	080070-100	8	1.0						3.45		2		●	●	●	
	080070-150		1.5										●	●	●	
	080070-200		2.0										●	●	●	
EZGR	030030-050S	3	0.5	±0.013 0.05	3	2.5	38.7	5	1.25	0	0.8	Fig. 2	●			EZH030..
	030030-100S		1.0										●			
	040040-050S	4	0.5		4	3.45	44.7	8	1.7		1		●			EZH040..
	040040-100S		1.0										●			
	040040-150S		1.5										●			
	040040-200S		2.0										●			
	050050-100S	5	1.0		5	4.3	52.8	10	2.15		1.5		●			EZH050..
	050050-150S		1.5										●			
	050050-200S		2.0										●			
	060060-100S	6	1.0		6	5.15	60.7		2.65		2		●			EZH060..
	060060-150S		1.5										●			
	060060-200S		2.0										●			
	070070-100S	7	1.0		7	6.2	63.7		3.05		2		●			EZH070..
	070070-150S		1.5										●			
	070070-200S		2.0										●			
	080070-100S	8	1.0						3.45				●			
	080070-150S		1.5										●			
	080070-200S		2.0										●			

· CDX shows available grooving depth.

EZ Bars Identification System

EZ G R 030 030 – 050 S

Symbol of EZ Bars	Applications	Insert Hand	Min. Bore Dia.	Shank Dia.	Edge Width	Type
	G : Internal Grooving	R : Right-hand L : Left-hand	030 : 3mm 040 : 4mm ⋮	030 : 3mm 040 : 4mm ⋮	050 : 0.5mm 100 : 1.0mm 150 : 1.5mm ⋮	S : Short type (LU dimension)

Recommended Cutting Conditions

Workpiece Material	Insert Grades (Cutting Speed Vc: m/min) MEGACOAT PR1225	Carbide GW05	EZGR030030-...S	EZGR/L040040-...(S) EZGR/L050050-...(S)	EZGR/L060060-...(S) EZGR/L070070-...(S) EZGR/L080070-...(S)	Remarks
			f (mm/rev)			
Carbon Steel / Alloy Steel	★ 30 ~ 100	-	~0.02	~0.03	~0.05	Coolant
Stainless Steel	★ 30 ~ 80	-	~0.01	~0.02	~0.03	
Non-ferrous Metals	-	★ ~ 300	-	~0.05	~0.08	

★ : 1st Recommendation

● : Std. Item

EZ Bars are sold in 1 piece boxes

Applicable Sleeves for Internal Grooving Inserts

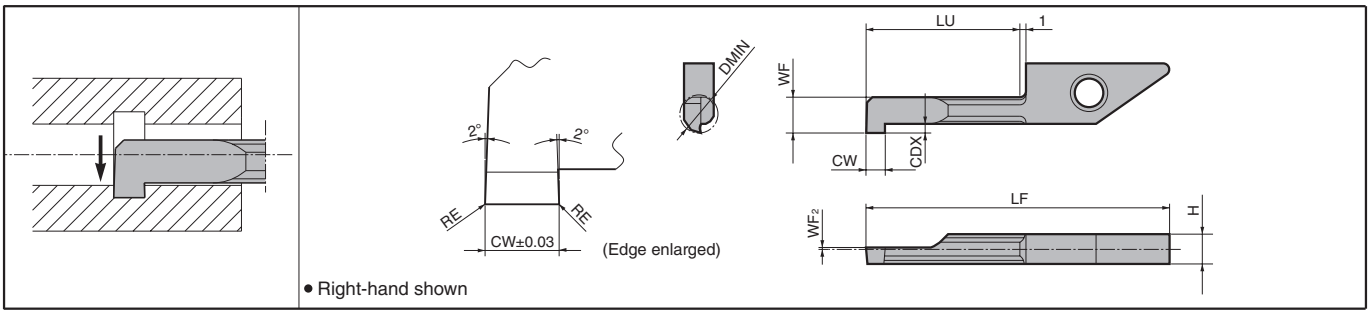
Applicable Sleeves

Sleeve				Applicable Insert for Small Dia. Internal Grooving		Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length with coolant hole) ➡ F26,F27	EZH-HP (Adjustable overhang length) ➡ F28,F29	EZH-ST ➡ F30,F31	Sleeve Shank Dia. DCON(mm)	EZG	Shank Dia. DCON(mm)	
-	-	EZH 03012ST-80	12	EZG_ 030030-...	3	(General purpose)
		04012ST-80		EZG_ 040040-...	4	
		05012ST-80		EZG_ 050050-...	5	
		06012ST-80		EZG_ 060060-...	6	
		07012ST-80		EZG_ 070070-...	7	
				EZG_ 080070-...	8	
-	EZH 03016HP-100	EZH 03016ST-100	16	EZG_ 030030-...	3	(General purpose)
	04016HP-100	04016ST-100		EZG_ 040040-...	4	
	05016HP-100	05016ST-100		EZG_ 050050-...	5	
	06016HP-100	06016ST-100		EZG_ 060060-...	6	
	07016HP-100	07016ST-100		EZG_ 070070-...	7	
				EZG_ 080070-...	8	
EZH 03019CT-120	EZH 03019HP-120	EZH 03019ST-120	19.05	EZG_ 030030-...	3	Citizen Machinery
04019CT-120	04019HP-120	04019ST-120		EZG_ 040040-...	4	
05019CT-120	05019HP-120	05019ST-120		EZG_ 050050-...	5	
06019CT-120	06019HP-120	06019ST-120		EZG_ 060060-...	6	
07019CT-120	07019HP-120	07019ST-120		EZG_ 070070-...	7	
				EZG_ 080070-...	8	
EZH 03020CT-120	EZH 03020HP-120	EZH 03020ST-120	20	EZG_ 030030-...	3	Eguro Tsugami Citizen Machinery (General purpose)
04020CT-120	04020HP-120	04020ST-120		EZG_ 040040-...	4	
05020CT-120	05020HP-120	05020ST-120		EZG_ 050050-...	5	
06020CT-120	06020HP-120	06020ST-120		EZG_ 060060-...	6	
07020CT-120	07020HP-120	07020ST-120		EZG_ 070070-...	7	
				EZG_ 080070-...	8	
EZH 03022CT-135	EZH 03022HP-135	EZH 03022ST-135	22	EZG_ 030030-...	3	Star Micronics Nomura DS Tsugami
04022CT-135	04022HP-135	04022ST-135		EZG_ 040040-...	4	
05022CT-135	05022HP-135	05022ST-135		EZG_ 050050-...	5	
06022CT-135	06022HP-135	06022ST-135		EZG_ 060060-...	6	
07022CT-135	07022HP-135	07022ST-135		EZG_ 070070-...	7	
				EZG_ 080070-...	8	
EZH 03025.0CT-135	EZH 03025.0HP-135	EZH 03025.0ST-135	25	EZG_ 030030-...	3	Eguro Tsugami Citizen Machinery (General purpose)
04025.0CT-135	04025.0HP-135	04025.0ST-135		EZG_ 040040-...	4	
05025.0CT-135	05025.0HP-135	05025.0ST-135		EZG_ 050050-...	5	
06025.0CT-135	06025.0HP-135	06025.0ST-135		EZG_ 060060-...	6	
07025.0CT-135	07025.0HP-135	07025.0ST-135		EZG_ 070070-...	7	
				EZG_ 080070-...	8	
EZH 03025.4CT-120	EZH 03025.4HP-120	EZH 03025.4ST-120	25.4	EZG_ 030030-...	3	Citizen Machinery
04025.4CT-120	04025.4HP-120	04025.4ST-120		EZG_ 040040-...	4	
05025.4CT-120	05025.4HP-120	05025.4ST-120		EZG_ 050050-...	5	
06025.4CT-120	06025.4HP-120	06025.4ST-120		EZG_ 060060-...	6	
07025.4CT-120	07025.4HP-120	07025.4ST-120		EZG_ 070070-...	7	
				EZG_ 080070-...	8	

· Choose sleeves (DCB) to meet with DCON dimension of Internal Grooving Inserts.
· Adjustment Pin cannot be installed to **EZH-ST** sleeves.
To adjust overhang of the bar, please use **EZH-CT / HP** Sleeves.
· Machine manufacturers in random order.

Small Dia. Internal Grooving System Tip-Bars

VNG



• Right-hand shown

Classification of usage										
● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	●		○				See Page for Applicable Toolholders
	M	Stainless Steel	●		○				
	K	Cast Iron				●			
	N	Non-ferrous Metals					●		
	S	Titanium Alloys					●		
	H	Hard Materials (~40HRC)	○		○				
		Hard Materials (40HRC~)							

Dimensions

Description		Min. Bore Dia.	Dimension (mm)								MEGA COAT		PVD	Carbide	PCD		See Page for Applicable Toolholders
		DMIN	CW	RE	H	LF	LU	WF	WF_2	CDX	PR1225		PR930	KW10	KPD001	KPD010	
VNGR	0410-11	4	1.0	0.05	3.9	30.8	11	3.5	0.1	0.8	●		●	●			F34 F35
	0420-11		2.0								●		●	●			
	0510-11	5	1.0	0.05				4.4		1.0	●		●	●			
	0520-11		2.0								●		●	●			
	0610-20	6	1.0	0.05		39.8	20	5.2	0.3	1.8	●		●	●			
	0620-20		2.0								●		●	●			
	0710-20	7	1.0	0.05				6.2		2.0	●		●	●			
	0720-20		2.0								●		●	●			
VNGR	0410-11NB	4	1.0	0.05	3.9	30.8	11	3.5	0.1	0.8					MTO		
	0420-11NB		2.0												MTO		
	0510-11NB	5	1.0	0.05				4.4		1.0					MTO		
	0520-11NB		2.0												MTO		
	0610-20NB	6	1.0	0.05		39.8	20	5.2	0.3	1.8					MTO		
	0620-20NB		2.0												MTO		
	0710-20NB	7	1.0	0.05				6.2		2.0					MTO	MTO	
	0720-20NB		2.0												MTO		

· CDX : shows available grooving depth.
· WF_2 : indicates the cutting edge is above the Tool's Center Position.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades(Cutting Speed Vc: m/min)			VNG04 VNG05	VNG06 VNG07	Remarks
	MEGA COAT	PVD	Carbide	f (mm/rev)		
	PR1225	PR930	KW10			
Carbon Steel / Alloy Steel	★ 30~100	☆ 30~100		~0.03	~0.05	Coolant
Stainless Steel	★ 30~80	☆ 30~80		~0.02	~0.03	
Non-ferrous Metals			★ ~300	~0.05	~0.08	

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item
MTO : Made to order

System Tip-Bars (VNG) are sold in 5 piece boxes

CBN & PCD Inserts are sold in 1 piece boxes

High Precision Small Dia. Internal Grooving

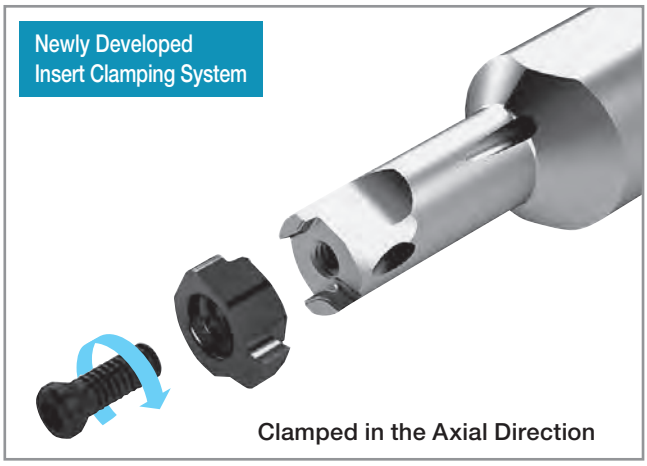
SIGC

Newly Developed Clamping System Ensures a Firm Insert Hold to Provide High-Precision Machining

Excellent Chip Evacuation with Double Coolant Holes and Optimized Flute Shape with a ø8mm Minimum Cutting Diameter

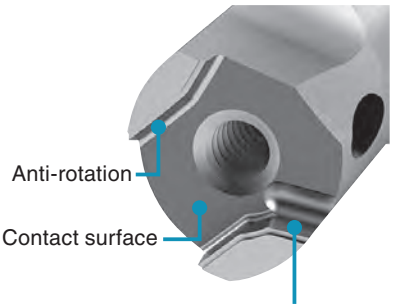
1 Firm Insert Clamping System Provides High-Precision Machining

Firm clamping action by pulling the bottom surface of the insert in axial direction
Stable machining is achieved by ensuring a firm clamp on the insert

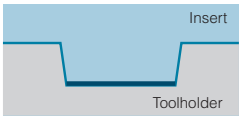


Clamping Part (Image)

Firm clamping is available due to large contact surface

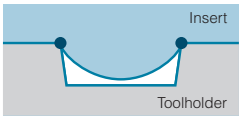


SIGC



Bottom Surface Contact

Competitor A

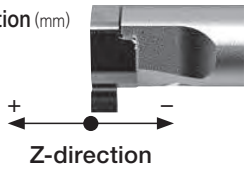


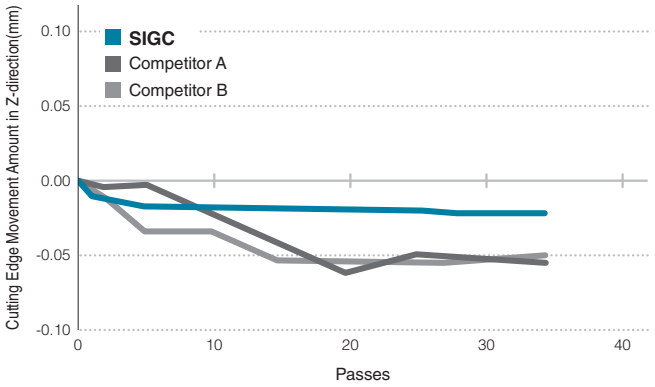
Point Contacts

Cutting Edge Stability Position Comparison (Internal evaluation)

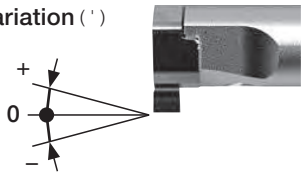
Measurement of the cutting edge position and angle after turning

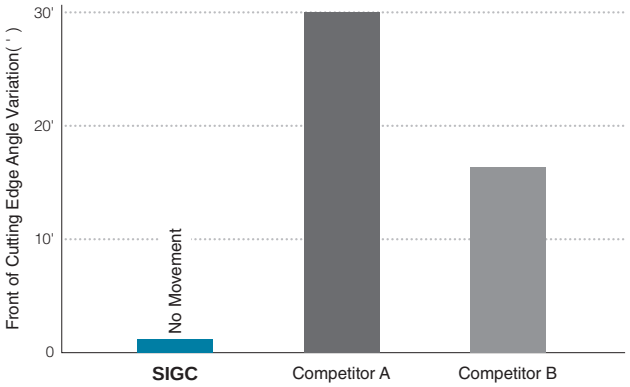
Cutting Edge Movement Amount in Z-direction (mm)





Front of Cutting Edge Angle Variation (')





Cutting Conditions:Vc = 50 m/min, ap = 0.2 mm, f = 0.05 mm/rev, Wet Workpiece Material : SCM435 External Turning

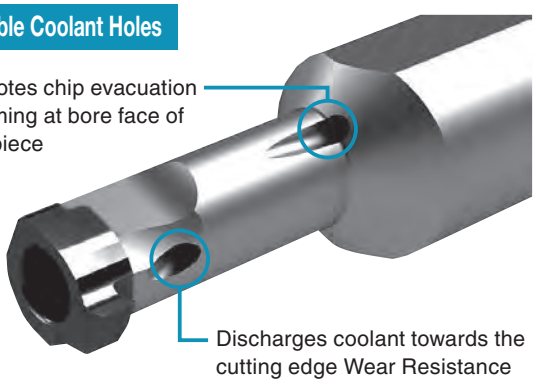
SIGC ensures high precision machining by preventing cutting edge position movement

2 Excellent Chip Evacuation

Excellent Chip Evacuation with Double Coolant Holes and Optimized Flute Shape

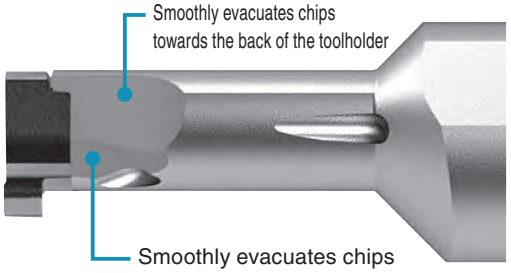
Double Coolant Holes

Promotes chip evacuation by aiming at bore face of workpiece



Discharges coolant towards the cutting edge Wear Resistance

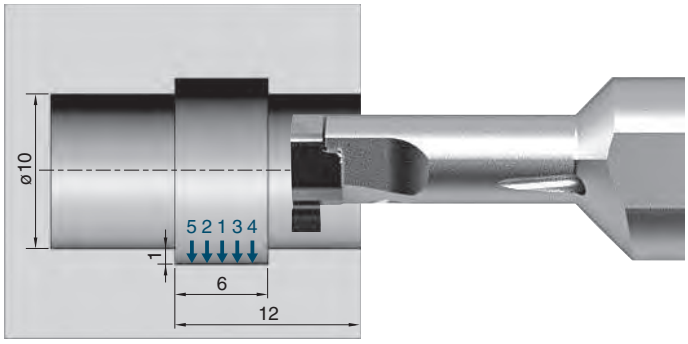
Flute Shape



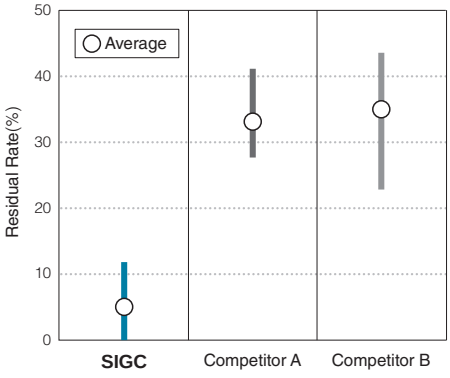
Provides a better solution when facing chip evacuation difficulties in small internal grooving
Prevents chip crunching

Chip Evacuation Comparison (Internal evaluation)

Cutting Conditions:Vc = 50 m/min, ap = 1.0 mm (Shouldering), f = 0.03 mm/rev, Wet (Internal coolant) , Workpiece Material : SCM415, Edge Width2 mm

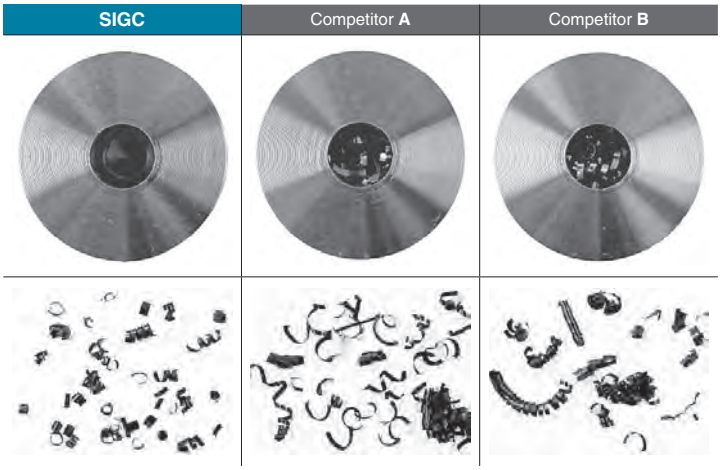


Residual Rate (%)



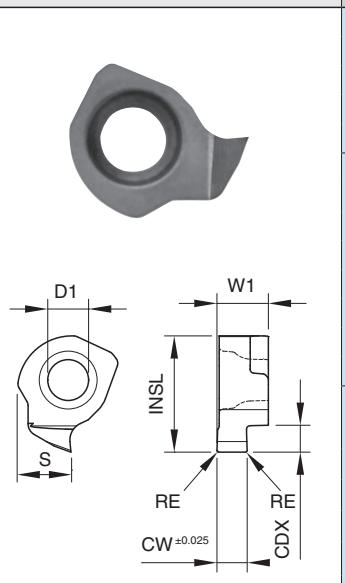
$$\text{Residual Rate (\%)} = \frac{\text{Weight of remaining chip in the hole (g)}}{\text{Weight of chips removed (g)}} \times 100$$

Chip Evacuation Comparison



No Remaining Chips
Chip Evacuation : Good

Applicable Inserts

Insert (Handed Insert shows Right-hand)	Description	CW	CDX	RE	W1	INSL	S	D1	MEGACOAT NANO PLUS PR1725 R	MEGACOAT NANO PLUS PR1725 L	MEGACOAT NANO PR1535 R	MEGACOAT NANO PR1535 L	Applicable Toolholders
	GC08R/L 100-005	1.00	1.5	0.05	3.4	7.7	3.5	2.7	●	●	●	●	SIGCR/L 0812-EH SIGCR/L 0806-WH
	120-005	1.20							●	●	●	●	
	125-005	1.25							●	●	●	●	
	150-010	1.50		0.1					●	●	●	●	
	200-010	2.00							●	●	●	●	
	GC10R/L 100-005	1.00	2.2	0.05	4.7	9.6	4.4	3.5	●	●	●	●	SIGCR/L 1016-EH SIGCR/L 1008-WH-L85 SIGCR 1008-WH-L100
	120-005	1.20							●	●	●	●	
	125-005	1.25							●	●	●	●	
	145-010	1.45		0.1					●	●	●	●	
	150-010	1.50							●	●	●	●	
	200-010	2.00							●	●	●	●	
	250-020	2.50		0.2					●	●	●	●	
	300-020	3.00							●	●	●	●	
	GC12R/L 100-005	1.00	2.2	0.05	4.7	11.6	5.4	3.5	●	●	●	●	SIGCR/L 1216-EH SIGCR 1210-WH-L95 SIGCR/L 1210-WH-L110
	120-005	1.20							●	●	●	●	
	125-005	1.25							●	●	●	●	
	145-010	1.45		0.1					●	●	●	●	
	150-010	1.50							●	●	●	●	
	200-010	2.00							●	●	●	●	
	250-020	2.50		0.2					●	●	●	●	
	300-020	3.00							●	●	●	●	

· CDX : shows available grooving depth.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min) MEGACOAT NANO PLUS PR1725	MEGACOAT NANO PR1535	(1) f for Grooving (mm/rev) / (2) f for Turning (mm/rev) / (3) ap for Turning (mm) GC08R/L…	GC10R/L, GC12R/L 100 ~ 200…	GC10R/L, GC12R/L 250 ~ 300…	Remarks
Carbon Steel	★ 50~80	☆ 50~80	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	Coolant
			(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
			(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Alloy Steel	★ 50~80	☆ 50~80	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
			(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
			(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Stainless Steel	☆ 50~80	★ 50~80	(1) 0.01~0.03	(1) 0.01~0.03	(1) 0.01~0.03	
			(2) 0.01~0.03	(2) 0.01~0.03	(2) 0.01~0.03	
			(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	

★ : 1st Recommendation ☆ : 2nd Recommendation

Applicable Sleeves

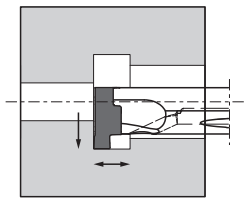
Shank Size (Hole Dia.: mm)	06 (6 mm)	08 (8 mm)	10 (10 mm)	12 (12 mm)	16 (16 mm)
Toolholder Description	SIGCR/L 0806-WH	SIGCR/L 1008-WH-L85 SIGCR 1008-WH-L100	SIGCR 1210-WH-L95 SIGCR/L 1210-WH-L110	SIGCR/L 0812-EH	SIGCR/L 1016-EH SIGCR/L 1216-EH
SH Sleeves (For Boring Bars)	SH 06…	SH 08…	SH 10…	SH 12…	SH 16…
SHC Sleeves (Coolant Sleeve)	–	SHC 08…	SHC 10…	SHC 12…	SHC 16…
SHA Sleeves	–	SHA 08…	SHA 10…	SHA 12…	–
EZH Sleeves (For EZ Bars)	EZH 06…ST/CT/HP…	EZH 08…ST/CT/HP…	–	–	–

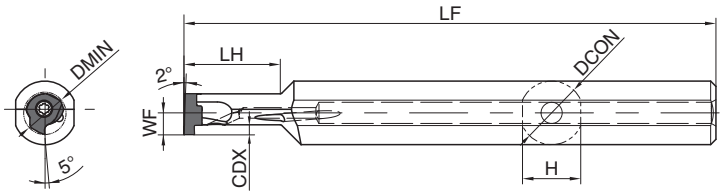
* Remove the positioning pin when mounting SIGC to the EZH-CT/HP Sleeve
Positioning function is not available

● : Std. Item

GC type inserts are sold in 5 piece boxes

SIGC Excellent Bar (with Coolant Hole)





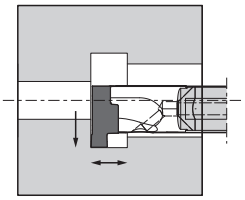
• Right-hand shown

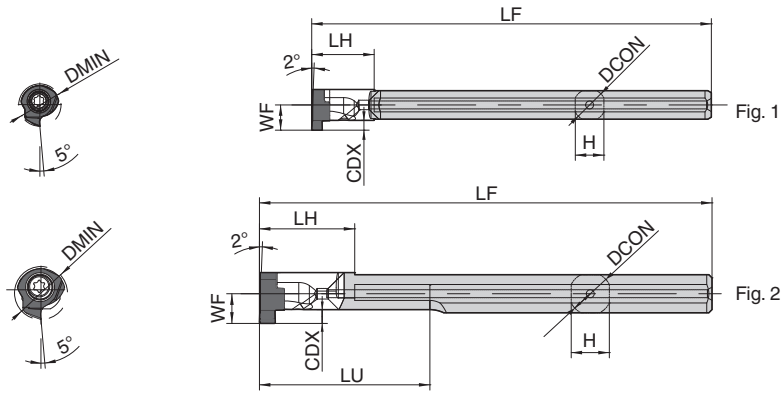
Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	CDX	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡G56
SIGC$^{R/L}$	0812-EH	●	●	8	12	11	100	18	4.1	1.5	SB-2270T$^{R/L}$	FT-7	GC08$^{R/L}$100-005~GC08$^{R/L}$200-010
	1016-EH	●	●	10	16	15	100	21	5.0	2.2	SB-3070T$^{R/L}$	FT-8	GC10$^{R/L}$100-005~GC10$^{R/L}$300-020
	1216-EH	●	●	12	16	15	110	25	6.0	2.2			GC12$^{R/L}$100-005~GC12$^{R/L}$300-020

SIGC Carbide Shank Bar (with Coolant Hole)





• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LU	LH	WF	CDX	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡G56
SIGC$^{R/L}$	0806-WH	●	●	8	6	5.4	75	–	12	4.8	1.5	Fig. 1	SB-2270T$^{R/L}$	FT-7	GC08$^{R/L}$100-005~GC08$^{R/L}$200-010
	1008-WH-L85	●	●	10	8	7.2	85	32	18	5.6	2.2	Fig. 2	SB-3070T$^{R/L}$	FT-8	GC10$^{R/L}$100-005~GC10$^{R/L}$300-020
	1008-WH-L100	●					100	45							GC10R100-005~GC10R300-020
	1210-WH-L95	●		12	10	9.2	95	32		6.6					GC12R100-005~GC12R300-020
	1210-WH-L110	●	●				110	45							GC12$^{R/L}$100-005~GC12$^{R/L}$300-020

Setting the insert
·Use compressed air or other measures to remove chips from the insert pocket
·Mount the insert into the toolholder ensure the bottom makes contact with the end of the toolholder's surface
·Keeping the insert seated, tighten the insert clamp screw at an appropriate torque
Recommended tightening torque : 0.8 N·m(SB-2270T$^{R/L}$),1.2 N·m(SB-3070T$^{R/L}$)
L-hand clamp screw for L-hand toolholder

GC**R-***	GC**L-***
LOCK Right-hand screw	LOCK Left-hand screw
Toolholder : SIGCR****-**	Toolholder : SIGCL****-**
Clamp Screw : SB-****TR	Clamp Screw : SB-****TL

● : Std. Item

Applicable Inserts

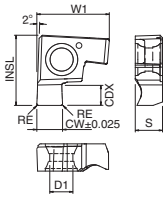
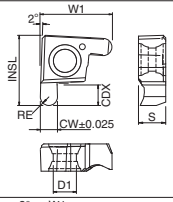
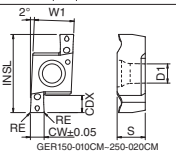
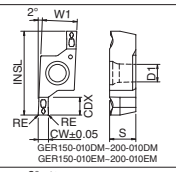
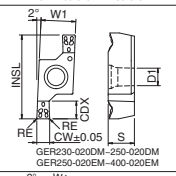
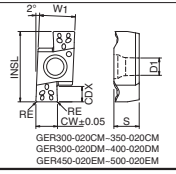
(mm)

Description	W1	INSL	S	D1
GE$^{R}_{L}$...-A	6.69	6.5	2.58	2.5
GER...-AR				
GE$^{R}_{L}$...-B	8.46	8.2	3.18	2.7
GER...-BR				
GER...-CM	5.8	11.48	4.05	2.8
GER...-DM	6.8	16.44	5.05	3.4
GER...-EM	9.54	21.66	5.55	4.4

P	Carbon Steel / Alloy Steel		●	◔		
M	Stainless Steel		●	◔		
K	Cast Iron					◔
N	Non-ferrous Metals					●
S	Titanium Alloys					●
H	Hard Materials (~40HRC)		●	○		
	Hard Materials (40HRC~)					

Classification of usage
- ● :Continuous-Light Interruption / 1st Choice
- ◔ :Continuous-Light Interruption / 2nd Choice
- ● :Continuous / 1st Choice
- ○ :Continuous / 2nd Choice

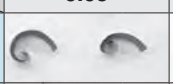
See Page for Applicable Toolholders

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) CW	CDX	RE	Cermet TN6020 R	TN6020 L	MEGA COAT PR1225 R	PR1225 L	PVD Coated Carbide PR1025 R	PR1025 L	Carbide GW15 R	GW15 L	KW10 R	KW10 L	Applicable Toolholders	See Page for Applicable Toolholders
 2-edge		GE$^{R}_{L}$	100-005A	1.00	1.5	0.05	●		●	●	▲	▲			●		SIGE$^{R}_{L}$...A-EH SIGE$^{R}_{L}$...A-WH	G60 G61
			120-005A	1.20			●		●	●	▲							
			125-005A	1.25					●	●	▲	▲			●			
			150-010A	1.50		0.1	●		●	●	▲				●	●		
			200-010A	2.00			●		●	●	▲	▲			●			
		GE$^{R}_{L}$	100-005B	1.00	2.2	0.05	●		●	●	▲	▲			●	●	SIGE$^{R}_{L}$...B-EH SIGE$^{R}_{L}$...B-WH SIGER...B-WH-90	G60 G61 G62
			120-005B	1.20			●		●	●	▲				●			
			125-005B	1.25					●	●	▲				●			
			145-010B	1.45		0.1	●		●	●	▲				●			
			150-010B	1.50			●	●	●	●	▲				●			
			200-010B	2.00			●	●	●	●	▲	▲			●	●		
			250-020B	2.50		0.2	●	●	●	●	▲	▲			●			
			300-020B	3.00			●	●	●	●	▲	▲			●	●		
 2-edge Full-R		GER	100-050AR	1.00	1.5	0.5			●		▲				●		SIGER...A-EH SIGER...A-WH	G60 G61
			200-100AR	2.00		1.0			●		▲							
		GER	100-050BR	1.00	2.2	0.5			●		▲				●		SIGER...B-EH SIGER...B-WH SIGER...B-WH-90	G60 G61 G62
			200-100BR	2.00		1.0			●		▲				●			
	 GER150-010CM–250-020CM	GER	150-010CM	1.50	2.5	0.1			●		▲						SIGER...C-EH SIGER...C-WH SIGER...C-WH-90	
			200-010CM	2.00					●		▲							
			250-020CM	2.50		0.2			●		▲							
			300-020CM	3.00					●		▲							
			350-020CM	3.50					●		▲							
	 GER150-010DM–200-010DM GER150-010EM–200-010EM	GER	150-010DM	1.50	3.0	0.1			●		▲						SIGER...D-EH	G60
			200-010DM	2.00	3.2				●		▲							
			230-020DM	2.30		0.2			●		▲							
			250-020DM	2.50					●		▲							
			300-020DM	3.00	4.5				●		▲							
			350-020DM	3.50					●		▲							
			400-020DM	4.00					●		▲							
	 GER230-020DM–250-020DM GER250-020EM–400-020EM	GER	150-010EM	1.50	3.0	0.1			●		▲						SIGER...E-EH	
			200-010EM	2.00	3.2				●		▲							
			250-020EM	2.50	4.5	0.2			●		▲							
			300-020EM	3.00					●		▲							
			350-020EM	3.50	5.5				●		▲							
			400-020EM	4.00					●		▲							
2-edge Molded Chipbreaker	 GER300-020CM–350-020CM GER300-020DM–400-020DM GER450-020EM–500-020EM		450-020EM	4.50	6.5				●		▲							
			500-020EM	5.00					●		▲							

· CDX shows available grooving depth.

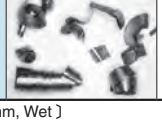
Recommended Cutting Conditions ➡ G115

Chip Control Comparison(Molded Chipbreaker)

f (mm/rev) / Description	SCM415 (Bore Dia. : ø16) 0.05	0.07	0.1	Evaluation
SIGER1612C-EH GER300-020CM				Good Chip Control
Competitor A Width : 3mm			Insert Fracture	Unstable Chip Control and biting
Competitor B Width : 3mm				Unstable Chip Control and biting

〔Vc =100m/min, ap=2.0mm , Wet〕 (Internal evaluation)

Chip Control Comparison (Min. Bore Dia. : ø8)

f (mm/rev) / Description	SCM415 0.02	Evaluation
SIGER0808A-EH GER200-010A		✓
Competitor C Width : 2mm		⊘ Chipping

〔Vc=50m/min, ap=1.25mm, Wet〕 (Internal evaluation)

● : Std. Item
▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

Applicable Inserts

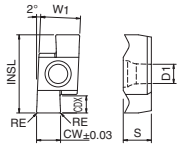
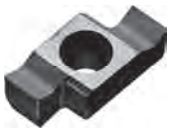
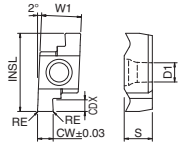
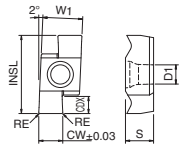
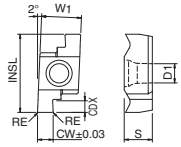
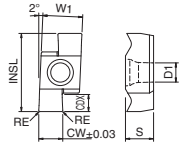
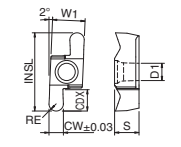
(mm)

Description	W1	INSL	S	D1
GE$^{R}_{L}$...-C	5.8	11.48	4.05	3.1
GER...-CR				
GE$^{R}_{L}$...-D	6.8	16.44	5.05	3.6
GER...-DR				
GE$^{R}_{L}$...-E	9.54	21.66	5.55	4.6

		Cermet	MEGA COAT	PVD Coated Carbide	Carbide	
		TN6020	PR1225	PR1025	GW15	KW10
P	Carbon Steel / Alloy Steel	●	○	○		
M	Stainless Steel	●	○			
K	Cast Iron				○	
N	Non-ferrous Metals				●	
S	Titanium Alloys				●	
H	Hard Materials (~40HRC)		●	○		
	Hard Materials (40HRC~)					

Classification of usage
- ● :Continuous~Light Interruption / 1st Choice
- ○ :Continuous~Light Interruption / 2nd Choice
- ● :Continuous / 1st Choice
- ○ :Continuous / 2nd Choice

See Page for Applicable Toolholders

Insert (Handed Insert shows Right-hand)	Description	CW	CDX	RE	TN6020 R	TN6020 L	PR1225 R	PR1225 L	PR1025 R	PR1025 L	GW15 R	GW15 L	KW10 R	KW10 L	Applicable Toolholders	See Page for Applicable Toolholders
 2-edge 	GE$^{R}_{L}$ 100-005C	1.00	2.5	0.05	●	●	●	●	▲	▲	●	●			SIGE$^{R}_{L}$...C-EH SIGE$^{R}_{L}$...C-WH SIGER...C-WH-90	G60 G61 G62
	120-005C	1.20			●		●	●	▲	▲	●					
	125-005C	1.25			●		●		▲	▲	●	●				
	140-005C	1.40			●		●		▲		●					
	145-010C	1.45		0.1			●		▲	▲						
	150-010C	1.50			●		●	●	▲	▲	●	●				
	170-010C	1.70					●		▲		●					
	185-010C	1.85					●		▲							
	195-010C	1.95					●									
	200-010C	2.00			●		●	●	▲	▲	●	●				
	250-020C	2.50		0.2	●	●	●	●	▲		●	●				
	300-020C	3.00			●	●	●	●	▲	▲	●					
	350-020C	3.50					●		▲	▲	●					
 2-edge  GER100-005D~280-020D  GER300-020D~400-020D	GE$^{R}_{L}$ 100-005D	1.00	2.5	0.05	●		●	●	▲	▲	●	●			SIGE$^{R}_{L}$...D-EH	G60
	140-005D	1.40			●		●	●	▲		●					
	145-010D	1.45		0.10	●		●		▲	▲						
	150-010D	1.50	3.0		●	●	●	●	▲	▲	●	●				
	170-010D	1.70			●		●	●	▲							
	185-010D	1.85							▲							
	195-010D	1.95							▲							
	200-010D	2.00	3.2		●	●	●	●	▲	▲	●					
	225-010D	2.25					●	●	▲	▲						
	230-020D	2.30		0.20	●		●	●			●					
	250-020D	2.50			●	●	●	●	▲	▲	●					
	280-020D	2.80							▲		●					
	300-020D	3.00	4.5		●	●	●	●	▲	▲	●	●				
	330-020D	3.30							▲							
	350-020D	3.50					●									
	400-020D	4.00			●		●	●	▲		●					
 2-edge  GER100-005E~430-020E  GER450-020E~500-020E	GE$^{R}_{L}$ 100-005E	1.00	2.5	0.05	●		●	●	▲		●				SIGE$^{R}_{L}$...E-EH	G60
	150-010E	1.50	3.0	0.1	●		●	●	▲	▲	●	●				
	170-010E	1.70			●		●	●	▲	▲	●					
	185-010E	1.85			●				▲	▲						
	195-010E	1.95							▲	▲						
	200-010E	2.00			●		●		▲	▲	●	●				
	225-010E	2.25	3.2		●		●		▲		●					
	230-020E	2.30		0.2	●	●	●		▲		●					
	250-020E	2.50			●	●	●	●	▲	▲	●	●				
	275-020E	2.75	4.5				●				●					
	280-020E	2.80			●		●	●	▲	▲						
	300-020E	3.00			●	●	●	●	▲	▲	●	●				
	330-020E	3.30			●		●		▲	▲						
	350-020E	3.50			●	●	●		▲	▲	●					
	400-020E	4.00	5.5		●		●		▲	▲	●	●				
	430-020E	4.30			●		●									
	450-020E	4.50	6.5		●		●				●					
	460-020E	4.60					●		▲							
	500-020E	5.00			●		●		▲	▲	●					
 2-edge Full-R 	GER 200-100CR	2.00	2.5	1.0			●		▲		●				SIGER...C-EH SIGER...C-WH SIGER...C-WH-90	G60 G61 G62
	250-125CR	2.50		1.25			●		▲		●					
	300-150CR	3.00		1.5			●		▲		●					
	GER 200-100DR	2.00	3.2	1.0			●		▲		●				SIGER...D-EH	G60
	300-150DR	3.00	4.5	1.5			●		▲		●					

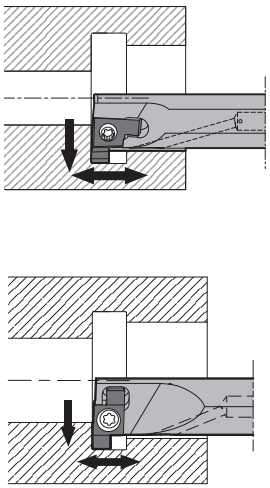
· CDX shows available grooving depth.

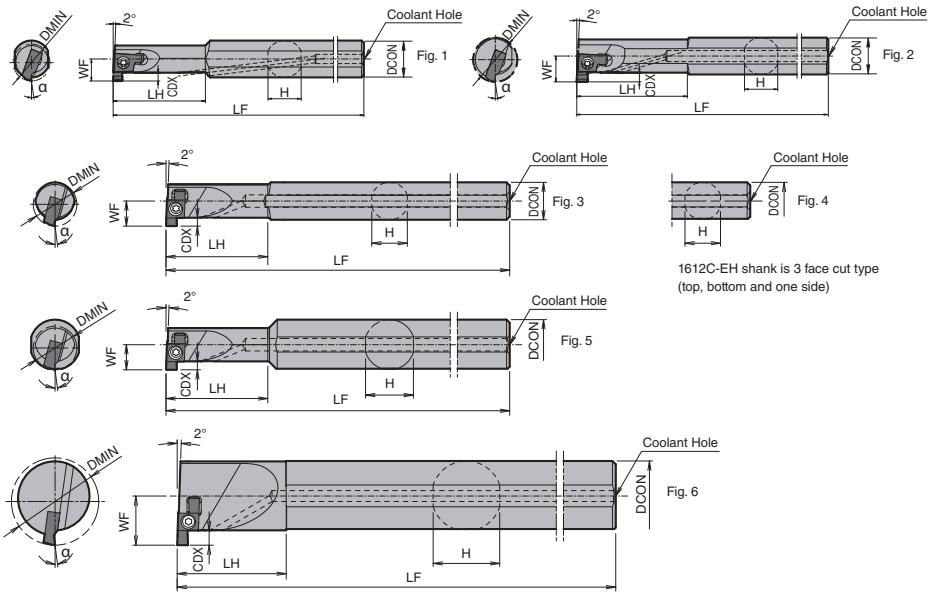
Recommended Cutting Conditions ➡ G115

● : Std. Item
▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

SIGE-EH Excellent Bar (with Coolant Hole)





1612C-EH shank is 3 face cut type (top, bottom and one side)

● Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	CDX	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench FT	Spare Parts: Wrench DT	Applicable Inserts ➡G58, G59
SIGE$^{R/L}$	0808A-EH	●	●	8	8	7.2	100	20	4.8	1.5	Fig. 1	SB-2045TRN	FT-6	-	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR
	1010B-EH	●	●	10	10	9	125	25	6.2	2.2	Fig. 1	SB-2255TR	-	DT-7	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR
	1210B-EH	●	●	12				30	7		Fig. 2				
	1412C-EH	●	●	14	12	11.4	150	33	8	2.5	Fig. 3	SB-2570TR	FT-8	-	GE$^{R/L}$100-005C~GE$^{R/L}$350-020C GER150-010CM~GER350-020CM GER200-100CR~GER300-150CR
	1612C-EH	●	●	16				20	8.5		Fig. 4				
	1616C-EH	●	●		16	15	160	36	9		Fig. 5				
	2020D-EH	●	●	20	20	19	180	40	12.1	4.5		SB-3080TR	FT-10	-	GE$^{R/L}$100-005D~GE$^{R/L}$400-020D GER150-010DM~GER400-020DM GER200-100DR~GER300-150DR
	2525E-EH	●	●	25	25	24	200	45	15.6	6.5		SB-4085TR	FT-15	-	GE$^{R/L}$100-005E~GE$^{R/L}$500-020E GER150-010EM~GER500-020EM
	3232E-EH	●	●	32	32	30.4	220	55	19						
	4032E-EH	●	●	40			250	45	23		Fig. 6				

· CDX shows available grooving depth. Available Groove Depth : "CDX" Dimension of Insert.

Features

● Large chip pocket screw clamp toolholder design enables excellent chip evacuation



Screw Clamp　　Conventional Clamp

● Cost effective chip control from a molded chipbreaker



GER...M

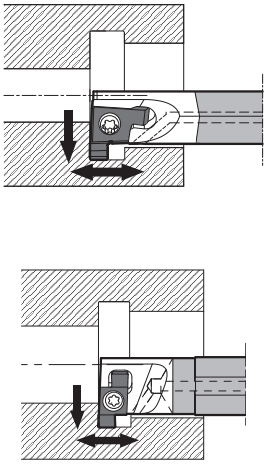
● Cutting edge is free from contact face

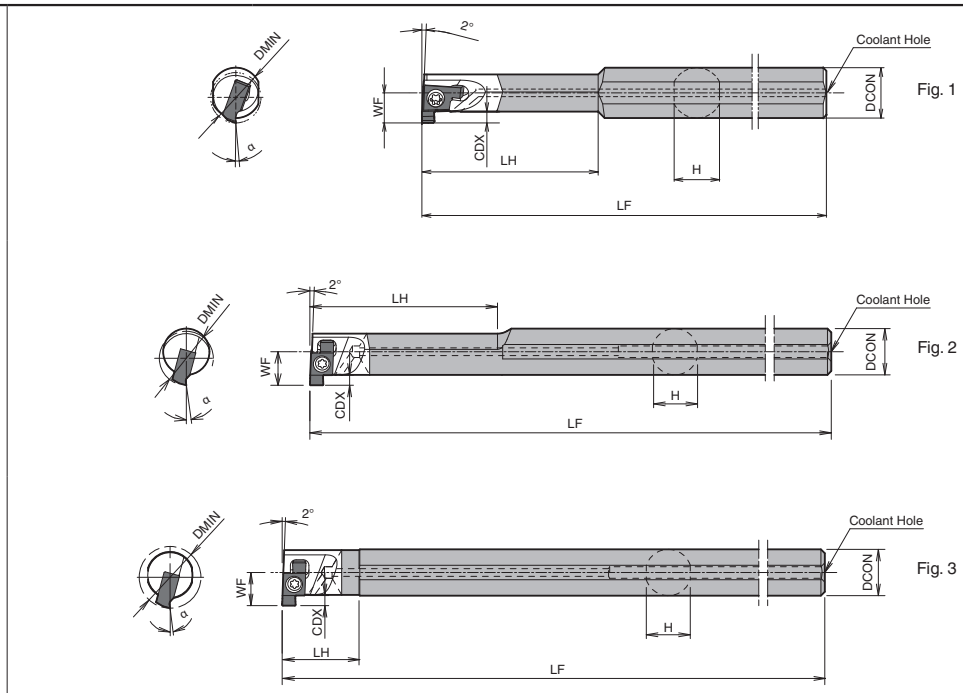


● An 8mm minimum bore diameter with a 2-edge design

● : Std. Item

SIGE-WH Carbide Shank Bar (with Coolant Hole)

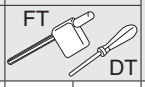




● Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock		Min. Bore Dia.	Dimension (mm)						Drawing	Spare Parts			Applicable Inserts ➡G58, G59
												Clamp Screw	Wrench		
		R	L	DMIN	DCON	H	LF	LH	WF	CDX			 FT DT		
SIGE$^{R/L}$	0808A-WH	●	●	8	8	7.2	125	28	4.8	1.5	Fig. 1	SB-2045TRN	FT-6	-	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR
	1010B-WH	●	●	10	10	9	125	35	6.2	2.2		SB-2255TR	-	DT-7	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR
	1210B-WH	●	●	12			140	45	7						
	1412C-WH	●	●	14	12	11.4	150	50	8.7	2.5	Fig. 2	SB-2570TR	FT-8	-	GE$^{R/L}$100-005C~GE$^{R/L}$350-020C GER150-010CM~GER350-020CM GER200-100CR~GER300-150CR
	1612C-WH	●	●	16			180	20	8.5		Fig. 3				

· CDX shows available grooving depth. Available Groove Depth : "CDX" Dimension of Insert.

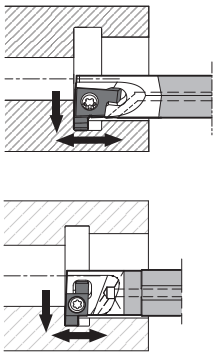
Applicable Insert & Rake Angle (α) after Installment of Insert

Toolholder Description		Applicable Insert & Rake Angle (α) after Installment of Insert			
		Ground Chipbreaker	α	Molded Chipbreaker	α
SIGE$^{R/L}$	0808A-EH	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR	5°	-	-
	1010B-EH	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR	5°	-	-
	1210B-EH				
	1412C-EH	GE$^{R/L}$100-005C~GE$^{R/L}$350-020C GER200-100CR~GER300-150CR	8°	GER150-010CM~GER350-020CM	10°
	1612C-EH				
	1616C-EH				
	2020D-EH	GE$^{R/L}$100-005D~GE$^{R/L}$400-020D GER200-100DR~GER300-150DR	9°	GER150-010DM~GER400-020DM	10°
	2525E-EH	GE$^{R/L}$100-005E~GE$^{R/L}$500-020E	10°	GER150-010EM~GER500-020EM	10°
	3232E-EH				
	4032E-EH				
SIGE$^{R/L}$	0808A-WH	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR	5°	-	-
	1010B-WH	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR	5°	-	-
	1210B-WH				
	1008B-WH-90				
	1210B-WH-90				
	1412C-WH	GE$^{R/L}$100-005C~GE$^{R/L}$350-020C GER200-100CR~GER300-150CR	8°	GER150-010CM~GER350-020CM	10°
	1612C-WH				
	1412C-WH-90				

α indicates the rake angle at the center of the edge width after installing insert.

● : Std. Item

SIGE-WH-90 (for Automatic Lathe) Carbide Shank Bar (with Coolant Hole)



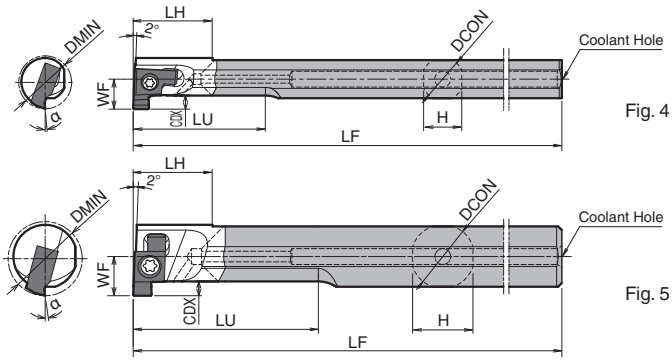


Fig. 4

Fig. 5

●Right-hand shown

Right-hand Insert for Right-hand Toolholder.

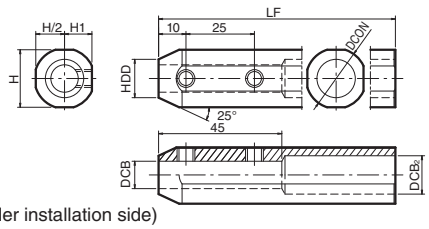
Toolholder Dimensions

Description		Stock	Min. Bore Dia.	Dimension (mm)							Drawing	Spare Parts		Applicable Inserts ➔G58, G59
			DMIN	DCON	H	LF	LU	*LH	WF	CDX		Clamp Screw	Wrench	
SIGER	1008B-WH-90	●	10	8	7.2	90	25	15	5.6	2.2	Fig. 4	SB-2255TR	FT-7	GER100-005B~GER300-020B GER100-050BR~GER200-100BR
	1210B-WH-90	●	12	10	9.4		30		6.6					
	1412C-WH-90	●	14	12	11.4	90	35	15	7.4	2.5	Fig. 5	SB-2570TR	FT-8	GER100-005C~GER350-020C GER150-010CM~GER350-020CM GER200-100CR~GER300-150CR

* LH shows minimum overhang length.

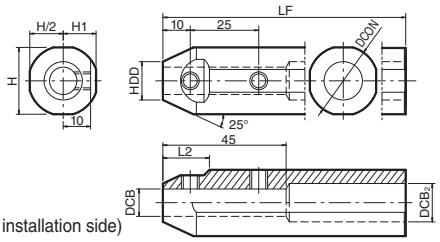
· See Page ➔ **G61** for Applicable Insert & Rake Angle (α) after Installment of Insert.

Applicable Sleeves



(Toolholder installation side)

Fig. 1



(Toolholder installation side)

Fig. 2

Description		Stock	Dimension (mm)								Drawing	Spare Parts		Applicable Machine Manufacturer
			DCB	DCON	HDD	DCB2	H	H1	LF	L2		Screw	Wrench	
SHA	0820-120	●	8	20	14	12	19	9.25	120	-	Fig. 1	HS6X4P	LW-3	Eguro Tsugami Citizen Machinery
	1020-120	●	10											
SHA	0825.0-135	●	8	25	14	14	24	11.5	135	17	Fig. 2			
	1025.0-135	●	10											
	1225.0-135	●	12		16									
SHA	0819-120	●	8	19.05	14	12	18	8.75	120	-	Fig. 1	HS6X4P	LW-3	Citizen Machinery
	1019-120	●	10											
SHA	0820-120	●	8	20	14	12	19	9.25	120	-	Fig. 1			
	1020-120	●	10											
SHA	0825.4-120	●	8	25.4	14	14	24.4	12	120	17	Fig. 2			
	1025.4-120	●	10											
	1225.4-120	●	12		16									
SHA	0822-125	●	8	22	14	14	21	10	125	-	Fig. 1	HS6X4P	LW-3	Star Micronics Nomura DS
	1022-125	●	10											
	1222-125	●	12		16									
SHA	0823-120	●	8	23	14	14	22	10.5	120	16	Fig. 2	HS6X4P	LW-3	Nomura DS
	1023-120	●	10											
	1223-120	●	12		16									

* Length of DCB···45mm (All of SHA sleeves)

· Choose sleeves (DCB) to meet with DCON dimension of toolholder.

· Machine manufacturers in random order.

● : Std. Item

Inserts for Small Dia. Internal Grooving

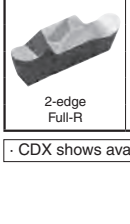
Applicable Inserts (GIV / GIV-E / GIV-W)

(mm)

Description	W1	INSL	S
GV$^{R/L}$...SS	3.6	9	3.0
GV$^{R/L}$...S	4.0	11	4.0
GV$^{R/L}$...A	4.0	12	5.0
GV$^{R/L}$...B	4.5	15	5.5
GV$^{R/L}$...C	5.8	21	6.5

Classification of usage
- ● : Continuous~Light Interruption / 1st Choice
- ◔ : Continuous~Light Interruption / 2nd Choice
- ● : Continuous / 1st Choice
- ○ : Continuous / 2nd Choice

		TN90	TC40N	TC60M	PR1225	PR930	KW10	KPD010
P	Carbon Steel / Alloy Steel				●	◔		
M	Stainless Steel				●	◔		
K	Cast Iron						●	
N	Non-ferrous Metals						●	●
S	Titanium Alloys						●	●
H	Hard Materials (~40HRC)				●	○		
	Hard Materials (40HRC~)							

Insert (Handed Insert shows Right-hand)	Description		Dimension(mm) CW	CDX	RE	Cermet TN90 R	TN90 L	TC40N R	TC40N L	TC60M R	TC60M L	MEGA COAT PR1225 R	PR1225 L	PVD Coated Carbide PR930 R	PR930 L	Carbide KW10 R	KW10 L	PCD KPD010 R	KPD010 L	Applicable Toolholders
 1-edge	GV$^{R/L}$	100-020SS	1.00	2.3	0.2	▲				●		●	●	●		●	●			GIV$^{R/L}$...1SS
		125-020SS	1.25							●		●	●	●		●	●			
		145-020SS	1.45			▲				●		●	●	●	●	●	●			
		200-020SS	2.00			▲				●		●	●	●		●	●			
		250-020SS	2.50							●		●	●	●		●	●			
		300-020SS	3.00							●		●	●	●	●	●	●			
	GV$^{R/L}$	100-020S	1.00			▲		●	●	●		●	●	●	●	●	●			GIV$^{R/L}$...1S GIV$^{R/L}$...1SE
		125-020S	1.25			▲		●	●	●		●		●		●	●			
		145-020S	1.45					●		●		●		●		●	●			
		185-020S	1.85					●		●		●		●		●	●			
		200-020S	2.00			▲		●	●	●		●	●	●	●	●	●			
		250-020S	2.50					●		●		●	●	●		●	●			
		340-020S	3.40					●		●		●		●		●	●			
 2-edge	GV$^{R/L}$	100-020A	1.00	2.3	0.2	▲		●	●	●	●	●	●	●	●	●	●			GIV$^{R/L}$...1A GIV$^{R/L}$...1AE GIV$^{R/L}$...1AW
		125-020A	1.25			▲		●	●	●		●	●	●		●	●			
		145-020A	1.45			▲		●	●	●	●	●	●	●		●	●			
		185-020A	1.85					●		●		●	●	●		●	●			
		200-020A	2.00			▲		●	●	●	●	●	●	●	●	●	●			
		250-020A	2.50			▲		●		●		●	●	●		●	●			
		300-020A	3.00			▲		●		●		●		●		●	●			
		340-020A	3.40					●		●		●		●		●	●			
	GV$^{R/L}$	145-020B	1.45	2.8	0.2	▲		●	●	●	●	●	●	●	●	●	●			GIV$^{R/L}$...1B GIV$^{R/L}$...1BE GIV$^{R/L}$...1BW
		185-020B	1.85			▲		●	●	●	●	●		●		●				
		200-020B	2.00	3.2		▲	▲	●	●	●	●	●	●	●	●	●	●			
		230-020B	2.30			▲		●		●	●	●	●	●	●	●				
		250-020B	2.50			▲		●	●	●	●	●	●	●	●	●	●			
		280-020B	2.80					●	●	●		●		●		●				GIV$^{R/L}$...2B GIV$^{R/L}$...2BE GIV$^{R/L}$...2BW
		300-020B	3.00			▲		●	●	●	●	●	●	●	●	●	●			
		340-020B	3.40	4.2				●		●		●		●		●				
		400-020B	4.00			▲		●		●		●		●		●	●			
	GV$^{R/L}$	280-020C	2.80	4.5	0.2	▲		●	●	●	●	●	●	●		●	●			GIV$^{R/L}$...1C GIV$^{R/L}$...1CE GIV$^{R/L}$...1CW
		300-020C	3.00			▲	▲	●	●	●	●	●	●	●	●	●	●			
		340-020C	3.40	5.5		▲		●	●	●	●	●	●	●	●	●	●			
		400-020C	4.00			▲		●	●	●	●	●	●	●	●	●	●			GIV$^{R/L}$...2C GIV$^{R/L}$...2CE GIV$^{R/L}$...2CW
		430-020C	4.30	6.3				●	●	●	●	●		●		●	●			
		460-020C	4.60					●				●		●		●	●			
		500-020C	5.00					●		●	●	●	●	●	●	●	●			
 1-edge	GVR	145-020A	1.45	2.3	0.2													●		GIVR...1A GIVR...1AE GIVR...1AW
		200-020A	2.00															●		
	GVR	200-020B	2.00	3.2	0.2													●		GIVR...1B GIVR...1BE GIVR...1BW
		250-020B	2.50															●		
 2-edge Full-R	GV$^{R/L}$	200-100AR	2.00	2.3	1.00					●		●	●	●	●	●				GIV$^{R/L}$...1A
		250-125AR	2.50		1.25					●		●		●		●				GIV$^{R/L}$...1AE
		300-150AR	3.00		1.50					●		●		●		●				GIV$^{R/L}$...1AW
	GVR	200-100BR	2.00	3.2	1.00	▲				●		●		●		●				GIVR...1B□
		300-150BR	3.00	4.2	1.50	▲				●		●		●		●				GIVR...2B□

· CDX shows available grooving depth.

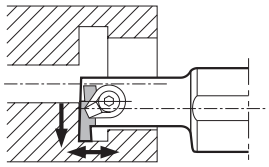
Recommended Cutting Conditions G116
See Page for Applicable Toolholders G65

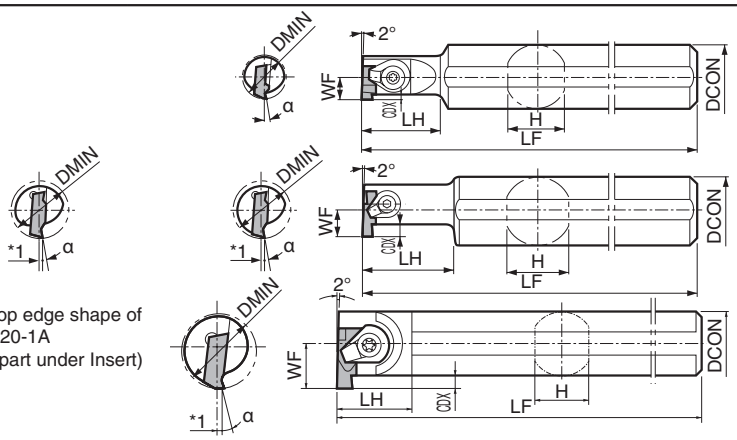
● : Std. Item
▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

CBN & PCD Inserts are sold in 1 piece boxes

GIV



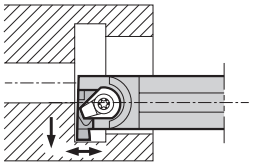


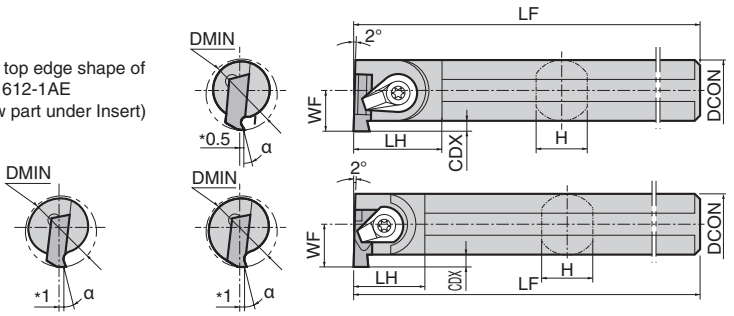
Shows top edge shape of GIV$^{R}_{L}$1620-1A (No jaw part under Insert)

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

GIV-E Excellent Bar



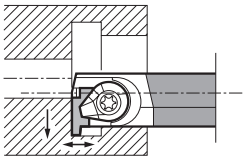


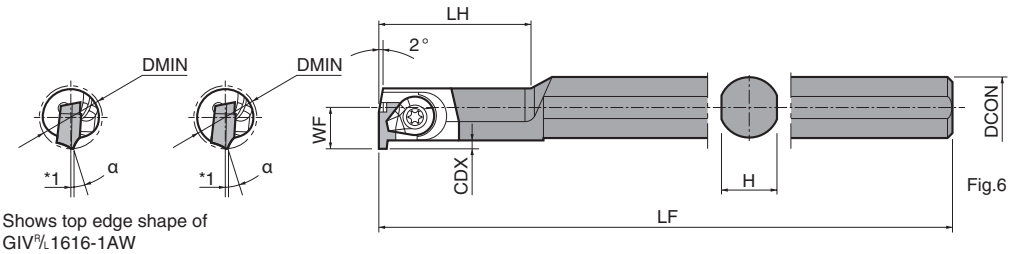
Shows top edge shape of GIV$^{R}_{L}$1612-1AE (No jaw part under Insert)

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

GIV-W Carbide Shank Bar





Shows top edge shape of GIV$^{R}_{L}$1616-1AW (No jaw part under Insert)

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Applicable Insert & Rake Angle (α) after Installment of Insert

Toolholder Description	Insert Description ➔G63		Rake Angle (α)	
	General Grooving (Square)	Full-R Grooving (Round)	TC40N	TN90,TC60M PR930,PR1225 KW10
GIV$^{R}_{L}$…1SS	GV$^{R}_{L}$100~300-020SS	-	10°	15°
GIV$^{R}_{L}$…1S	GV$^{R}_{L}$100~340-020S	-	10°	15°
GIV$^{R}_{L}$…1SE	GV$^{R}_{L}$100~340-020S	-	3°	8°
GIV$^{R}_{L}$…1A(□)	GV$^{R}_{L}$100~340-020A	GV$^{R}_{L}$200-100AR~300-150AR	3°	8°
GIV$^{R}_{L}$…1B(□)	GV$^{R}_{L}$145~250-020B	GV$^{R}_{L}$200-100BR	4°	9°
GIV$^{R}_{L}$…2B(□)	GV$^{R}_{L}$280~400-020B	GV$^{R}_{L}$300-150BR		
GIV$^{R}_{L}$…1C(□)	GV$^{R}_{L}$280~340-020C	-	5°	10°
GIV$^{R}_{L}$…2C(□)	GV$^{R}_{L}$400~500-020C	-		

* GIV, GIV-E and GIV-W are designed to set the cutting edge height 1mm above the center height. (0.5mm for GIV$^{R}_{L}$1612-1AE)

Toolholder Dimensions

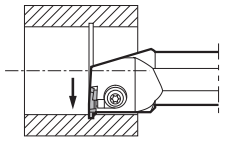
Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	CDX	Drawing	Spare Parts: Clamp Set		Spare Parts: Wrench	Spare Parts: Wrench	See Page for Applicable Inserts
GIV$^{R}_{L}$	1216-1SS	●	●	12	16	15	150	20	6.0	2.2	Fig. 1	CPS-4V	-	FT-10	-	G63
	1420-1S	●	●	14	20	19	150	24	7.0	2.2	Fig. 1	CPS-5F	-	FT-15	-	
	1620-1A	●	●	16	20	19	160	28	8.0	2.2	Fig. 2	CPS-5V	-	FT-15	-	
	2025-1B	●	●	20	25	23	180	35	10.0	Note1) 2.8	Fig. 2	CPS-5V	-	FT-15	-	
	2025-2B	●	●							Note2) 3.2						
	2532-1C	●	●	25	32	30	200	43	12.5	Note3) 4.5	Fig. 2	-	CPS-6V	-	LW-3	
	3232-1C	●	●	32			220	52	16.0							
	4032-1C	●	●	40			250	43	21.0		Fig. 3					
	2532-2C	●	●	25	32	30	200	43	12.5	Note4) 5.5	Fig. 2					
	3232-2C	●	●	32			220	52	16.0							
	4032-2C	●	●	40			250	43	22.2		Fig. 3					
GIV$^{R}_{L}$	1412-1SE	●	●	14	12	11.4	150	18	7.7	1.7	Fig. 4	CPS-5F	-	FT-15	-	
	1612-1AE	●	●	16	12	11.4	150	19	8.2	2.2	Fig. 5	CPS-5V	-	FT-15	-	
	2016-1BE	●	●	20	16	15.2	180	20	11.2	Note1) 2.8	Fig. 5	CPS-5V	-	FT-15	-	
	2016-2BE	●	●					19	11.7	Note5) 3.2						
	2520-1CE	●	●	25	20	19	200	25	14.5	Note6) 4.5	Fig. 5	-	CPS-6V	-	LW-3	
	3225-1CE	●	●	32	25	24	220	24	17.5	Note7) 4.5						
	4032-1CE	●	●	40	32	31	240	29	21.0	Note7) 4.5						
	2720-2CE	●	●	27	20	19	200	25	16.2	Note4) 5.5						
	3225-2CE	●	●	32	25	24	220	24	18.7							
	4032-2CE	●	●	40	32	31	240	29	22.2							
GIV$^{R}_{L}$	1616-1AW	●	●	16	16	15	175	48	10.6	2.2	Fig. 6	CPS-5V	-	FT-15	-	
	2020-1BW	●	●	20	20	19	220	60	14.6	Note1) 2.8	Fig. 6	CPS-5V	-	FT-15	-	
	2020-2BW	●	●							Note2) 3.2						
	2525-1CW	●	●	25	25	24	260	70	19.1	Note3) 4.5	Fig. 6	-	CPS-6V	-	LW-3	
	2525-2CW	●	●							Note4) 5.5						

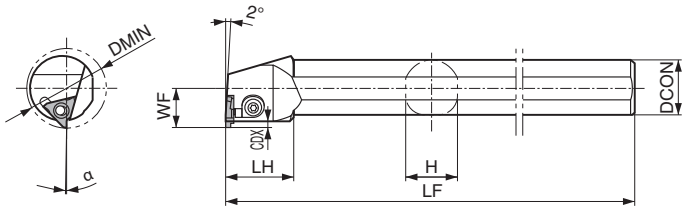
· CDX shows available grooving depth.

Note 1) GV$^{R}_{L}$200~250-020B Insert can be used up to a Groove Depth 3.2mm.
Note 2) GV$^{R}_{L}$300~400-020B Insert can be used up to a Groove Depth 4.2mm.
Note 3) GV$^{R}_{L}$340-020C Insert can be used up to a Groove Depth 5.5mm.
Note 4) GV$^{R}_{L}$430~500-020C Insert can be used up to a Groove Depth 6.3mm.
Note 5) GV$^{R}_{L}$300~400-020B Insert can be used up to a Groove Depth 3.8mm. (When using GIV$^{R}_{L}$2016-2BE)
Note 6) GV$^{R}_{L}$340-020C Insert can be used up to a Groove Depth 4.7mm. (When using GIV$^{R}_{L}$2520-1CE)
Note 7) GV$^{R}_{L}$340-020C Insert can be used up to a Groove Depth 5.3mm. (When using GIV$^{R}_{L}$3225-1CE, GIV$^{R}_{L}$4032-1CE)
If you need any of insert groove depth specified in notes 1 to 7, modify the dimension CDX of toolholder.

● : Std. Item

KIGBA





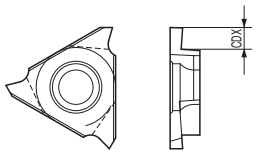
●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	*CDX	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts ➡G6~G8
KIGBA R/L	3525-16	●	●	35	25	23	220	30	17.5	2.8	LGBA-16 R/L S	FT-15	GBA32 R/L type
	4032-22	●	●	40	32	30	250	30	23.0	3.0	LGBA-22 R/L S	FT-15	GBA43 R/L type

*CDX shows the distance from the toolholder to the cutting edge.
Available Grooving Depth depends on the insert.
KIGBA R/L 3525-16 : CDX of the applicable insert (GBA32)
4032-22 : CDX of the applicable insert (GBA43)
(1) 2.0mm (CDX < 3.0mm)
(2) 3.0mm (CDX ≥ 3.0mm)



· Clamp Set : LGBA-○○LS for Right-hand Toolholder, and LGBA-○○RS for Left-hand Toolholder.

● : Std. Item

Rake Angle (α) after Installment of GBA insert

GBA32R/L○○○-○○○		GBA43R/L○○○-○○○		GBA43R/L○○○-○○○R (Full-R)		
α	Insert Grades	α	Insert Grades	α	Insert Grades	Full-R Description
+1°	TN620,TN90,PV7040,PR930 PR1115, PR1215, PR1625 PR905, KPD001, KPD010	-9°	KBN510, KBN525	+1°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625 PR905	050R~150R
+11°	KW10	+1°	TN620,TC40N,TN90,PV7040 PR930, PR1115, PR1215, PR1625, PR905 KPD001, KPD010	+5°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625 PR905	200R
		+11°	KW10		KW10	050R~200R

Rake Angle (α) after Installment of GBA-GM insert

α	Insert Description
+1°	GBA43R/L150-020GM
+6°	GBA43R/L175-020GM ≀ GBA43R/L265-030GM
+3°	GBA43R/L300-030GM ≀ GBA43R/L400-040GM

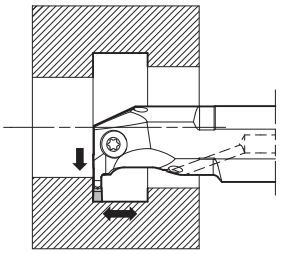
α indicates the rake angle at the center of the edge width, after installing insert.

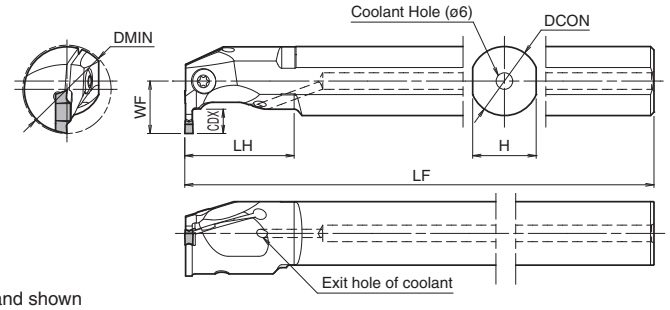
Rake Angle (α) after Installment of GBA-MY insert

α	Insert Description
+6°	GBA43R/L175-020MY ≀ GBA43R/L350-030MY
+5°	GBA43R/L400-040MY

α indicates the rake angle at the center of the edge width, after installing insert.

KGDI





• Right-hand shown

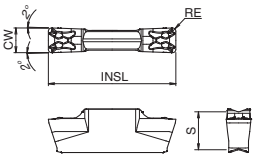
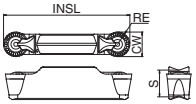
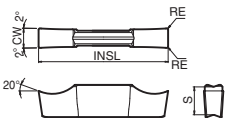
Toolholder Dimensions

Description		Stock		Min. Bore Dia.		Dimension (mm)						Edge Width CW(mm)		Spare Parts			
				DMIN										Clamp Screw		Wrench	
		R	L	with GMI/GS	with CM	DCON	H	LF	LH	WF	CDX	MIN.	MAX.				
KGDI R/L	1816B-2	●	●	18	-	16	15	150	25	9.5	4.5	2.0	2.0	GS-50	-	LW-3	-
	2520B-2	●	●	25		20	18	180	30	14.5	6						
	3225B-2	●	●	32		25	23	200	40	19	7			-	SB-5TR	-	LTW-20
KGDI R/L	2016B-3	●	●	20	21	16	15	150	25	11.5	5.5	3.0	3.0	GS-50	-	LW-3	-
	2520B-3	●	●	25	26	20	18	180	30	14.5	6						
	3225B-3	●	●	32	33	25	23	200	40	19	8			-	SB-5TR	-	LTW-20
KGDI R/L	3225B-4	●	●	32	40(34*)	25	23	200	40	19	8.5	4.0	5.0	-	SB-5TR	-	LTW-20
	4032B-4	●	●	40	48(42*)	32	29	220	50	23.5	11						
KGDI R/L	3225B-5	●	●	32	37(34*)	25	23	200	40	19	8.5	5.0	5.0	-	SB-5TR	-	LTW-20
	4032B-5	●	●	40	45(42*)	32	29	220	50	23.5	11						

* By slightly chamfering the holder tip of about 0.5 mm, the cutting diameter can be minimized. See G69 for more details

Applicable Inserts

Classification of usage										
◕ : Continuous~Light Interruption / 1st Choice	P	Carbon Steel	●	○	◔	◕	◔		Applicable Toolholders
◔ : Continuous~Light Interruption / 2nd Choice	M	Stainless Steel			◕	◔	◔		
● : Continuous / 1st Choice	K	Cast Iron					◕		
○ : Continuous / 2nd Choice	N	Non-ferrous Metals						◕	
	S	Titanium Alloys						◕	

Insert			Description		Dimension (mm)					Cermet		MEGACOAT NANO	MEGACOAT		Carbide	Applicable Toolholders
					CW	Tolerance	RE	INSL	S	TN620	TN90	PR1535	PR1225	PR1215	GW15	
Grooving and Turning	 General purpose		GDM	2013N-020GMI	2.0	±0.03	0.2	13.5	4.3	●		●	●	●		KGDI R/L...-2
				3015N-040GMI	3.0		0.4	15.5	4.6	●		●	●	●		KGDI R/L...-3
				4020N-040GMI	4.0			20	4.3	●		●	●	●		KGDI R/L...-4
				5020N-040GMI	5.0	±0.04				●		●	●	●		KGDI R/L...-4
				5020N-080GMI			0.8			●		●	●	●		KGDI R/L...-5
Full-R / Copying			GDM	3015N-150R-CM	3.0	±0.03	1.5	16.3	4.6	●		●	●	●		KGDI R/L...-3
				4020N-200R-CM	4.0		2.0	20	4.3	●	●	●	●	●		KGDI R/L...-4
				5020N-250R-CM	5.0	±0.04	2.5	21		●	●	●	●	●		KGDI R/L...-4 KGDI R/L...-5
Grooving	 Low Cutting Force		GDG	4020N-040GS	4.0	±0.02	0.4	20	4.3	●	●	●	●	●	●	KGDI R/L...-4
				5020N-040GS	5.0					●	●	●	●	●	●	KGDI R/L...-4 KGDI R/L...-5

● : Std. Item

Inserts are sold in 10 piece boxes

Recommended Cutting Conditions (Vc)

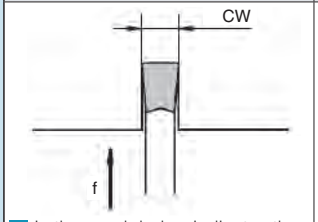
Workpiece Material	Chipbreaker	Recommended Insert Grades (Cutting Speed Vc : m/min)						Remarks
		Cermet		MEGACOAT NANO	MEGACOAT		Carbide	
		TN620	TN90	PR1535	PR1225	PR1215	GW15	
Carbon Steel	GMI CM GS	☆ 100~220	☆ 100~220	☆ 80~150	★ 80~200	☆ 100~200	-	Coolant
Alloy Steel		☆ 80~200	☆ 80~200	☆ 70~150	★ 70~180	☆ 80~180	-	
Stainless Steel		☆ 70~180	☆ 70~180	★ 60~150	☆ 60~150	☆ 60~150	-	
Cast Iron		-	-	-	-	★ 100~200	-	
Aluminum Alloys		-	-	-	-	-	★ 200~500	
Brass		-	-	-	-	-	★ 100~200	

★ : 1st Recommendation ☆ : 2nd Recommendation

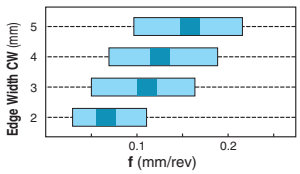
Recommended Cutting Conditions (f, ap)

Chipbreaker: GMI (General purpose)

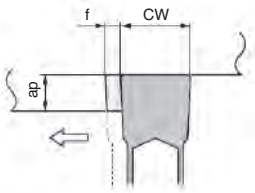
Grooving

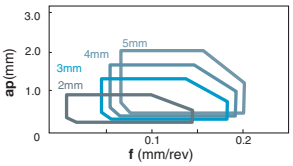


■ In the graph below indicates the most recommended value of feed (f)



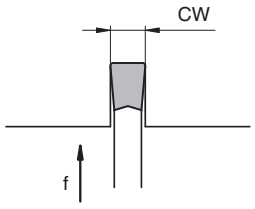
Turning



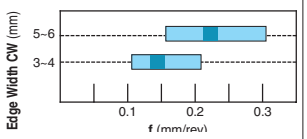


Chipbreaker: CM (Copying)

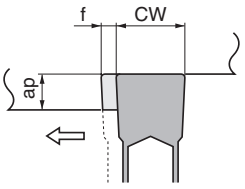
Grooving

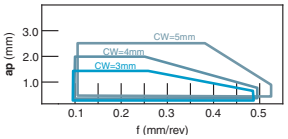


■ In the graph below indicates the most recommended value of feed (f)



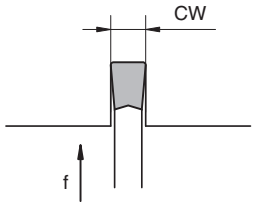
Turning



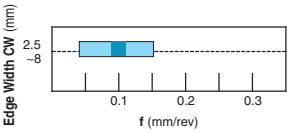


Chipbreaker: GS (Low cutting force)

Grooving

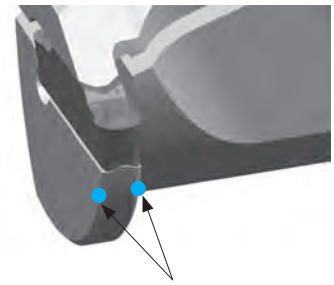


■ In the graph below indicates the most recommended value of feed (f)



* When turning, keep ap less than or equal to the corner-R(RE).

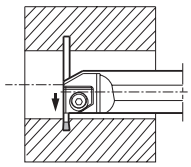
Additional processing of toolholder tip when CM chipbreaker is installed

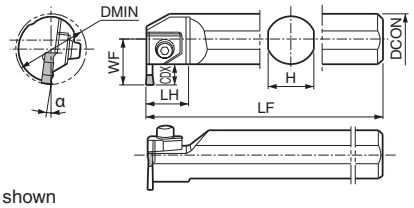


* By slightly chamfering the holder tip of about 0.5 mm, the cutting diameter can be minimized.
See Min. Bore Dia. in toolholder dimensions table on **G68**.

Internal Large Dia. Deep Grooving Toolholders [GH / GHU Insert]

KIGH





• Right-hand shown

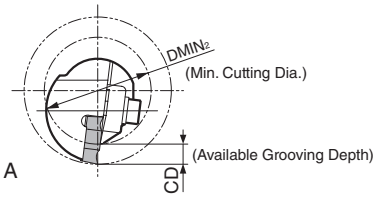


Fig. A

Toolholder Dimensions

Description		Stock	Min. Bore Dia. DMIN	DCON	H	LF	LH	WF	CDX	Clamp	Clamp Bolt	Washer	Spring	Wrench
KIGHR	4532B-4	●	45	32	30	200		28.2		CGH-1L	HH6X25	W-6	SP-6	LW-5
	5540B-4	●	55	40	38	250	27	32.3	12					
	6550B-4	●	65	50	48	300		37.3						
	4532B-5	●	45	32	30	200		28.2						
	5540B-5	●	55	40	38	250	27	32.3	12					
	6550B-5	●	65	50	48	300		37.3						
	5540B-7	●	55	40	38	250	27	32.3	12	CGH-2L				

· CDX shows the distance from the toolholder to the cutting edge. For the available grooving depth (CD), ref. to "List of Min. Available Cutting Diameter and Groove Depth".
· LH depends on the insert's edge width.

Rake Angle (α) after Installment of GH / GHU insert

GH○○○○-○○		GHU○○-○○	
α	Insert Grades	α	Insert Grades
-5°	A65, A66N, PT600M	+5°	TN60 CR9025
+5°	TC40N		
+15°	TN90, TC60M PR930 KW10		

List of the Min. Cutting Diameter and Grooving Depth (Refer to Fig. A)

Toolholder Description		øD (Min. Cutting Dia.)					
KIGHR	4532B-○	ø110	ø70	ø65	ø60	ø55	ø45
	5540B-○	ø70	ø60	ø55			
	6550B-○	ø65					
Available Grooving Depth CD (mm)		12	11.5	11	10	9	Under 8

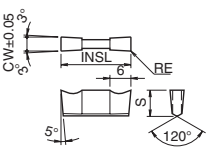
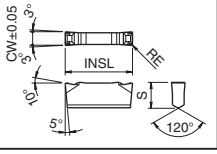
Applicable Inserts

(mm)

Description	INSL	S
GH4020-○○~ GH8020-○○	20	7.5
GHU○○-○○	20	

P	Carbon Steel / Alloy Steel					●					
M	Stainless Steel					●					
K	Cast Iron							●	○		●
N	Non-ferrous Metals							●			
S	Titanium Alloys							●			
H	Hard Materials (~40HRC)					●					
	Hard Materials (40HRC~)									○	●

Classification of usage
● : Continuous~Light Interruption / 1st Choice
◔ : Continuous~Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

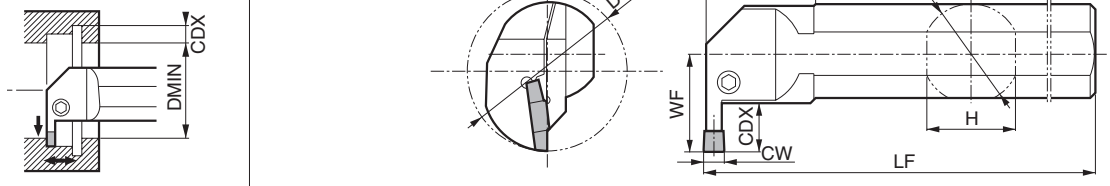
Insert		Description		Dimension (mm) CW	RE	Cermet TN60	Cermet TC40N	Cermet TC60M	CVD Coated Carbide CR9025	PVD Coated Carbide PR930	Carbide KW10	Ceramic A65	Ceramic A66N	Ceramic PT600M	Applicable Toolholders
 Ground Chipbreaker		GH	4020-02	4.0	0.2		●	●		●	●				KIGHR4532B-4 5540B-4 6550B-4
			4020-05		0.5		●	●		●	●	●	●	●	
			4520-02	4.5	0.2		●								
			4520-05		0.5		●								
			5020-02	5.0	0.2		●	●		●	●				KIGHR4532B-5 5540B-5 6550B-5
			5020-05		0.5		●	●		●	●	●	●	●	
			5520-02	5.5	0.2		●								
			5520-05		0.5		●								
			6020-02	6.0	0.2		●	●		●	●				
			6020-05		0.5		●	●		●	●	●		●	
			6520-02	6.5	0.2		●								
			6520-05		0.5		●								
 Ceramic			7020-02	7.0	0.2		●	●		●	●				KIGHR5540B-7 6550B-7
			7020-05		0.5		●	●		●	●	●			
			7520-02	7.5	0.2		●								
			7520-05		0.5		●								
			8020-02	8.0	0.2		●	●		●	●				
			8020-05		0.5		●	●		●	●				
	Ceramic insert is above shape.														
 Molded Chipbreaker		GHU	40-20	4.0	0.25	●			●						KIGHR ...○○○○B-4
			50-20	5.0	0.30	●			●						KIGHR ...○○○○B-5
			60-20	6.0	0.30	●			●						

Recommended Cutting Conditions ➔ G113

● : Std. Item

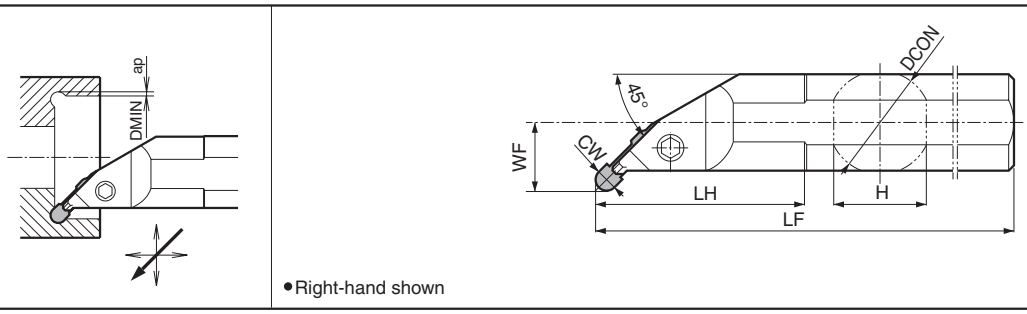
Inserts are sold in 10 piece boxes

KIGM-8 (8mm-Width Insert / Large Internal Diameter Deep Grooving)



●Right-hand shown

KIGMU-8 (8mm-Width Insert / Large Internal Diameter Undercut Grooving)



●Right-hand shown

Toolholder Dimensions

Description	Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	CDX	ap			Edge Width CW(mm) MIN.	MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
KIGM R/L 6540B-8	▲	▲	65	40	36	300	41	41	20	-			8.0	8.0	HH6X20	LW-5
KIGMUR 6540B-8	▲		65	40	36	300	83	26	-	2.2			8.0	8.0	HH6X20	LW-5

· CDX shows available grooving depth.

· ap shows the distance from the internal face of the workpiece.

Applicable Inserts

(mm)

Description	INSL	S
GMM8030-080MW	30	5.5
GMG8030-050MG		
GMGA8030-400R		

P	Carbon Steel / Alloy Steel			◔	●		
M	Stainless Steel			●	◔		
K	Cast Iron					●	◔
N	Non-ferrous Metals						●
S	Titanium Alloys						●
H	Hard Materials (~40HRC)			○	●		
	Hard Materials (40HRC~)						

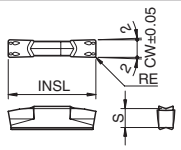
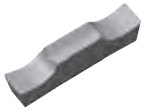
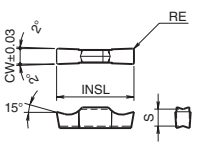
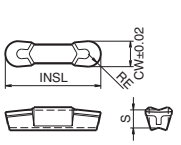
Classification of usage

● : Continuous~Light Interruption / 1st Choice

◔ : Continuous~Light Interruption / 2nd Choice

● : Continuous / 1st Choice

○ : Continuous / 2nd Choice

Insert		Description	Dimension (mm) CW	RE	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PR930	PR905	Carbide KW10	Applicable Toolholders	See Page for Applicable Toolholders
 Chip Control Oriented / M Class		GMM 8030-080MW	8.0	0.8		▲	▲	▲	▲	▲	KIGM R/L ...8 KIGMUR ...8	G71
 Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG 8030-050MG	8.0	0.5	▲	▲		▲	▲	▲		
 Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMGA 8030-400R	8.0	4.0						▲		

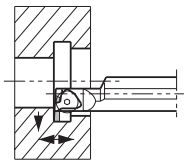
· If using a full-R insert with KIGM-8 toolholder, you need to modify the corner of insert adapter of toolholder.

Recommended Cutting Conditions G117

▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

KGIA



Integral Type

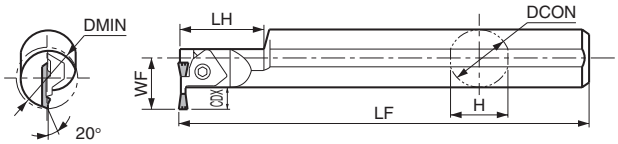
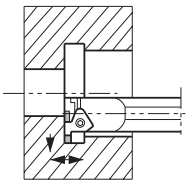


Fig. 1



Separate Type

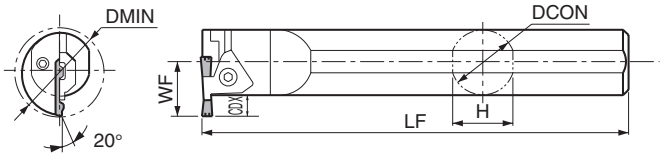


Fig. 2

●Right-hand shown

Toolholder Dimensions

Description		Stock	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	CDX	Drawing	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench
KGIAR	3232B-3	▲	32	32	30.4	200	45	26.5	10	Fig. 1	CGIA-3R	HH5X15	SP-5	LW-4
	4332B-3	▲	43	32	30	200	-	26.3		Fig. 2				
	5140B-3	▲	51	40	38	250	-	30.3						
	3232B-4	▲	32	32	30.4	200	45	26.5	10	Fig. 1	CGIA-4R			
	4332B-4	▲	43	32	30	200	-	26.3		Fig. 2				
	5140B-4	▲	51	40	38	250	-	30.3						
	5640B-5	▲	56	40	38	250	-	35.3	15	Fig. 2	CGIA-5R			
	6650B-5	▲	66	50	48	250	-	40.3						

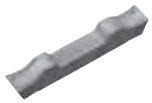
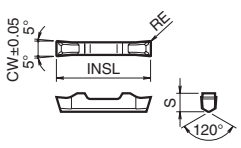
· CDX shows available grooving depth.

Composition

Type	Spare Parts / Toolholder Description		Toolholder	Blade	Clamp Screw	Wrench
Integral Type	KGIAR	3232B-3	-	-	-	-
Separate Type		4332B-3	KGIAR32H	BGIAR43-3	SB-40140TR	FT-15
		5140B-3	KGIAR40H	BGIAR51-3		
Integral Type		3232B-4	-	-	-	-
Separate Type		4332B-4	KGIAR32H	BGIAR43-4	SB-40140TR	FT-15
		5140B-4	KGIAR40H	BGIAR51-4		
Separate Type		5640B-5	KGIAR40H	BGIAR56-5	SB-40140TR	FT-15
		6650B-5	KGIAR50H	BGIAR66-5		

Applicable Inserts

				Classification of usage
P	Carbon Steel / Alloy Steel	○	●	● : Continuous~Light Interruption / 1st Choice
M	Stainless Steel	○	●	◔ : Continuous~Light Interruption / 2nd Choice
K	Cast Iron			● : Continuous / 1st Choice
N	Non-ferrous Metals			○ : Continuous / 2nd Choice
S	Titanium Alloys			
H	Hard Materials (~40HRC)	○	●	
	Hard Materials (40HRC~)			

Insert		Description		Dimension (mm) CW	RE	INSL	S	Cermet TN60	CVD Coated Carbide CR9025	Applicable Toolholders
 Molded Chipbreaker		GIA	30	3.0	0.20	25	5.0	▲	▲	KGIAR …3
			40	4.0	0.25			▲	▲	KGIAR …4
			50	5.0	0.30	30		▲	▲	KGIAR …5

Recommended Cutting Conditions G114

▲ :To be replaced by a new product

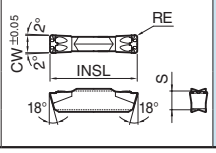
Inserts are sold in 10 piece boxes

KIGM-V Applicable Inserts

(mm)

Description	INSL	S
GMM3015…V□	15.5	4.3
GMM4020…V□	20	
GMM5020…V□		

P	Carbon Steel / Alloy Steel			◔	●			Classification of usage
M	Stainless Steel			●	◔			
K	Cast Iron					●	◔	● : Continuous~Light Interruption / 1st Choice
N	Non-ferrous Metals						●	◔ : Continuous~Light Interruption / 2nd Choice
S	Titanium Alloys						●	● : Continuous / 1st Choice
H	Hard Materials (~40HRC)			○	●			○ : Continuous / 2nd Choice
	Hard Materials (40HRC~)							

Insert		Description		Dimension (mm)		Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Applicable Toolholders
				CW	RE	TN90	CR9025	PR915	PR930	PR905	KW10	
 Chip Control Oriented / M Class		GMM	3015-040V	3.0	0.4	▲	▲	▲	▲	▲	▲	KIGM R/L 2016B-3V 2520B-3V 3225B-3V
			4020-040V	4.0	0.4	▲	▲	▲	▲	▲	▲	KIGM R/L 3225B-4V 4032B-4V
			5020-080V	5.0	0.8		▲	▲	▲	▲	▲	

· It is not recommended to use this for KIGM-V Internal Grooving Toolholders which require GMM...V type inserts with the 18˚ front relief angle, because the relief angle of the insert used for GMM4020-04 toolholder is 10˚.

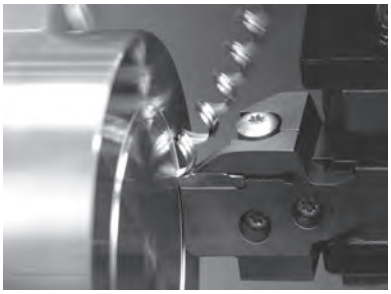
Recommended Cutting Conditions G117

▲ :To be replaced by a new product

Inserts are sold in 10 piece boxes

External dia. of the groove DAXN / DAXX

External dia. of the groove within DAXN ~ DAXX are the available range for the initial grooving on the unprocessed workpiece (Ref. to Fig. 1).



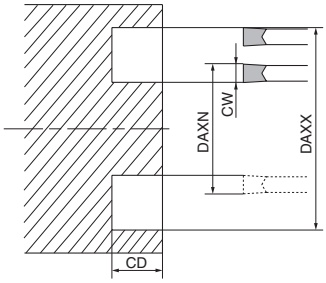
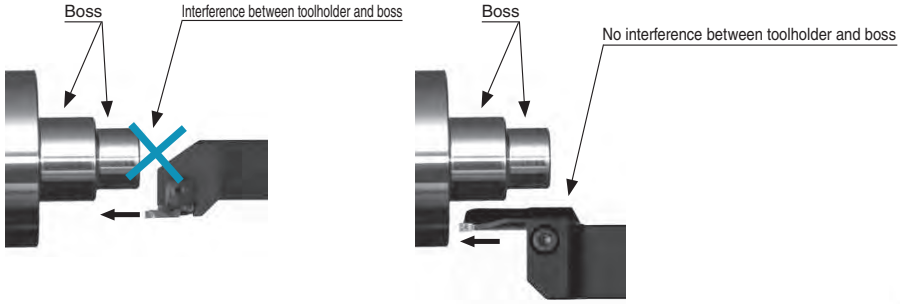


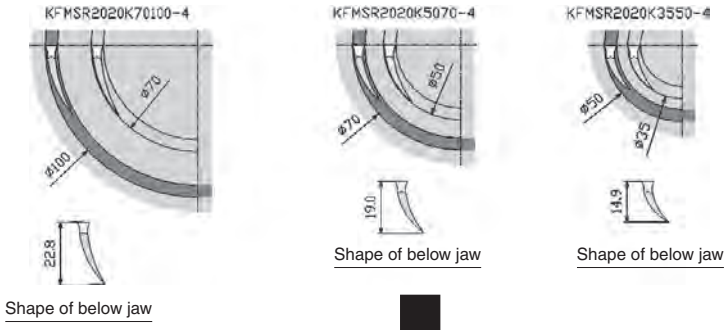
Fig. 1

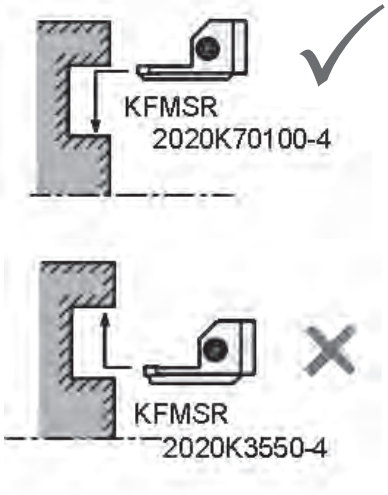
Caution for Face Grooving

1) When face grooving, the suitable toolholder depends on the length of the boss



2) Selection of Face Grooving Toolholder





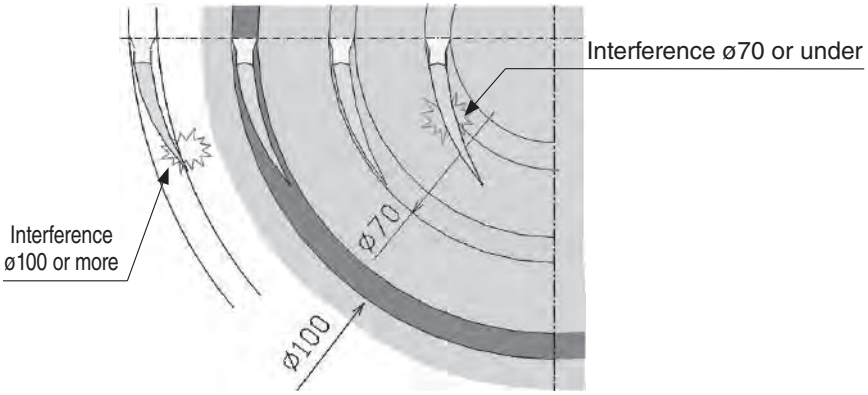
Wider grooving (turning) should be performed from the outside inwards

- Example of usage for the face grooving toolholder.

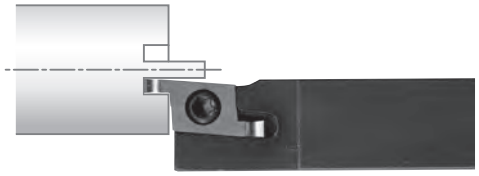
When face grooving, KFMSR2525M70100-4 should be between ø70~ø100 for grooving the outer diameter at first. If the workpiece is machined at a diameter ø100 or ø70, the jaw of toolholder interferes with the workpiece.

3) Interference of Face Grooving Toolholder

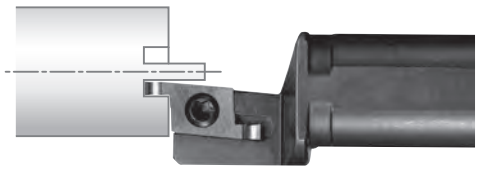
e.g.) KFMSR2525M70100-4



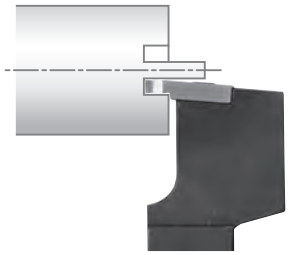
Small Dia. Face Grooving ø6~



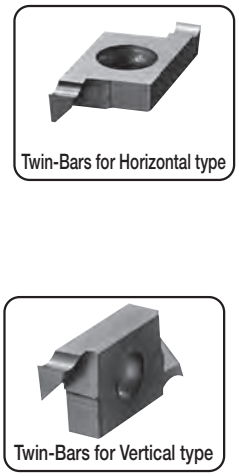
Type	STW
External dia. of the groove (MIN.)	ø6
Edge Width (mm)	0.5 ~ 2.0
Max. Grooving Depth (mm)	1.0 ~ 3.0
See Page	**G82**



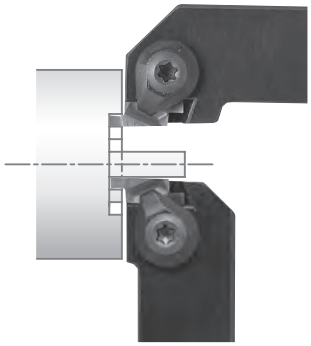
Type	S..-STW
External dia. of the groove (MIN.)	ø6
Edge Width (mm)	0.5 ~ 2.0
Max. Grooving Depth (mm)	1.0 ~ 3.0
See Page	**G82**



Type	STWS
External dia. of the groove (MIN.)	ø6
Edge Width (mm)	0.5 ~ 2.0
Max. Grooving Depth (mm)	1.0 ~ 3.0
See Page	**G83**



Small Dia. Face Grooving ø8~

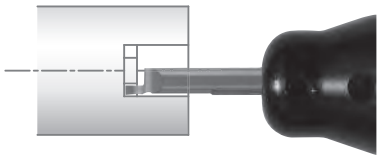


Type	GFVS-AA
External dia. of the groove (MIN.)	ø8
Edge Width (mm)	1.0 ~ 3.0
Max. Grooving Depth (mm)	2.2
See Page	**G98**

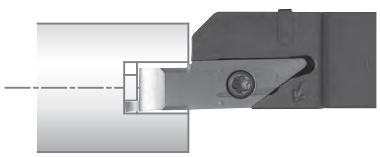
Type	GFVT-AA
External dia. of the groove (MIN.)	ø8
Edge Width (mm)	1.0 ~ 3.0
Max. Grooving Depth (mm)	2.2
See Page	**G98**



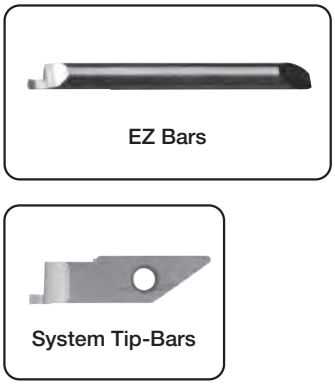
Small Dia. Face Grooving ø5~, ø8~



Type	EZFG
External dia. of the groove (MIN.)	ø5, ø6, ø8
Edge Width (mm)	1.0 ~ 3.0
Max. Grooving Depth (mm)	1.5 ~ 3.0
See Page	**G78**



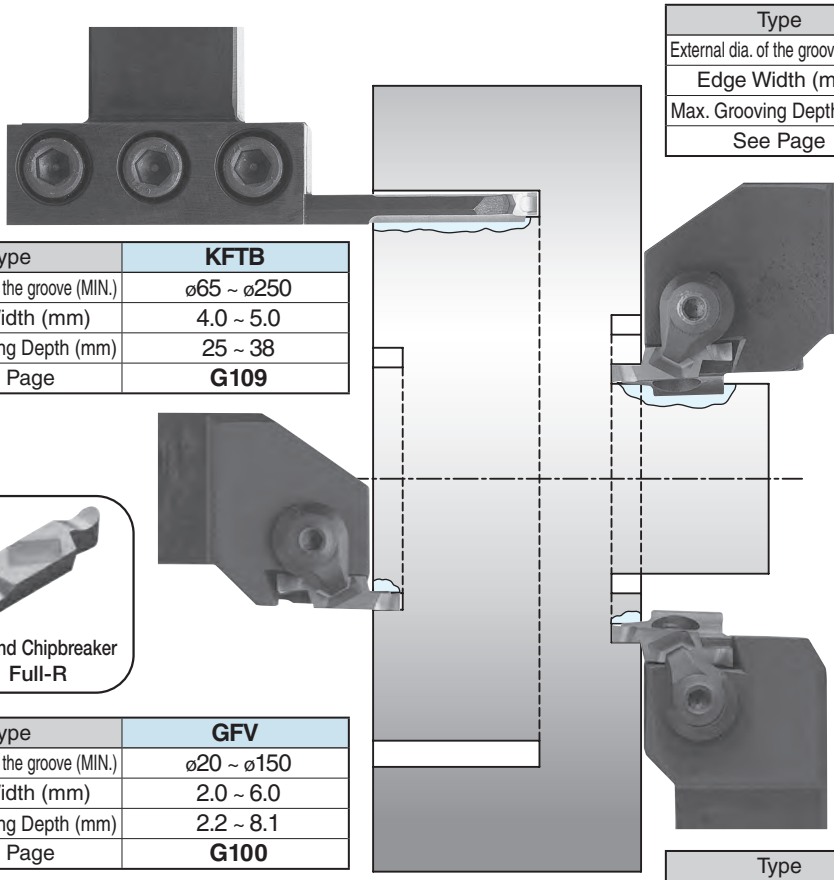
Type	VNFG
External dia. of the groove (MIN.)	ø8
Edge Width (mm)	1.0 ~ 3.0
Max. Grooving Depth (mm)	2.0 ~ 3.0
See Page	**G80**



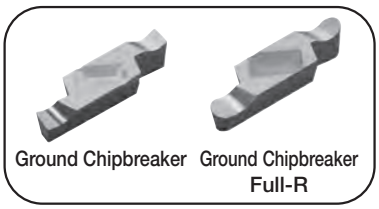
Summary of Face Grooving

Face Grooving ø20~



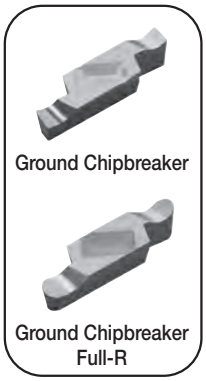


Type	KFTB
External dia. of the groove (MIN.)	ø65 ~ ø250
Edge Width (mm)	4.0 ~ 5.0
Max. Grooving Depth (mm)	25 ~ 38
See Page	**G109**



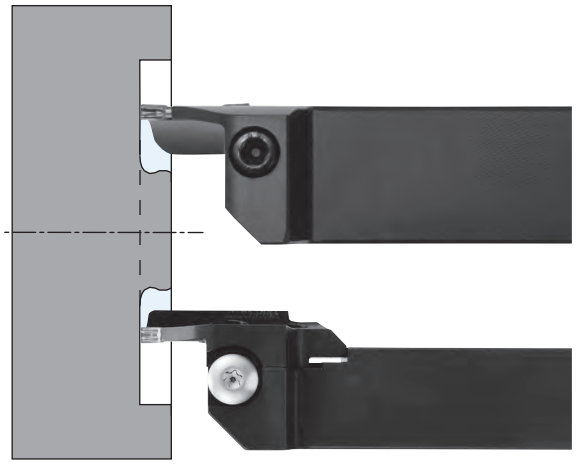
Type	GFV
External dia. of the groove (MIN.)	ø20 ~ ø150
Edge Width (mm)	2.0 ~ 6.0
Max. Grooving Depth (mm)	2.2 ~ 8.1
See Page	**G100**

Type	GFVS
External dia. of the groove (MIN.)	ø35 ~ ø150
Edge Width (mm)	2.5 ~ 6.0
Max. Grooving Depth (mm)	4.6 ~ 8.1
See Page	**G103**



Type	GFVT
External dia. of the groove (MIN.)	ø35 ~ ø150
Edge Width (mm)	2.5 ~ 6.0
Max. Grooving Depth (mm)	4.6 ~ 8.1
See Page	**G103**

KGDF Face Grooving ø25~



Type	KGDF-Z
External dia. of the groove (MIN.)	ø50
Edge Width (mm)	3.0 ~ 5.0
Max. Grooving Depth (mm)	15
See Page	**G92**

Type	*KGDF
External dia. of the groove (MIN.)	ø25
Edge Width (mm)	2.0 ~ 6.0
Max. Grooving Depth (mm)	6 ~ 32
See Page	**G88**

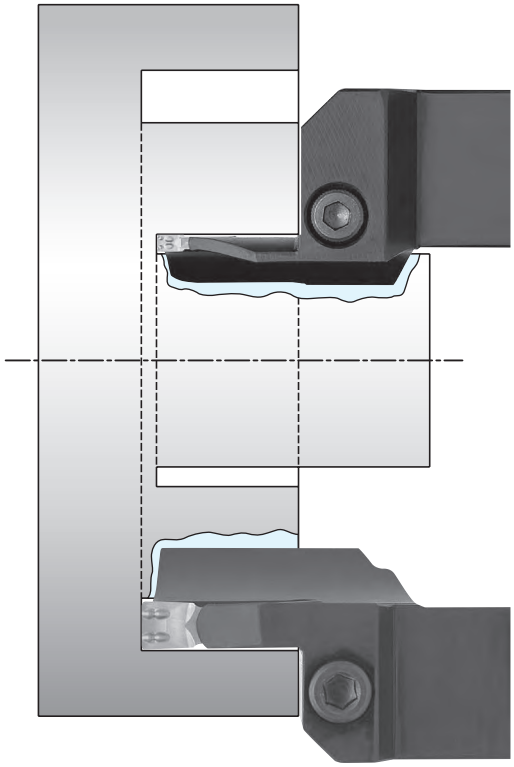
* The separate type toolholders can accept all the blades if their hand is matching.

Grooving and Turning	Deep grooving and Turning	High Feed	Full-R
GM	**DM**	**GH**	**CM**






Face Grooving & Turning ø25~

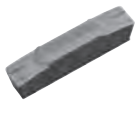


Type	KFMS
External dia. of the groove (MIN.)	ø25 ~ ø235
Edge Width (mm)	3.0 ~ 6.0
Max. Grooving Depth (mm)	13 ~ 32
See Page	**G106**



Molded Chipbreaker

Type	KFMS-8
External dia. of the groove (MIN.)	ø54 ~ ø155
Edge Width (mm)	8.0
Max. Grooving Depth (mm)	25
See Page	**G108**



Molded Chipbreaker

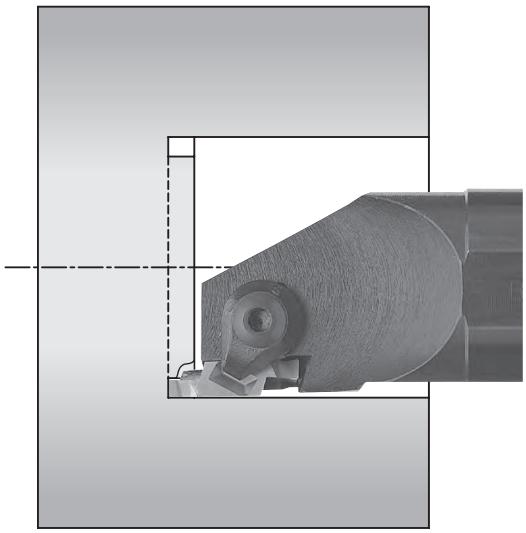


Ground Chipbreaker

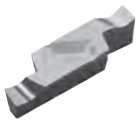


Molded Chipbreaker Full-R

Face Grooving ø35~



Type	GIFV
External dia. of the groove (MIN.)	ø35 ~ ø50
Edge Width (mm)	2.0 ~ 6.0
Max. Grooving Depth (mm)	2.2 ~ 8.1
See Page	**G110**



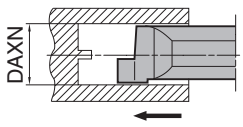
Ground Chipbreaker

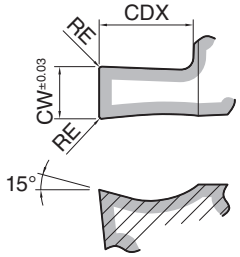


Ground Chipbreaker Full-R

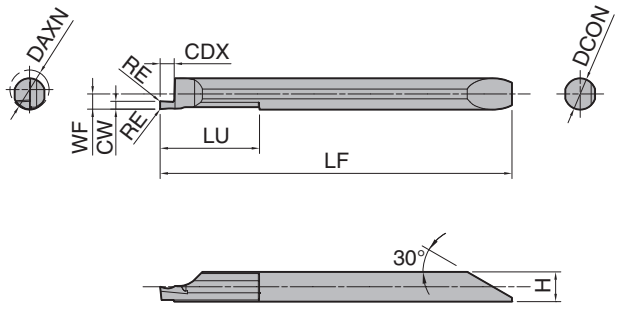
Small Dia. Face Grooving EZ Bars

EZFG





Detail of edge



●Right-hand shown

●Dimensions

Description	External dia. of the groove (MIN.)	Dimension (mm)								MEGACOAT		Carbide	Applicable Sleeves
										PR1225		GW05	
	DAXN	CW ±0.03	RE	DCON	H	LF	LU	WF	CDX	R	L	R	
EZFGR/L 050040-100	5	1.0	±0.013 0.05	4	3.8	45.0	12	1.9	1.5	●	●	●	EZH040..
050040-150		1.5							2.0	●	●	●	
EZFGR/L 060050-100	6	1.0	±0.013 0.05	5	4.8	53.2	15	2.4	1.5	●	●	●	EZH050..
060050-150		1.5							2.5	●	●	●	
060050-200		2.0							3.0	●	●	●	
EZFGR/L 080070-100	8	1.0	±0.013 0.05	7	6.8	64.2	25	3.4	2.0	●	●	●	EZH070..
080070-150		1.5							2.5	●	●	●	
080070-200		2.0							3.0	●	●	●	
080070-300		3.0								●	●	●	

· CDX shows available grooving depth.

◆Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)		EZFGR/L050040-100 EZFGR/L060050-100 EZFGR/L080070-100	EZFGR/L050040-150 EZFGR/L060050-150 EZFGR/L080070-150	EZFGR/L060050-200 EZFGR/L080070-200	EZFGR/L080070-300	Remarks
	MEGACOAT	Carbide					
	PR1225	GW05	f (mm/rev)				
Carbon Steel / Alloy Steel	★ 30~100	-	~0.02	~0.03	~0.04	~0.05	Coolant
Stainless Steel	★ 30~80	-	~0.01	~0.02	~0.02	~0.03	
Non-ferrous Metals	-	★ ~300	~0.03	~0.05	~0.06	~0.08	

★ : 1st Recommendation

◆EZ Bars Identification System

EZ FG R 050 040 - 100

Symbol of EZ Bars	Applications	Insert Hand	External dia. of the groove (MIN.)	Shank Dia.	Edge Width
	FG : Face Grooving	R : Right-hand L : Left-hand	050 : 5mm 060 : 6mm 080 : 8mm	040 : 4mm 050 : 5mm 070 : 7mm	100 : 1.0mm 150 : 1.5mm 200 : 2.0mm 300 : 3.0mm

EZ Bars are sold in 1 piece boxes

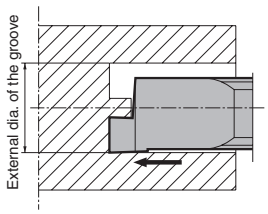
● : Std. Item

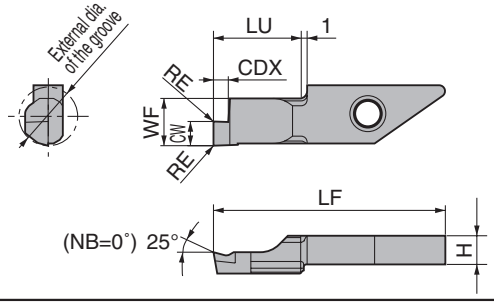
Applicable Sleeves

Sleeve				Applicable Insert for Internal Face Grooving		Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length with coolant hole) ➡ F27	EZH-HP (Adjustable overhang length) ➡ F28,F29	EZH-ST ➡ F30,F31	Sleeve Shank Dia. DCON(mm)	EZFG	Shank Dia. DCON(mm)	
-	-	EZH 04012ST-80	12	EZFG R/L 050040-...	4	(General purpose)
		05012ST-80		EZFG R/L 060050-...	5	
		07012ST-80		EZFG R/L 080070-...	7	
-	EZH 04016HP-100	EZH 04016ST-100	16	EZFG R/L 050040-...	4	(General purpose)
	05016HP-100	05016ST-100		EZFG R/L 060050-...	5	
	07016HP-100	07016ST-100		EZFG R/L 080070-...	7	
EZH 04019CT-120	EZH 04019HP-120	EZH 04019ST-120	19.05	EZFG R/L 050040-...	4	Citizen Machinery
05019CT-120	05019HP-120	05019ST-120		EZFG R/L 060050-...	5	
07019CT-120	07019HP-120	07019ST-120		EZFG R/L 080070-...	7	
EZH 04020CT-120	EZH 04020HP-120	EZH 04020ST-120	20	EZFG R/L 050040-...	4	Eguro Tsugami Citizen Machinery (General purpose)
05020CT-120	05020HP-120	05020ST-120		EZFG R/L 060050-...	5	
07020CT-120	07020HP-120	07020ST-120		EZFG R/L 080070-...	7	
EZH 04022CT-135	EZH 04022HP-135	EZH 04022ST-135	22	EZFG R/L 050040-...	4	Star Micronics Nomura DS Tsugami
05022CT-135	05022HP-135	05022ST-135		EZFG R/L 060050-...	5	
07022CT-135	07022HP-135	07022ST-135		EZFG R/L 080070-...	7	
EZH 04025.0CT-135	EZH 04025.0HP-135	EZH 04025.0ST-135	25	EZFG R/L 050040-...	4	Eguro Tsugami Citizen Machinery (General purpose)
05025.0CT-135	05025.0HP-135	05025.0ST-135		EZFG R/L 060050-...	5	
07025.0CT-135	07025.0HP-135	07025.0ST-135		EZFG R/L 080070-...	7	
EZH 04025.4CT-120	EZH 04025.4HP-120	EZH 04025.4ST-120	25.4	EZFG R/L 050040-...	4	Citizen Machinery
05025.4CT-120	05025.4HP-120	05025.4ST-120		EZFG R/L 060050-...	5	
07025.4CT-120	07025.4HP-120	07025.4ST-120		EZFG R/L 080070-...	7	

· Choose sleeves (DCB) to meet with DCON dimension of Face Grooving Inserts.
· Adjustment Pin cannot be installed to **EZH-ST** sleeves. To adjust overhang of the bar, please use **EZH-CT / HP** sleeves.
· Machine manufacturers in random order

VNFG (System Tip-Bars)





•Right-hand shown

Dimensions

Classification of usage										
● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	●		○				See Page for Applicable Toolholders	
	M	Stainless Steel	●		○					
	K	Cast Iron				●				
	N	Non-ferrous Metals				○	●			
	S	Titanium Alloys				○	●			
	H	Hard Materials (~40HRC)	○		○					
		Hard Materials (40HRC~)								

Description		External dia. of the groove		Dimension (mm)							MEGA COAT		PVD	Carbide	PCD		See Page for Applicable Toolholders
		DAXN [MIN.]	DAXX [MAX.]	CW±0.03	RE	H	LF	LU	WF	CDX	PR1225		PR930	KW10	KPD001	KPD010	
VNFGR	0810-10	8 (0)	∞ (∞)	1.0	0.05	3.9	29.6	10	7.3	2.0	●		●	●			F34 F35
	0820-10			2.0							●		●	●			
	0830-10			3.0						3.0	●		●	●			
VNFGR	0820-10NB			2.0	0.05	3.9	29.6	10	7.3	2.0					MTO	MTO	
	0830-10NB			3.0						3.0					MTO		

· CDX shows available grooving depth.

· External dia. of the groove DAXN (0) means that you can make the initial groove within DAXN ~ DAXX and then widen it to the center.

System Tip-Bars are sold in 5 piece boxes

CBN & PCD Inserts are sold in 1 piece boxes

● : Std. Item
MTO : Made to order

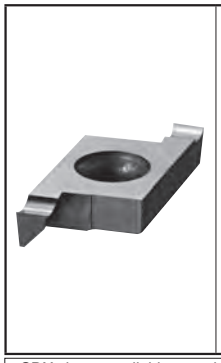
◆ Recommended Cutting Conditions

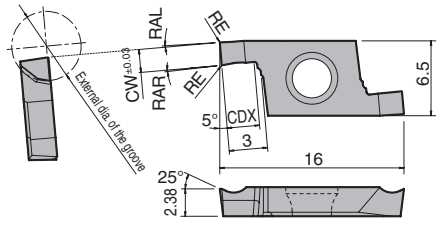
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			VNFG0810	VNFG0820	VNFG0830	Remarks
	MEGA COAT	PVD Coated Carbide	Carbide				
	PR1225	PR930	KW10	f (mm/rev)			
Carbon Steel / Alloy Steel	★ 30~100	☆ 30~100		~0.02	~0.04	~0.05	Coolant
Stainless Steel	★ 30~80	☆ 30~80		~0.01	~0.02	~0.03	
Non-ferrous Metals			★ ~300	~0.04	~0.06	~0.08	

★ : 1st Recommendation ☆ : 2nd Recommendation

Small Dia. Face Grooving (Twin-Bars)

TWFG (Horizontal type)





●Left-hand shown

Description		External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Dimension (mm) CW	Dimension (mm) RE	Dimension (mm) CDX	Angle RA	Insert Grades PVD Coated Carbide PR1535	Insert Grades PVD Coated Carbide PR1025	Insert Grades Carbide KW10
TWFGL	050	6 (0)	∞ (∞)	0.5	0.05	1.0	1.5°	●	●	●
	080			0.8		1.5		●	●	●
	100			1.0		2.2	2°	●	●	●
	125			1.25				●	●	●
	150			1.5				●	●	●
	180			1.8		3.0		●	●	●
	200			2.0				●	●	●

· CDX shows available grooving depth.

· External dia. of the groove DAXN (0) means that you can make the initial groove within DAXN ~ DAXX and then widen it to the center.

STW (Square Shank for Horizontal type)

(For right-hand toolholder for boring, See page **F38**.)



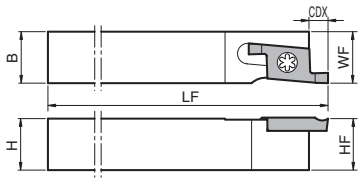


Fig. 1

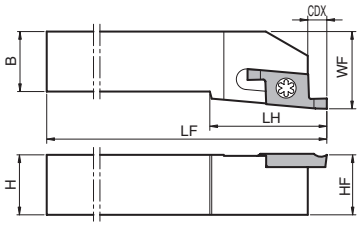


Fig. 2

● Left-hand shown

Toolholder Dimensions

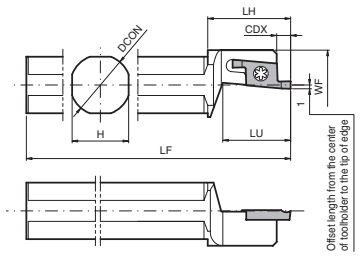
Description		Stock	Dimension (mm) H	HF	B	LF	LH	WF	CDX	Drawing	Spare Parts Clamp Screw	Spare Parts Wrench	Applicable Inserts G82
STWL	1010F-15	●	10	10	10	85	-	10	3	Fig. 1	SB-3080TR	LTW-10S	TWFGL○○○
	1212F-15	●	12	12	12			12					
	1212K-15	●	12	12	12	125		12					
	1616K-15	●	16	16	16			16					
	2020K-15	●	20	20	20		25	25		Fig. 2			
	2525M-15	●	25	25	25	150		32					

· CDX shows the distance from the toolholder to the cutting edge. Available groove depth : "CDX" of insert.

S..-STW (Round Shank for Horizontal type)

(For right-hand toolholder for boring, See page **F38**.)





●Left-hand shown

Fig. 1

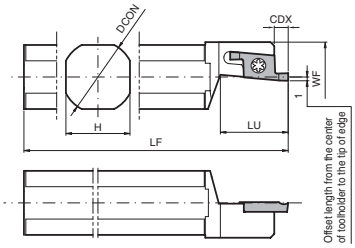


Fig. 2

Toolholder Dimensions

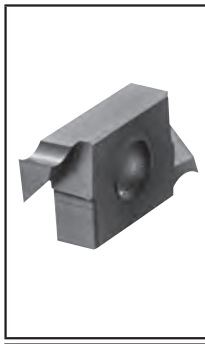
Description		Stock	Dimension (mm) DCON	WF	H	LF	LU	LH	CDX	Drawing	Spare Parts Clamp Screw	Spare Parts Wrench	Applicable Inserts G82
S12F-	STWL15	●	12	20	11	80	18	22	3	Fig.1	SB-3080TR	LTW-10S	TWFGL○○○
S14H-	STWL15	●	14		13	100							
S15F-	STWL15	●	15.875		15	85							
S16F-	STWL15	●	16										
S19G-	STWL15	●	19.05	18.5	17	90		-	3	Fig.2			
S19K-	STWL15	●				120							
S20G-	STWL15	●	20	19.5	18	90							
S20K-	STWL15	●				120							
S22K-	STWL15	●	22	21.5	20	125	22						
S25.0J-	STWL15	●	25	24.5	23	110							
S25K-	STWL15	●	25.4	25		120							

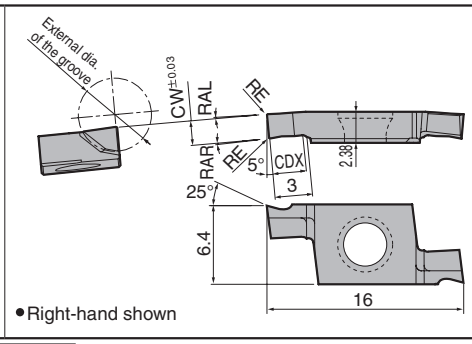
· CDX shows the distance from the toolholder to the cutting edge. Available groove depth : "CDX" of insert.

Twin-Bars are sold in 5 piece boxes

● : Std. Item

TWFGT (Vertical type)





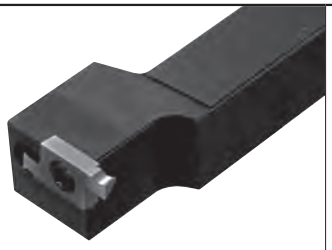
● Right-hand shown

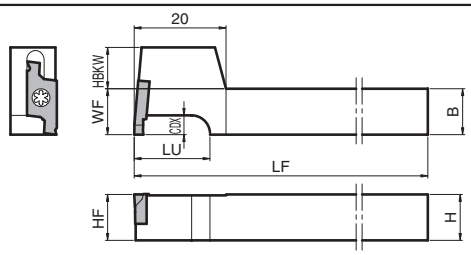
Description		External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Dimension (mm) CW	Dimension (mm) RE	Dimension (mm) CDX	Angle RA	Insert Grades PVD Coated Carbide PR1535	Insert Grades PVD Coated Carbide PR1025	Insert Grades Carbide KW10
TWFGTR	050	6 (0)	∞ (∞)	0.5	0.05	1.0	1.5°	●	●	●
	080			0.8		1.5		●	●	●
	100			1.0		2.2	2°	●	●	●
	125			1.25				●	●	●
	150			1.5				●	●	●
	180			1.8		3.0		●	●	●
	200			2.0				●	●	●

· CDX shows available grooving depth.

· External dia. of the groove DAXN (0) means that you can make the initial groove within DAXN ~ DAXX and then widen it to the center.

STWS (Square Shank for vertical type , L-shape)





● Right-hand shown

Toolholder Dimensions

Description		Stock	Dimension (mm) H	HF	B	LF	LU	WF	HBKW	CDX	Spare Parts Clamp Screw	Spare Parts Wrench	Applicable Inserts G83
STWSR	1010JX-15T	●	10	10	10	120	16	10	9	3	SB-3080TR	LTW-10S	TWFGTR○○○
	1212JX-15T	●	12	12	12			12	7				
	1616JX-15T	●	16	16	16		20	16	3				
STWSR	1010F-15T	●	10	10	10	85	16	10	9				
	1212F-15T	●	12	12	12			12	7				

· CDX shows the distance from the toolholder to the cutting edge. Available groove depth : "CDX" of insert.

Recommended Cutting Conditions (TWFG / TWFGT)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min) MEGACOAT NANO PR1535	PVD Coated Carbide PR1025	Carbide KW10	TWFGL050 TWFGL080 TWFGL100 TWFGTR050 TWFGTR080 TWFGTR100 f (mm/rev)	TWFGL125 TWFGL150 TWFGTR125 TWFGTR150 f (mm/rev)	TWFGL180 TWFGL200 TWFGTR180 TWFGTR200 f (mm/rev)	Remarks
Carbon Steel / Alloy Steel	★ 30~100	☆ 30~100	-	~0.02	~0.03	~0.04	Coolant
Stainless Steel	★ 30~80	☆ 30~80	-	~0.01	~0.02	~0.02	
Non-ferrous Metals	-	-	★ ~300	~0.03	~0.04	~0.06	

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item

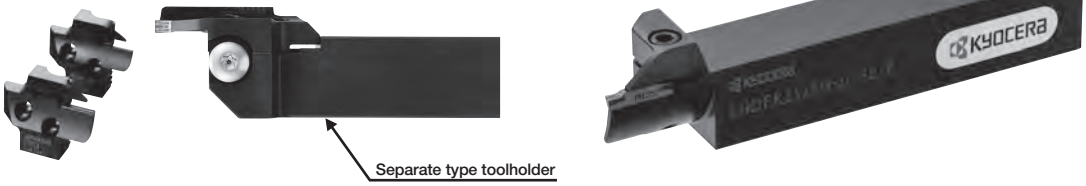
Twin-Bars are sold in 5 piece boxes

KGDF Face Grooving

Features

Separate type toolholder (toolholder + blade) and Integral type toolholder are available

Adaptable to a wide range of face grooving applications by changing blades

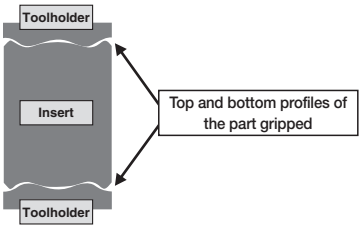


New insert clamping system "W Grip"

Unique "W Grip" (insert anti-slip structure) provides stable machining quality

1) Prevents abnormal machining surface and / or insert breakage resulting from slip of insert.
2) Improves repetitive installation accuracy of insert

* GDFM and GDFMS inserts are not applicable to KGD external grooving, cut-off and KGDI internal grooving toolholders.



W Grip technology

Smooth chip control

GM Chipbreaker for general purpose, GH Chipbreaker for high feed grooving, and DM Chipbreaker for deep grooving are available.

Advantages of Chipbreaker

GM Chipbreaker for general purpose

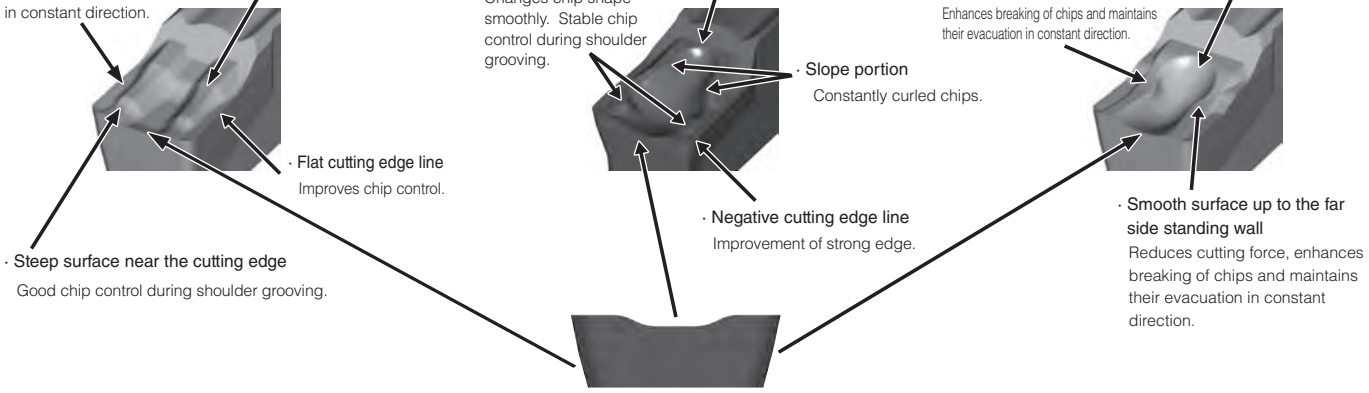
- Smooth surface from cutting edge to the far side
  Enhances breaking of chips and maintains their evacuation in constant direction.
- Gradually raised surface
  Keeps curling of chips in constant shape.
- Flat cutting edge line
  Improves chip control.
- Steep surface near the cutting edge
  Good chip control during shoulder grooving.

GH Chipbreaker for high feed grooving

- Concave part in middle
  Control chips upward.
- Dots jutted out center side
  Changes chip shape smoothly. Stable chip control during shoulder grooving.
- Slope portion
  Constantly curled chips.
- Negative cutting edge line
  Improvement of strong edge.

DM Chipbreaker for deep grooving

- Concave part in middle
  Enhances breaking of chips.
- Inflated inner surface
  Enhances breaking of chips and maintains their evacuation in constant direction.
- Smooth surface up to the far side standing wall
  Reduces cutting force, enhances breaking of chips and maintains their evacuation in constant direction.

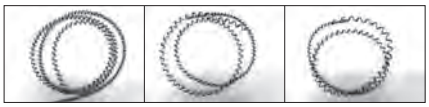


- Curved lead edge
  Keeps chips in constant shape.

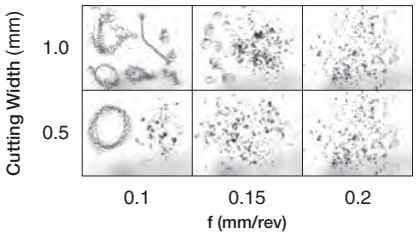
Chip Control of GM Chipbreaker

<Cutting Conditions>
Vc=150m/min f =0.05~0.2mm/rev GDFM5020N-040GM SCM415 Wet

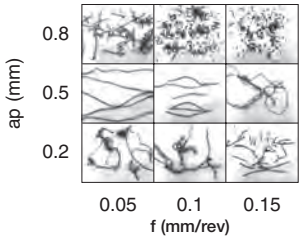
Face Grooving (ø62)



Side Grooving



Turning



High precision edge preparation

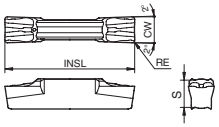
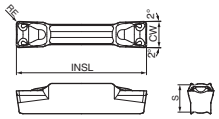
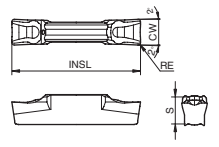
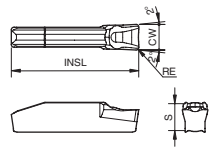
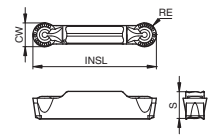
High precision molding technology with tolerance ±0.03mm (Edge width 2, 3, 4mm types)

Highly-reputed MEGACOAT coating technology

Long tool life and high efficiency machining achieved by superior oxidation resistance and wear resistance.

GDFM / GDFMS

Classification of usage							
◕ : Continuous~Light Interruption / 1st Choice ◔ : Continuous~Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	●	○	◕	◔	See Page for Applicable Toolholders
	M	Stainless Steel			◕	◔	
	K	Cast Iron				◕	
	N	Non-ferrous Metals					
	S	Titanium Alloys					
	H	Hard Materials (~40HRC)					
		Hard Materials (40HRC~)					

Insert			Description		Dimension (mm)					Cermet		MEGACOAT		
					CW	Tolerance	RE	INSL	S	TN620	TN90	PR1225	PR1215	
Grooving and Turning			GDFM	2020N-020GM	2.0	±0.03	0.2	21	3.9		●	●	●	G88 ~ G94
				3020N-030GM	3.0		0.3	20	4.3		●	●	●	
				4020N-040GM	4.0		0.4		4.5		●	●	●	
				5020N-040GM	5.0	±0.04					●	●	●	
				5020N-080GM			0.8				●	●	●	
				6020N-040GM	6.0		0.4				●	●	●	
				6020N-080GM			0.8				●	●	●	
Grooving and Turning (High feed)			GDFM	4020N-040GH	4.0	±0.03	0.4	20	4.5			●	●	
				5020N-040GH	5.0	±0.04						●	●	
				5020N-080GH			0.8					●	●	
				6020N-040GH	6.0		0.4					●	●	
				6020N-080GH			0.8					●	●	
Deep grooving and Turning			GDFM	3020N-030DM	3.0	±0.03	0.3	20	4.3		●	●	●	
				4020N-040DM	4.0		0.4		4.5		●	●	●	
				5020N-040DM	5.0	±0.04					●	●	●	
				6020N-040DM	6.0						●	●	●	
	 1-edge		GDFMS	3020N-030DM	3.0	±0.03	0.3	20	4.3		●	●	●	
				4020N-040DM	4.0		0.4		4.5		●	●	●	
				5020N-040DM	5.0	±0.04					●	●	●	
				6020N-040DM	6.0						●	●	●	
Full-R			GDFM	3020N-150R-CM	3.0	±0.03	1.5	20	4.3	●		●	●	
				4020N-200R-CM	4.0		2.0	*21	4.5	●		●	●	
				5020N-250R-CM	5.0	±0.04	2.5			●		●	●	
				6020N-300R-CM	6.0		3.0	*22		●		●	●	

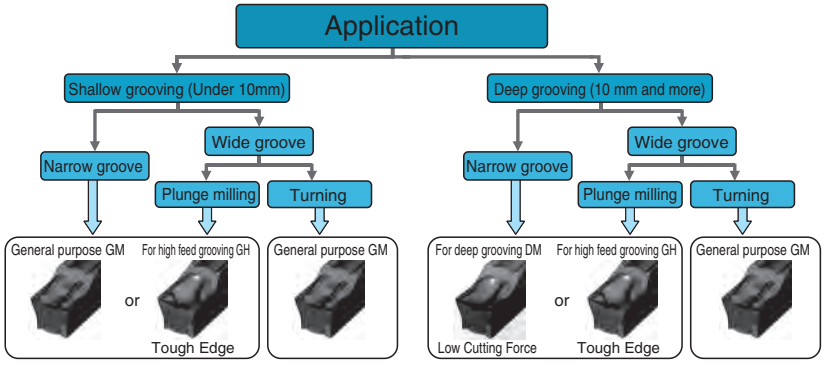
* GDFM40/50/60-CM differs from other descriptions in length (INSL) to avoid interference of a toolholder with workpiece.

Recommended Cutting Conditions ➔ G96

Inserts Identification System

G D F	M	S	30	20	N	-	030	DM
Series	Tolerance Symbol M : M Class	No. of edge No Indication : 2-edge S : 1-edge	Edge Width 20 : 2mm 30 : 3mm ⋮	Insert Length 20 : 20mm	Hand of Tool N : Neutral		Corner-R(RE) 020 : 0.2mm 030 : 0.3mm 040 : 0.4mm 150R : 1.5mm (Full-R)	Chipbreaker Symbol GM : Grooving and Turning DM : Grooving GH : High feed grooving CM : Full-R

Chipbreaker Selection



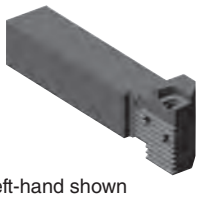
* If chip control is not stable when using the general GM chipbreaker for grooving, change the chipbreaker to the DM chipbreaker for deep grooving or GH chipbreaker for high feed grooving.

● : Std. Item

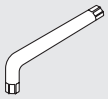
Inserts are sold in 10 piece boxes

KGDF

Toolholder Assembly Identification

Unit Description (Unit Description is not printed.)	Blade (Blade Description is printed.)	Toolholder (Toolholder Description is printed.)
Left-hand : KGDFL…S	Left-hand : KGDFL…-C	**Right**-hand : KGD**R**…-C
 ●Left-hand shown	 ●Left-hand shown	 ●Right-hand shown
Right-hand : KGDFR…S	Right-hand : KGDFR…-C	**Left**-hand : KGD**L**…-C
 ●Right-hand shown	 ●Right-hand shown	 ●Left-hand shown

· Right-hand Blade for **Left-hand** Toolholder, Left-hand Blade for **Right-hand** Toolholder.
· The Unit Description is not printed on the product. It is printed on the box label.
· Combination of the toolholder and blade (both separately sold) can make up the corresponding assembly.
· The insert clamping screw (BH6X10TR), blade fixing screw (SB-60120TR) and wrench (LTW-25) which are included in the toolholder can be used.

Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
		
BH6X10TR	SB-60120TR	LTW-25

Face Grooving Toolholder Assembly Identification System

Hand of unit	Toolholder shank size	Toolholder Length	Width	Symbol of assembly toolholder
R : Right-hand L : Left-hand	2020 : □20 2525 : □25	X : Special	2 : 2mm 3 : 3mm ⋮	S : indicates the unit description

KGDF **R** **2020** **X** **25** - **3** **A** **S**

Series
KGDF Face Grooving

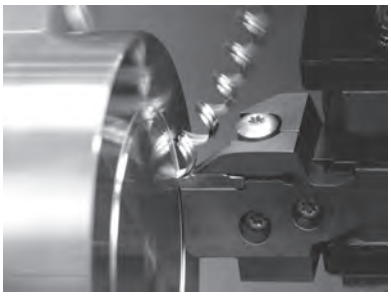
External dia. of the groove (MIN.) : DAXN
Indicates the minimum external diameter suitable for the initial face grooving.
25 : 25mm . . 235 : 235mm

* For the maximum external diameter which can be applied to the initial face grooving (you can also use 1-edge insert), ref. to the MAX. : DAXX value of "External dia. of the groove" in the dimension tables of toolholders and blades.

Grooving Depth	
A : 6~13mm B : 13~15mm	2-edge insert (1-edge insert can also be used.)
C : 20~25mm D : 32mm	1-edge insert

External dia. of the groove DAXN / DAXX

External dia. of the groove within DAXN ~ DAXX are the available range for the initial grooving on the unprocessed workpiece (Ref. to Fig. 1).
Then, you can widen it up to the center towards the inside (excluding the models listed in the right table) and towards the outside according to machine limits.



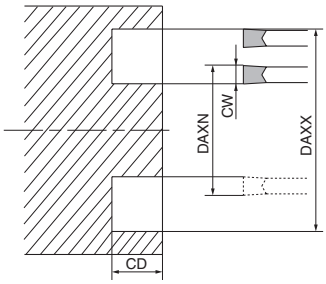
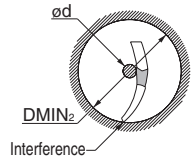


Fig. 1

Limit of Turning toward Center

Turning towards the Center causes the toolholder to interfere with the groove wall depending on the initial cut's diameter.

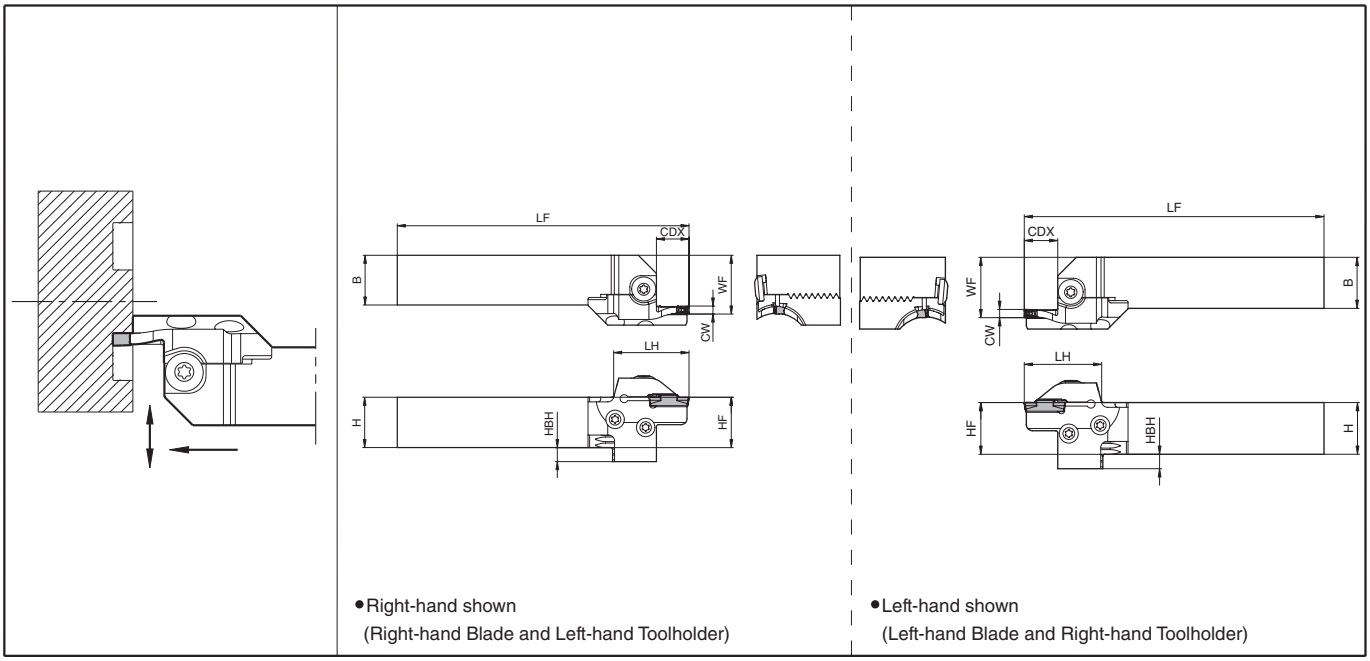


Remaining Boss Dia.ød

Description	DMIN2 25	26	27	28 and over
	ød (mm)			
KGDF R/L 2020X25-3AS 2525X25-3AS	4	2	0	0 (No remaining Boss)
KGDF R/L 2020X25-4AS 2525X25-4AS	6	3	0	
KGDF R/L 2020X25-5AS 2525X25-5AS	7	4	1	
KGDF R/L 2020X25-6AS 2525X25-6AS	9	4	1	

e.g.)
KGDFR2020X25-3AS with ø25 as first cut towards the center, it will cause a rubbing with the toolholder cartridge if ød is 4.0mm.

KGDF



●Right-hand shown
(Right-hand Blade and Left-hand Toolholder)

●Left-hand shown
(Left-hand Blade and Right-hand Toolholder)

● Toolholder Dimensions

Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description ➡G95	Toolholder Description ➡G32	Unit Description (Standard Stock Description)	Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	CDX
0°	2	□20	6	25	30	KGDFR -25-2A-C	KGDL2020-C	KGDFR 2020X25-2AS	▲	-	20	20	12	20	115	33	24.5	6
				30	35	-30-2A-C		2020X30-2AS	-	-								
				35	45	-35-2A-C		2020X35-2AS	-	-								
				45	60	-45-2A-C		2020X45-2AS	-	-								
				60	80	-60-2A-C		2020X60-2AS	-	-								
				80	100	-80-2A-C		2020X80-2AS	-	-								
				100	130	-100-2A-C		2020X100-2AS	-	-								
			13	25	30	-25-2B-C									118	36		13
				30	35	-30-2B-C												
				35	45	-35-2B-C												
				45	60	-45-2B-C												
			15	60	80	-60-2B-C		-							120	38		15
				80	100	-80-2B-C												
				100	130	-100-2B-C												
		□25	6	25	30	KGDFR -25-2A-C	KGDL2525-C	KGDFR 2525X25-2AS	▲	-	25	25	7	25	140	33	29.5	6
				30	35	-30-2A-C		2525X30-2AS	▲	-								
				35	45	-35-2A-C		2525X35-2AS	▲	-								
				45	60	-45-2A-C		2525X45-2AS	▲	-								
				60	80	-60-2A-C		2525X60-2AS	▲	-								
				80	100	-80-2A-C		2525X80-2AS	▲	-								
				100	130	-100-2A-C		2525X100-2AS	▲	-								
			13	25	30	-25-2B-C									143	36		13
				30	35	-30-2B-C												
				35	45	-35-2B-C												
				45	60	-45-2B-C												
			15	60	80	-60-2B-C		-							145	38		15
				80	100	-80-2B-C												
				100	130	-100-2B-C												
		□32	6	25	30	KGDFR -25-2A-C	KGDL3232-C	-			32	32	-	32	160	33	36.5	6
				30	35	-30-2A-C												
				35	45	-35-2A-C												
				45	60	-45-2A-C												
				60	80	-60-2A-C												
				80	100	-80-2A-C												
				100	130	-100-2A-C												
			13	25	30	-25-2B-C									163	36		13
				30	35	-30-2B-C												
				35	45	-35-2B-C												
				45	60	-45-2B-C												
			15	60	80	-60-2B-C									165	38		15
				80	100	-80-2B-C												
				100	130	-100-2B-C												

Note) 1. When the unit description is not available (the stock is "-"), please purchase toolholder and blade separately.
2. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡G85

▲ :To be replaced by a new product

Toolholder Dimensions

Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description G95	Toolholder Description G32	Unit Description (Standard Stock Description)	Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	CDX
0°	3	□20	13	25	30	KGDF$^{R}_{L}$ -25-3A-C	KGD$^{L}_{R}$2020-C	KGDF$^{R}_{L}$ 2020X25-3AS	▲	▲	20	20	12	20	118	36	24.5	13
				30	40	-30-3A-C		2020X30-3AS	▲	-								
				40	50	-40-3A-C		2020X40-3AS	-	-								
			15	50	65	-50-3B-C		2020X50-3BS	▲	-					120	38		15
				65	85	-65-3B-C		2020X65-3BS	-	-								
				85	110	-85-3B-C		2020X85-3BS	-	-								
				110	145	-110-3B-C		2020X110-3BS	-	-								
			22	50	65	-50-3C-C		2020X50-3CS	▲	-					127	45		22
				65	85	-65-3C-C		2020X65-3CS	-	-								
			25	85	110	-85-3C-C		2020X85-3CS	-	-					130	48		25
				110	145	-110-3C-C		2020X110-3CS	-	-								
		□25	13	25	30	KGDF$^{R}_{L}$ -25-3A-C	KGD$^{L}_{R}$2525-C	KGDF$^{R}_{L}$ 2525X25-3AS	▲	-	25	25	7	25	143	36	29.5	13
				30	40	-30-3A-C		2525X30-3AS	▲	-								
				40	50	-40-3A-C		2525X40-3AS	▲	-								
			15	50	65	-50-3B-C		2525X50-3BS	▲	▲					145	38		15
				65	85	-65-3B-C		2525X65-3BS	▲	▲								
				85	110	-85-3B-C		2525X85-3BS	▲	▲								
				110	145	-110-3B-C		2525X110-3BS	▲	-								
			22	50	65	-50-3C-C		2525X50-3CS	▲	-					152	45		22
				65	85	-65-3C-C		2525X65-3CS	-	-								
			25	85	110	-85-3C-C		2525X85-3CS	-	-					155	48		25
				110	145	-110-3C-C		2525X110-3CS	▲	-								
		□32	13	25	30	KGDF$^{R}_{L}$ -25-3A-C	KGD$^{L}_{R}$3232-C	-			32	32	-	32	163	36	36.5	13
				30	40	-30-3A-C												
				40	50	-40-3A-C												
			15	50	65	-50-3B-C									165	38		15
				65	85	-65-3B-C												
				85	110	-85-3B-C												
				110	145	-110-3B-C												
			22	50	65	-50-3C-C									172	45		22
				65	85	-65-3C-C												
			25	85	110	-85-3C-C									175	48		25
				110	145	-110-3C-C												
0°	4	□20	13	25	35	KGDF$^{R}_{L}$ -25-4A-C	KGD$^{L}_{R}$2020-C	KGDF$^{R}_{L}$ 2020X25-4AS	▲	-	20	20	12	20	118	36	24.5	13
			15	35	50	-35-4B-C		2020X35-4BS	▲	-					120	38		15
				50	70	-50-4B-C		2020X50-4BS	-	-								
				70	100	-70-4B-C		2020X70-4BS	-	-								
				100	150	-100-4B-C		2020X100-4BS	-	-								
				150	220	-150-4B-C		2020X150-4BS	-	-								
				220	∞	-220-4B-C		2020X220-4BS	-	-								
			25	35	50	-35-4C-C		2020X35-4CS	-	-					130	48		25
				50	70	-50-4C-C		2020X50-4CS	-	-								
				70	100	-70-4C-C		2020X70-4CS	-	-								
				100	150	-100-4C-C		2020X100-4CS	-	-								
				150	220	-150-4C-C		2020X150-4CS	-	-								
				220	∞	-220-4C-C		2020X220-4CS	-	-								
		□25	13	25	35	KGDF$^{R}_{L}$ -25-4A-C	KGD$^{L}_{R}$2525-C	KGDF$^{R}_{L}$ 2525X25-4AS	▲	-	25	25	7	25	143	36	29.5	13
			15	35	50	-35-4B-C		2525X35-4BS	▲	▲					145	38		15
				50	70	-50-4B-C		2525X50-4BS	▲	▲								
				70	100	-70-4B-C		2525X70-4BS	▲	-								
				100	150	-100-4B-C		2525X100-4BS	▲	▲								
				150	220	-150-4B-C		2525X150-4BS	▲	-								
				220	∞	-220-4B-C		2525X220-4BS	▲	▲								
			25	35	50	-35-4C-C		2525X35-4CS	▲	-					155	48		25
				50	70	-50-4C-C		2525X50-4CS	▲	-								
				70	100	-70-4C-C		2525X70-4CS	▲	▲								
				100	150	-100-4C-C		2525X100-4CS	▲	-								
				150	220	-150-4C-C		2525X150-4CS	▲	-								
				220	∞	-220-4C-C		2525X220-4CS	▲	▲								
		□32	13	25	35	KGDF$^{R}_{L}$ -25-4A-C	KGD$^{L}_{R}$3232-C	-			32	32	-	32	163	36	36.5	13
			15	35	50	-35-4B-C									165	38		15
				50	70	-50-4B-C												
				70	100	-70-4B-C												
				100	150	-100-4B-C												
				150	220	-150-4B-C												
				220	∞	-220-4B-C												
			25	35	50	-35-4C-C									175	48		25
				50	70	-50-4C-C												
				70	100	-70-4C-C												
				100	150	-100-4C-C												
				150	220	-150-4C-C												
				220	∞	-220-4C-C												

Note) 1. When the unit description is not available (the stock is "-"), please purchase toolholder and blade separately.
2. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡ G85

▲ :To be replaced by a new product

Face Grooving Toolholders (Separate Type)

Toolholder Dimensions

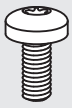
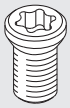
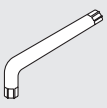
Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description ➡G95	Toolholder Description ➡G32	Unit Description (Standard Stock Description)	Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	CDX
0°	5	□20	15	25	35	KGDF$^{R}_{L}$ -25-5B-C	KGD$^{L}_{R}$2020-C	KGDF$^{R}_{L}$ 2020X25-5BS	-	-	20	20	12	20	120	38	24.5	15
				35	50	-35-5B-C		2020X35-5BS	-	-								
				50	75	-50-5B-C		2020X50-5BS	-	-								
				75	115	-75-5B-C		2020X75-5BS	▲	▲								
				115	180	-115-5B-C		2020X115-5BS	-	-								
				180	235	-180-5B-C		2020X180-5BS	-	-								
				235	∞	-235-5B-C		2020X235-5BS	-	-								
			20	25	35	-25-5C-C		2020X25-5CS	-	-					125	43		20
			25	35	50	-35-5C-C		2020X35-5CS	-	-					130	48		25
				50	75	-50-5C-C		2020X50-5CS	-	-								
				75	115	-75-5C-C		2020X75-5CS	-	-								
				115	180	-115-5C-C		2020X115-5CS	-	-								
				180	235	-180-5C-C		2020X180-5CS	-	-								
				235	∞	-235-5C-C		2020X235-5CS	-	-								
			32	75	115	-75-5D-C		-							137	55		32
				115	180	-115-5D-C												
				180	235	-180-5D-C												
				235	∞	-235-5D-C												
		□25	15	25	35	KGDF$^{R}_{L}$ -25-5B-C	KGD$^{L}_{R}$2525-C	KGDF$^{R}_{L}$ 2525X25-5BS	▲	-	25	25	7	25	145	38	29.5	15
				35	50	-35-5B-C		2525X35-5BS	-	-								
				50	75	-50-5B-C		2525X50-5BS	▲	-								
				75	115	-75-5B-C		2525X75-5BS	▲	▲								
				115	180	-115-5B-C		2525X115-5BS	-	-								
				180	235	-180-5B-C		2525X180-5BS	-	-								
				235	∞	-235-5B-C		2525X235-5BS	▲	-								
			20	25	35	-25-5C-C		2525X25-5CS	-	-					150	43		20
			25	35	50	-35-5C-C		2525X35-5CS	▲	-					155	48		25
				50	75	-50-5C-C		2525X50-5CS	▲	-								
				75	115	-75-5C-C		-										
				115	180	-115-5C-C												
				180	235	-180-5C-C												
				235	∞	-235-5C-C												
			32	75	115	-75-5D-C		KGDF$^{R}_{L}$ 2525X75-5DS	▲	-					162	55		32
				115	180	-115-5D-C		2525X115-5DS	▲	-								
				180	235	-180-5D-C		2525X180-5DS	▲	-								
				235	∞	-235-5D-C		2525X235-5DS	▲	-								
		□32	15	25	35	KGDF$^{R}_{L}$ -25-5B-C	KGD$^{L}_{R}$3232-C	-			32	32	-	32	165	38	36.5	15
				35	50	-35-5B-C												
				50	75	-50-5B-C												
				75	115	-75-5B-C												
				115	180	-115-5B-C												
				180	235	-180-5B-C												
				235	∞	-235-5B-C												
			20	25	35	-25-5C-C									170	43		20
			25	35	50	-35-5C-C									175	48		25
				50	75	-50-5C-C												
				75	115	-75-5C-C												
				115	180	-115-5C-C												
				180	235	-180-5C-C												
				235	∞	-235-5C-C												
			32	75	115	-75-5D-C									182	55		32
				115	180	-115-5D-C												
				180	235	-180-5D-C												
				235	∞	-235-5D-C												

Note) 1. When the unit description is not available (the stock is "-"), please purchase toolholder and blade separately.
2. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡G85

Spare Parts (Common with separate types)

* The parts are included in the toolholder and unit.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Spare Parts: Clamp Screw (for Blade)	Spare Parts: Wrench
			
KGDF$^{R}_{L}$ .....S	BH6X10TR	SB-60120TR	LTW-25

▲ :To be replaced by a new product

Toolholder Dimensions

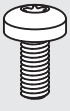
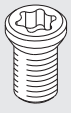
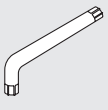
Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description ➡G95	Toolholder Description ➡G32	Unit Description (Standard Stock Description)	Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	CDX
0°	6	□20	15	25	35	KGDF$^{R}_{L}$ -25-6B-C	KGD$^{L}_{R}$ 2020-C	-			20	20	12	20	120	38	24.5	15
				35	50	-35-6B-C												
				50	75	-50-6B-C												
				75	115	-75-6B-C												
				115	180	-115-6B-C												
				180	235	-180-6B-C												
				235	∞	-235-6B-C												
			20	25	35	-25-6C-C									125	43		20
			25	35	50	-35-6C-C									130	48		25
				50	75	-50-6C-C												
				75	115	-75-6C-C												
				115	180	-115-6C-C												
				180	235	-180-6C-C												
				235	∞	-235-6C-C												
			32	75	115	-75-6D-C									137	55		32
				115	180	-115-6D-C												
				180	235	-180-6D-C												
				235	∞	-235-6D-C												
		□25	15	25	35	KGDF$^{R}_{L}$ -25-6B-C	KGD$^{L}_{R}$ 2525-C	-			25	25	7	25	145	38	29.5	15
				35	50	-35-6B-C												
				50	75	-50-6B-C												
				75	115	-75-6B-C												
				115	180	-115-6B-C												
				180	235	-180-6B-C												
				235	∞	-235-6B-C												
			20	25	35	-25-6C-C									150	43		20
			25	35	50	-35-6C-C									155	48		25
				50	75	-50-6C-C												
				75	115	-75-6C-C												
				115	180	-115-6C-C												
				180	235	-180-6C-C												
				235	∞	-235-6C-C												
			32	75	115	-75-6D-C									162	55		32
				115	180	-115-6D-C												
				180	235	-180-6D-C												
				235	∞	-235-6D-C												
		□32	15	25	35	KGDF$^{R}_{L}$ -25-6B-C	KGD$^{L}_{R}$ 3232-C	-			32	32	-	32	165	38	36.5	15
				35	50	-35-6B-C												
				50	75	-50-6B-C												
				75	115	-75-6B-C												
				115	180	-115-6B-C												
				180	235	-180-6B-C												
				235	∞	-235-6B-C												
			20	25	35	-25-6C-C									170	43		20
			25	35	50	-35-6C-C									175	48		25
				50	75	-50-6C-C												
				75	115	-75-6C-C												
				115	180	-115-6C-C												
				180	235	-180-6C-C												
				235	∞	-235-6C-C												
			32	75	115	-75-6D-C									182	55		32
				115	180	-115-6D-C												
				180	235	-180-6D-C												
				235	∞	-235-6D-C												

Note) 1. Please purchase toolholder and blade separately.
2. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)

Applicable Inserts ➡G85

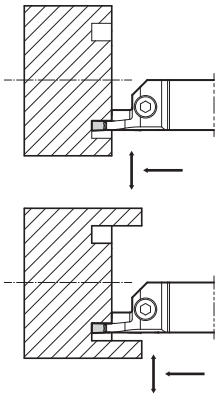
Spare Parts (Common with separate types)

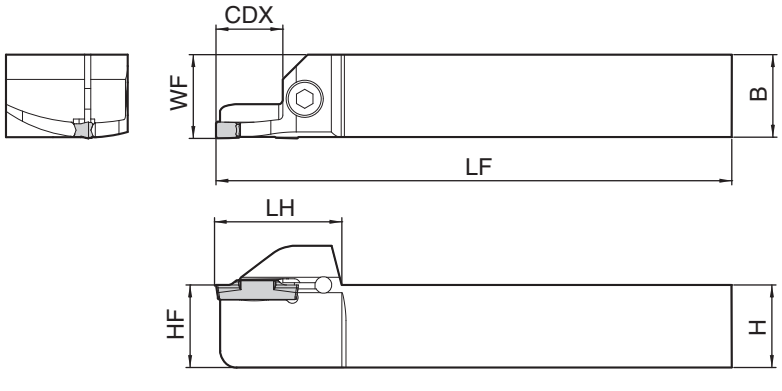
* The parts are included in the toolholder and unit.

Unit Description	Spare Parts		
	Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
			
KGDF$^{R}_{L}$ .....S	BH6X10TR	SB-60120TR	LTW-25

Face Grooving Toolholders (Integral Type)

KGDF-Z





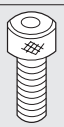
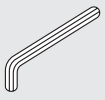
●Right-hand shown

Toolholder Dimensions

Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Description	Stock R	Stock L	Dimension (mm) H	HF	B	LF	LH	WF	CDX
3	□20	15	50	65	KGDF R/L 2020K50-3B-Z	●	●	20	20	20	125	30.5	20.3	15
			65	85	2020K65-3B-Z	●	●							
			85	110	2020K85-3B-Z	●	●							
			110	145	2020K110-3B-Z	●	●							
	□25		50	65	KGDF R/L 2525M50-3B-Z	●	●	25	25	25	150		25.3	
			65	85	2525M65-3B-Z	●	●							
			85	110	2525M85-3B-Z	●	●							
			110	145	2525M110-3B-Z	●	●							
4	□20	15	50	70	KGDF R/L 2020K50-4B-Z	●	●	20	20	20	125	30.5	20.3	15
			70	100	2020K70-4B-Z	●	●							
			100	150	2020K100-4B-Z	●	●							
	□25		50	70	KGDF R/L 2525M50-4B-Z	●	●	25	25	25	150		25.3	
			70	100	2525M70-4B-Z	●	●							
			100	150	2525M100-4B-Z	●	●							
5	□20	15	50	75	KGDF R/L 2020K50-5B-Z	●	●	20	20	20	125	30.5	20.3	15
			75	115	2020K75-5B-Z	●	●							
			115	180	2020K115-5B-Z	●	●							
	□25		50	75	KGDF R/L 2525M50-5B-Z	●	●	25	25	25	150		25.3	
			75	115	2525M75-5B-Z	●	●							
			115	180	2525M115-5B-Z	●	●							

Applicable Inserts ➡ G85

Spare Parts

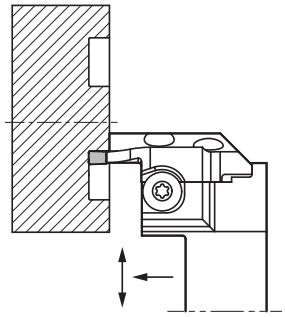
Description	Spare Parts: Clamp Bolt	Spare Parts: Wrench
		
KGDF R/L...-Z	HH5X16	LW-4

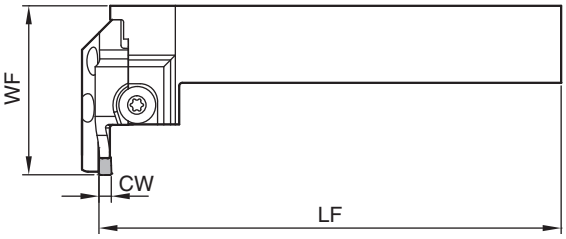
Toolholder Identification System (Integral Type)

KGDF	R	2525	M	50	3	B	Z
Series: KGDF Face Grooving	Hand of Tool: R : Right-hand, L : Left-hand	Shank Size: 2020 : □20mm, 2525 : □25mm	Toolholder Length: K : 125mm, M : 150mm	External dia. of the groove (MIN.): 50 : 50mm ⋮ 115 : 115mm	Edge Width: 3 : 3mm, 4 : 4mm, 5 : 5mm	Grooving Depth: B : 15mm	Toolholder Type: Z : Integral Type

● : Std. Item

KGDF





● Right-hand shown (Right-hand Blade and Right-hand Toolholder)

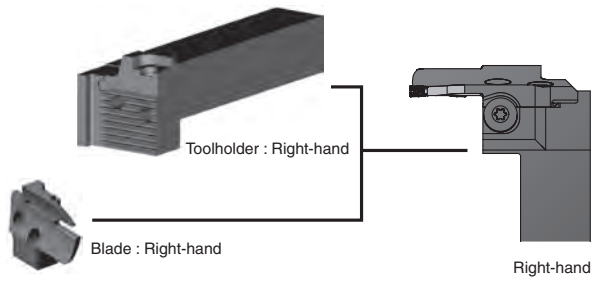
Combination of Toolholder & Blade

Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description ➡G95	Toolholder Description ➡G32	Dimension (mm) LF	WF
90°	2	□20	6	25	30	KGDFR -25-2A-C	KGDSR2020-C	125	49.7
				30	35	-30-2A-C			
				35	45	-35-2A-C			
				45	60	-45-2A-C			
				60	80	-60-2A-C			
				80	100	-80-2A-C			
				100	130	-100-2A-C			
			13	25	30	-25-2B-C			52.7
			15	30	35	-30-2B-C			54.7
				35	45	-35-2B-C			
				45	60	-45-2B-C			
				60	80	-60-2B-C			
				80	100	-80-2B-C			
				100	130	-100-2B-C			
		□25	6	25	30	KGDFR -25-2A-C	KGDSR2525-C	150	49.7
				30	35	-30-2A-C			
				35	45	-35-2A-C			
				45	60	-45-2A-C			
				60	80	-60-2A-C			
				80	100	-80-2A-C			
				100	130	-100-2A-C			
			13	25	30	-25-2B-C			52.7
			15	30	35	-30-2B-C			54.7
				35	45	-35-2B-C			
				45	60	-45-2B-C			
				60	80	-60-2B-C			
				80	100	-80-2B-C			
				100	130	-100-2B-C			
90°	3	□20	13	25	30	KGDF$^{R}_{L}$ -25-3A-C	KGDS$^{R}_{L}$2020-C	125	52.7
				30	40	-30-3A-C			
				40	50	-40-3A-C			
			15	50	65	-50-3B-C			54.7
				65	85	-65-3B-C			
				85	110	-85-3B-C			
				110	145	-110-3B-C			
			22	50	65	-50-3C-C			59.7
				65	85	-65-3C-C			
			25	85	110	-85-3C-C			61.7
				110	145	-110-3C-C			
		□25	13	25	30	KGDF$^{R}_{L}$ -25-3A-C	KGDS$^{R}_{L}$2525-C	150	52.7
				30	40	-30-3A-C			
				40	50	-40-3A-C			
			15	50	65	-50-3B-C			54.7
				65	85	-65-3B-C			
				85	110	-85-3B-C			
				110	145	-110-3B-C			
			22	50	65	-50-3C-C			59.7
				65	85	-65-3C-C			
			25	85	110	-85-3C-C			61.7
				110	145	-110-3C-C			

Applicable Inserts ➡ G85

Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description ➡G95	Toolholder Description ➡G32	Dimension (mm) LF	WF
90°	4	□20	13	25	35	KGDF$^{R}_{L}$ -25-4A-C	KGDS$^{R}_{L}$2020-C	125	52.7
			15	35	50	-35-4B-C			54.7
				50	70	-50-4B-C			
				70	100	-70-4B-C			
				100	150	-100-4B-C			
				150	220	-150-4B-C			
				220	∞	-220-4B-C			
			25	35	50	-35-4C-C			64.7
				50	70	-50-4C-C			
				70	100	-70-4C-C			
				100	150	-100-4C-C			
				150	220	-150-4C-C			
				220	∞	-220-4C-C			
		□25	13	25	35	KGDF$^{R}_{L}$ -25-4A-C	KGDS$^{R}_{L}$2525-C	150	52.7
			15	35	50	-35-4B-C			54.7
				50	70	-50-4B-C			
				70	100	-70-4B-C			
				100	150	-100-4B-C			
				150	220	-150-4B-C			
				220	∞	-220-4B-C			
			25	35	50	-35-4C-C			64.7
				50	70	-50-4C-C			
				70	100	-70-4C-C			
				100	150	-100-4C-C			
				150	220	-150-4C-C			
				220	∞	-220-4C-C			

Applicable Inserts ➡ G85



·KGDF 90° type is not available as unit (Toolholder + blade). Please purchase toolholder and blade separately.
·Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.
·The insert clamping Screw (BH6X10TR), blade fixing Screw (SB-60120TR) and Wrench (LTW-25) which are included in the toolholder can be used.

Face Grooving Toolholders (90° Separate Type)

Combination of Blade & Toolholder

Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description G95	Toolholder Description G32	Dimension (mm) LF	WF
90°	5	□20	15	25	35	KGDF$^{R}_{L}$ -25-5B-C	KGDS$^{R}_{L}$2020-C	125	54.7
				35	50	-35-5B-C			
				50	75	-50-5B-C			
				75	115	-75-5B-C			
				115	180	-115-5B-C			
				180	235	-180-5B-C			
				235	∞	-235-5B-C			
			20	25	35	-25-5C-C			59.7
			25	35	50	-35-5C-C			64.7
				50	75	-50-5C-C			
				75	115	-75-5C-C			
				115	180	-115-5C-C			
				180	235	-180-5C-C			
				235	∞	-235-5C-C			
			32	75	115	-75-5D-C			71.7
				115	180	-115-5D-C			
				180	235	-180-5D-C			
				235	∞	-235-5D-C			
		□25	15	25	35	KGDF$^{R}_{L}$ -25-5B-C	KGDS$^{R}_{L}$2525-C	150	54.7
				35	50	-35-5B-C			
				50	75	-50-5B-C			
				75	115	-75-5B-C			
				115	180	-115-5B-C			
				180	235	-180-5B-C			
				235	∞	-235-5B-C			
			20	25	35	-25-5C-C			59.7
			25	35	50	-35-5C-C			64.7
				50	75	-50-5C-C			
				75	115	-75-5C-C			
				115	180	-115-5C-C			
				180	235	-180-5C-C			
				235	∞	-235-5C-C			
			32	75	115	-75-5D-C			71.7
				115	180	-115-5D-C			
				180	235	-180-5D-C			
				235	∞	-235-5D-C			

Applicable Inserts G85

Shank Angle	Edge Width CW (mm)	Shank Size (mm)	Max. depth of cut (mm)	External dia. of the groove (mm) DAXN [MIN.]	DAXX [MAX.]	Blade Description G95	Toolholder Description G32	Dimension (mm) LF	WF
90°	6	□20	15	25	35	KGDF$^{R}_{L}$ -25-6B-C	KGDS$^{R}_{L}$2020-C	125	54.7
				35	50	-35-6B-C			
				50	75	-50-6B-C			
				75	115	-75-6B-C			
				115	180	-115-6B-C			
				180	235	-180-6B-C			
				235	∞	-235-6B-C			
			20	25	35	-25-6C-C			59.7
			25	35	50	-35-6C-C			64.7
				50	75	-50-6C-C			
				75	115	-75-6C-C			
				115	180	-115-6C-C			
				180	235	-180-6C-C			
				235	∞	-235-6C-C			
			32	75	115	-75-6D-C			71.7
				115	180	-115-6D-C			
				180	235	-180-6D-C			
				235	∞	-235-6D-C			
		□25	15	25	35	KGDF$^{R}_{L}$ -25-6B-C	KGDS$^{R}_{L}$2525-C	150	54.7
				35	50	-35-6B-C			
				50	75	-50-6B-C			
				75	115	-75-6B-C			
				115	180	-115-6B-C			
				180	235	-180-6B-C			
				235	∞	-235-6B-C			
			20	25	35	-25-6C-C			59.7
			25	35	50	-35-6C-C			64.7
				50	75	-50-6C-C			
				75	115	-75-6C-C			
				115	180	-115-6C-C			
				180	235	-180-6C-C			
				235	∞	-235-6C-C			
			32	75	115	-75-6D-C			71.7
				115	180	-115-6D-C			
				180	235	-180-6D-C			
				235	∞	-235-6D-C			

Applicable Inserts G85

Face Grooving Blade Identification System

Hand of blade	Width	Blade Symbol
R : Right-hand L : Left-hand	2 : 2mm 3 : 3mm 4 : 4mm 5 : 5mm 6 : 6mm	C : Applicable to toolholder with suffix "-C"

KGDF	R	-	25	-	3	A	-	C

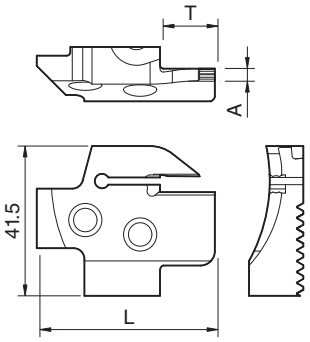
Series	External dia. of the groove (MIN.) : DAXN	Grooving Depth	
KGDF Face Grooving	Indicates the minimum external diameter suitable for the initial face grooving.	A : 6/13mm B : 13/15mm	2-edge insert (1-edge insert can also be used.)
	25 : 25mm ⋮ 235 : 235mm	C : 20mm~25mm D : 32mm	1-edge insert



Example of printing of blade description

Face Grooving Blade

Blade Dimensions

Shape	Blade Description		Stock		Dimension (mm)			External dia. of the groove (mm)		Edge Width (mm)	Applicable Inserts G85	Toolholder Description G32
								DAXN	DAXX			
			R	L	L	T	A	[MIN.]	[MAX.]	CW		
 Right-hand shown	KGDFR	-25-2A-C	●	-	44.35	6	1.5	25	30	2	GDFM 2020N-020GM	KGD$^{L}_{R}$...-C KGDS$^{R}_{L}$...-C
		-30-2A-C	●	-				30	35			
		-35-2A-C	●	-				35	45			
		-45-2A-C	●	-				45	60			
		-60-2A-C	●	-				60	80			
		-80-2A-C	●	-				80	100			
		-100-2A-C	●	-				100	130			
		-25-2B-C	●	-	47.35	13		25	30			
		-30-2B-C	●	-	49.35	15		30	35			
		-35-2B-C	●	-				35	45			
		-45-2B-C	●	-				45	60			
		-60-2B-C	●	-				60	80			
		-80-2B-C	●	-				80	100			
		-100-2B-C	●	-				100	130			
	KGDF$^{R}_{L}$	-25-3A-C	●	●	47.35	13	2	25	30	3	GDFM 3020N-030GM GDFM 3020N-030DM GDFMS 3020N-030DM GDFM3020N-150R-CM	
		-30-3A-C	●	●				30	40			
		-40-3A-C	●	●				40	50			
		-50-3B-C	●	●	49.35	15		50	65			
		-65-3B-C	●	●				65	85			
		-85-3B-C	●	●				85	110			
		-110-3B-C	●	●				110	145			
		-50-3C-C	●	●	56.35	22		50	65			
		-65-3C-C	●	●				65	85			
		-85-3C-C	●	●	59.35	25		85	110			
		-110-3C-C	●	●				110	145			
	KGDF$^{R}_{L}$	-25-4A-C	●	●	47.35	13	3	25	35	4	GDFM 4020N-040GM GDFM 4020N-040GH GDFM 4020N-040DM GDFMS 4020N-040DM GDFM4020N-200R-CM	
		-35-4B-C	●	●	49.35	15		35	50			
		-50-4B-C	●	●				50	70			
		-70-4B-C	●	●				70	100			
		-100-4B-C	●	●				100	150			
		-150-4B-C	●	●				150	220			
		-220-4B-C	●	●				220	∞			
		-35-4C-C	●	●	59.35	25		35	50			
		-50-4C-C	●	●				50	70			
		-70-4C-C	●	●				70	100			
		-100-4C-C	●	●				100	150			
		-150-4C-C	●	●				150	220			
		-220-4C-C	●	●				220	∞			
	KGDF$^{R}_{L}$	-25-5B-C	●	●	49.35	15	4	25	35	5	GDFM 5020N-040GM GDFM 5020N-080GM GDFM 5020N-040GH GDFM 5020N-080GH GDFM 5020N-040DM GDFMS 5020N-040DM GDFM5020N-250R-CM	
		-35-5B-C	●	●				35	50			
		-50-5B-C	●	●				50	75			
		-75-5B-C	●	●				75	115			
		-115-5B-C	●	●				115	180			
		-180-5B-C	●	●				180	235			
		-235-5B-C	●	●				235	∞			
		-25-5C-C	●	●	54.35	20		25	35			
		-35-5C-C	●	●	59.35	25		35	50			
		-50-5C-C	●	●				50	75			
		-75-5C-C	●	●				75	115			
		-115-5C-C	●	●				115	180			
		-180-5C-C	●	●				180	235			
		-235-5C-C	●	●				235	∞			
		-75-5D-C	●	●	66.35	32		75	115			
		-115-5D-C	●	●				115	180			
		-180-5D-C	●	●				180	235			
		-235-5D-C	●	●				235	∞			
	KGDF$^{R}_{L}$	-25-6B-C	●	●	49.35	15	5	25	35	6	GDFM 6020N-040GM GDFM 6020N-080GM GDFM 6020N-040GH GDFM 6020N-080GH GDFM 6020N-040DM GDFMS 6020N-040DM GDFM6020N-300R-CM	
		-35-6B-C	●	●				35	50			
		-50-6B-C	●	●				50	75			
		-75-6B-C	●	●				75	115			
		-115-6B-C	●	●				115	180			
		-180-6B-C	●	●				180	235			
		-235-6B-C	●	●				235	∞			
		-25-6C-C	●	●	54.35	20		25	35			
		-35-6C-C	●	●	59.35	25		35	50			
		-50-6C-C	●	●				50	75			
		-75-6C-C	●	●				75	115			
		-115-6C-C	●	●				115	180			
		-180-6C-C	●	●				180	235			
		-235-6C-C	●	●				235	∞			
		-75-6D-C	●	●	66.35	32		75	115			
		-115-6D-C	●	●				115	180			
		-180-6D-C	●	●				180	235			
		-235-6D-C	●	●				235	∞			

● : Std. Item

Recommended Cutting Conditions

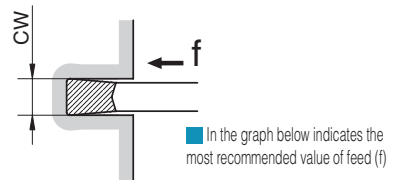
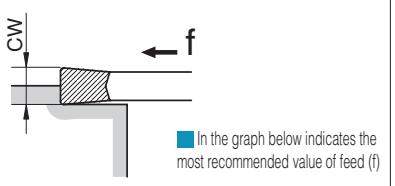
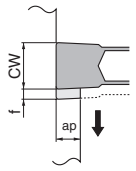
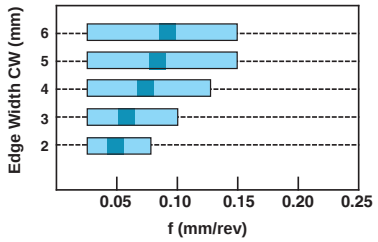
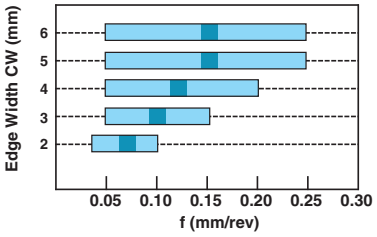
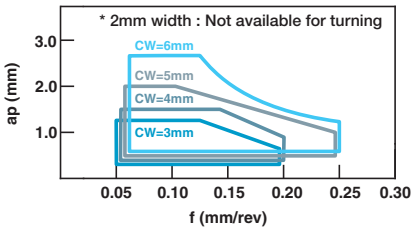
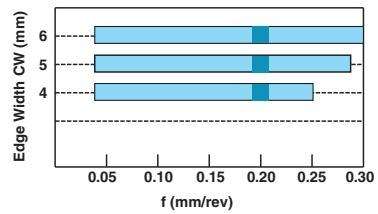
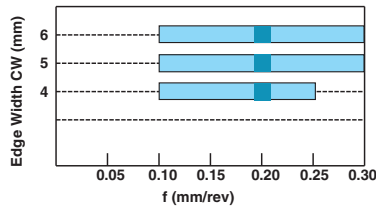
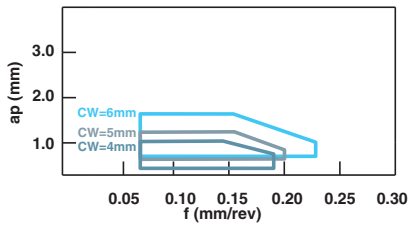
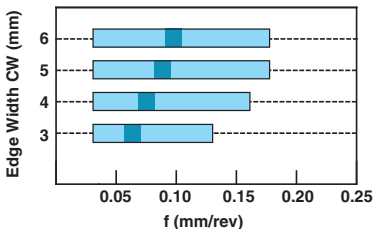
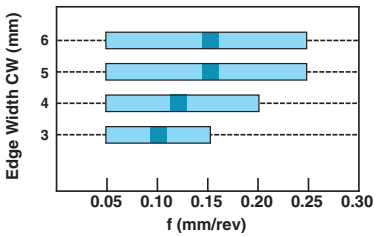
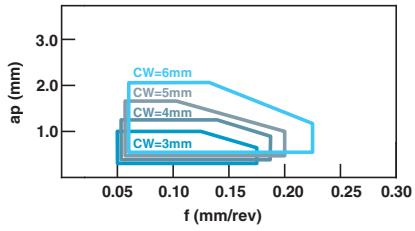
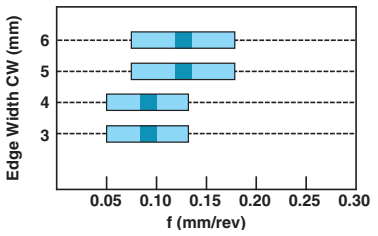
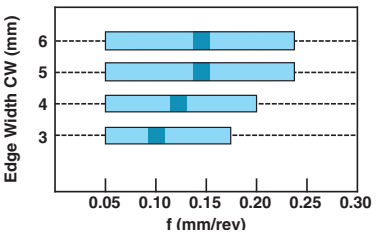
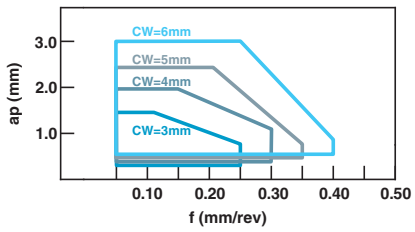
Recommended Cutting Conditions (Vc)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)				Remarks
	Cermet		MEGACOAT		
	TN620	TN90	PR1225	PR1215	
Carbon Steel	☆ 60~200	☆ 80~200	★ 60~160	☆ 80~160	Coolant
Alloy Steel	☆ 60~160	☆ 70~160	★ 60~150	☆ 60~150	
Stainless Steel	-	-	★ 50~120	☆ 50~120	
Cast Iron	-	-	-	★ 80~160	

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (Feed Rate / ap)

[Workpiece Material : S50C]

Chipbreaker	Grooving	Shoulder grooving (Side grooving)	Turning
			
GM (Grooving, Turning)			
GH (Grooving, Turning, High Feed Grooving)			
DM (Deep grooving, Turning)			
CM (Copying)			

● When shoulder grooving
- If ap is set smaller, set feed higher.
- If ap is set larger, set feed lower.

1) The above values are based on the condition that the CDX of toolholder is 15 mm or less.
2) If the toolholder's CDX is over 15 mm, set the values for turning to 90% or less of those above.

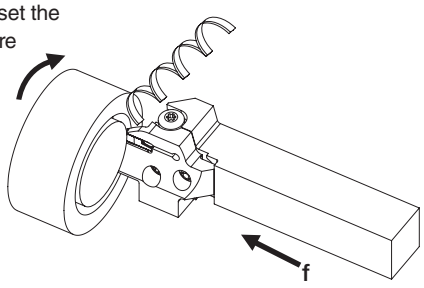
Guide for Face Grooving

1) Toolholder Selection

Check the range of applicable "External dia. of the groove" as well as the groove width and depth.

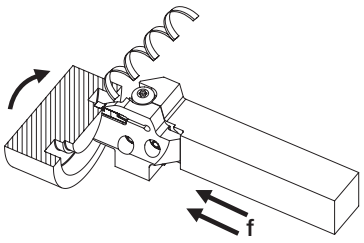
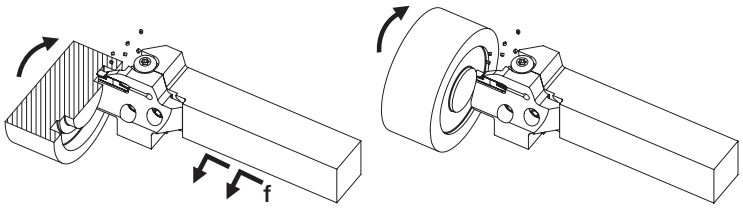
2) Cutting conditions (Feed rate : f)

When machining on steel, set the feed rate (f) so that chips are created in a helical form in cut-off.



3) How to widen the groove (Plunge milling and Turning)

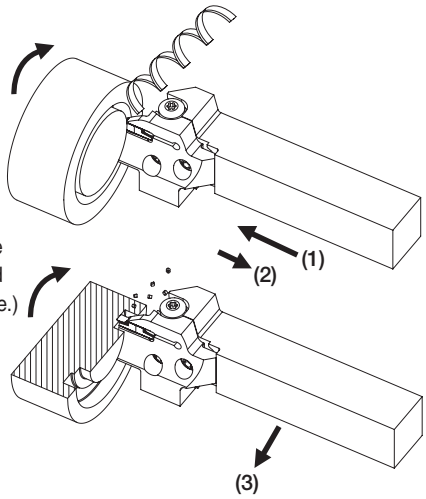
Start machining from the outside and then proceed to the inside. Chip control will be better in this way.

Plunge milling (Grooving + Side grooving)	Turning
	

4) Guide for turning

A. When the cutting amount (ap) is over 0.5 mm

(1) Perform Plunge milling.
(2) Return the cutting by 0.1 mm.
(Failure to pull the tool back before traverse machining will result in an unbalanced load applied on only one side of the cutting edge.)
(3) Perform turning.
(Ref. to Fig. 1)



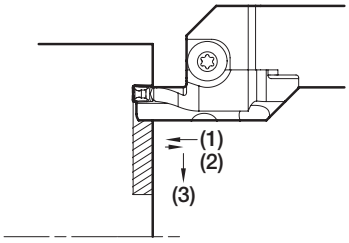


Fig. 1

● When widening the face groove width (Ref. to Fig. 2)
Apply the “Step Turning”.
Then perform finishing.

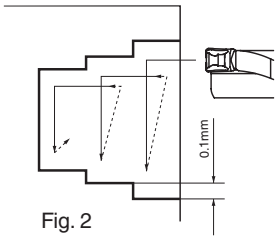
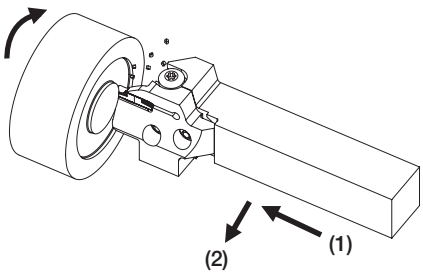


Fig. 2

B. When the cutting amount (ap) is under 0.5 mm

(1) Perform Plunge milling.
(2) Perform turning.
Machining without interruption is possible. (Ref. to Fig. 3)



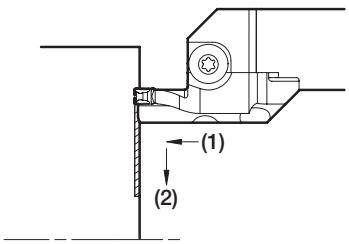
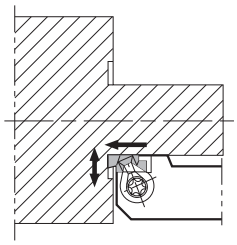
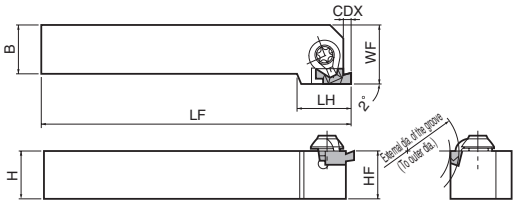


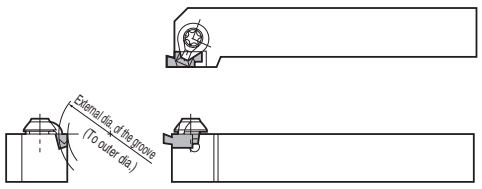
Fig. 3

GFVS-AA





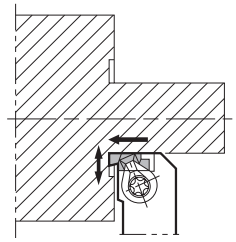
● Right-hand shown

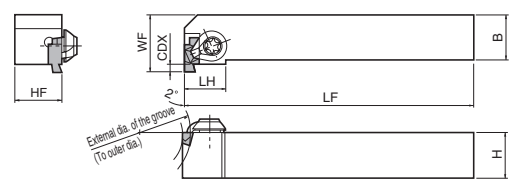


● Left-hand shown

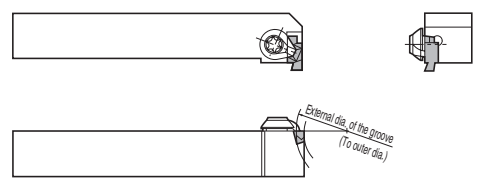
Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

GFVT-AA





● Right-hand shown



● Left-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock		Dimension (mm)							External dia. of the groove		Spare Parts		Applicable Inserts ➔ G99
		R	L	H	HF	B	LF	LH	WF	CDX	DAXN [MIN.]	DAXX [MAX.]	Clamp Set	Wrench	
GFVSR/L	**2020K-08AA**	●	●	20	20	20	125	18	25	2.2	8 (0)	∞ (∞)	CPS-5V	FT-15	GVFL/R100-005AA ~ GVFL/R300-005AA
	2525M-08AA	●	●	25	25	25	150		32						
GFVTR/L	**2020K-08AA**	●	●	20	20	20	125	14	25	2.2	8 (0)	∞ (∞)	CPS-5V	FT-15	GVFL/R100-005AA ~ GVFL/R300-005AA
	2525M-08AA	●	●	25	25	25	150		32						

Note 1. CDX shows available grooving depth.

2. The value ( ) of External dia. of the groove (DAXX) is the maximum outer diameter value after the initial groove between DAXN ~ DAXX. (It is possible to widen the groove to infinity ∞). The value ( ) of External dia. of the groove (DAXN) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between DAXN ~ DAXX.

● : Std. Item

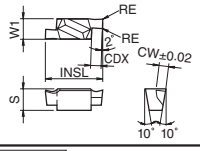
Grooving Inserts

Applicable Inserts

(mm)

Description		W1	INSL	S
GVF$^{R}_{L}$	100-...AA	4.3	12	4.5
	200-...AA			
	300-...AA			

P	Carbon Steel / Alloy Steel	●	○		Classification of usage
M	Stainless Steel	●	○		
K	Cast Iron			◕	◕:Continuous~Light Interruption / 1st Choice
N	Non-ferrous Metals			◕	◔:Continuous~Light Interruption / 2nd Choice
S	Titanium Alloys			◕	●:Continuous / 1st Choice
H	Hard Materials (~40HRC)	●	○		○:Continuous / 2nd Choice
	Hard Materials (40HRC~)				

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) CW	CDX	RE	MEGACOAT PR1225 R	PR1225 L	PVD Coated Carbide PR930 R	PR930 L	Carbide KW10 R	KW10 L	Applicable Toolholders	See Page for Applicable Toolholders
		GVF$^{R}_{L}$ 100-005AA	1.00	2.2	0.05	●	●	●	●	●	●	GFVS$^{L}_{R}$...-08AA GFVT$^{L}_{R}$...-08AA	G98
		200-005AA	2.00			●	●	●	●	●	●		
		300-005AA	3.00			●	●	●	●	●	●		

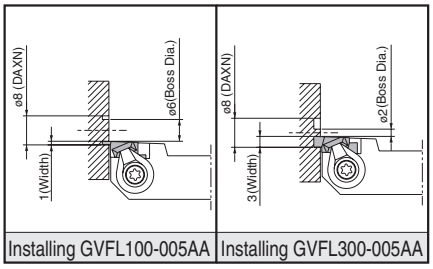
· CDX shows available grooving depth.

· GVF$^{R}_{L}$...005AA inserts are not compatible with GVF$^{R}_{L}$...- ○○○ A(See Page **G105**) inserts because their Side Relief Angle is 10°.

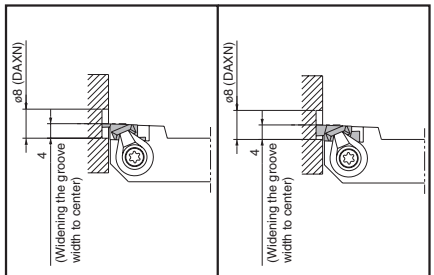
External dia. of the groove of GFVS-AA (apply to GFVT-AA)

Description		External dia. of the groove DAXN [MIN.]	DAXX [MAX.]	Applicable Inserts
GFVS$^{R}_{L}$	2020K-08AA	8	∞	GVF$^{L}_{R}$100-005AA ~ GVF$^{L}_{R}$300-005AA
	2525M-08AA			
GFVT$^{R}_{L}$	2020K-08AA	(0)	(∞)	
	2525M-08AA			

- It is available to infinity ∞ in case of machining the first groove bigger than DAXN.
- When machining towards the outer diameter then there is no MAX. limit to the further groove machining.
- When machining the initial groove on the face at DAXN ø8
  If the initial groove is made smaller than this, the toolholder interferes with the workpiece.
- When widening the groove width to inner diameter.
  For machining up to the center of the workpiece regardless of insert width.



Installing GVFL100-005AA | Installing GVFL300-005AA



Installing GVFL100-005AA | Installing GVFL300-005AA

Recommended Cutting Conditions (GFVS-AA / GFVT-AA)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min) MEGA COAT PR1225	PVD Coated Carbide PR930	Carbide KW10	Grooving f (mm/rev)	Turning* ap (mm)	Turning* f (mm/rev)	Remarks
Carbon Steel / Alloy Steel	★ 50~100	☆ 50~100		0.01~0.05	Max.0.5	0.01~0.05	Coolant
Stainless Steel	★ 50~80	☆ 50~80		0.01~0.03	Max.0.3	0.01~0.02	
Non-ferrous Metals			★ ~200	0.01~0.08	Max.0.5	0.01~0.08	

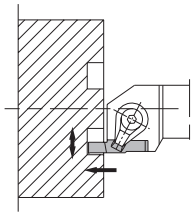
* ap has to be set for less than corner-R(RE) when turning of edge width 1.0 mm (GVF$^{R}_{L}$100-005AA). ★ : 1st Recommendation ☆ : 2nd Recommendation

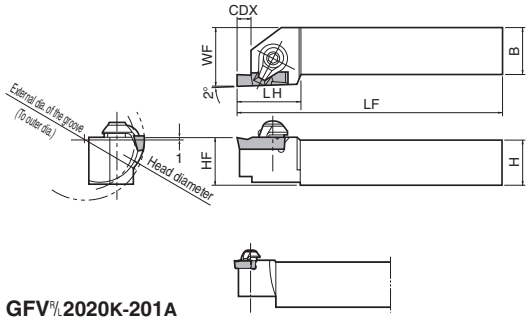
● : Std. Item

Inserts are sold in 10 piece boxes

Face Grooving Toolholders [GVF Insert]

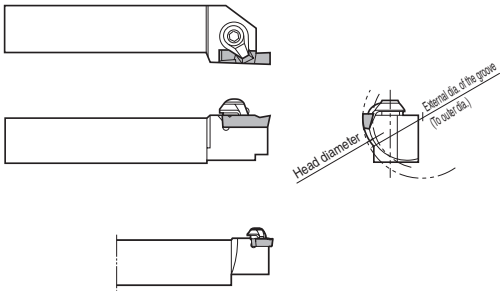
GFV





GFV$^{R}_{L}$2020K-201A
GFV$^{R}_{L}$2525M-201A
shows right figure

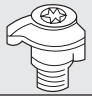
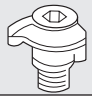
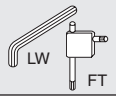
●Right-hand shown



●Left-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

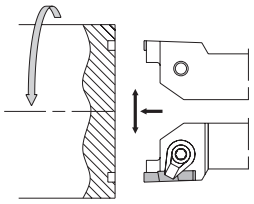
Toolholder Dimensions

Description		Stock		Dimension (mm)							External dia. of the groove		Spare Parts			Applicable Inserts ➔ G105
													Clamp Set		Wrench	
		R	L	H	HF	B	LF	LH	WF	CDX	DAXN [MIN.]	DAXX [MAX.]				
GFV$^{R}_{L}$	2020K-201A	●	●	20	21	20	125	20	25	2.2	20 (12)	∞	CPS-5V	-	FT-15	GVF$^{R}_{L}$200~340-020A GVF$^{R}_{L}$200-…~300-…AR
	2525M-201A	●	●	25	26	25	150	23	32							
GFV$^{R}_{L}$	2020K-351B	●	●	20	21	20	125	28	25	4.6	35 (25)	50 (∞)	-	CPS-6V	LW-3	GVF$^{R}_{L}$250~350-020B
	2525M-351B	●	●	25	26	25	150	30	32							GVF$^{R}_{L}$300-150BR
	2020K-352B	●	●	20	21	20	125	28	25	5.1						GVF$^{R}_{L}$400~490-020B
	2525M-352B	●	●	25	26	25	150	30	32							GVF$^{R}_{L}$400-200BR
	2020K-501B	●	●	20	21	20	125	28	25	4.6	50 (25)	70 (∞)				GVF$^{R}_{L}$250~350-020B
	2525M-501B	●	●	25	26	25	150	30	32							GVF$^{R}_{L}$300-150BR
	2020K-502B	●	●	20	21	20	125	28	25	5.1						GVF$^{R}_{L}$400~490-020B
	2525M-502B	●	●	25	26	25	150	30	32							GVF$^{R}_{L}$400-200BR
	2020K-701B	●	●	20	21	20	125	28	25	4.6	70 (25)	100 (∞)				GVF$^{R}_{L}$250~350-020B
	2525M-701B	●	●	25	26	25	150	30	32							GVF$^{R}_{L}$300-150BR
	2020K-702B	●	●	20	21	20	125	28	25	5.1						GVF$^{R}_{L}$400~490-020B
	2525M-702B	●	●	25	26	25	150	30	32							GVF$^{R}_{L}$400-200BR
GFV$^{R}_{L}$	2525M-501C	●	●	25	26	25	150	35	32	6.6	50 (25)	70 (∞)	-	CPS-8V	LW-4	GVF$^{R}_{L}$350~450-040C
	2525M-502C	●	●							8.1						GVF$^{R}_{L}$500~600-040C
	2525M-701C	●	●							6.6	70 (25)	100 (∞)				GVF$^{R}_{L}$350~450-040C
	2525M-702C	●	●							8.1						GVF$^{R}_{L}$500~600-040C
	2525M-1001C	●	●							6.6	100 (25)	150 (∞)				GVF$^{R}_{L}$350~450-040C
	2525M-1002C	●	●							8.1						GVF$^{R}_{L}$500~600-040C
	2525M-1501C	●	●							6.6	150 (25)	250 (∞)				GVF$^{R}_{L}$350~450-040C
	2525M-1502C	●	●							8.1						GVF$^{R}_{L}$500~600-040C

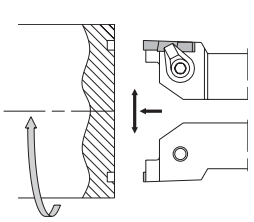
Note 1. CDX shows available grooving depth.
2. The value ( ) of External dia. of the groove (DAXX) is the maximum outer diameter value after the initial groove between DAXN ~ DAXX. (It is possible to widen the groove to infinity ∞).
The value ( ) of External dia. of the groove (DAXN) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between DAXN ~ DAXX.
3. Standard toolholders are designed with the edge position 1.0mm above the center. When using non-standard toolholders, set the edge position 1.0mm above the center.

Selection of Toolholder & Insert

Toolholder	Right-hand
Insert	Right-hand



Toolholder	Left-hand
Insert	Left-hand



● : Std. Item

External dia. of the groove of GFV

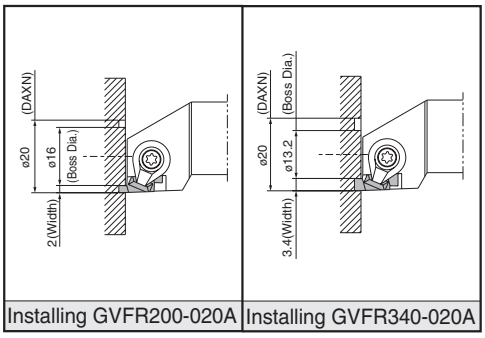
(1) e.g.) GFV$^{R}/_{L}$...-201A

Description		External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Applicable Inserts
GFV$^{R}/_{L}$	2020K-201A	20	∞	GVF$^{R}/_{L}$200~340-020A
	2525M-201A	(12)	(∞)	GVF$^{R}/_{L}$200-…~300-…AR

- It is available to infinity ∞ in case of machining the first groove bigger than DAXN.
- When machining towards the outer diameter then there is no MAX. limit to the further groove machining.

- When machining the initial groove on the face at DAXN ø20

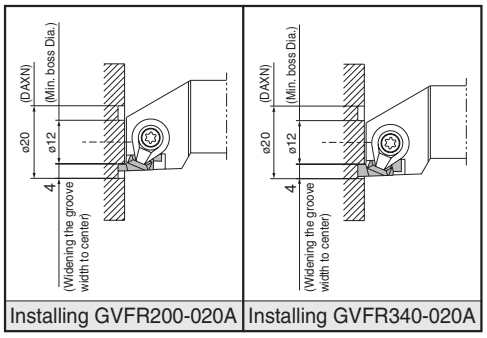
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.Boss Dia. depends on insert width.



Installing GVFR200-020A | Installing GVFR340-020A

- When widening the groove width to inner diameter.

Face groove diameter DAXN (12) is the limit; the toolholder interferes with the workpiece in case of smaller than ø12.The toolholder interferes with the workpiece when closer to the center.



Installing GVFR200-020A | Installing GVFR340-020A

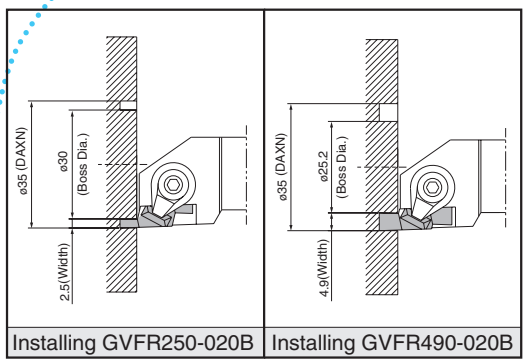
(2) e.g.) GFV$^{R}/_{L}$...-351B/352B (same as GFV$^{R}/_{L}$...-○○○B or GFV$^{R}/_{L}$...-○○○C)

Description		External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Applicable Inserts
GFV$^{R}/_{L}$	2020K-351B	35	50	GVF$^{R}/_{L}$250~350-020B
	2525M-351B			GVF$^{R}/_{L}$300-150BR
	2020K-352B	(25)	(∞)	GVF$^{R}/_{L}$400~490-020B
	2525M-352B			GVF$^{R}/_{L}$400-200BR

- It is possible to widen the groove to infinity ∞ when machining the initial groove within DAXN ~ DAXX and then widening to outer diameter.

- When machining the initial groove on the face at DAXN ø35

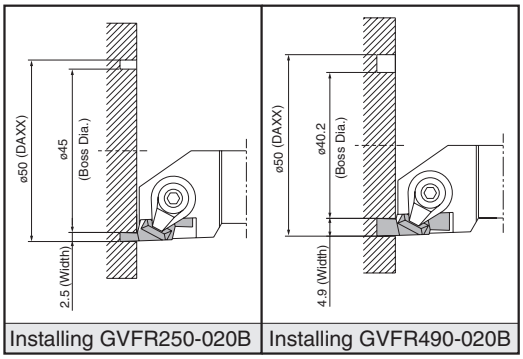
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.Boss Dia. depends on insert width.



Installing GVFR250-020B | Installing GVFR490-020B

- When machining the initial groove on the face at DAXX ø50.

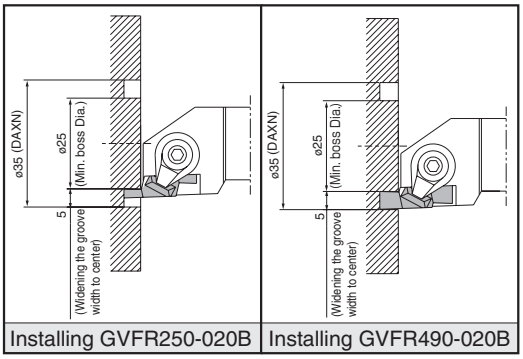
If the initial groove is made larger than this, the toolholder interferes with the workpiece.Boss Dia. depends on insert width.



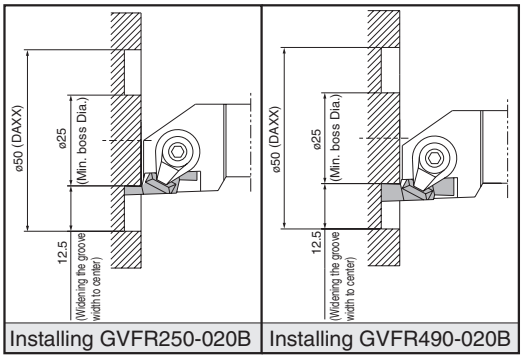
Installing GVFR250-020B | Installing GVFR490-020B

- When widening the groove width to inner diameter.

ø25 Boss Dia. is the limitation regardless of insert width,
even widening the groove width to the center from the initial groove at DAXN (ø35) or DAXX (ø50).
The toolholder interferes with the workpiece when closer to the center.



Installing GVFR250-020B | Installing GVFR490-020B

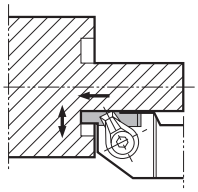


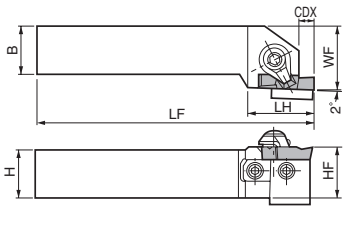
Installing GVFR250-020B | Installing GVFR490-020B

Face Grooving Toolholders [GVF Insert]

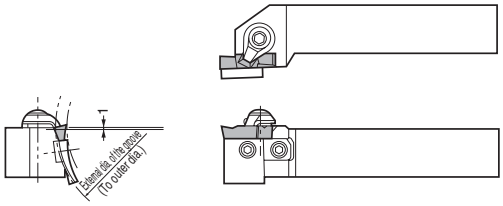
GFVS

This toolholder can machine various face grooving diameters by replacing the blade.





●Right-hand shown

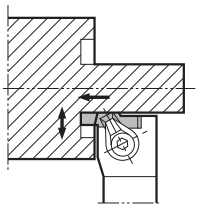


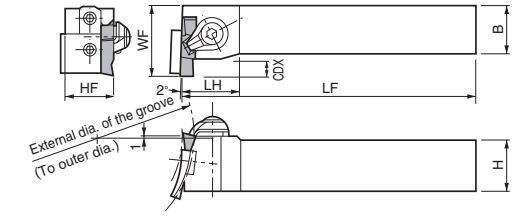
●Left-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

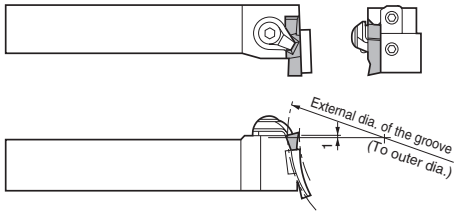
GFVT

This toolholder can machine various face grooving diameters by replacing the blade.





●Right-hand shown

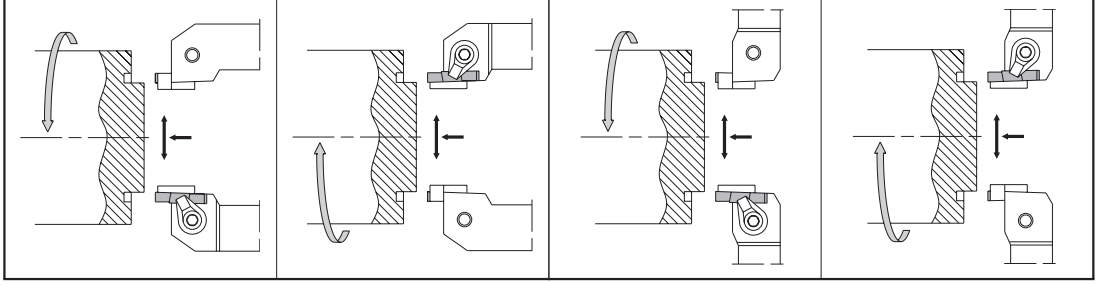


●Left-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

◆ Selection of Toolholder & Insert

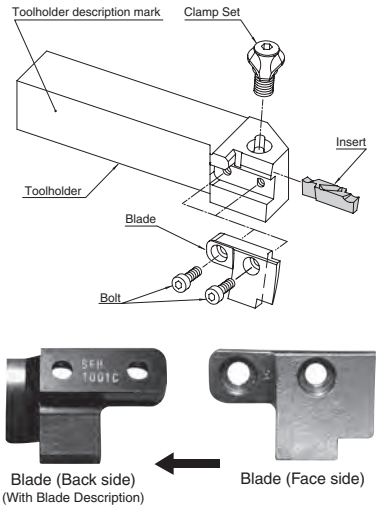
GFVS		GFVT	
Toolholder: Right-hand / Insert: Left-hand	Toolholder: Left-hand / Insert: Right-hand	Toolholder: Right-hand / Insert: Left-hand	Toolholder: Left-hand / Insert: Right-hand



● Combination of Base-Holder & Blade

Toolholder Description (Stamped below)	Stock R	Stock L	Blade Description	Toolholder Description (Unit Description)
GFVS$^{R}_{L}$2020K-HB GFVT$^{R}_{L}$2020K-HB	●	●	SF$^{R}_{L}$ -351B	GFVS$^{R}_{L}$2020K -351B GFVT$^{R}_{L}$2020K -352B
			-352B	-501B
			-501B	-502B
			-502B	-701B
			-701B	-702B
			-702B	
GFVS$^{R}_{L}$2525M-HB GFVT$^{R}_{L}$2525M-HB	●	●	SF$^{R}_{L}$ -351B	GFVS$^{R}_{L}$2525M -351B GFVT$^{R}_{L}$2525M -352B
			-352B	-501B
			-501B	-502B
			-502B	-701B
			-701B	-702B
			-702B	
GFVS$^{R}_{L}$2525M-HC GFVT$^{R}_{L}$2525M-HC	●	●	SF$^{R}_{L}$ -501C	GFVS$^{R}_{L}$2525M -501C GFVT$^{R}_{L}$2525M -502C
			-502C	-701C
			-701C	-702C
			-702C	-1001C
			-1001C	-1002C
			-1002C	-1501C
			-1501C	-1502C
			-1502C	

Example of installation (GFVS)



How to refer to the face grooving toolholder and blade

Q : Though "GFVSR2525M-HC" is marked on the face grooving toolholder, the size of cutting dia. is unknown.
How could it be found out?

A : Take off the blade.
Description of the blade is listed on the back of the blade.
Using the description, check the description of the toolholder in the catalog.
If "SFR-1001C" is integrated to "GFVSR2525M-HC", the description of the toolholder is "GVFSR2525M-1001C".

· Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.
· Installation of GFVT is also pursuing example of installation of GFVS.

● : Std. Item

Toolholder Dimensions

Description	Stock R	Stock L	H	HF	B	LF	LH	WF	CDX	External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Spare Parts: Clamp Set	Spare Parts: Wrench	Spare Parts: Blade	Spare Parts: Bolt	Applicable Inserts (G105)
GFVS$^{R}_{L}$ 2020K-351B	●	●	20	21	20	125	30	25	5.1	35 (25)	50 (∞)	CPS-6V	LW-3	SF$^{R}_{L}$-351B	HH4X12	GVF$^{L}_{R}$250~350-020B
2525M-351B	●	●	25	26	25	150	32	32	(4.6)							GVF$^{L}_{R}$300-150BR
2020K-352B	●	●	20	21	20	125	30	25	5.1					SF$^{R}_{L}$-352B		GVF$^{L}_{R}$400~490-020B
2525M-352B	●	●	25	26	25	150	32	32	(5.1)							GVF$^{L}_{R}$400-200BR
2020K-501B	●	●	20	21	20	125	30	25	5.1	50 (25)	70 (∞)			SF$^{R}_{L}$-501B		GVF$^{L}_{R}$250~350-020B
2525M-501B	●	●	25	26	25	150	32	32	(4.6)							GVF$^{L}_{R}$300-150BR
2020K-502B	●	●	20	21	20	125	30	25	5.1					SF$^{R}_{L}$-502B		GVF$^{L}_{R}$400~490-020B
2525M-502B	●	●	25	26	25	150	32	32	(5.1)							GVF$^{L}_{R}$400-200BR
2020K-701B	●	●	20	21	20	125	30	25	5.1	70 (25)	100 (∞)			SF$^{R}_{L}$-701B		GVF$^{L}_{R}$250~350-020B
2525M-701B	●	●	25	26	25	150	32	32	(4.6)							GVF$^{L}_{R}$300-150BR
2020K-702B	●	●	20	21	20	125	30	25	5.1					SF$^{R}_{L}$-702B		GVF$^{L}_{R}$400~490-020B
2525M-702B	●	●	25	26	25	150	32	32	(5.1)							GVF$^{L}_{R}$400-200BR
GFVS$^{R}_{L}$ 2525M-501C	●	●	25	26	25	150	32	32	8.1(*5.1)	50 (25)	70 (∞)	CPS-8V	LW-4	SF$^{R}_{L}$-501C	HH4X12	GVF$^{L}_{R}$350~450-040C
2525M-502C	●	●							8.1(8.1)					SF$^{R}_{L}$-502C		GVF$^{L}_{R}$500~600-040C
2525M-701C	●	●							8.1(*5.1)	70 (25)	100 (∞)			SF$^{R}_{L}$-701C		GVF$^{L}_{R}$350~450-040C
2525M-702C	●	●							8.1(8.1)					SF$^{R}_{L}$-702C		GVF$^{L}_{R}$500~600-040C
2525M-1001C	●	●							8.1(*5.1)	100 (25)	150 (∞)			SF$^{R}_{L}$-1001C		GVF$^{L}_{R}$350~450-040C
2525M-1002C	●	●							8.1(8.1)					SF$^{R}_{L}$-1002C		GVF$^{L}_{R}$500~600-040C
2525M-1501C	●	●							8.1(*5.1)	150 (25)	250 (∞)			SF$^{R}_{L}$-1501C		GVF$^{L}_{R}$350~450-040C
2525M-1502C	●	●							8.1(8.1)					SF$^{R}_{L}$-1502C		GVF$^{L}_{R}$500~600-040C
GFVT$^{R}_{L}$ 2020K-351B	●	●	20	21	20	125	22	30	5.1	35 (25)	50 (∞)	CPS-6V	LW-3	SF$^{R}_{L}$-351B	HH4X12	GVF$^{L}_{R}$250~350-020B
2525M-351B	●	●	25	26	25	150	25	35	(4.6)							GVF$^{L}_{R}$300-150BR
2020K-352B	●	●	20	21	20	125	22	30	5.1					SF$^{R}_{L}$-352B		GVF$^{L}_{R}$400~490-020B
2525M-352B	●	●	25	26	25	150	25	35	(5.1)							GVF$^{L}_{R}$400-200BR
2020K-501B	●	●	20	21	20	125	22	30	5.1	50 (25)	70 (∞)			SF$^{R}_{L}$-501B		GVF$^{L}_{R}$250~350-020B
2525M-501B	●	●	25	26	25	150	25	35	(4.6)							GVF$^{L}_{R}$300-150BR
2020K-502B	●	●	20	21	20	125	22	30	5.1					SF$^{R}_{L}$-502B		GVF$^{L}_{R}$400~490-020B
2525M-502B	●	●	25	26	25	150	25	35	(5.1)							GVF$^{L}_{R}$400-200BR
2020K-701B	●	●	20	21	20	125	22	30	5.1	70 (25)	100 (∞)			SF$^{R}_{L}$-701B		GVF$^{L}_{R}$250~350-020B
2525M-701B	●	●	25	26	25	150	25	35	(4.6)							GVF$^{L}_{R}$300-150BR
2020K-702B	●	●	20	21	20	125	22	30	5.1					SF$^{R}_{L}$-702B		GVF$^{L}_{R}$400~490-020B
2525M-702B	●	●	25	26	25	150	25	35	(5.1)							GVF$^{L}_{R}$400-200BR
GFVT$^{R}_{L}$ 2525M-501C	●	●	25	26	25	150	27	38	8.1(*5.1)	50 (25)	70 (∞)	CPS-8V	LW-4	SF$^{R}_{L}$-501C	HH4X12	GVF$^{L}_{R}$350~450-040C
2525M-502C	●	●							8.1(8.1)					SF$^{R}_{L}$-502C		GVF$^{L}_{R}$500~600-040C
2525M-701C	●	●							8.1(*5.1)	70 (25)	100 (∞)			SF$^{R}_{L}$-701C		GVF$^{L}_{R}$350~450-040C
2525M-702C	●	●							8.1(8.1)					SF$^{R}_{L}$-702C		GVF$^{L}_{R}$500~600-040C
2525M-1001C	●	●							8.1(*5.1)	100 (25)	150 (∞)			SF$^{R}_{L}$-1001C		GVF$^{L}_{R}$350~450-040C
2525M-1002C	●	●							8.1(8.1)					SF$^{R}_{L}$-1002C		GVF$^{L}_{R}$500~600-040C
2525M-1501C	●	●							8.1(*5.1)	150 (25)	250 (∞)			SF$^{R}_{L}$-1501C		GVF$^{L}_{R}$350~450-040C
2525M-1502C	●	●							8.1(8.1)					SF$^{R}_{L}$-1502C		GVF$^{L}_{R}$500~600-040C

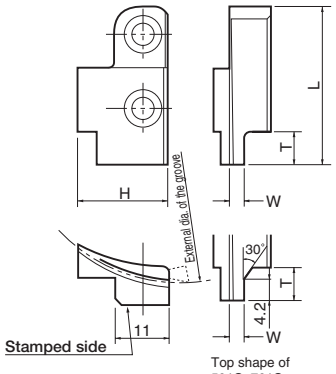
Note 1. CDX shows the distance from the toolholder to the cutting edge. The grooving depth is the mentioned in ( ).

2. The value ( ) of External dia. of the groove (DAXX) is the maximum outer diameter value after the initial groove between DAXN ~ DAXX. (It is possible to widen the groove to infinity ∞).
   The value ( ) of External dia. of the groove (DAXN) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between DAXN ~ DAXX.
3. Standard toolholders are designed with the edge position 1.0mm above the center.
   When using non-standard toolholders, set the edge position 1.0mm above the center.
4. GFVS and GFVT are composed of a base-holder and a blade.
   If the blade should be damaged, replace it with a new blade as listed in the left table.
   (e.g.) GFVSR2020K-HB + SFR-351B = GFVSR2020K-351B
   (e.g.) GFVTR2020K-HB + SFR-351B = GFVTR2020K-351B
   *GVF$^{L}_{R}$400~450-040C: CDX is 6.6

● : Std. Item

Face Grooving Toolholders

Blade Dimensions

Shape	Description	Stock R	Stock L	Dimension (mm) L	H	T	W	External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Applicable Inserts	Applicable Toolholders
	SF$^{R/L}$ -351B	●	●	30.5	11	4.7	2.0	35	50	GVF$^{L/R}$250~350-020B GVF$^{L/R}$300-150BR	GFV(S/T)$^{R/L}$○○○○□-○○○B (Toolholder Stamp GFV(S/T)$^{R/L}$○○○○□-HB)
	-352B	●	●				3.4			GVF$^{L/R}$400~490-020B GVF$^{L/R}$400-200BR	
	SF$^{R/L}$ -501B	●	●		15		2.0	50	70	GVF$^{L/R}$250~350-020B GVF$^{L/R}$300-150BR	
	-502B	●	●				3.4			GVF$^{L/R}$400~490-020B GVF$^{L/R}$400-200BR	
	SF$^{R/L}$ -701B	●	●		17		2.0	70	100	GVF$^{L/R}$250~350-020B GVF$^{L/R}$300-150BR	
	-702B	●	●				3.4			GVF$^{L/R}$400~490-020B GVF$^{L/R}$400-200BR	
	SF$^{R/L}$ -501C	●	●	35	15	7.5	2.8	50	70	GVF$^{L/R}$350~450-040C	GFV(S/T)$^{R/L}$○○○○□-○○○C (Toolholder Stamp GFV(S/T)$^{R/L}$○○○○□-HC)
	-502C	●	●				4.3			GVF$^{L/R}$500~600-040C	
	SF$^{R/L}$ -701C	●	●		20		2.8	70	100	GVF$^{L/R}$350~450-040C	
	-702C	●	●				4.3			GVF$^{L/R}$500~600-040C	
	SF$^{R/L}$ -1001C	●	●		23		2.8	100	150	GVF$^{L/R}$350~450-040C	
●Right-hand shown	-1002C	●	●				4.3			GVF$^{L/R}$500~600-040C	
・Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.	SF$^{R/L}$ -1501C	●	●		23		2.8	150	250	GVF$^{L/R}$350~450-040C	
	-1502C	●	●				4.3			GVF$^{L/R}$500~600-040C	

External dia. of the groove of GFVS / GFVT

e.g.) GFVS$^{R/L}$...-351B/352B

(same as GFVS$^{R/L}$...-○○○B, ...-○○○C ➡G103

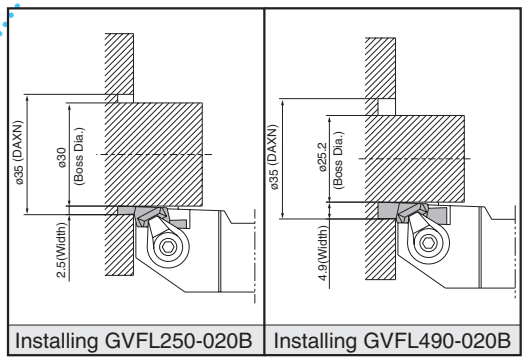
GFVT$^{R/L}$...-○○○B, ...-○○○C ➡G103)

Description		External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Applicable Inserts
GFVS$^{R/L}$	2020K-351B	35 (25)	50 (∞)	GVF$^{L/R}$250~350-020B GVF$^{L/R}$300-150BR
	2525M-351B			
	2020K-352B			GVF$^{L/R}$400~490-020B GVF$^{L/R}$400-200BR
	2525M-352B			

●It is possible to widen the groove to infinity ∞ when machining the initial groove within DAXN ~ DAXX and then widening to outer diameter.

●When machining the initial groove on the face at DAXN ø35

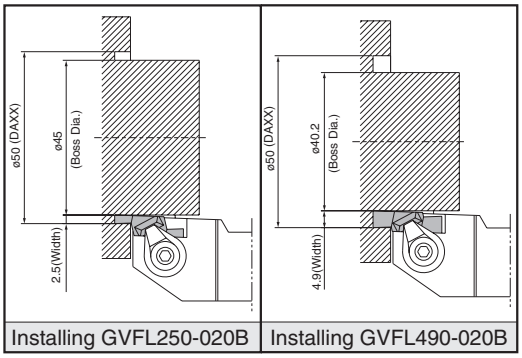
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.Boss Dia. depends on insert width.



Installing GVFL250-020B | Installing GVFL490-020B

●When machining the initial groove on the face at DAXX ø50

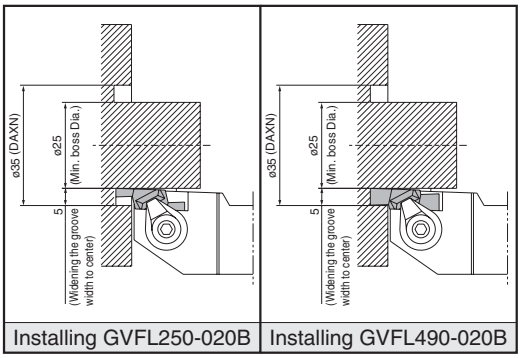
If the initial groove is made larger than this, the toolholder interferes with the workpiece.Boss Dia. depends on insert width.



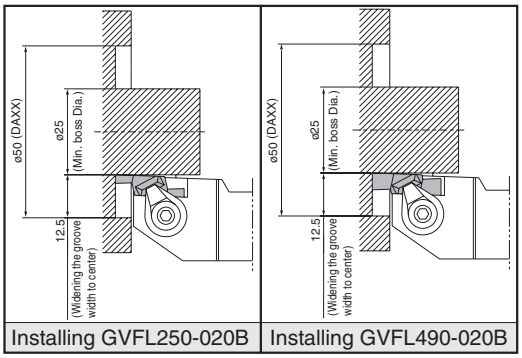
Installing GVFL250-020B | Installing GVFL490-020B

●When widening the groove width to inner diameter

ø25 Boss Dia. is the limitation regardless of insert width, even widening the groove width to the center from the initial groove at DAXN (ø35) or DAXX (ø50). The toolholder interferes with the workpiece when closer to the center.



Installing GVFL250-020B | Installing GVFL490-020B



Installing GVFL250-020B | Installing GVFL490-020B

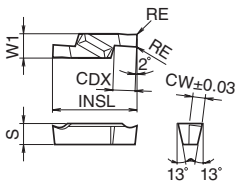
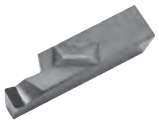
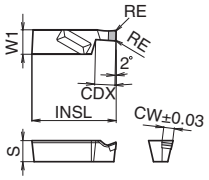
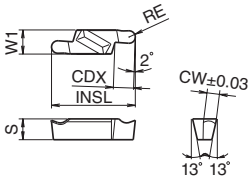
●: Std. Item

Applicable Inserts

(mm)

Description	W1	INSL	S
GVF$^{R}_{L}$ ...- ○○○ **A**	4.3	12	4.5
...- ○○○ **B**	5.8	20	5.0
...- ○○○ **C**	7.0	27	7.0
...- ○○○ **AR**	4.3	12	4.5
...- ○○○ **BR**	5.8	20	5.0

		Classification of usage
P	Carbon Steel / Alloy Steel	●:Continuous~Light Interruption / 1st Choice
M	Stainless Steel	◔:Continuous~Light Interruption / 2nd Choice
K	Cast Iron	●:Continuous / 1st Choice
N	Non-ferrous Metals	○:Continuous / 2nd Choice
S	Titanium Alloys	
H	Hard Materials (~40HRC)	
	Hard Materials (40HRC~)	

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) CW	CDX	RE	Cermet TN90 R	TN90 L	TC40N R	TC40N L	TC60M R	TC60M L	MEGA COAT PR1225 R	PR1225 L	PVD Coated Carbide PR930 R	PR930 L	Carbide KW10 R	KW10 L	PCD KPD010 R	KPD010 L	Applicable Toolholders	See Page for Applicable Toolholders
 	GVF$^{R}_{L}$	200-020A	2.00	2.3	0.2	▲	▲	●	●	●		●	●	●	●	●	●			GFV$^{R}_{L}$ ...-201A GIFV$^{R}_{L}$ ...-201A	G100 G110
		230-020A	2.30					●				●	●	●		●	●				
		250-020A	2.50					●	●	●		●	●	●	●	●	●				
		270-020A	2.70									●	●	●	●	●	●				
		290-020A	2.90					●	●			●	●	●	●	●	●				
		340-020A	3.40					●				●	●	●	●	●	●				
	GVF$^{R}_{L}$	250-020B	2.50	4.8	0.2	▲	▲	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ ...- ○○ 1B GFVS$^{L}_{R}$ ...- ○○ 1B GFVT$^{L}_{R}$ ...- ○○ 1B GIFV$^{R}_{L}$ ...- ○○ 1B	G100 G103 G110
		300-020B	3.00			▲	▲	●	●	●	●	●	●	●	●	●	●				
		350-020B	3.50			▲	▲	●	●	●	●	●	●	●	●	●	●				
		400-020B	4.00	5.3		▲	▲	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ ...- ○○ 2B GFVS$^{L}_{R}$ ...- ○○ 2B GFVT$^{L}_{R}$ ...- ○○ 2B GIFV$^{R}_{L}$ ...- ○○ 2B	
		430-020B	4.30					●	●	●	●	●	●	●	●	●	●				
		460-020B	4.60					●	●			●	●	●	●	●	●				
		490-020B	4.90					●	●	●	●	●	●	●	●	●	●				
	GVF$^{R}_{L}$	350-040C	3.50	6.8	0.4	▲	▲	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ ...- ○○ 1C GFVS$^{L}_{R}$ ...- ○○ 1C GFVT$^{L}_{R}$ ...- ○○ 1C GIFV$^{R}_{L}$ ...- ○○ 1C	
		400-040C	4.00			▲	▲	●	●	●	●	●	●	●	●	●	●				
		450-040C	4.50					●	●	●	●	●	●	●	●	●	●				
		500-040C	5.00	8.3		▲	▲	●	●	●	●	●	●	●	●	●	●			GFV$^{R}_{L}$ ...- ○○ 2C GFVS$^{L}_{R}$ ...- ○○ 2C GFVT$^{L}_{R}$ ...- ○○ 2C GIFV$^{R}_{L}$ ...- ○○ 2C	
		550-040C	5.50							●	●	●	●	●	●	●	●				
		600-040C	6.00					●	●			●	●	●	●	●	●				
  1-edge	GVF$^{R}_{L}$	250-020B	2.50	4.8	0.2													●	●	GFV$^{R}_{L}$ ...- ○○ 1B GFVS$^{L}_{R}$ ...- ○○ 1B GFVT$^{L}_{R}$ ...- ○○ 1B GIFV$^{R}_{L}$ ...- ○○ 1B	G100 G103 G110
		300-020B	3.00															●	●		
		400-020B	4.00	5.3														MTO	MTO	GFV$^{R}_{L}$ ...- ○○ 2B GFVS$^{L}_{R}$ ...- ○○ 2B GFVT$^{L}_{R}$ ...- ○○ 2B GIFV$^{R}_{L}$ ...- ○○ 2B	
	GVFR	350-040C	3.50	6.8	0.4													MTO		GFVR ...- ○○ 1C GFVSL ...- ○○ 1C GFVTL ...- ○○ 1C GIFVR ...- ○○ 1C	
  Full-R	GVF$^{R}_{L}$	200-100AR	2.00	2.3	1.00							●	●	●	●	●	●			GFV$^{R}_{L}$ ...-201A GIFV$^{R}_{L}$ ...-201A	G100 G110
		250-125AR	2.50		1.25							●	●	●		●	●				
		300-150AR	3.00		1.50							●	●	●	●	●	●				
	GVF$^{R}_{L}$	300-150BR	3.00	4.8	1.50							●	●	●	●	●	●			GFV$^{R}_{L}$ ...- ○○ 1B GFVS$^{L}_{R}$ ...- ○○ 1B GFVT$^{L}_{R}$ ...- ○○ 1B GIFV$^{R}_{L}$ ...- ○○ 1B	G100 G103 G110
		400-200BR	4.00	5.3	2.00							●	●	●	●	●	●			GFV$^{R}_{L}$ ...- ○○ 2B GFVS$^{L}_{R}$ ...- ○○ 2B GFVT$^{L}_{R}$ ...- ○○ 2B GIFV$^{R}_{L}$ ...- ○○ 2B	

· CDX shows available grooving depth.

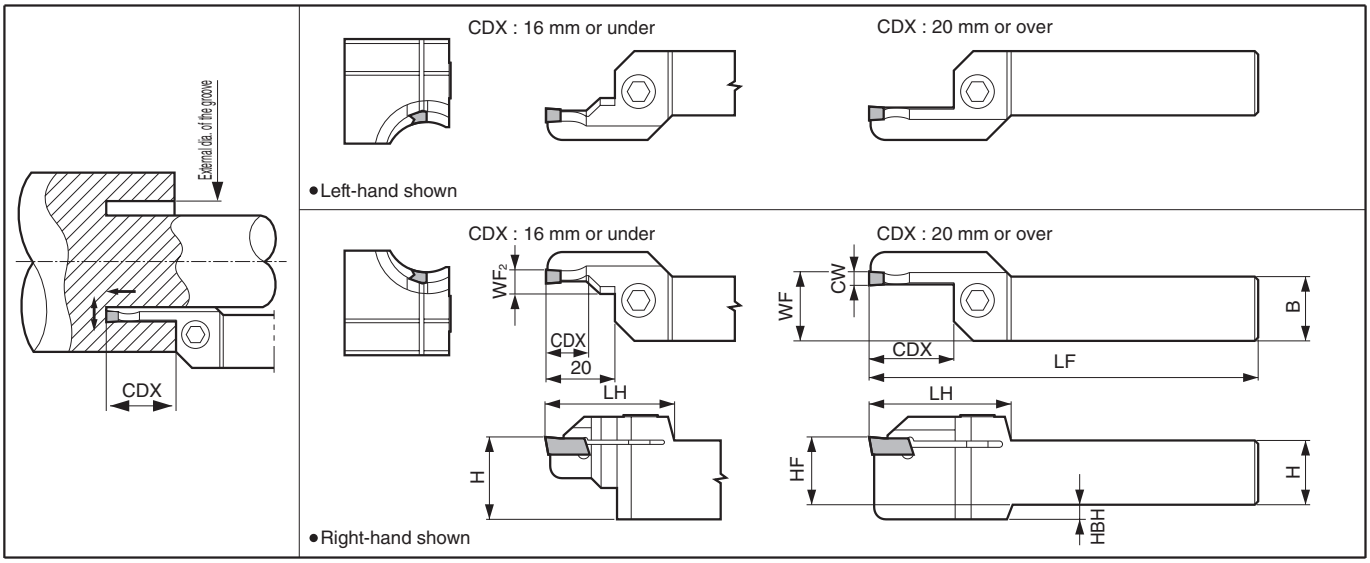
Recommended Cutting Conditions ➔ G116

● : Std. Item
▲ : To be replaced by a new product
MTO : Made to order

Inserts are sold in 10 piece boxes

CBN & PCD Inserts are sold in 1 piece boxes

KFMS (Will be switched to KGDF G84~G91)



Toolholder Dimensions

Description		Stock		Dimension (mm)									Edge Width (mm)	External dia. of the groove		Spare Parts			
		R	L	H	HF	HBH	B	LF	LH	WF	WF_2	CDX	CW	DAXN [MIN.]	DAXX [MAX.]	Clamp Bolt	Wrench		
KFMS R/L	2020K2530-3	●		20	20	-	20	125	39	20.7	6.1	13	3	25	30	HH5X20	LW-4		
	2020K3040-3	●												30	40				
	2020K4050-3	●												40	50				
	2020K5065-3	●							41		-	22		50	65				
	2020K6585-3	●												65	85				
	2020K85110-3	●				5			44			25		85	110				
	2020K110145-3	●												110	145				
	2525M2530-3	●	●	25	25	-	25	150	39	25.7	6.1	13		25	30	HH5X25	LW-4		
	2525M3040-3	●	●											30	40				
	2525M4050-3	●	●											40	50				
	2525M5065-3	●	●						41		-	22		50	65				
	2525M6585-3	●	●											65	85				
	2525M85110-3	●	●						44			25		85	110				
	2525M110145-3	●	●											110	145				
KFMS R/L	2020K2535-4	●		20	20	-	20	125	39	20.7	7.1	12	4	25	35	HH5X20	LW-4		
	2020K3550-4	●										20		35	50				
	2020K5070-4	●							44		-	25		50	70				
	2020K70100-4	●				5								70	100				
	2020K100150-4	●												100	150				
	2020K150220-4	●												150	220				
	2020K220800-4	●												220	∞				
	2525M2535-4	●	●	25	25	-	25	150	39	25.7	7.1	12		25	35	HH5X25	LW-4		
	2525M3550-4	●	●									20		35	50				
	2525M5070-4	●	●						44		-	25		50	70				
	2525M70100-4	●	●											70	100				
	2525M100150-4	●	●											100	150				
	2525M150220-4	●	●											150	220				
	2525M220800-4	●	●											220	∞				

● : Std. Item

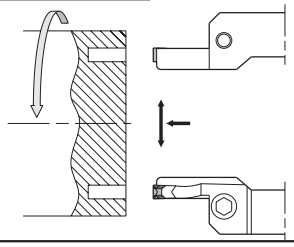
Toolholder Dimensions

Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	WF_2	CDX	Edge Width (mm) CW	External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Spare Parts: Clamp Bolt	Spare Parts: Wrench
KFMS$^{R}_{L}$	2020K2535-5	●		20	20	-	20	125	39	20.7 (21.2)	-	20	5 (6)	25	35	HH5X20	LW-4
	2020K3550-5	●												35	50		
	2020K5075-5	●												50	75		
	2020K75115-5	●				5			44			25		75	115		
	2020K115180-5	●												115	180		
	2020K180235-5	●												180	235		
	2020K235800-5	●												235	∞		
	2525M2535-5	●	●	25	25	-	25	150	39	25.7 (26.2)	-	20		25	35	HH5X25	LW-4
	2525M3550-5	●	●											35	50		
	2525M5075-5	●	●						44			25		50	75		
	2525M75115-5	●	●											75	115		
	2525M115180-5	●	●						51			32		115	180		
	2525M180235-5	●	●											180	235		
	2525M235800-5	●	●											235	∞		

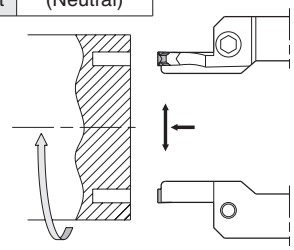
· CDX shows available grooving depth.
· External dia. of the groove : The diameter range of the initial groove.
· For KFMS$^{R}_{L}$...-5 toolholder can hold a 6mm width insert. ( ) value shows the dimension of a 6mm width insert.

Selection of Toolholder & Insert

Toolholder	Right-hand
Insert	(Neutral)



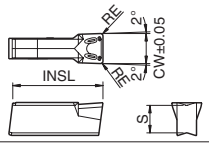
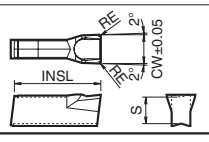
Toolholder	Left-hand
Insert	(Neutral)



Applicable Inserts (mm)

Description	INSL	S
FMM30-03 ~ FMM60-04	12	3.5
FMN3 ~ FMN6	12	3.5

		Classification of usage
P	Carbon Steel / Alloy Steel	●:Continuous~Light Interruption / 1st Choice ◔:Continuous~Light Interruption / 2nd Choice ●:Continuous / 1st Choice ○:Continuous / 2nd Choice
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metals	
S	Titanium Alloys	
H	Hard Materials (~40HRC)	
	Hard Materials (40HRC~)	

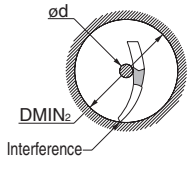
Insert		Description		Dimension (mm) CW	Dimension (mm) RE	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	PVD Coated Carbide PR905	Carbide KW10	Applicable Toolholders
 Face Grooving Chip Control Oriented / M Class		FMM	30-03	3.0	0.3	●	●	●	●	●	●	KFMS$^{R}_{L}$... 3
			40-04	4.0	0.4	●	●	●	●	●	●	KFMS$^{R}_{L}$... 4
			50-04	5.0		●	●	●	●	●	●	KFMS$^{R}_{L}$... 5
			60-04	6.0		●	●		●	●	●	
 Face Grooving Sharp-Cutting Oriented / M Class		FMN	3	3.0	0.25	●	●		●		●	KFMS$^{R}_{L}$... 3
			4	4.0		●	●		●		●	KFMS$^{R}_{L}$... 4
			5	5.0		●	●		●		●	KFMS$^{R}_{L}$... 5
			6	6.0			●		●		●	

· FMN inserts are only for Deep Grooving and not applicable for Turning.

Recommended Cutting Conditions G114

Limit of Turning toward Center

Turning towards the Center causes the toolholder to interfere with the groove wall depending on the initial cut's diameter.



Remaining Boss Dia. ød

Description \ $DMIN_2$	25	26	27	28 and over
	ød (mm)			
KFMS$^{R}_{L}$ 2020K2530-3 / KFMS$^{R}_{L}$ 2525M2530-3	4	2	0	0
KFMS$^{R}_{L}$ 2020K2535-4 / KFMS$^{R}_{L}$ 2525M2535-4	6	3	0	(No remaining Boss)
KFMS$^{R}_{L}$ 2020K2535-5 / KFMS$^{R}_{L}$ 2525M2535-5	7 *(5)	4 *(2)	1 *(0)	

e.g.)
KFMSR 2525M2530-3 with ø25 as first cut towards the center, it will cause a rubbing with the toolholder cartridge if ød is 4.0mm.

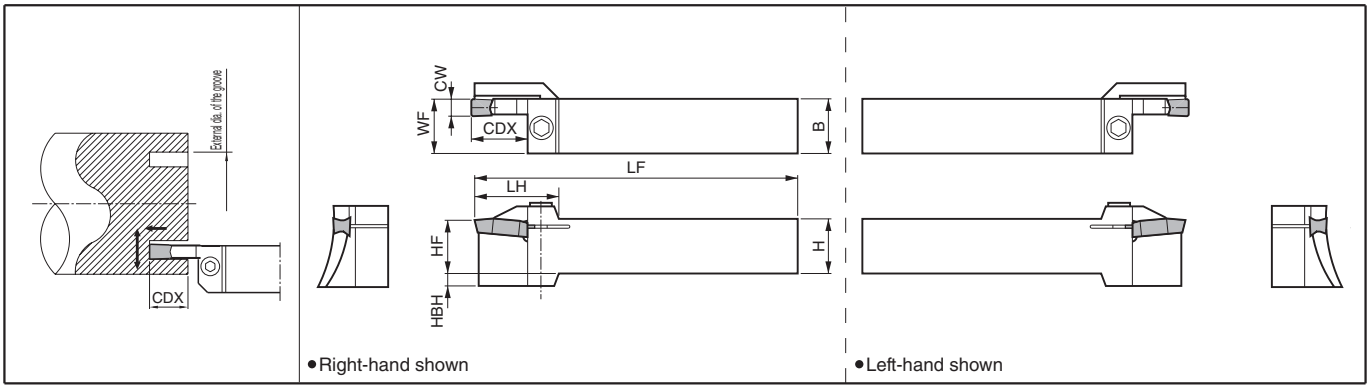
*( ) value shows the Dimension using FMM60-04 Insert.

● : Std. Item

Inserts are sold in 10 piece boxes

Face Grooving Toolholders

KFMS-8



Toolholder Dimensions

Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	CDX	CW	Edge Width (mm)	External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	Spare Parts: Clamp Bolt	Spare Parts: Wrench
KFMS$^{R/L}$	2525M5464-8	●	●	25	25	-	25	150	41	26	25	8		54 (0)	64 (∞)	HH6X25	LW-5
	2525M6382-8	●	●			2.4								63 (0)	82 (∞)		
	2525M80115-8	●	●			6			40					80 (0)	115 (∞)		
	2525M105160-8	●	●											105 (0)	160 (∞)		
	2525M155510-8	●	●	25	25	6	25	150	43	26	25	8		155 (0)	510 (∞)		
	3232P155510-8	●		32	32	-	32	170		33							

· CDX shows available grooving depth.

· The value ( ) of External dia. of the groove (DAXX) is the maximum outer diameter value after the initial groove between DAXN ~ DAXX. (It is possible to widen the groove to infinity ∞).
The value ( ) of External dia. of the groove (DAXN) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between DAXN ~ DAXX.

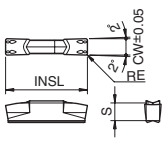
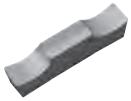
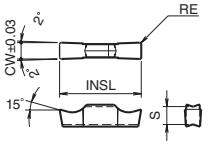
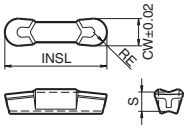
Applicable Inserts

(mm)

Description	INSL	S
GMM 8030-080MW	30	5.5
GMG 8030-050MG		
GMGA 8030-400R		

		Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide
		TN90	CR9025	PR915	PR930	PR905	KW10
P	Carbon Steel / Alloy Steel			◔	●		
M	Stainless Steel			●	◔		
K	Cast Iron					●	◔
N	Non-ferrous Metals						●
S	Titanium Alloys						●
H	Hard Materials (~40HRC)			○	●		
	Hard Materials (40HRC~)						

Classification of usage
●:Continuous~Light Interruption / 1st Choice
◔:Continuous~Light Interruption / 2nd Choice
●:Continuous / 1st Choice
○:Continuous / 2nd Choice

Insert		Description	Dimension (mm) CW	Dimension (mm) RE	TN90	CR9025	PR915	PR930	PR905	KW10	Applicable Toolholders
 Chip Control Oriented / M Class		GMM 8030-080MW	8.0	0.8		▲	▲	▲	▲	▲	KFMS$^{R/L}$ ...8
 Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG 8030-050MG	8.0	0.5	▲	▲		▲	▲	▲	
 Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMGA 8030-400R	8.0	4.0						▲	

· If using a full-R insert with KFMS-8 toolholder, you need to modify the corner of insert adapter of toolholder.

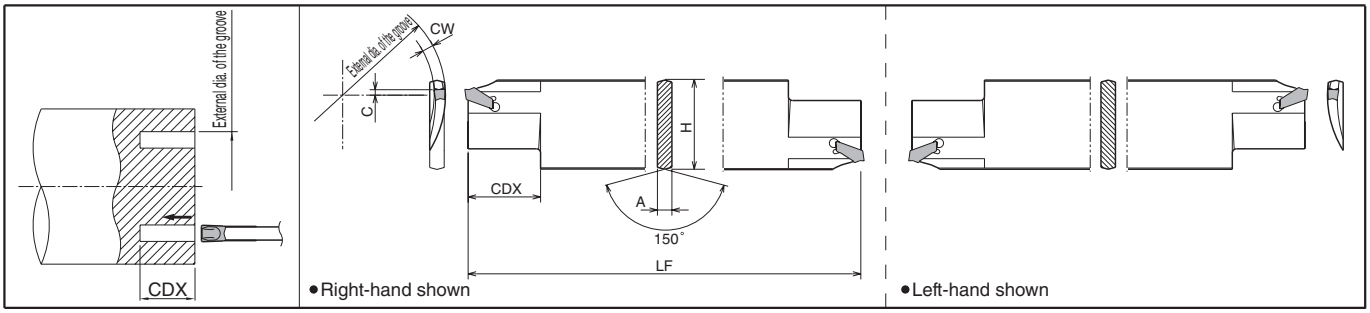
Recommended Cutting Conditions ➡ G117

Inserts are sold in 10 piece boxes

● : Std. Item
▲ : To be replaced by a new product

Face Grooving Blade

KFTB-S



Blade Dimensions

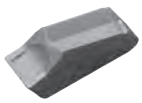
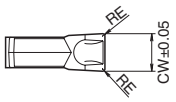
Description		Stock R	Stock L	Dimension (mm) *H	LF	A	CDX	C			Edge Width (mm) CW	External dia. of the groove DAXN [MIN.]	DAXX [MAX.]	Spare Parts Releasing Wrench	Applicable Inserts	Applicable Blocks ⇒H40
KFTB R/L	65100-4S	●	●	32	150	5.2	25	4			4.0	65	100	LTK-5	FTK4	KTKTB20-32
	90150-4S	●	●				30	0				90	150			25-32
	150250-4S	●	●									140	250			32-32
	250800-4S	●	●			3.2						230	∞			
KFTB R/L	90150-5S	●	●	32	150	5.2	30	0			5.0	90	150		FTK5	KTKTBF25-32
	150250-5S	●	●				32					150	250			32-32
	250800-5S	●	●			4.0	38					250	∞			

· CDX shows available grooving depth.
· External dia. of the groove : The diameter range of the initial groove.
· The insert has Self-Clamping system and it is not suitable for tight tolerance grooves (tolerance±0.05mm).
· Lightly tap an Insert with a Plastic hammer. (End of insert does not touch toolholder.)
· KFTB R/L 65100-4S toolholder is designed with the edge position 4mm above the Center.
* Dimension H shows virtual apex distance.

Applicable Inserts

P	Carbon Steel / Alloy Steel			◕		
M	Stainless Steel			◕		
K	Cast Iron					◕
N	Non-ferrous Metals					◕
S	Titanium Alloys					◕
H	Hard Materials (~40HRC)			○		
	Hard Materials (40HRC~)					

Classification of usage
◕:Continuous~Light Interruption / 1st Choice
◴:Continuous~Light Interruption / 2nd Choice
●:Continuous / 1st Choice
○:Continuous / 2nd Choice

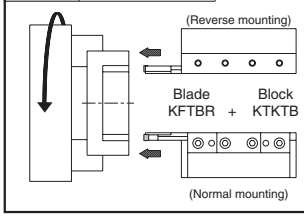
Insert		Description		Dimension (mm) CW	RE	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR930		Carbide KW10	Applicable Toolholders
		FTK	4	4.0	0.25	▲	●	●		●	KFTB R/L 65100-4S, 90150-4S, 150250-4S, 250800-4S
			5	5.0		▲	●	●		●	KFTB R/L 90150-5S, 150250-5S, 250800-5S

Recommended Cutting Conditions ⇒G116

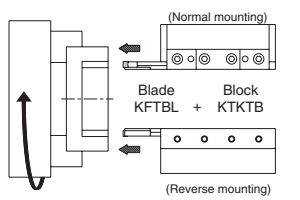
Selection of Blade and Insert

Combination of Blade + KTKTB

Blade	Right-hand
Insert	Neutral

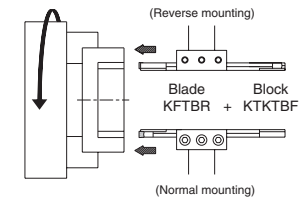


Blade	Left-hand
Insert	Neutral

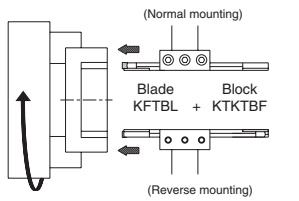


Combination of Blade + KTKTBF

Blade	Right-hand
Insert	Neutral

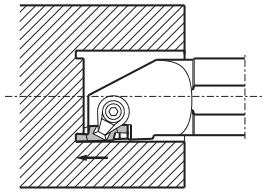


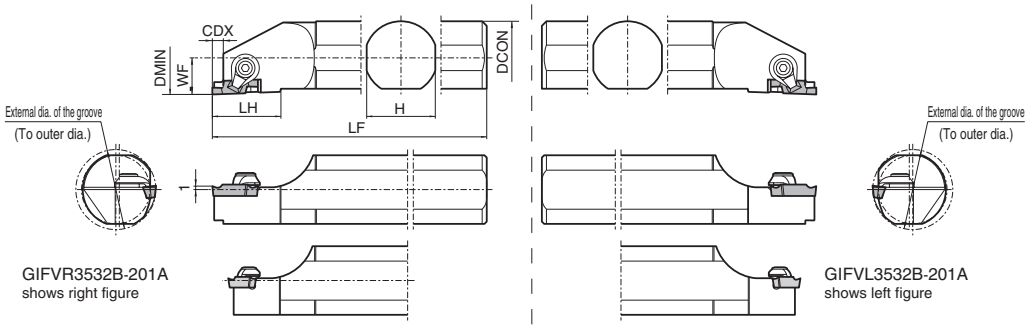
Blade	Left-hand
Insert	Neutral



● : Std. Item
▲ : To be replaced by a new product

GIFV





GIFVR3532B-201A shows right figure

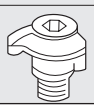
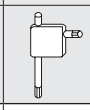
●Right-hand shown

GIFVL3532B-201A shows left figure

●Left-hand shown

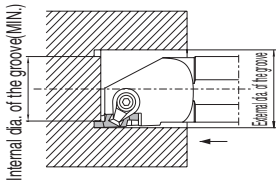
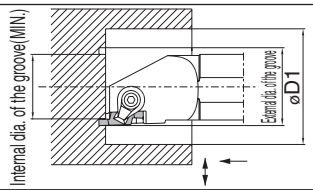
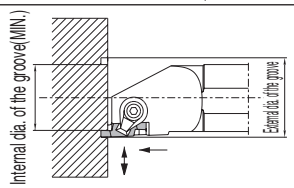
Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock		Dimension (mm)							External dia. of the groove		Spare Parts				Applicable Inserts ➔ G105
													Clamp Set		Wrench		
		R	L	DMIN	DCON	H	LF	LH	WF	CDX	DAXN [MIN.]	DAXX [MAX.]					
GIFV$^{R}_{L}$	3532B-201A	●	●	35	32	30	250	23	16	2.2	35 (12)	∞	CPS-5V	-	FT-15	-	GVF$^{R}_{L}$...-...A GVF$^{R}_{L}$...-...AR
GIFV$^{R}_{L}$	3532B-351B	●	●	35				30		4.6	35 (25)	50 (∞)	-	CPS-6V	-	LW-3	GVF$^{R}_{L}$250~350-020B GVF$^{R}_{L}$300-150BR
	3532B-352B	●	●							5.1	35 (25)	50 (∞)					GVF$^{R}_{L}$400~490-020B GVF$^{R}_{L}$400-200BR
	5032B-501B	●	●	50						4.6	50 (25)	70 (∞)					GVF$^{R}_{L}$250~350-020B GVF$^{R}_{L}$300-150BR
	5032B-502B	●								5.1	50 (25)	70 (∞)					GVF$^{R}_{L}$400~490-020B GVF$^{R}_{L}$400-200BR
GIFV$^{R}_{L}$	5032B-501C	●	●	50				35		6.6	50 (25)	70 (∞)		CPS-8V		LW-4	GVF$^{R}_{L}$350~450-040C
	5032B-502C	●	●							8.1	50 (25)	70 (∞)					GVF$^{R}_{L}$500~600-040C

Note 1. CDX shows available grooving depth.
2. Standard toolholders are designed with the edge position 1.0mm above the center.

External dia. of the groove depends on the application.

Applications	Description		Internal dia. of the groove (MIN.)	External dia. of the groove DAXN [MIN.]	External dia. of the groove DAXX [MAX.]	External dia. of the groove (MAX.)	Remarks
	GIFV$^{R}_{L}$	3532B-201A	-	35	∞	∞	-
	GIFV$^{R}_{L}$	3532B-351B			50		
		3532B-352B		50	70		
		5032B-501B					
		5032B-502B					
	GIFV$^{R}_{L}$	5032B-501C					
		5032B-502C					
	GIFV$^{R}_{L}$	3532B-201A	12	35	∞	∞	If øD1 ≥ 58-2CW, the Face Grooving Dia. can be expanded to Internal dia. of the groove (MIN.) toward the Center. CW = Edge Width If øD1 ≥ 75-2CW, the Face Grooving Dia. can be expanded to Internal dia. of the groove (MIN.) toward the Center. CW = Edge Width
	GIFV$^{R}_{L}$	3532B-351B	25		50		
		3532B-352B		50	70		
		5032B-501B					
		5032B-502B					
	GIFV$^{R}_{L}$	5032B-501C					
		5032B-502C					
	GIFV$^{R}_{L}$	3532B-201A	12	35	∞	∞	-
	GIFV$^{R}_{L}$	3532B-351B	25		50		
		3532B-352B		50	70		
		5032B-501B					
		5032B-502B					
	GIFV$^{R}_{L}$	5032B-501C					
		5032B-502C					

· The value ( ) of External dia. of the groove (MAX.) is the maximum outer diameter value after the initial groove between DAXN ~ DAXX (It is possible to widen the groove to infinity ∞).
· The value ( ) of Internal dia. of the groove (MIN.) is the minimum diameter of the boss which remains in the center when widening the groove width to a smaller value after the initial groove between DAXN ~ DAXX.

● : Std. Item

Recommended Cutting Conditions

◆ GBA inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)												(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	MC	Cermet			MEGA	MEGA NANO	PVD Coated Carbide			Carbide	CBN	PCD						
	PV7040	TN620	TC40N	TN90	PR1215	PR1625	PR930	PR1115	PR905	KW10	KBN510 KBN525	KPD001 (KPD010)	GBA○○R/L 033~120-...	GBA○○R/L 125~225-...	GBA○○R/L 230~325-...	GBA○○R/L 330~350-...	GBA○○R/L 400~480-...	
Carbon Steel	☆ 150~240	★ 80~220	☆ 150~220	☆ 150~220	★ 80~200	★ 80~180	☆ 80~180	☆ 80~180	-	-	-	-	(1) 0.03~0.08 (2) Not recom. (3) Not recom.	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	☆ 130~220	★ 80~200	☆ 130~200	☆ 130~200	★ 80~180	★ 80~160	☆ 80~160	☆ 80~160	-	-	-	-	(1) 0.03~0.07 (2) Not recom. (3) Not recom.	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	-	-	-	☆ 70~150	☆ 60~150	★ 60~130	☆ 60~130	☆ 60~130	-	-	-	-	(1) 0.03~0.07 (2) Not recom. (3) Not recom.	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Cast Iron	-	-	-	-	-	-	-	-	★ 80~180	☆ 60~120	★ 150~400	-	(1) 0.03~0.08 (2) Not recom. (3) Not recom.	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	
Aluminum Alloys	-	-	-	-	-	-	-	-	-	★ 150~400	-	★ 150~2,000	(1) 0.05~0.12 (2) Not recom. (3) Not recom.	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	
Brass	-	-	-	-	-	-	-	-	-	★ 150~300	-	★ 200~800	(1) 0.05~0.12 (2) Not recom. (3) Not recom.	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	
Hard Materials	-	-	-	-	-	-	-	-	-	-	★ 80~120	-	-	(1) 0.02~0.05 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.01~0.04 (3) Max. 0.1	-	-	

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

MC indicates MEGACOAT Cermet.

MEGA indicates MEGACOAT, and MEGANANO indicates MEGACOAT NANO.

◆ GBA inserts (GM Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)			(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet	MEGACOAT NANO	MEGACOAT	GBA43R/L 140-010GM	GBA43R/L 150-020GM	GBA43R/L 175-020GM~ 230-020GM	GBA43R/L 250-030GM~ 350-030GM	GBA43R/L 400-040GM	
	TN620	PR1625	PR1215						
Carbon Steel	★ 80~240	★ 80~220	☆ 80~220	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.2	(1) 0.03~0.12 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.12 (2) 0.03~0.09 (3) Max. 0.3	(1) 0.04~0.15 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	★ 80~220	★ 80~200	☆ 80~200	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.2	(1) 0.03~0.12 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.12 (2) 0.03~0.09 (3) Max. 0.3	(1) 0.04~0.15 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	-	★ 60~150	☆ 60~150	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.2	(1) 0.03~0.1 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.1 (2) 0.03~0.09 (3) Max. 0.3	(1) 0.04~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.04~0.12 (2) 0.05~0.1 (3) Max. 0.8	

* Above cutting condition is for external grooving. Set both cutting speed and feed 20% lower for internal grooving.

★ : 1St Recommendation ☆ : 2nd Recommendation

◆ GBA inserts (MY Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet		MEGA	PVD Coated Carbide		Carbide	CBN	PCD						
	TN6020	TC40N	PR1215	PR930	PR1115	KW10	KBN510	KPD001 (KPD010)	GBA43R/L 175-020MY~ 200-020MY	GBA43R/L 230-020MY~ 265-030MY	GBA43R/L 300-030MY	GBA43R/L 330-030MY~ 350-030MY	GBA43R/L 400-040MY	
Carbon Steel	☆ 150~220	-	★ 80~200	☆ 80~200	☆ 80~200	-	-	-	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	☆ 130~200	-	★ 80~180	☆ 80~180	☆ 80~180	-	-	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	☆ 70~150	-	☆ 60~150	☆ 60~150	★ 60~150	-	-	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

MEGA indicates MEGACOAT.

Recommended Cutting Conditions

GBF inserts

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)			(1) f for Grooving (mm/rev) / (2) f for Turning (mm) / (3) ap for Turning (mm)				Remarks
	MEGACOAT	MEGACOAT NANO	Carbide					
	PR1215	PR1535	GW15	GBF32R/L025 - 053	GBF32R/L065 - 095	GBF32R/L100 - 145	GBF32R/L150 - 300	
Carbon Steel	★ 80 ~ 180	☆ 70 ~ 160	-	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.2	Coolant
Alloy Steel	★ 80 ~ 180	☆ 70 ~ 160	-	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) MAX. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) MAX. 0.2	
Stainless Steel	☆ 60 ~ 130	★ 50 ~ 120	-	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) MAX. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) MAX. 0.2	
Cast Iron	-	-	★ 60 ~ 100	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.2	
Aluminum Alloys	-	-	★ 150 ~ 400	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.2	
Brass	-	-	★ 150 ~ 300	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) MAX. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) MAX. 0.2	

★ : 1st Recommendation ☆ : 2nd Recommendation

GBF-000F inserts (RE=0.00)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)			(1) f for Grooving (mm/rev) / (2) f for Turning (mm) / (3) ap for Turning (mm)				Remarks
	MEGACOAT	MEGACOAT NANO	Carbide					
	PR1215	PR1535	GW15	GBF32R/L 025 ~ 053 - 000F	GBF32R/L 065 ~ 095 - 000F	GBF32R/L 100 ~ 145 - 000F	GBF32R/L 150 ~ 200 - 000F	
Carbon Steel	★ 80 ~ 180	☆ 70 ~ 160	-	(1) 0.005~0.03 (2) Not recom. (3) Not recom.	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	Coolant
Alloy Steel	★ 80 ~ 180	☆ 70 ~ 160	-	(1) 0.005~0.025 (2) Not recom. (3) Not recom.	(1) 0.01~0.03 (2) Not recom. (3) Not recom.	(1) 0.01~0.04 (2) 0.01~0.03 (3) MAX. 0.2	(1) 0.01~0.04 (2) 0.01~0.03 (3) MAX. 0.2	
Stainless Steel	☆ 60 ~ 130	★ 50 ~ 120	-	(1) 0.005~0.02 (2) Not recom. (3) Not recom.	(1) 0.01~0.025 (2) Not recom. (3) Not recom.	(1) 0.01~0.03 (2) 0.01~0.025 (3) MAX. 0.2	(1) 0.01~0.03 (2) 0.01~0.025 (3) MAX. 0.2	
Cast Iron	-	-	★ 60 ~ 100	(1) 0.005~0.03 (2) Not recom. (3) Not recom.	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	
Aluminum Alloys	-	-	★ 150 ~ 400	(1) 0.005~0.03 (2) Not recom. (3) Not recom.	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	
Brass	-	-	★ 150 ~ 300	(1) 0.01~0.03 (2) Not recom. (3) Not recom.	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	(1) 0.01~0.05 (2) 0.01~0.04 (3) MAX. 0.2	

★ : 1st Recommendation ☆ : 2nd Recommendation

GBF-GL inserts

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)		(1) f for Grooving (mm/rev) / (2) f for Turning (mm) / (3) ap for Turning (mm)				Remarks
	MEGACOAT	MEGACOAT NANO					
	PR1215	PR1535	GBF32R075 - 005GL	GBF32R095 - 100-005GL	GBF32R150 - 200-010GL	GBF32R300 - 010GL	
Carbon Steel	★ 80 ~ 180	☆ 70 ~ 160	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) MAX. 0.3	(1) 0.04~0.1 (2) 0.04~0.08 (3) MAX. 0.5	Coolant
Alloy Steel	★ 80 ~ 180	☆ 70 ~ 160	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.03~0.06 (3) MAX. 0.2	(1) 0.03~0.07 (2) 0.03~0.06 (3) MAX. 0.3	(1) 0.04~0.09 (2) 0.04~0.08 (3) MAX. 0.5	
Stainless Steel	☆ 60 ~ 130	★ 50 ~ 120	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.03~0.06 (3) MAX. 0.2	(1) 0.03~0.07 (2) 0.03~0.06 (3) MAX. 0.3	(1) 0.04~0.09 (2) 0.04~0.08 (3) MAX. 0.5	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ TGF inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)							(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)				Remarks
	Cermet	MEGA	PVD Coated Carbide		Carbide	CBN	PCD					
	TC40N	PR1215	PR930	PR1115	KW10	KBN510	KPD001 (KPD010)	TGF32R/L 033~050-005	TGF32R/L 075~095-010	TGF32R/L 100~145-010	TGF32R/L 150~250-010	
Carbon Steel	☆ 150~220	★ 80~180	☆ 80~180	☆ 80~180	-	-	-	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	Coolant
Alloy Steel	☆ 130~200	★ 80~160	☆ 80~160	☆ 80~160	-	-	-	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	
Stainless Steel	-	☆ 60~130	☆ 60~130	★ 60~130	-	-	-	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	
Cast Iron	-	-	-	-	★ 60~100	-	-	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	
Aluminum Alloys	-	-	-	-	★ 150~400	-	★ 150~2,000	(1) 0.01~0.05 (2) Not recom. (3) Not recom.	(1) 0.02~0.07 (2) Not recom. (3) Not recom.	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.06 (3) Max. 0.2	
Brass	-	-	-	-	★ 150~300	-	★ 200~800	(1) 0.01~0.04 (2) Not recom. (3) Not recom.	(1) 0.02~0.06 (2) Not recom. (3) Not recom.	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	(1) 0.03~0.07 (2) 0.02~0.05 (3) Max. 0.2	

・MEGA indicates MEGACOAT.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GH inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet			PVD Coated Carbide	Carbide	Ceramic								
	TN90	TC40N	TC60M	PR930	KW10	A65	A66N	PT600M	GH 40~50...	GH 55~70...	GH 75~80...	GH 100~120...		
Carbon Steel	-	☆ 150~220	☆ 100~150	★ 80~180	-	-	-	-	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5	(1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0		Coolant
Alloy Steel	-	☆ 130~200	☆ 80~130	★ 80~160	-	-	-	-	(1) 0.07~0.18 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.07~0.18 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.1~0.23 (2) 0.1~0.18 (3) Max. 1.5	(1) 0.15~0.27 (2) 0.15~0.22 (3) Max. 2.0		
Stainless Steel	-	-	☆ 60~100	★ 60~130	-	-	-	-	(1) 0.07~0.16 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.07~0.16 (2) 0.07~0.13 (3) Max. 1.0	(1) 0.1~0.21 (2) 0.1~0.18 (3) Max. 1.5	(1) 0.15~0.25 (2) 0.15~0.22 (3) Max. 2.0		
Cast Iron	-	-	-	-	★ 60~100	☆ 150~300	☆ 150~300	☆ 150~300	KW10 (1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0 A65/A66N (1) 0.03~0.07 (2) Not recom. (3) Not recom.	KW10 (1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0 A65/A66N (1) 0.03~0.07 (2) Not recom. (3) Not recom.	KW10 (1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5 A65/A66N (1) 0.05~0.09 (2) Not recom. (3) Not recom.	KW10 (1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0 A65/A66N (1) 0.05~0.09 (2) Not recom. (3) Not recom.		
Aluminum Alloys	-	-	-	-	★ 150~400	-	-	-	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5	(1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0		
Brass	-	-	-	-	★ 150~300	-	-	-	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.07~0.2 (2) 0.07~0.15 (3) Max. 1.0	(1) 0.1~0.25 (2) 0.1~0.2 (3) Max. 1.5	(1) 0.15~0.3 (2) 0.15~0.25 (3) Max. 2.0		
Hard Materials	-	-	-	-	-	☆ 40~80	☆ 40~80	☆ 40~80	(1) 0.02~0.05 (2) 0.01~0.03 (3) Max. 0.1	(1) 0.02~0.05 (2) 0.01~0.03 (3) Max. 0.2	(1) 0.02~0.05 (2) 0.01~0.04 (3) Max. 0.2			

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GHU Inserts (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet			CVD Coated Carbide	PVD Coated Carbide		Ceramic							
	TN60	TC40N	TC60M	CR9025	PR630	PR930	A65	A66N	GHU 40-20	GHU 50-20	GHU 60-20			
Carbon Steel	☆ 130~200	-	-	☆ 80~180	-	-	-	-	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.15 (2) 0.05~0.12 (3) Max. 1.5			Coolant
Alloy Steel	☆ 100~180	-	-	☆ 80~160	-	-	-	-	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.0	(1) 0.06~0.15 (2) 0.05~0.12 (3) Max. 1.5			
Stainless Steel	-	-	-	☆ 60~130	-	-	-	-	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.2			

* Above cutting condition is for external grooving. Set both cutting speed and feed 10% lower for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions

GA Inserts (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide		Carbide						
	TN60	TN90	TC40N	TC60M	CR9025	PR630	PR930	KW10	GA 30	GA 40	GA 50			
Carbon Steel	☆ 130~200	-	-	-	★ 80~180	-	-	-	(1) 0.06~0.18 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.06~0.21 (2) 0.05~0.17 (3) Max. 1.0	(1) 0.06~0.25 (2) 0.05~0.2 (3) Max. 1.3			Coolant
Alloy Steel	☆ 100~180	-	-	-	★ 80~160	-	-	-	(1) 0.06~0.15 (2) 0.05~0.12 (3) Max. 0.3	(1) 0.06~0.18 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.06~0.22 (2) 0.05~0.18 (3) Max. 0.8			
Stainless Steel	-	-	-	-	★ 60~130	-	-	-	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.1 (2) 0.05~0.08 (3) Max. 0.8	(1) 0.06~0.12 (2) 0.05~0.1 (3) Max. 1.2			

★ : 1st Recommendation ☆ : 2nd Recommendation

GIA Inserts (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)								(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide		Carbide						
	TN60	TN90	TC40N	TC60M	CR9025	PR630	PR930	KW10	GIA 30	GIA 40	GIA 50			
Carbon Steel	☆ 60~120	-	-	-	★ 60~120	-	-	-	(1) 0.04~0.08 (2) 0.02~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.02~0.08 (3) Max. 0.4	(1) 0.05~0.1 (2) 0.05~0.08 (3) Max. 0.5			Coolant
Alloy Steel	☆ 60~100	-	-	-	★ 60~100	-	-	-	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.3	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.4	(1) 0.05~0.08 (2) 0.05~0.08 (3) Max. 0.5			
Stainless Steel	-	-	-	-	★ 60~80	-	-	-	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.3	(1) 0.04~0.07 (2) 0.02~0.07 (3) Max. 0.4	(1) 0.05~0.08 (2) 0.05~0.08 (3) Max. 0.5			

★ : 1st Recommendation ☆ : 2nd Recommendation

FMM / FMN Inserts

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)						Face Grooving (FMM / FMN)			Turning (FMM)			Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Edge Width (mm)			Edge Width (mm)			
	TN90	CR9025	PR915	PR930	PR905	KW10	3.0	4.0	5.0 / 6.0	3.0	4.0	5.0 / 6.0	
							f (mm/rev)			f (mm/rev)			
Carbon Steel	☆ 100~220	☆ 80~200	☆ 80~200	★ 80~200	-	-	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	Coolant
Alloy Steel	☆ 80~200	☆ 70~180	☆ 70~180	★ 70~180	-	-	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Stainless Steel	☆ 70~160	☆ 60~150	★ 60~150	☆ 60~150	-	-	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Cast Iron	-	-	-	-	★ 80~180	☆ 70~150	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Aluminum Alloys	-	-	-	-	-	★ 200~500	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	
Brass	-	-	-	-	-	★ 100~200	0.03~0.05	0.03~0.08	0.05~0.10	0.05~0.10	0.05~0.25	0.10~0.30	

· Set the feed rate 1/100 of edge width on the first groove and check chip evacuation.

· FMN type Inserts are only for Deep Grooving, and when used for turning, set to ap=0.2mm and under.

★ : 1st Recommendation ☆ : 2nd Recommendation

Ref. to the notes below for turning conditions.

ap and f of FMM

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 50% of Edge Width	· ap ≤ 0.5CW
f (MAX.) (mm/rev)	under 3~5% of Edge Width	· f ≤ 0.03(Min.) ~ 0.05(Max.) CW

ap x f should be as follows.

Load(mm^2) \ Edge Width(mm)	3.0	4.0	5.0	6.0	
ap x f	~0.09	~0.14	~0.25	~0.36	· ap x f ≤ 0.01CW^2

◆ SIGE (Ground Chipbreaker : GE$^{R}/_{L}$...A(R), GE$^{R}/_{L}$...B(R))

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)				(1) f for Grooving (mm/rev)			Remarks
	Cermet	MEGACOAT	PVD Coated Carbide	Carbide	(2) f for Turning (mm/rev)			
	TN6020	PR1225	PR1025	KW10	(3) ap for Turning (mm)			
					GE$^{R}/_{L}$ 100~200-010A 100~200-100AR	GE$^{R}/_{L}$ 100~200-010B 100~200-100BR	GE$^{R}/_{L}$ 250~300-020B	
Carbon Steel	☆ 50~80	★ 50~80	☆ 50~80	-	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	Coolant
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Alloy Steel	☆ 50~80	★ 50~80	☆ 50~80	-	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Stainless Steel	-	★ 50~80	☆ 50~80	-	(1) 0.01~0.03	(1) 0.01~0.03	(1) 0.01~0.03	
					(2) 0.01~0.03	(2) 0.01~0.03	(2) 0.01~0.03	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Cast Iron	-	-	-	★ 50~80	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.05	(3) Max. 0.05	(3) Max. 0.1	
Aluminum Alloys	-	-	-	★ 50~100	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.1	(3) Max. 0.1	(3) Max. 0.2	
Brass	-	-	-	★ 50~100	(1) 0.01~0.03	(1) 0.02~0.04	(1) 0.02~0.04	
					(2) 0.01~0.03	(2) 0.02~0.04	(2) 0.02~0.04	
					(3) Max. 0.1	(3) Max. 0.1	(3) Max. 0.2	

* Use PVD coated carbide or carbide for turning with edge width 1mm. (GE$^{R}/_{L}$100-005A / 100-005B)

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ SIGE (Ground Chipbreaker : GE$^{R}/_{L}$···C(R), GE$^{R}/_{L}$··D(R), GE$^{R}/_{L}$···E)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)				(1) f for Grooving (mm/rev)							Remarks
	Cermet	MEGA COAT	PVD Coated Carbide	Carbide	(2) f for Turning (mm/rev)							
	TN6020	PR1225	PR1025	GW15	(3) ap for Turning (mm)							
					GE$^{R}/_{L}$ 100-200-010C 200-100CR	GE$^{R}/_{L}$ 250~350-020C 250-300-150CR						
					GE$^{R}/_{L}$ 100~145-010D	GE$^{R}/_{L}$ 150~195-010D	GE$^{R}/_{L}$ 200~280-020D 200-100DR		GE$^{R}/_{L}$ 300~400-020D 300-150DR			
					GE$^{R}/_{L}$ 100-010E	GE$^{R}/_{L}$ 150~195-010E	GE$^{R}/_{L}$ 200~225-010E 230-020E	GE$^{R}/_{L}$ 250~330-020E		GE$^{R}/_{L}$ 350~430-020E	GE$^{R}/_{L}$ 450~500-020E	
Carbon Steel	☆ 120~180	★ 60~140	☆ 60~140	-	(1) 0.03~0.08	(1) 0.03~0.08	(1) 0.04~0.09	(1) 0.04~0.09	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	Coolant
					(2) 0.03~0.08	(2) 0.03~0.08	(2) 0.04~0.09	(2) 0.04~0.09	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Alloy Steel	☆ 100~160	★ 60~120	☆ 60~120	-	(1) 0.03~0.07	(1) 0.03~0.07	(1) 0.04~0.08	(1) 0.04~0.08	(1) 0.05~0.1	(1) 0.05~0.1	(1) 0.05~0.1	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.08	(2) 0.04~0.08	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Stainless Steel	☆ 70~130	★ 60~110	☆ 60~110	-	(1) 0.03~0.07	(1) 0.03~0.07	(1) 0.04~0.08	(1) 0.04~0.08	(1) 0.05~0.1	(1) 0.05~0.1	(1) 0.05~0.1	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.08	(2) 0.04~0.08	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Cast Iron	-	-	-	★ 60~100	(1) 0.03~0.08	(1) 0.03~0.08	(1) 0.04~0.09	(1) 0.04~0.09	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	
					(2) 0.03~0.08	(2) 0.03~0.08	(2) 0.04~0.09	(2) 0.04~0.09	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.3	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	
Aluminum Alloys	-	-	-	★ 150~300	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.15	(1) 0.05~0.15	(1) 0.08~0.15	(1) 0.08~0.15	(1) 0.08~0.15	
					(2) 0.05~0.12	(2) 0.05~0.12	(2) 0.05~0.15	(2) 0.05~0.15	(2) 0.08~0.15	(2) 0.08~0.15	(2) 0.08~0.15	
					(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.8	(3) Max. 0.8	(3) Max. 0.8	
Brass	-	-	-	★ 100~250	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.15	(1) 0.05~0.15	(1) 0.08~0.15	(1) 0.08~0.15	(1) 0.08~0.15	
					(2) 0.05~0.12	(2) 0.05~0.12	(2) 0.05~0.15	(2) 0.05~0.15	(2) 0.08~0.15	(2) 0.08~0.15	(2) 0.08~0.15	
					(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.5	(3) Max. 0.8	(3) Max. 0.8	(3) Max. 0.8	

* Use PVD coated carbide or carbide for turning with edge width 1mm. (GE$^{R}/_{L}$100-010C / 100-010D / 100-010E)

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ SIGE (Molded Chipbreakers : GER...CM, GER...DM, GER...EM)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)				(1) f for Grooving (mm/rev)						Remarks
	Cermet	MEGA COAT	PVD Coated Carbide	Carbide	(2) f for Turning (mm/rev)						
	TN6020	PR1225	PR1025	GW15	(3) ap for Turning (mm)						
					GER 150~200-010CM	GER 250~350-020CM					
					GER 150~200-010DM		GER 230~250-020DM	GER 300~400-020DM			
					GER 150~200-010EM			GER 250~300-020EM	GER 350~400-020EM	GER 450~500-020EM	
Carbon Steel	-	★ 60~160	☆ 60~160	-	(1) 0.03~0.1	(1) 0.03~0.12	(1) 0.04~0.12	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	Coolant
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.1	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 1.0	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	
Alloy Steel	-	★ 60~140	☆ 60~140	-	(1) 0.03~0.1	(1) 0.03~0.1	(1) 0.04~0.12	(1) 0.05~0.12	(1) 0.05~0.12	(1) 0.05~0.12	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.1	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 1.0	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	
Stainless Steel	-	★ 60~110	☆ 60~110	-	(1) 0.03~0.08	(1) 0.03~0.08	(1) 0.04~0.08	(1) 0.05~0.1	(1) 0.05~0.1	(1) 0.05~0.1	
					(2) 0.03~0.1	(2) 0.03~0.1	(2) 0.04~0.1	(2) 0.05~0.1	(2) 0.05~0.1	(2) 0.05~0.1	
					(3) Max. 1.0	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	(3) Max. 1.5	

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions

GV Inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)						(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)						Remarks
	Cermet			MEGA COAT	PVD Coated Carbide	Carbide	GV$^{R}_{L}$ 100~300-...SS 100~300-...S	GV$^{R}_{L}$ 145~185-...B	GV$^{R}_{L}$ 200~280-...B	GV$^{R}_{L}$ 300~400-...B			
	TN90	**TC40N**	**TC60M**	**PR1225**	**PR930**	**KW10**	GV$^{R}_{L}$ 100~340-...A 200~300-...AR		GV$^{R}_{L}$ 200-100BR	GV$^{R}_{L}$ 300-150BR	GV$^{R}_{L}$ 280~300-...C	GV$^{R}_{L}$ 340~400-...C	GV$^{R}_{L}$ 430~500-...C	
Carbon Steel	☆ 120~180	☆ 120~180	☆ 80~120	★ 80~160	☆ 80~140	-	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	Coolant
Alloy Steel	☆ 100~160	☆ 100~160	☆ 80~100	★ 80~140	☆ 80~120	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	
Stainless Steel	☆ 70~130	-	☆ 60~100	★ 60~130	☆ 60~110	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	
Cast Iron	-	-	-	-	-	★ 60~100	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	
Aluminum Alloys	-	-	-	-	-	★ 150~300	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	
Brass	-	-	-	-	-	★ 100~250	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	

* Use MEGACOAT, PVD coated carbide or carbide for turning with edge width 1mm (GV$^{R}_{L}$100SS / 100S / 100A)

★ : 1st Recommendation ☆ : 2nd Recommendation

GVF Inserts (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)						(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)					Remarks
	Cermet			MEGA COAT	PVD Coated Carbide	Carbide	GVF$^{R}_{L}$ 200~340...A	GVF$^{R}_{L}$ 250~350...B	GVF$^{R}_{L}$ 400~490...B	GVF$^{R}_{L}$ 350~450...C	GVF$^{R}_{L}$ 500~600...C	
	TN90	**TC40N**	**TC60M**	**PR1225**	**PR930**	**KW10**	GVF$^{R}_{L}$ 200-100AR ~300-150AR	GVF$^{R}_{L}$ 300-150BR	GVF$^{R}_{L}$ 400-200BR			
Carbon Steel	☆ 150~220	☆ 150~220	☆ 100~150	★ 80~200	☆ 80~180	-	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	Coolant
Alloy Steel	☆ 130~200	☆ 130~200	☆ 80~130	★ 80~180	☆ 80~160	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Stainless Steel	☆ 70~150	-	☆ 60~100	★ 80~150	☆ 60~130	-	(1) 0.03~0.07 (2) 0.03~0.1 (3) Max. 0.3	(1) 0.04~0.08 (2) 0.04~0.08 (3) Max. 0.3	(1) 0.05~0.09 (2) 0.05~0.09 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.8	
Cast Iron	-	-	-	-	-	★ 60~100	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.1 (3) Max. 0.8	
Aluminum Alloys	-	-	-	-	-	★ 150~400	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	
Brass	-	-	-	-	-	★ 150~300	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	(1) 0.08~0.15 (2) 0.08~0.15 (3) Max. 0.8	

· Apply a sufficient amount of coolant.
· The ap should be under 0.5mm if a good surface finish is required.

★ : 1st Recommendation ☆ : 2nd Recommendation

FTK Inserts

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)				Edge Width (mm)					Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide	Carbide	4.0	5.0				
	TN90	**CR9025**	**PR930**	**KW10**	f (mm/rev)					
Carbon Steel	☆ 120~200	★ 80~180	☆ 60~130	-	0.05~0.15	0.05~0.15				Coolant
Alloy Steel	☆ 100~160	★ 70~150	☆ 60~130	-	0.05~0.15	0.05~0.15				
Stainless Steel	☆ 80~150	☆ 60~140	☆ 50~120	-	0.05~0.15	0.05~0.15				
Cast Iron	-	-	-	★ 50~100	0.10~0.30	0.10~0.30				
Aluminum Alloys	-	-	-	★ 200~450	0.05~0.25	0.05~0.25				
Brass	-	-	-	★ 100~200	0.05~0.25	0.05~0.25				

★ : 1st Recommendation ☆ : 2nd Recommendation

GMN Inserts (CBN / PCD)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)		(1) f for Grooving (mm/rev) (2) f for Turning (mm/rev) (3) ap for Turning (mm)				Remarks
	CBN	PCD					
	KBN510 KBN525	**KPD001 (KPD010)**	GMN2	GMN3	GMN4 GMN5	GMN6	
Aluminum Alloys	-	★ 150~2,000	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.18 (2) 0.08~0.18 (3) Max. 0.8	(1) 0.10~0.20 (2) 0.10~0.20 (3) Max. 0.8	Coolant
Brass	-	★ 200~800	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	(1) 0.08~0.18 (2) 0.08~0.18 (3) Max. 0.8	(1) 0.10~0.20 (2) 0.10~0.20 (3) Max. 0.8	
Cast Iron	★ 150~400	-	(1) 0.04~0.09 (2) 0.04~0.09 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.5	(1) 0.05~0.12 (2) 0.05~0.12 (3) Max. 0.5	(1) 0.05~0.15 (2) 0.05~0.15 (3) Max. 0.8	
Hard Materials	★ 80~120	-	(1) 0.02~0.05 (2) 0.01~0.03 (3) Max. 0.1	(1) 0.03~0.07 (2) 0.01~0.05 (3) Max. 0.2	(1) 0.03~0.08 (2) 0.03~0.08 (3) Max. 0.3	(1) 0.05~0.1 (2) 0.05~0.1 (3) Max. 0.4	

★ : 1st Recommendation

Recommended Cutting Conditions

◆ GMG / GMM / GMN / GMGA Inserts

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)						Grooving				Turning				Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Edge Width (mm)				Edge Width (mm)				
	TN90	CR9025	PR915	PR930	PR905	KW10	2.0~3.0	4.0	5.0	6.0 / 8.0	2.0~3.0	4.0	5.0	6.0 / 8.0	
							f (mm/rev)				f (mm/rev)				
Carbon Steel	☆ 100~220	☆ 80~200	☆ 80~200	★ 80~200	-	-	0.05~0.15	0.10~0.25	0.15~0.35	0.20~0.35	0.10~0.20	0.15~0.30	0.20~0.40	0.25~0.40	Coolant
Alloy Steel	☆ 80~200	☆ 70~180	☆ 70~180	★ 70~180	-	-	0.05~0.15	0.10~0.25	0.15~0.35	0.20~0.35	0.10~0.20	0.15~0.30	0.20~0.40	0.25~0.40	
Stainless Steel	☆ 70~160	☆ 60~150	★ 60~150	☆ 60~150	-	-	0.05~0.15	0.10~0.20	0.15~0.35	0.20~0.35	0.10~0.20	0.15~0.25	0.20~0.40	0.25~0.40	
Cast Iron	-	-	-	-	★ 100~200	☆ 70~150	0.05~0.20	0.10~0.30	0.15~0.40	0.20~0.40	0.10~0.25	0.15~0.35	0.20~0.45	0.25~0.45	
Aluminum Alloys	-	-	-	-	-	★ 200~500	0.05~0.20	0.08~0.25	0.10~0.25	0.12~0.30	0.10~0.20	0.10~0.25	0.10~0.25	0.15~0.30	
Brass	-	-	-	-	-	★ 100~200	0.05~0.15	0.08~0.20	0.10~0.25	0.12~0.30	0.10~0.20	0.10~0.25	0.10~0.25	0.15~0.30	

Ref. to the notes below for turning conditions.

★ : 1st Recommendation ☆ : 2nd Recommendation

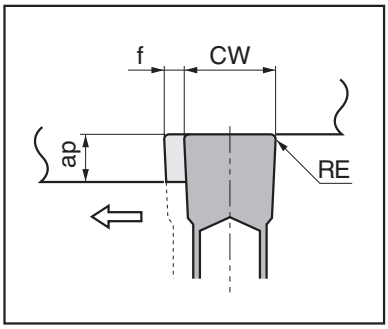
(1) When using KGM Toolholder

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 80% of Edge Width	· ap ≤ 0.8CW
f (MAX.) (mm/rev)	under 10% of Edge Width	· f ≤ 0.1CW

(ap) x (f) shall not exceed 1/2 of ap (MAX.) x f (MAX.)

Load(mm²) \ Edge Width(mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap x f	~0.20	~0.36	~0.64	~1.00	~1.44	~2.56

· ap x f $\leqq \frac{1}{2}$ x 0.8CW x 0.1CW=0.04CW²



(2) When using KGM-T Toolholder (Deep grooving type)

Use 90% of KGM conditions

(3) When using KGMM / KGMS / KFMS-8 Toolholder

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 50% of Edge Width	· ap ≤ 0.5CW
f (MAX.) (mm/rev)	under 4% of Edge Width	· f ≤ 0.04CW

should be as follows. (50% or under of KGM)

Load(mm²) \ Edge Width(mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap x f	~0.10	~0.18	~0.32	~0.50	~0.72	~1.28

· ap x f ≤ 0.02CW²

(4) When using KIGM Toolholder

	Recommended Cutting Conditions	
ap (MAX.) (mm)	under 70% of Edge Width	· ap ≤ 0.7CW
f (MAX.) (mm/rev)	under 8% of Edge Width	· f ≤ 0.08CW

should be as follows. (under 70% of KGM)

Load(mm²) \ Edge Width(mm)	3.0	4.0	5.0
ap x f	~0.25	~0.44	~0.70

· ap×f ≤ 0.04CW²

◆ GMG / GMM / GMGA8030 Inserts (Face Grooving)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)						Face Grooving			Turning			Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Edge Width (mm)			Edge Width (mm)			
	TN90	CR9025	PR915	PR930	PR905	KW10	8.0			8.0			
							f (mm/rev)			f (mm/rev)			
Carbon Steel	☆ 100~220	☆ 80~160	☆ 80~160	★ 80~160	-	-	0.1~0.2			0.1~0.25			Coolant
Alloy Steel	☆ 80~160	☆ 70~160	☆ 70~160	★ 70~160	-	-	0.1~0.2			0.1~0.25			
Stainless Steel	☆ 70~140	☆ 60~130	★ 60~130	☆ 60~130	-	-	0.1~0.2			0.1~0.25			
Cast Iron	-	-	-	-	★ 80~180	☆ 70~130	0.1~0.3			0.1~0.35			
Aluminum Alloys	-	-	-	-	-	★ 200~300	0.08~0.25			0.08~0.30			
Brass	-	-	-	-	-	★ 100~150	0.08~0.25			0.08~0.30			

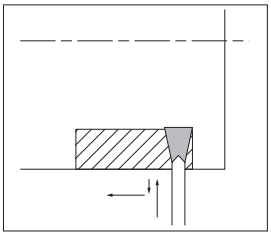
★ : 1st Recommendation ☆ : 2nd Recommendation

Guide for External Grooving

Point (I) (Turning after Grooving)

1) Grooving Depth 0.5mm or over : For roughing (Refer to Fig. 1)
Before turning, pull the tool back about 0.1mm after grooving, instead of turning subsequent to grooving.
(Failure to pull the tool back before traverse machining will result in an unbalanced load applied on only one side of the cutting edge.)

2) Grooving Depth 0.5mm or under : For finishing (Refer to Fig. 2)
Turning subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge. (Retention time is not necessary.)

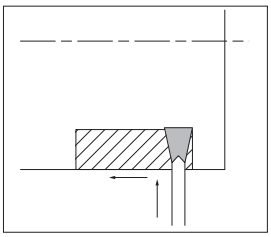


Before turning, pull the tool back about 0.1mm after grooving.
(Grooving Depth 0.5mm or over at roughing)
Fig. 1

Point (II)

1) When widening the groove width (Refer to Fig. 3), apply the "Step Turning."
2) The widened groove and side walls should be finished last.
(For better chip control, ap 0.5mm or over is recommended.)

Note) If the workpiece is not supported at the center, reduce the feed rate when grooving towards center.



Turning subsequent to grooving
(Grooving Depth 0.5mm or under at finishing)
Fig. 2

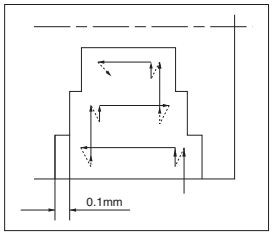


Fig. 3

Guide for Face Grooving

<Toolholder Selection>

(1) Choose the best tool depending on the groove width.
External dia. of the groove listed in the catalog indicates the available range (between DAXN and DAXX) for the initial grooving on the unprocessed workpiece (Ref. to Fig. 1).

(2) Confirm Grooving Depth (CD)

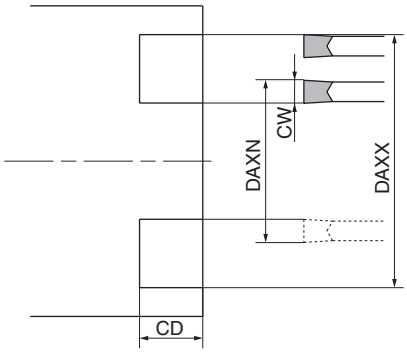


Fig. 1

(3) It is recommended to install the toolholder in the reverse position. (Fig. 2)
(This will provide smooth chip flow and chip clearance.)

Toolholder	Right-hand	Toolholder	Left-hand
Insert	(Neutral)	Insert	(Neutral)

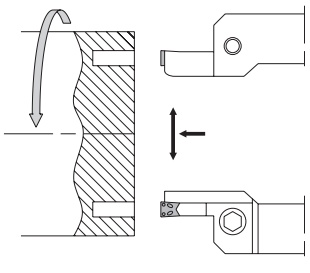


Fig. 2 Toolholder's Hand and Rotation

<Guide for turning>

Turning direction should be from the outer diameter to the inner diameter as shown in Fig. 3
This improves chip evacuation.

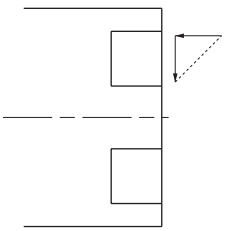
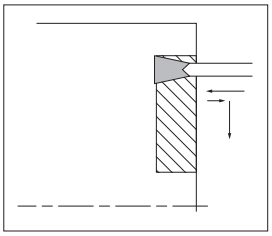


Fig. 3

Guide for Face Grooving (Continued)

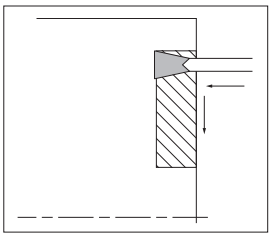
Point (I) (Turning after Grooving)

1) Grooving Depth 0.5mm or over : For roughing (Refer to Fig. 4)
Before turning, pull the tool back about 0.1mm after grooving, instead of turning subsequent to grooving.
(Failure to pull the tool back before traverse machining will result in an unbalanced load applied on only one side of the cutting edge.)



Before turning, pull the tool back about 0.1mm after grooving.
(Grooving Depth 0.5mm or over at roughing)
Fig. 4

2) Grooving Depth 0.5mm or under : For finishing (Refer to Fig. 5)
Turning subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Retention time is not necessary.)



Turning subsequent to grooving
(Grooving Depth 0.5mm or under at finishing)
Fig. 5

Point (II)

1) When widening the groove width. (Ref. to Fig. 6)
Apply the "Step Turning".
2) The widened groove and side walls should be finished last.
(For better chip control, ap 0.5mm or over is recommended.)

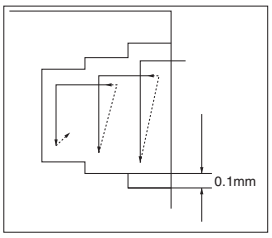
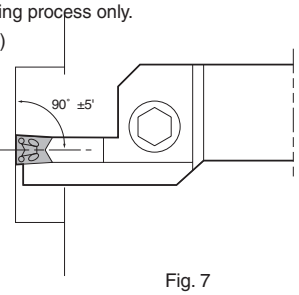


Fig. 6

Trouble shooting

Trouble	Countermeasures
Whitish trace remains at the groove bottom.	(1) Increase the cutting speed for finishing process only. (This can handle most of the cases.) If the method is not successful, try (2) as follows. (2) Check the insert edge's parallelness. (Adjustment: Apply the insert edge to the workpiece face and adjust the toolholder within the angle of ±5'. (Fig. 7)  Fig. 7
Chips are entangled.	(1) Install the toolholder in the reverse position. Adjust the coolant flow to the cutting edge. (2) When widening the groove, do not machine one deep groove. Instead, repeat shallow grooving and turning.
Insert cracks when turning.	Reverse the facing direction.
Groove is not straight.	Check the edge's parallelness. Decrease the feed rate.

Guide for Grooving

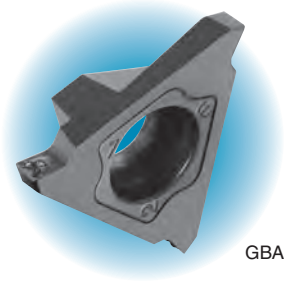
Guide for Grooving with Cermet Insert (Steel)

1. Set the f under 0.12mm/rev (0.05~0.10mm/rev normally).
2. Coolant is recommended.
3. Set the cutting speed Vc=150~220m/min.
4. Set the toolholder overhang as short as possible.

How to Improve Surface Finish (when surface roughness below 3μm Rz is required)

1. Increase the cutting speed (Vc=220m/min MAX.)
2. Program retention time at the groove bottom.
3. Apply a light hone to the cutting edge by hand lapper.

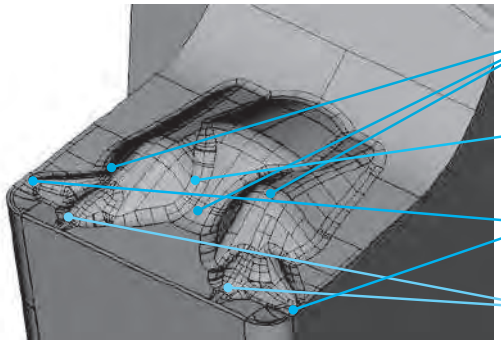
Chip Control of Grooving Insert with Molded Chipbreaker



GBA GM chipbreaker

1. Good chip control to cover wide application range stable chip control.
   Stable chip control at high cutting speed, covering wide range of feed rate
2. Improved chip control and excellent surface finish.
   Superior chip control performance and MEGACOAT PR1215 realizes the excellent surface quality
3. Chip control improvement at automated production line.
   (prevent frequent machine stop)

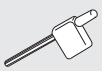
Multi Bump Design



- Center bump and dent squeeze and control chips
- Helps modifying chip shape
- Stable chip control at shoulder grooving and chamfering
- Front bump : Stabilize chip control at low feed rate

Smooth chip control with optimum bump layout on the chipbreaker

Alternative Toolholder Reference Table for Grooving Toolholder

Conventional Toolholder						Alternative Toolholder				
Description		Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Wrench	Description		Overall length (mm)	Remarks	See Page
										
KTGF R/L	1010K-16F	125	SB-4070TRW	FT-8	-	KTGF R/L	1010JX-16F	120		G18
	1212M-16F	150					1212JX-16F	120		
	1616M-16F	150					1616JX-16F	120		
KGM R/L	0810K-1.5-125	125	SE-40120TR	-	LTW-15S		-	-	No Alternative	G42
	1010K-1.5-125	125				KGM R/L	1010JX-1.5	120		
	1212M-1.5-150	150					1212JX-1.5	120		
KGM R/L	0810K-2-125	125	SE-40120TR	-	LTW-15S		-	-	No Alternative	
	1010K-2-125	125				KGM R/L	1010JX-2	120		
	1212M-2-150	150					1212JX-2	120		
	1616M-2-150	150	SE-50125TR	-	LTW-20		1616JX-2	120		
KGM R/L	1010K-2.5-125	125	SE-40120TR	-	LTW-15S		-	-	No Alternative	
	1212M-2.5-150	150				KGM R/L	1212JX-2.5	120		
	1616M-2.5-150	150	SE-50125TR	-	LTW-20		1616JX-2.5	120		
KGM R/L	1616M-3-150	150	SE-50125TR	-	LTW-20	KGM R/L	1616JX-3	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.



Cut-off

H1~H48

H

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KTKF	Lateral side screw clamp toolholder	H8
KTKF-S (for sub spindle tooling)	Lateral side screw clamp toolholder	H11
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KGM	Integral Toolholder	H32
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KPKTB-JCT / KTKTB / KTKTBF	Toolblock	H40
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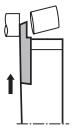
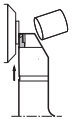
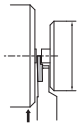
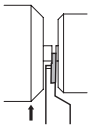
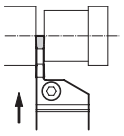
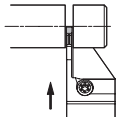
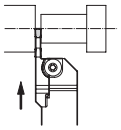
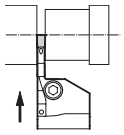
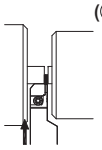
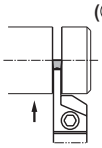
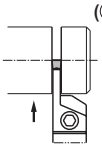
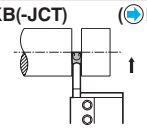
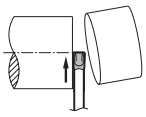
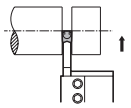
Alternative Toolholder Reference Table for Cut-off Toolholder		H48



Product Lineup

Small Diameter Cut-off (for Automatic Lathe) Cut-off Dia. : ~ø16	**KTKF** (➡H8)  Cut-off Dia. : ~ ø5, ø8, ø12, ø16 Edge Width. : 0.5 ~ 2.0 mm	**KTKF-JCT** (➡H12)  Cut-off Dia. : ~ ø5, ø8, ø12, ø16 Edge Width : 0.5 ~ 2.0 mm		For sub spindle tooling **KTKF-S** (➡H11)  Cut-off Dia. : ~ ø5, ø8, ø12, ø16 Edge Width : 0.5 ~ 2.0 mm	**KTKFS** (➡H16)  Cut-off Dia. : ~ ø6, ø9, ø12, ø14, ø16 Edge Width : 1.0 ~ 2.0 mm
KGD (Bolt Clamp) Cut-off Dia.: ~ ø51	**KGD** (➡H20, H24)  Edge Width : 1.3 ~ 4.0 mm	**KGD-JCT** (➡H22) (for Automatic Lathe)  Cut-off Dia. : ~ ø24, ø32 Edge Width : 2.0 ~ 3.0 mm	**KGD-S** (➡H25)  Edge Width : 2.0 ~ 4.0 mm	**KGD-JCT** (➡H26)  Edge Width : 3.0 ~ 4.0 mm	For sub spindle tooling **KGDS** (➡H21)  Cut-off Dia. : ~ ø24 Edge Width : 1.3 ~ 3.0 mm
KGM (Bolt Clamp) Cut-off Dia. : ~ ø60	**KGM** (➡H32)  Edge Width : 1.5 ~ 4.0 mm, 3 ~ 8 mm	**KGM-T** (➡H33)  Edge Width : 2.0 ~ 6.0 mm			
KPK (1-edge) Cut-off Dia. : ~ ø100	Blade type Cut-off Dia. ø50 ~ ø100	**KPKB(-JCT)** (➡H36)  Edge Width : 2.0 ~ 4.0 mm			
KTKB KTKH (1-edge) Cut-off Dia. : ~ ø120	Toolholder Type Cut-off Dia. ø30 ~ ø79	**KTKH-S** (➡H46)  Edge Width : 2.2 ~ 5.1 mm		Blade type Cut-off Dia. ø32 ~ ø120	**KTKB-S(S)** (➡H45)  Edge Width : 1.6 ~ 9.6 mm

Cut-off Tools

Series Name	Shape	Advantage	Applications
Small Diameter Cut-off		1) Insert clamp is side screw type from lateral side 2) 2-edge insert 3) Max. Cut-off Dia. : ø16	1) Cut-off and grooving of small workpieces 2) For automatic lathe, small machine
KGD		1) Insert is clamped from top side 2) 1-edge and 2-edge inserts available 3) Integral type and separate type are available 4) Max. Cut-off Dia. : ø50	1) PM Chipbreaker ··· Cut-off 2) PH Chipbreaker ··· Cut-off (High Feed Rate) Grooving 3) PG Chipbreaker ··· Cut-off (for automatic lathe), Sharp-Cutting Oriented 4) PF Chipbreaker ··· Cut-off (for automatic lathe), Low feed 5) PQ Chipbreaker ··· Cut-off (for automatic lathe), Medium feed
KGM		1) Insert is clamped from top side 2) 1-edge and 2-edge inserts available 3) Max. Cut-off Dia. : ø60	1) For cut-off and grooving of small workpieces 2) For automatic lathe, small machine 3) TMR Chipbreaker provides stable chip control up to high feed rate ranges
KPK		1) Self-clamping System that Opens and Closes the Contact Surface with a Wrench 2) 1-edge insert 3) Molded Chipbreaker 4) Blade Type JCT Type for High-pressure Coolant (Internal Coolant) is Available 5) Max. Cut-off Dia. : ø100	1) For cut-off and deep grooving 2) PM Chipbreaker ··· General Purpose PH Chipbreaker ··· For Tough Edge / High Feed Rate
KTKB KTKH		1) Self-Clamping System Tap the insert lightly with a plastic hammer to set it in the pocket 2) 1-edge insert 3) Blade type and Integral Shank type 4) Max. Cut-off Dia. : ø120	1) For cut-off and deep grooving 2) Standard chipbreaker is general cut-off type Feed rate : 0.1mm/rev or over  P Chipbreaker is for cut-off at low feed rates Feed rate : 0.03~0.08mm/rev 

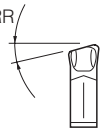
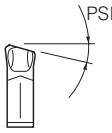
Guide for Cut-off

Tool Selection

		For Small Diameter Cut-off	KGD	KGM	KPK	KTKB / KTKH
Insert	1. Insert's Edge Number 1-edge Insert···For Larger Dia. Workpiece (Max. ø120)	-	-	-	✓	✓
	2-edge Insert···For Smaller Dia. Workpiece Cost per corner is reduced	✓	✓	✓	-	-
	2. Use a neutral angle insert if there is no limit to the finished shape.	TKF...S TKF...NB TKFS...S	GDM GDMS	GMM	PKM	TKN
	3. Insert with lead angle is recommended to prevent remaining boss.	TKF...DR	GDM-R/L (➡ Fig. 2)	GMM-R/L (➡ Fig. 2)	PKM-R/L (➡ Fig. 1)	TKR/L (➡ Fig. 1)
	4. If you want to make the remaining boss smaller when machining small or thin parts, use sharp corner and lead angle insert.	TKF...DR	-	GMM-R/L (➡ Fig. 2)	-	-
	5. Use the minimum width insert suitable for the machining.	✓	✓	✓	✓	✓
Toolholder	1. Use a suitable toolholder (blade) for the workpiece dia.	✓	✓	✓	✓	✓
	2. Use a more rigid toolholder (blade).	✓	✓	✓	✓	✓
	3. Use a back clamp toolholder if there is no space for clamping tools from top side (automatic lathe).	✓	-	-	-	-

How to select cut-off inserts with / without lead angle (including sharp corner)

1. If there is no restriction on the finished shape, use an insert without lead angle.
2. Insert with lead angle is recommended to prevent remaining boss.
3. If you want to make the remaining boss smaller when machining small or thin parts, use sharp corner and lead angle insert..

Hand of Lead Angle	N (Neutral)	R (Right-hand)	L (Left-hand)
			
· Inserts with lead angle reduce burrs at cut-off machining. · The larger the lead angle, the smaller the cutting force. The feed also needs to be smaller.			

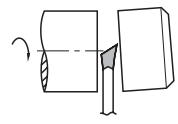
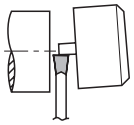
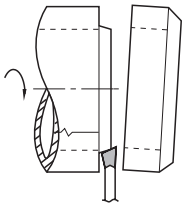
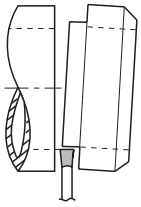
	Right-hand Lead angle	Neutral
Solid Workpiece		
Hollow Workpiece (Pipe)		

Fig. 1

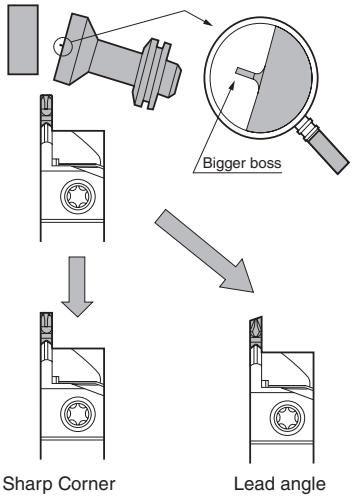


Fig. 2

Caution

1. For PKM, PKM-R/L, TKN and TKR/L, set the cutting edge height 0.1~0.2mm above the center height (Fig. 3) For other toolholders, set the cutting edge to the center height.
2. Be sure to perform wet processing. Supply ample coolant to the cutting edge.
3. Keep a constant rate during processing so that optimum product life will be achieved.
4. Cut off as close to the chuck as possible.
5. To prevent impacts, reduce feed rate by 1/2 ~ 1/3 when nearing the center of the workpiece

- Overuse of insert and toolholder (blade) may cause insert breakage and toolholder (blade) damage.
- Do not rework the insert and toolholder (blade) to prevent damage.
- Clean the insert pocket well with compressed air when replacing insert.

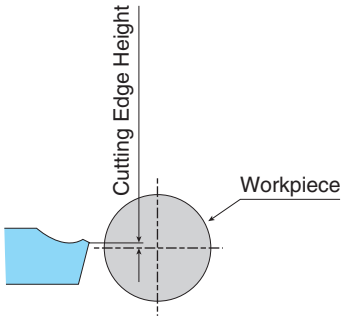
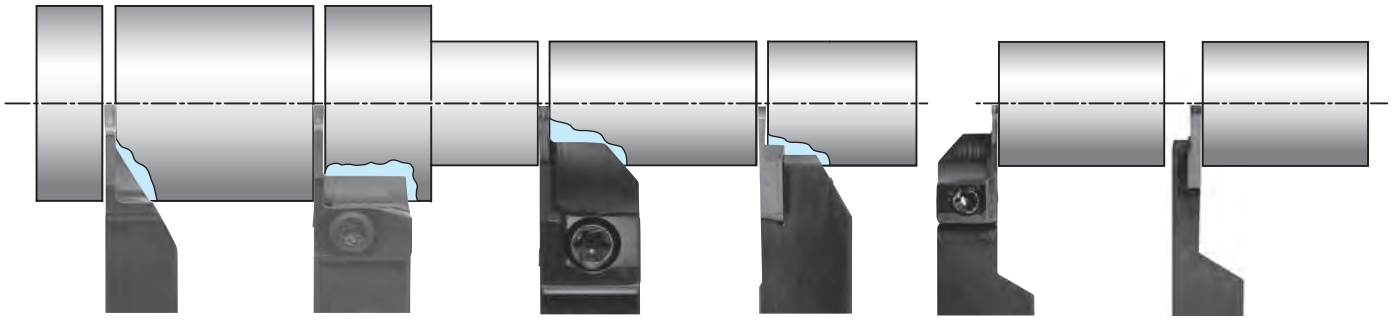


Fig. 3 (PKM, PKM-R/L, TKN, TKR/L)

Summary of Cut-off

Small Diameter Cut-off (for Automatic Lathe) ~ ø51

Small Shank



KTKH-S	KGM	KGD / KGD-JCT	KTKF	KGDS	KTKF-S / KTKFS
Cut-off Dia. : ~ ø45 Shank : □10 ~ 25 Edge Width : 2.2 ~ 4.1 Self Clamp	Cut-off Dia. : ~ ø32 Shank : □10 ~ 16 Edge Width : 1.5 ~ 4.0 Top Clamp	Cut-off Dia. : ~ ø51 Shank : □10 ~ 25 Edge Width : 1.3 ~ 4.0 Top Clamp	Cut-off Dia. : ~ ø16 Shank : □10 ~ 25 Edge Width : 0.5 ~ 2.0 Lateral Side Clamp	Cut-off Dia. : ~ ø24 Shank : □16 Edge Width : 1.3 ~ 3.0 Top Clamp	Cut-off Dia. : ~ ø16 Shank : □10 ~ 12 Edge Width : 0.5 ~ 2.0 (KTKF-S) 1.0 ~ 2.0 (KTKFS) Lateral Side Clamp
H46	H32	H20, H22	H8	H21	H11, H16

For KTKF / KTKF-S KTKFS

2-edge



Low cutting force

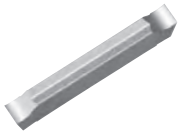


Chipbreaker for General Cut-off



Chipbreaker for Low Feed Cut-off

2-edge



Sharp Cutting PG Chipbreaker



Low Feed PF Chipbreaker



Medium Feed PQ Chipbreaker



(15° Lead Angle)



(15° Lead Angle)



(15° Lead Angle)

Chipbreaker edge shape	Cut-off (Self Clamp) H44		
	General Cut-off		Low Feed Cut-off
	Chamfered + R-honed	Sharp Edge	R-honed
			



KTKH-S H46
(Self Clamp)

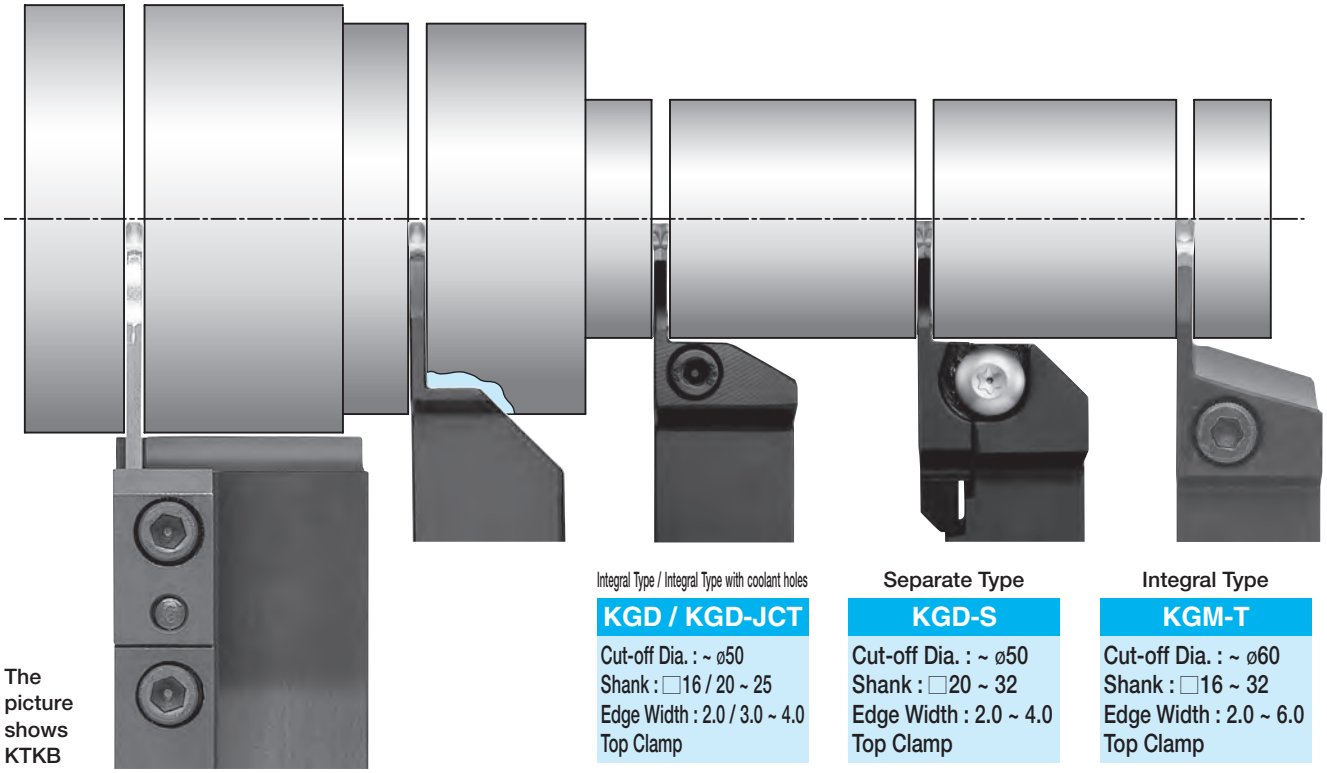


KGD H20
(Top Clamp)



KTKF H8
(Lateral Side Clamp)

General Cut-off ~ ø120



The picture shows KTKB

Integral Type / Integral Type with coolant holes

KGD / KGD-JCT

Cut-off Dia. : ~ ø50
Shank : □16 / 20 ~ 25
Edge Width : 2.0 / 3.0 ~ 4.0
Top Clamp

H24 / H26

Separate Type

KGD-S

Cut-off Dia. : ~ ø50
Shank : □20 ~ 32
Edge Width : 2.0 ~ 4.0
Top Clamp

H25

Integral Type

KGM-T

Cut-off Dia. : ~ ø60
Shank : □16 ~ 32
Edge Width : 2.0 ~ 6.0
Top Clamp

H33

Blade + Toolblock
With/Without Coolant Hole

KPK

Cut-off Dia. : ~ ø100
Toolblock : □16 ~ 32
Edge Width : 2.0 ~ 4.0
Self Clamp

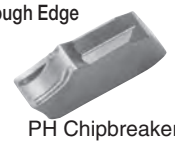
H36

General purpose



PM Chipbreaker

Tough Edge



PH Chipbreaker

Blade + Toolblock

KTKB

Cut-off Dia. : ~ ø120
Toolblock : □16 ~ 32
Edge Width : 1.6 ~ 9.6
Self Clamp

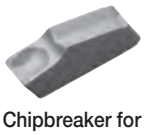
H45

Integral Type

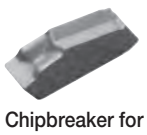
KTKH-S

Cut-off Dia. : ~ ø79
Shank : □20 ~ 25
Edge Width : 3.1 ~ 5.1
Self Clamp

H46



Chipbreaker for General Cut-off



Chipbreaker for Low Feed Cut-off

2-edge
Good chip control



PM Chipbreaker

1-edge
Good chip control



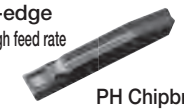
PM Chipbreaker

2-edge
High feed rate



PH Chipbreaker

1-edge
High feed rate



PH Chipbreaker

2-edge



Chipbreaker for Sharp Cutting

2-edge



Chipbreaker for Stability

1-edge



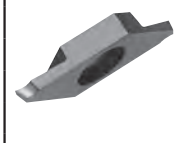
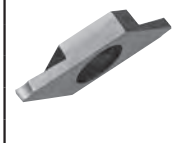
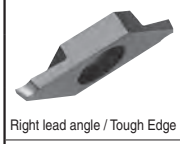
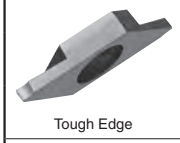
Chipbreaker for Stability

Blade + Toolblock		Separate Type	Integral Type		
					
KPK H36	KTKB H45	KGD-S H25	KTKH-S H46	KGD / KGD-JCT H24 / H26	KGM-T H32, H33

TKF

Classification of usage								
◕ : Continuous~Light Interruption / 1st Choice ◔ : Continuous~Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	◕	◔	◔			See Page for Applicable Toolholders
	M	Stainless Steel	◔	◕	◔			
	K	Cast Iron					◕	
	N	Non-ferrous Metals				◕	◔	

Applicable Inserts (TKF12)

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) CW	CUTDIA	RE	W1	S	D1	Angle (PSIRR)	MEGACOAT NANO PLUS PR1725 R	PR1725 L	MEGACOAT NANO PR1535 R	PR1535 L	MEGACOAT PR1225 R	PR1225 L	DLC Coated Carbide PDL025 R	PDL025 L	Carbide KW10 R	KW10 L
 Right lead angle	TKF12R/L 050-S-16DR	0.5	5	0.03	3	8.7	5	16°	●	●	●	●	●				●	●
	070-S-16DR	0.7	8						●	●	●	●	●	●			●	●
	100-S-16DR	1.0	12						●	●	●	●	●	●	●	●	●	●
	125-S-16DR	1.25							●	●	●	●	●		●	●		
	150-S-16DR	1.5							●	●	●	●	●	●	●	●	●	●
	200-S-16DR	2.0							●	●	●	●	●	●	●	●	●	●
	TKF12R/L 050-S	0.5	5	0.03	3	8.7	5	0°	●	●	●	●	●		●	●	●	●
	070-S	0.7	8						●	●	●	●	●	●	●	●	●	●
	100-S	1.0	12						●	●	●	●	●	●	●	●	●	●
	125-S	1.25							●	●	●	●	●		●	●		
	150-S	1.5							●	●	●	●	●	●	●	●	●	●
	200-S	2.0							●	●	●	●	●	●	●	●	●	●
 Right lead angle / Tough Edge	TKF12R/L 100-T-16DR	1.0	12	0.08	3	8.7	5	16°	●	●	●	●	●	●				
	150-T-16DR	1.5							●	●	●	●	●	●				
	200-T-16DR	2.0							●	●	●	●	●	●				
 Tough Edge	TKF12R/L 100-T	1.0	12	0.08	3	8.7	5	0°	●	●	●	●	●	●				
	150-T	1.5							●	●	●	●	●	●				
	200-T	2.0							●	●	●	●	●	●				
 Right lead angle Without Chipbreaker	TKF12R/L 050-NB-20DR	0.5	5	0	3	8.7	5	20°	●	●	●	●					●	●
	070-NB-20DR	0.7	8						●	●	●	●					●	●
	100-NB-20DR	1.0	12						●	●	●	●					●	●
	150-NB-20DR	1.5							●	●	●	●					●	●
	200-NB-20DR	2.0							●	●	●	●					●	●
 Without Chipbreaker	TKF12R/L 050-NB	0.5	5	0	3	8.7	5	0°	●	●	●	●					●	●
	070-NB	0.7	8						●	●	●	●					●	●
	100-NB	1.0	12						●	●	●	●					●	●
	150-NB	1.5							●	●	●	●					●	●
	200-NB	2.0							●	●	●	●					●	●

H9
H11
H13

· Lead angle (PSIRR) shows the angle when installed in toolholder.
· As Fig. 1 of **H9** shows, the cut-off diameter of the insert (CUTDIA) is indicated when the top of the cut-off edge progresses 1mm from the center.

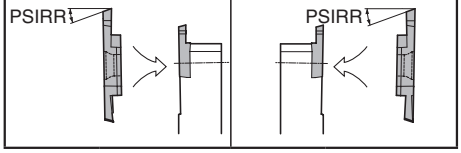
Inserts Identification System (Ref. to the Table 1)

TKF 12 R 050 — S — 16D R

- TKF — Insert Type
- 12 — Insert Size
- R — Insert Hand (R : Right-hand, L : Left-hand)
- 050 — Edge Width
- S — Name of Chipbreaker (S : S Chipbreaker, T : T Chipbreaker (Tough Edge), NB : Without Chipbreaker)
- 16D — Lead Angle (PSIRR)
- R — Hand of Lead Angle (R : Right-hand)

Table 1

Toolholder	Right-hand	Toolholder	Left-hand
Insert	Right-hand	Insert	Left-hand
Lead Angle	Right-hand	Lead Angle	Right-hand

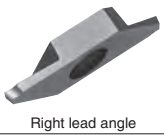
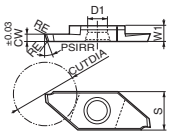
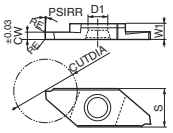
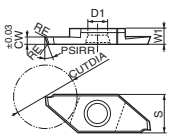
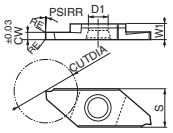
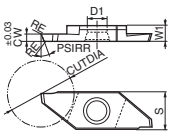
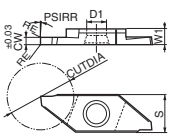


Inserts are sold in 10 piece boxes

● : Std. Item

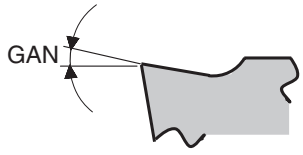
Classification of usage																
● : Continuous~Light Interruption / 1st Choice ◔ : Continuous~Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	●		◔		◔									
	M	Stainless Steel	◔		●		◔									
	K	Cast Iron													●	
	N	Non-ferrous Metals											●		◔	

Applicable Inserts (TKF16)

Insert Handed Insert shows Right-hand		Description	Dimension (mm)							Angle	MEGACOAT NANO PLUS		MEGACOAT NANO		MEGACOAT		DLC Coated Carbide		Carbide		See Page for Applicable Toolholders
			CW	CUTDIA	RE	W1	S	D1	PSIRR		PR1725		PR1535		PR1225		PDL025		KW10		
											R	L	R	L	R	L	R	L	R	L	
 Right lead angle		TKF16R/L 150-S-16DR	1.5	16	0.05	4	9.5	5	16°	●	●	●	●	●	●	●	●	●	●	H9 H11 H13
		200-S-16DR	2.0							●	●	●	●	●	●	●	●	●	●	
		TKF16R/L 150-S	1.5	16	0.05	4	9.5	5	0°	●	●	●	●	●	●	●	●	●	●	
		200-S	2.0							●	●	●	●	●	●	●	●	●	●	
 Right lead angle / Tough Edge		TKF16R/L 150-T-16DR	1.5	16	0.08	4	9.5	5	16°	●	●	●	●	●	●					
		200-T-16DR	2.0							●	●	●	●	●	●					
 Tough Edge		TKF16R/L 150-T	1.5	16	0.08	4	9.5	5	0°	●	●	●	●	●	●					
		200-T	2.0							●	●	●	●	●	●					
 Right lead angle Without Chipbreaker		TKF16R/L 150-NB-20DR	1.5	16	0	4	9.5	5	20°	●	●	●	●					●	●	
		200-NB-20DR	2.0							●	●	●	●					●	●	
 Without Chipbreaker		TKF16R/L 150-NB	1.5	16	0	4	9.5	5	0°	●	●	●	●					●	●	
		200-NB	2.0							●	●	●	●					●	●	

· Lead angle (PSIRR) shows the angle when installed in toolholder.
· As Fig. 1 of **H9** shows, the cut-off diameter of the insert (CUTDIA) is indicated when the top of the cut-off edge progresses 1mm from the center.

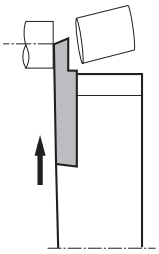
Descriptions of Chipbreaker Edge Shape

Edge Shape \ Chipbreaker	S Chipbreaker		T Chipbreaker (Tough Edge)		NB (Without Chipbreaker)	
	GAN	Description	GAN	Description	GAN	Description
	15°	TKF12…-S	12°	TKF…-T TKF…-T-16DR	0°	TKF…-NB TKF…-NB-20DR
	20°	TKF16…-S TKF16…-S-16DR				
	25°	TKF12…-S-16DR				

● : Std. Item

Inserts are sold in 10 piece boxes

KTKF / KTKF Goose-neck Holder / KTKF Y-axis Toolholder NEW



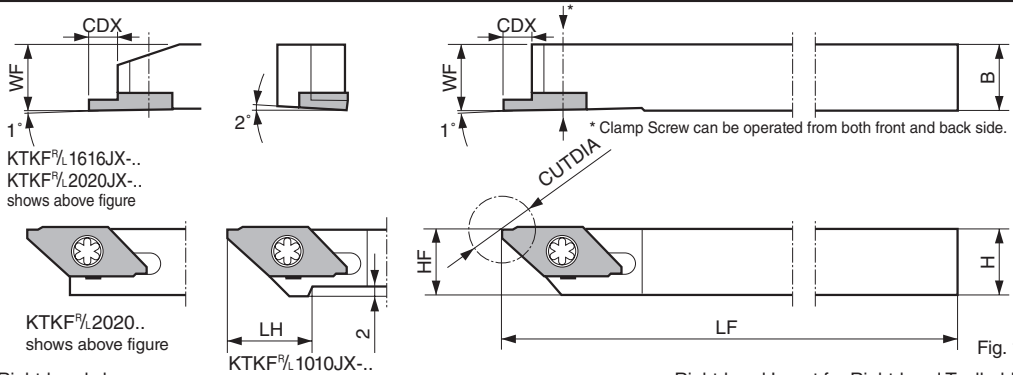


Fig. 1

● Right-hand shown

Right-hand Insert for Right-hand Toolholder.

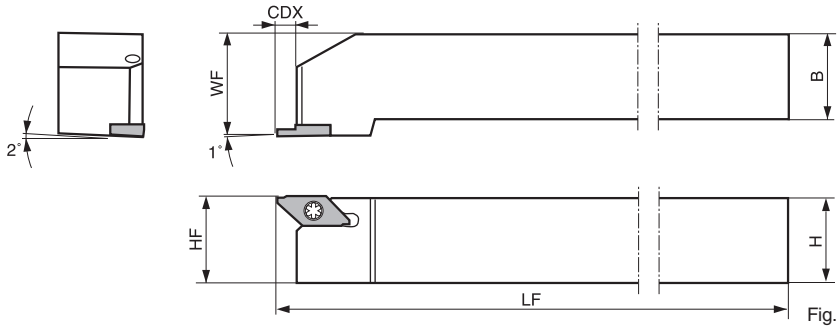
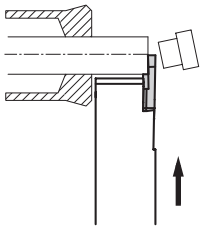


Fig. 2

● Right-hand shown

Right-hand Insert for Right-hand Toolholder.



<Goose-neck Holder>

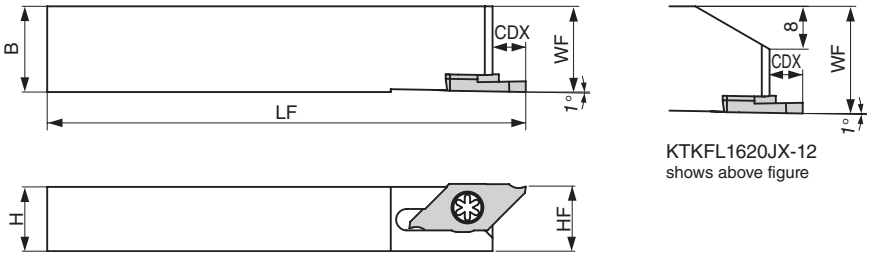
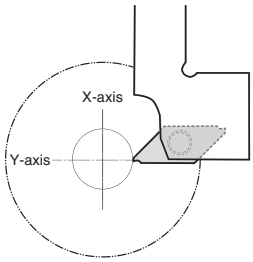


Fig. 3

● Left-hand shown

Left-hand Insert for Left-hand Toolholder.



<Y-axis Toolholder>

*HBKW KTKFR1216JX-12-Y : 15mm
KTKFR1616JX-12-Y : 11mm

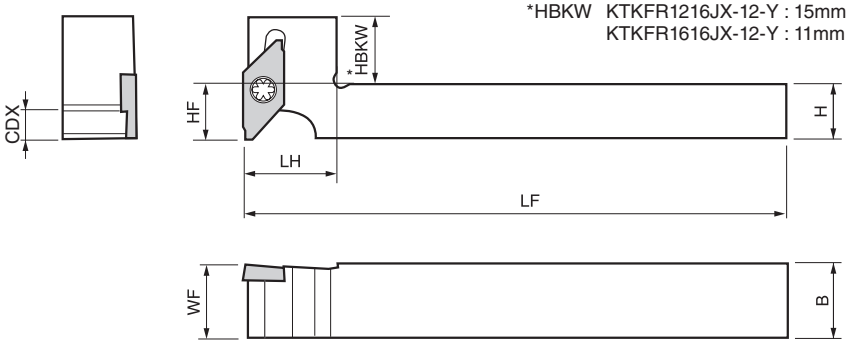


Fig. 4

● Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LH	WF	CDX	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts
KTKF$^{R}_{L}$	1010JX-12	●	●	10	10	10	120	15	10	6	Fig. 1	SB-4590TRWN	FT-10	TKF12$^{R}_{L}$ …
	1212JX-12	●	●	12	12	12		-	12					
	1616JX-12	●	●	16	16	16			16					
	2020JX-12	●	●	20	20	20			20					
KTKFR	2525M-12	●		25	25	25	150	-	30	6	Fig. 2	SB-4590TRWN	FT-10	TKF12R …
KTKF$^{R}_{L}$	1010JX-16	●	●	10	10	10	120	20	10	8	Fig. 1	SB-4590TRWN	FT-10	TKF16$^{R}_{L}$ …
	1212JX-16	●	●	12	12	12		-	12					
	1616JX-16	●	●	16	16	16			16					
	2020JX-16	●	●	20	20	20			20					
KTKFR	2525M-16	●		25	25	25	150	-	30	8	Fig. 2	SB-4590TRWN	FT-10	TKF16R …
KTKF$^{R}_{L}$	1212F-12	●	●	12	12	12	85	-	12	6	Fig. 1	SB-4590TRWN	FT-10	TKF12$^{R}_{L}$ …
	1212F-16	●	●							8				TKF16$^{R}_{L}$ …
KTKFL	1216JX-12		●	12	12	16	120	-	16	6	Fig. 3	SB-4590TRWN	FT-10	TKF12L …
	1620JX-12		●	16	16	20			20					
NEW KTKFR	1216JX-12-Y	●		12	12	16	120	20	16	15	Fig. 4	SB-4590TRWN	FT-10	TKF12R …
	1616JX-12-Y	●		16	16			25		11				

· CDX shows the distance from the toolholder to the cutting edge. ➡ **H6,H7** for the actual cut-off diameter.

Recommended Cutting Conditions ➡ **H47**

Note : Cut-off diameter of -12 type toolholder (CUTDIA) depends on the insert width.
Please see the precautions in **H10** when using Y-axis toolholder.

How to Use

1) When using Main Spindle only

Maximum cuttinng diameter is CUTDIA
Even if the cutting edge runs beyond the center line as shown in Fig.2, the insert does not contact the workpiece, since the workpiece falls off.
(The clearance between the insert and the workpiece is 0.2mm)

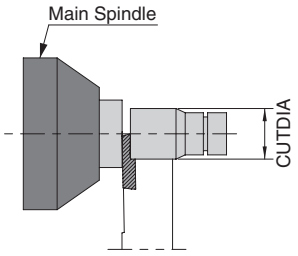


Fig. 1
(When the edge is at the center)

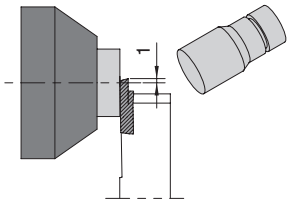


Fig. 2
(When the edge is 1mm beyond the center)

2) When using both Main and Sub spindles

In this case, when the cutting edge runs beyond the center line, the insert will contact the workpiece, since the workpiece does not fall off. Therefore the programmed distance beyond the center must be considered.
e.g.) When the cutting edge is programmed to run 1mm beyond the center as shown in Fig.4,
Maximum cutting dimeter CUTDIA2 (Fig. 4) is
CUTDIA2=[CUTDIA-1mm x 2](mm).
(The clearance between the insert and the workpiece is 0.2mm)

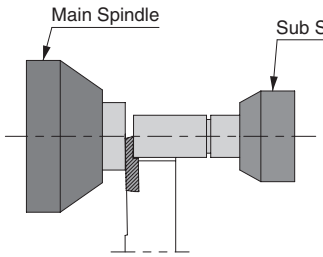


Fig. 3
(When the edge is at the center)

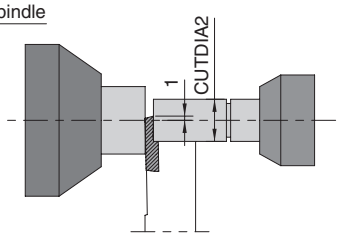
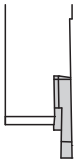
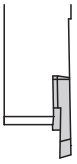
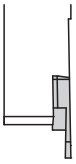
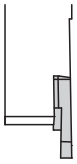
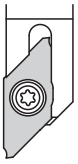
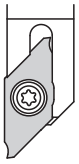
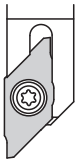


Fig. 4
(When the edge is 1mm beyond the center)

● : Std. Item

How to select edge prep.

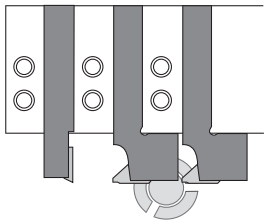
● Troubleshooting

Problems	Countermeasures	Countermeasures						
		Lead Angle (PSIRR)		Edge Width		Name of Chipbreaker		
		Neutral (0˚)	Yes	Narrower	Wider	S	T	NB
								
Insert Fracture	Insert Fracture Prevention	Effective			Effective		Effective	Effective
Long cutting time	Cutting time reduction	Effective			Effective		Effective	Effective
Entangled chips	Prevention of chip entanglement	Effective		Effective		Effective		
Large boss remain	Small boss remain		Effective	Effective		Effective		
Ring Remain (Hollow Workpiece)	Prevention of Ring Remain		Effective	Effective		Effective		
Deformation of Hollow Workpiece (pipe)	Preventing deformation		Effective	Effective		Effective		

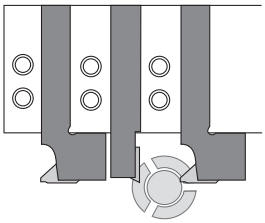
Precautions for using Y-axis toolholder

Do not use Y-axis toolholders side by side to prevent interference. (Only two Y-axis holder can be used at the same time)

With interference

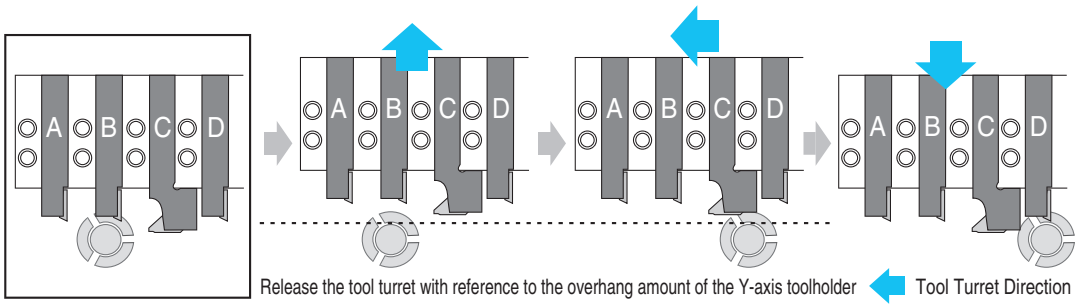


Without interference



Standard toolholders may be mounted between two Y-axis toolholders

When changing the tool, set the retracted position with reference to the cutting edge of the Y-axis holder. (When exchanging from tool B to D)

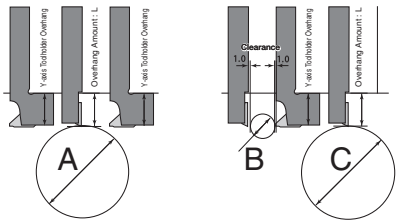
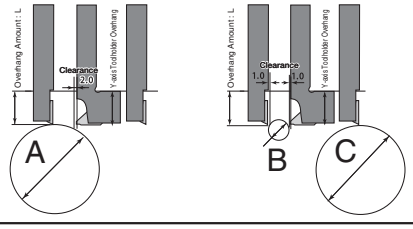


Release the tool turret with reference to the overhang amount of the Y-axis toolholder

Tool Turret Direction

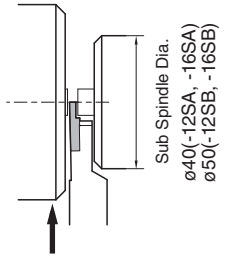
Note that using other toolholders together will result in dierent outside diameters

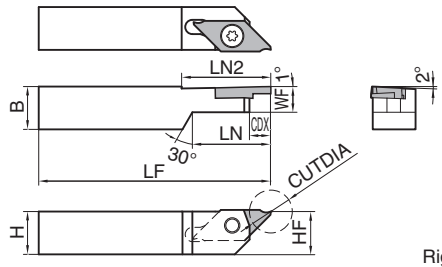
(Unit : mm)

Y-axis Toolholder Overhang	Examples	Available Outside Cutting Diameter (ø) \ Overhang Amount L	20	22	25
20		A	Without Restriction	Without Restriction	Without Restriction
		B	13.0	13.0	13.0
		C	Without Restriction	Without Restriction	Without Restriction
25		A	38.0	58.0	Without Restriction
		B	14.9	13.6	13.0
		C	45.0	60.0	Without Restriction

KTKF-S (for sub spindle tooling)

Right-hand

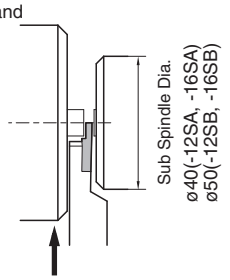


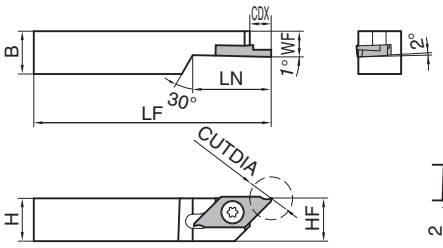


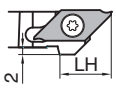
• Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Left-hand







KTKF$^{R}_{L}$1010JX-12SA
KTKF$^{R}_{L}$1010JX-16SA
shows left figure

• Left-hand shown

Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Cut-off Dia.	Dimension (mm)									Spare Parts		Applicable Inserts
													Clamp Screw	Wrench	
	R	L	CUTDIA	H	HF	B	LF	LH	LN	*LN2	WF	CDX			⇨ H6, H7
KTKF$^{R}_{L}$1010JX-12SA	●	●	5~12	10	10	10	120	15	22	26	7.2	6	SB-4570TRN	FT-10	TKF12$^{R}_{L}$
1212F-12SA	●	●		12	12	12	85	-							
KTKF$^{R}_{L}$1212JX-12SB	●	●					120		26						
KTKF$^{R}_{L}$1010JX-16SA	●	●	16	10	10	10	120	20	22	30	7.2	8			TKF16$^{R}_{L}$
1212F-16SA	●	●		12	12	12	85	-							
KTKF$^{R}_{L}$1212JX-16SB	●	●					120		26						

* CDX shows the distance from the toolholder to the cutting edge.
Cut-off diameter (CUTDIA) depends on the insert edge width.
* Only Right-hand is available for LN2 dimension.

Recommended Cutting Conditions ⇨ H47

How to Use

1) When using Main Spindle only

Maximum cuttinng diameter is CUTDIA
Even if the cutting edge runs beyond the center line as Fig. 2 on the program, the insert does not contact the fallen off workpiece.
(The clearance between the insert and the workpiece is 0.2mm)

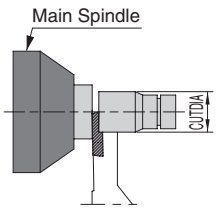


Fig. 1
(When the edge is at the center)

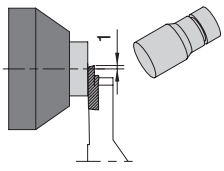


Fig. 2
(When the edge is 1mm beyond the center)

2) When Using Both Main and Sub Spindles

In this case, when the cutting edge runs beyond the center line, the insert will contact the workpiece, since the workpiece does not fall off. Therefore the programmed distance beyond the center must be considered.
e.g.) When the cutting edge is programmed to run 1mm beyond the center as shown in Fig.4,
Maximum cutting dimeter CUTDIA2 (Fig. 4) is CUTDIA2=[CUTDIA-1mm x 2](mm).
(The clearance between the insert and the workpiece is 0.2mm)

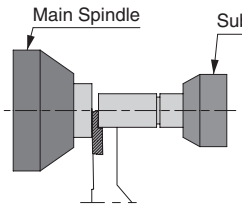


Fig. 3
(When the edge is at the center)

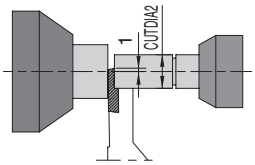


Fig. 4
(When the edge is 1mm beyond the center)

● : Std. Item

Cut-off Toolholders For Automatic Lathe Toolholders for High Pressure Coolant

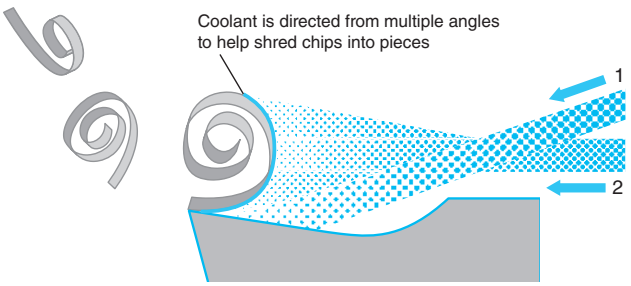
KTKF-JCT

Finely Breaks Chips into Small Pieces. Superior Chip Control Performance When Machining Difficult-to-Cut Material and Stainless Steel. Superior Cooling Action Improves Tool Life.

1 Excellent Chip Control

Discharges Coolant in Two Directions toward Rake Surface of Insert. Finely Breaks Chips into Small Pieces.

Coolant Discharge Structure Comparison



KTKF-JCT



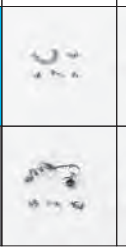
Competitor A

Chip Control Comparison (Internal evaluation)

SUS304

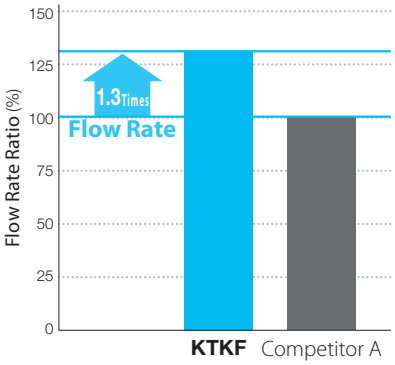
f (mm/rev)	0.01	0.02	0.03
KTKF -JCT			
Competitor A			

TAB6400 (Ti-6Al-4V)

f (mm/rev)	0.01	0.02	0.03
KTKF -JCT			
Competitor A			

Cutting Conditions : Vc = 80 m/min, Wet (Oil-based) Lubricating Pressure : 1.5 MPa (Internal)
Workpiece Material : ø12

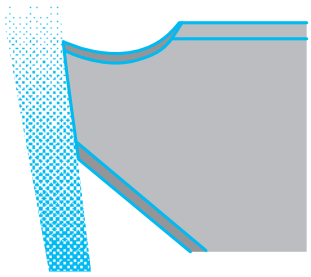
Coolant Flow Rate Comparison (Internal evaluation)



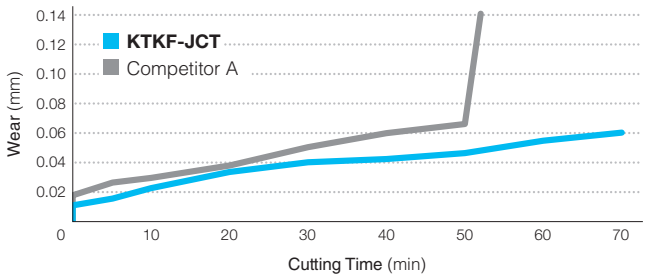
Lubricating Pressure : 1.5 MPa (Internal)

2 Superior Cooling Action Improves Tool Life

Coolant is directed from the flank face of the insert as well
An ample supply of coolant to the tool edge area helps to further suppress insert wear



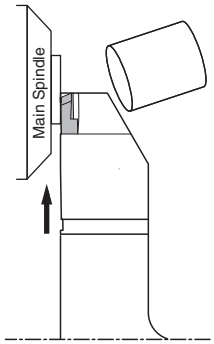
Wear Resistance Comparison (Internal evaluation)

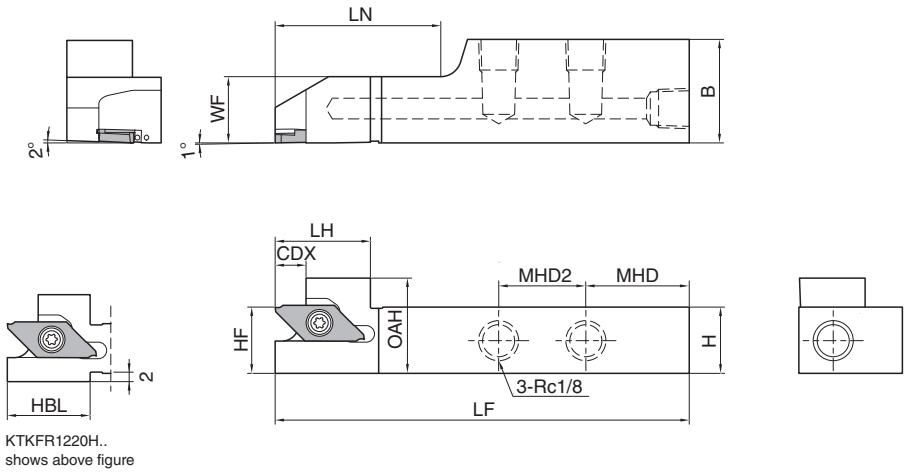


Cutting Conditions : Vc = 100 m/min, f = 0.02 mm/rev, Wet (Oil-based)
Lubricating Pressure : 1.5 MPa (Internal) Workpiece Material : TAB6400 (Ti-6Al-4v) ø12

KTKF-JCT

Right-hand



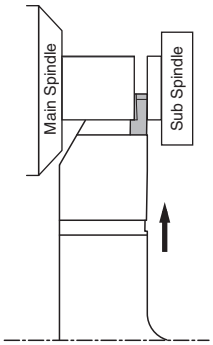


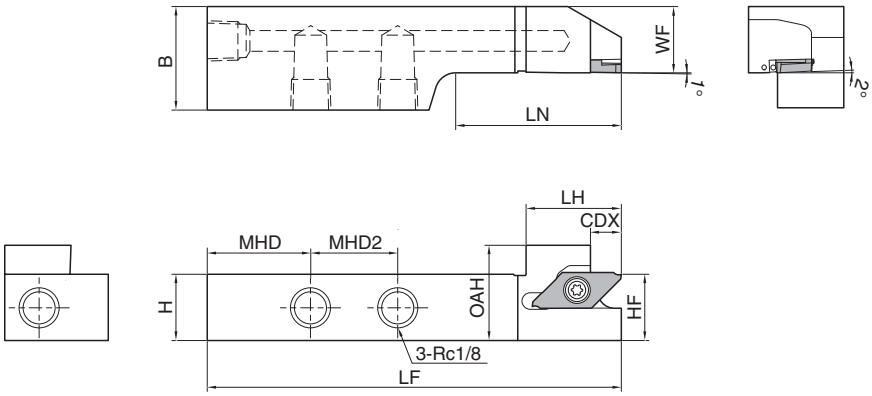
KTKFR1220H..
shows above figure

●Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Left-hand





●Left-hand shown

Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Dimension (mm)											Spare Parts			Applicable Inserts
														Clamp Screw	Wrench	Plug	
	R	L	H	HF	OAH	B	LF	HBL	LH	LN	WF	CDX	MHD	MHD2				
KTKFR 1220H-12JCT	●		12	12	19	20	100	20	20	28	12	7.5	35	-	SB-4590 TRWN	FT-10	GP-1	TKF12R … TKFT12R …
KTKF$^{R}_{L}$ 1625H-12JCT	●	●	16	16	23	25	100	-	23	40	16	7.5	25	21	SB-4590 TRWN	FT-10	GP-1	TKF12$^{R}_{L}$ … TKFT12$^{R}_{L}$ …
KTKF$^{R}_{L}$ 2025H-12JCT	●	●	20	20	27	25	100	-	23	40	20	7.5	25	21	SB-4590 TRWN	FT-10	GP-1	TKF12$^{R}_{L}$ … TKFT12$^{R}_{L}$ …
KTKF$^{R}_{L}$ 1625H-16JCT	●	●	16	16	23	25	100	-	23	40	16	9.6	25	21	SB-4590 TRWN	FT-10	GP-1	TKF16$^{R}_{L}$ …
KTKF$^{R}_{L}$ 2025H-16JCT	●	●	20	20	27	25	100	-	23	41	20	9.6	25	21	SB-4590 TRWN	FT-10	GP-1	TKF16$^{R}_{L}$ …

Applicable Inserts: H6, H7; J25 (Threading)

Recommended Cutting Conditions H47

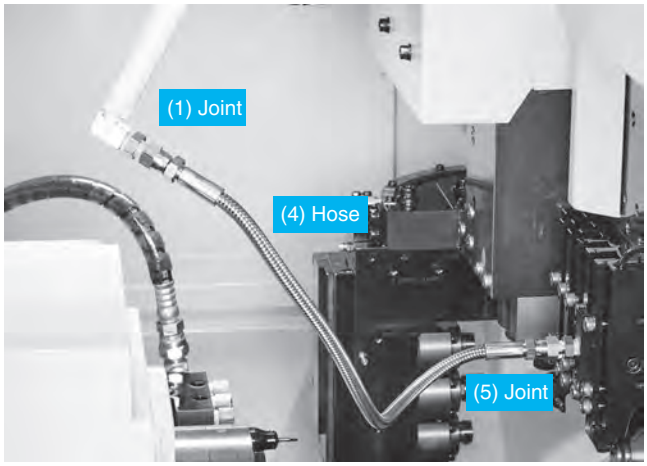
● : Std. Item

Coolant Piping Parts

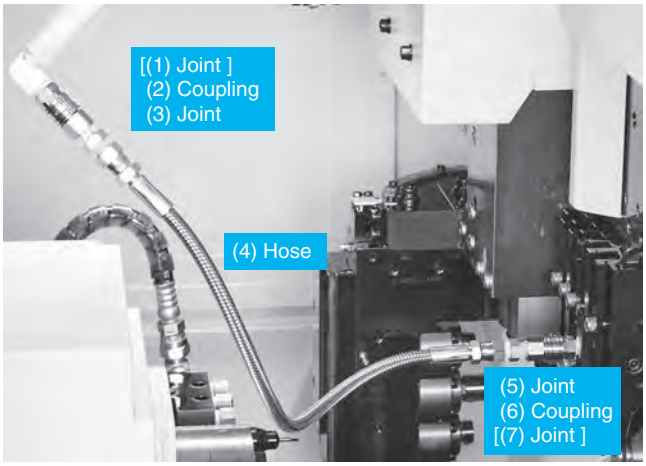
Pipe parts will be required separately if internal coolant is used

Pump Pressure : Up to 20 MPa. Pump Pressure: Up to 7.5 MPa if Coupling is used.

Without Coupling (Pump Pressure: Up to 20 MPa)



With Coupling (Pump Pressure: Up to 7.5 MPa)



Combination Part Description (Example)

Spare Parts	Description
(1) Joint	**J-ST-R1/8-G1/8**
(4) Hose	**HS-G1/8-G1/8-500**
(5) Joint	**J-ST-R1/8-G1/8**

Convert the thread standards on the machine's side (Rc1/4, Rc1/8, NPT1/8, etc.) to the thread standard on the hose side (G1/8) for use.
Use sealing agents such as seal tapes when installing piping parts.

Combination Part Description (Example)

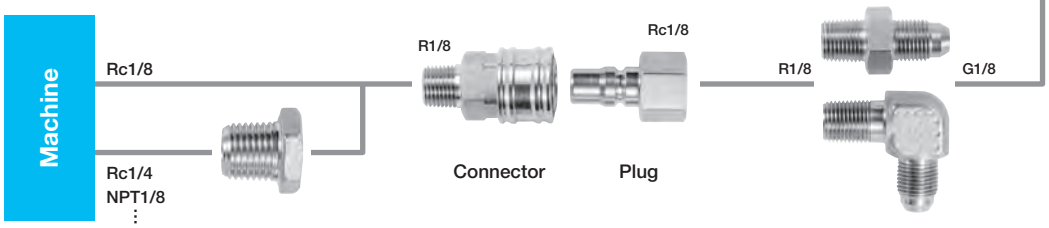
Spare Parts	Description
[(1) Joint]	**-**
(2) Coupling	**CP-ST-R1/8 , P-ST-RC1/8**
(3) Joint	**J-ST-R1/8-G1/8**
(4) Hose	**HS-G1/8-G1/8-500**
(5) Joint	**J-ST-R1/8-G1/8**
(6) Coupling	**P-ST-RC1/8 , CP-ST-R1/8**
[(7) Joint]	**-**

Convert the thread standards on the machine's side (Rc1/4, Rc1/8, NPT1/8, etc.) to thread standards of Coupling (Rc1/8, etc.) or hose (G1/8) for use.
Use sealing agents such as seal tapes when installing piping parts.

Without Coupling (Pump Pressure: Up to 20 MPa)



With Coupling (Pump Pressure: Up to 7.5 MPa)



(1) Joint (2) Coupling (3) Joint (4) Hose

Piping Installation Parts Description

Joint [(1)(3)(5)(7)]

Pressure Resistance : ~ 20.0MPa

Exterior	Description	Thread Standard	Stock
	**J-ST-R1/4-G1/8**	R1/4 ⇔ G1/8	●
	J-ST-NPT1/8-G1/8	NPT1/8 ⇔ G1/8	●
	**J-ST-R1/8-G1/8**	R1/8 ⇔ G1/8	●
	**J-AN-R1/8-G1/8**		●
	**J-ST-R1/4-RC1/8**	R1/4 ⇔ Rc1/8	●
	J-ST-NPT1/8-RC1/8	NPT1/8 ⇔ Rc1/8	●
	J-ST-R1/8-RC1/8	Rc1/8 ⇔ R1/8 (Extension Joint)	●

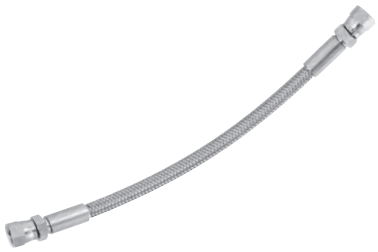
Coupling [(2)(6)]

Pressure Resistance : ~ 7.5MPa

Exterior	Description	Thread Standard	Stock
	**CP-ST-R1/8**	R1/8	●
	**P-ST-RC1/8**	Rc1/8	●

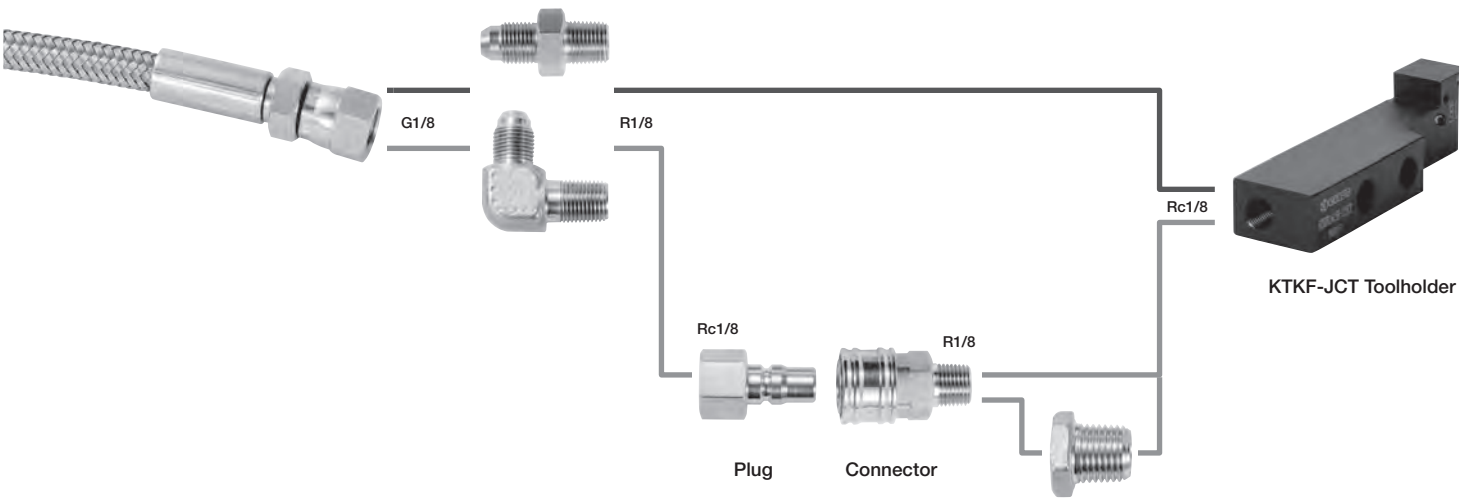
Hose (4)

Pressure Resistance : ~ 20.0MPa

Exterior	Description	Thread Standard	Overall length (mm)	Stock
	**HS-G1/8-G1/8-200**	G1/8	200	●
	HS-G1/8-G1/8-300		300	●
	HS-G1/8-G1/8-400		400	●
	HS-G1/8-G1/8-500		500	●
	HS-G1/8-G1/8-600		600	●
	HS-G1/8-G1/8-800		800	●

Cautions

1. Make sure machine door is completely closed before use of these parts.
2. Use appropriate seal for the male thread of the piping parts and make sure the connection is secure.
   Use plugs to seal off unused coolant holes.
3. Connect and fasten the coolant hose firmly.
4. The use of copper washers may cause leakage but will have no effect on the performance.
5. Commercial piping parts can be used if the thread standards are same. Check the pressure resistance before use.
6. Regularly changing the coolant filter is recommended.

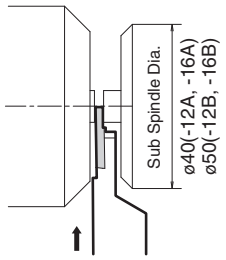


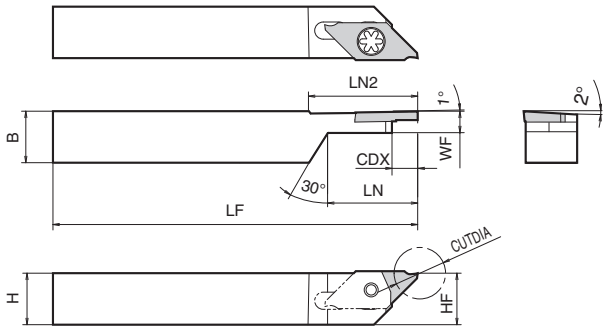
(4) Hose (5) Joint (6) Coupling (7) Joint (Extension Joint)

● : Std. Item

KTKFS (for sub spindle tooling) (Will be switched to KTKF-S ➡H11)

Right-hand

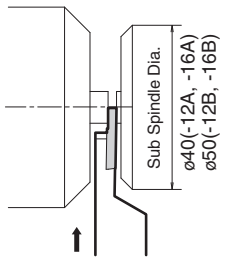


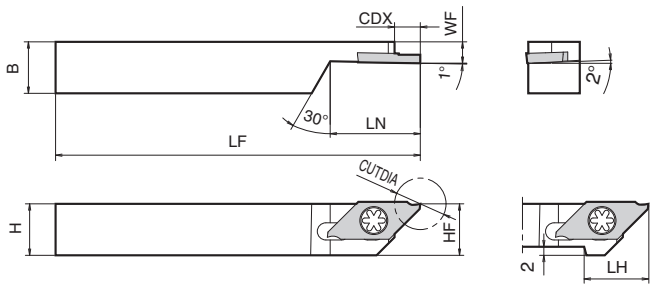


● Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Left-hand





KTKFS R/L 1010K-12A
KTKFS R/L 1010K-16A
shows left figure

● Left-hand shown

Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

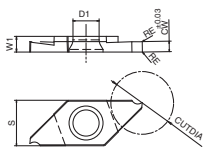
Description		Stock R	Stock L	Cut-off Dia. CUTDIA	Dimension (mm) H	HF	B	LF	LH	LN	*LN2	WF	CDX	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡H17
KTKFS R/L	1010K-12A	▲	▲	6 ~ 12	10	10	10	120	15	22	26	5	6	SB-4050TRN	LTW-10S	TKFS12 R/L
	1212F-12A	▲	▲		12	12	12	85	-							
	1212K-12B	▲	▲					120		26						
KTKFS R/L	1010K-16A	▲	▲	14 ~ 16	10	10	10	120	20	22	30	5	8	SB-4050TRN	LTW-10S	TKFS16 R/L
	1212F-16A	▲	▲		12	12	12	85	-							
	1212K-16B	▲	▲					120		26						

· CDX shows the distance from the toolholder to the cutting edge. Ref. to the table below for the actual cut-off diameter.

Recommended Cutting Conditions ➡H17

· Cut-off diameter (CUTDIA) depends on the insert edge width.
* Only Right-hand is available for LN2 dimension.

TKFS (for small diameter cut-off)

Insert (Handed insert shows Left-hand)	Description		Dimension (mm) CW	CUTDIA
	TKFS12 R/L	100-S	1.0	6
		150-S	1.5	9
		200-S	2.0	12
	TKFS16 R/L	150-S	1.5	14
		200-S	2.0	16

Notes) As Fig. 2 shows, the cut-off diameter (CUTDIA) of the insert is indicated when the top of the cutting edge progresses 1mm from the center.

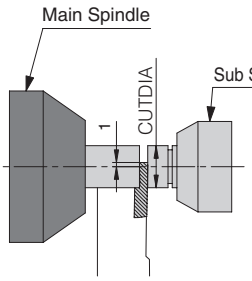


Fig. 1

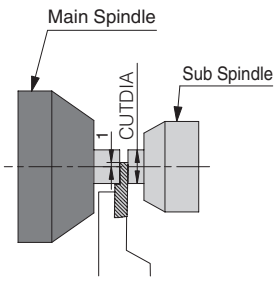


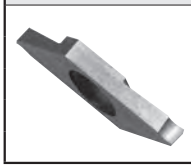
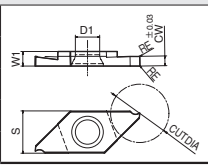
Fig. 2

· As Fig. 1 shows, use KTKFL (Left-hand) for the distance between main spindle and sub spindle.
· As Fig. 2 shows, KTKFS is recommended for small diameters and for the short distance between the main spindle and sub spindle.

▲ : To be replaced by a new product

Applicable Inserts

Classification of usage						
●: Continuous~Light Interruption / 1st Choice ◔: Continuous~Light Interruption / 2nd Choice ●: Continuous / 1st Choice ○: Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	●	◔	◔	
	M	Stainless Steel	◔	●	◔	
	K	Cast Iron				●
	N	Non-ferrous Metals				●

Insert Handed insert shows Left-hand		Description		Dimension (mm)						MEGACOAT NANO PLUS		MEGACOAT NANO		MEGACOAT		Carbide	
				CW	CUTDIA	RE	W1	S	D1	PR1725		PR1535		PR1225		KW10	
										R	L	R	L	R	L	R	L
		TKFS12R/L	100-S	1.0	6	0.05	2.2	8.7	4.4	▲	▲	▲	▲	▲	▲	▲	▲
			150-S	1.5	9					▲	▲	▲	▲	▲	▲	▲	▲
			200-S	2.0	12					▲	▲	▲	▲	▲		▲	▲
		TKFS16R/L	150-S	1.5	14	0.05	2.2	9.5	4.4	▲	▲	▲	▲	▲	▲	▲	▲
			200-S	2.0	16					▲	▲	▲	▲	▲	▲	▲	▲

· As Fig. 2 (**H16**) of shows, the cut-off diameter of the insert (CUTDIA) is indicated when the top of the cutting edge progresses 1mm from the center.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)				TKFS12			TKFS16		Remarks
	MEGACOAT NANO PLUS	MEGACOAT NANO	MEGACOAT	Carbide	Edge Width (mm)			Edge Width (mm)		
					1.0	1.5	2.0	1.5	2.0	
	PR1725	**PR1535**	**PR1225**	**KW10**	f (mm/rev)			f (mm/rev)		
Carbon Steel	★ 70 ~ 170	☆ 70 ~ 150	☆ 70 ~ 150	-	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	Coolant
Alloy Steel	★ 70 ~ 170	☆ 70 ~ 150	☆ 70 ~ 150	-	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	
Stainless Steel	☆ 60 ~ 140	★ 60 ~ 120	☆ 60 ~ 120	-	0.01 ~ 0.02	0.01 ~ 0.02	0.01 ~ 0.03	0.01 ~ 0.02	0.01 ~ 0.03	
Cast Iron	-	-	-	★ 50 ~ 100	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	
Aluminum Alloys	-	-	-	★ 200 ~ 450	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	
Brass	-	-	-	★ 100 ~ 200	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	

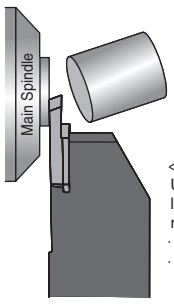
★ : 1st Recommendation ☆ : 2nd Recommendation

KTKF / KTKFS Selection Reference

KTKF

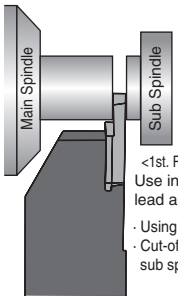
· Both Right-hand and Left-hand types are applicable to gang tool post.
· Basically Left-hand type is used for cut-off operation using a sub spindle.

KTKFR (Right-hand toolholder)



<1st. Recommendation>
Use insert with lead angle to remove boss.
· Not using sub spindle
· Cut-off operation near main spindle side

KTKFL (Left-hand toolholder)

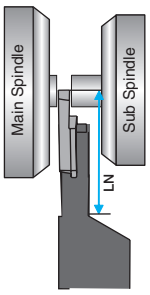


<1st. Recommendation>
Use insert without lead angle.
· Using sub spindle
· Cut-off operation near sub spindle side

KTKFS

· When machining workpiece with small diameter, use KTKFS to reduce overhang distance from the main spindle.

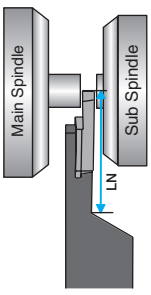
KTKFSR (Right-hand toolholder)



<How to select>
Hand of Toolholder
· Long workpiece and more rigidity
· Cut-off operation near main spindle side

<How to select>
LN dimension
· Sub Spindle Dia.
ø40→22 (A type)
ø50→26 (B type)

KTKFSL (Left-hand toolholder)



<How to select>
Hand of Toolholder
· Short workpiece and less rigidity
· Cut-off operation near sub spindle side

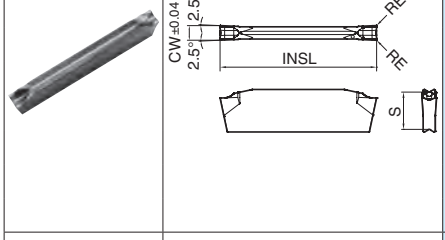
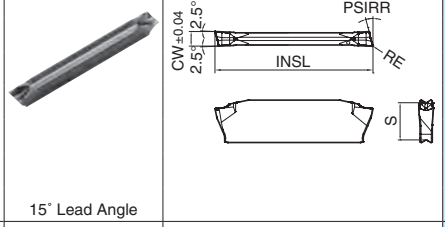
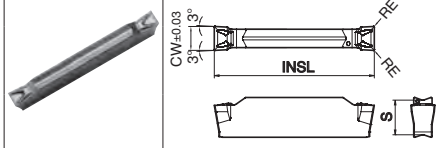
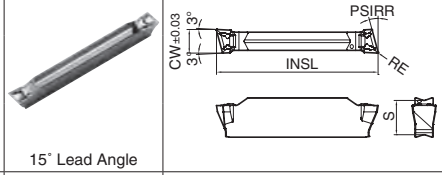
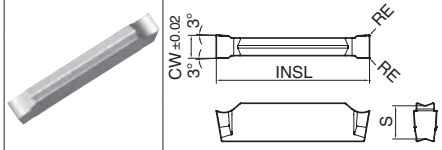
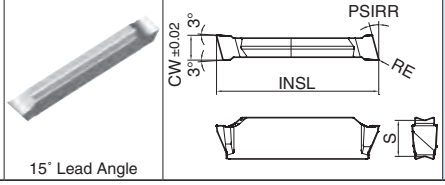
<How to select>
LN dimension
· Sub Spindle Dia.
ø40→22 (A type)
ø50→26 (B type)

▲ : To be replaced by a new product

Inserts are sold in 10 piece boxes

GDM / GDG

Classification of usage							
◓ : Continuous-Light Interruption / 1st Choice ◔ : Continuous-Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	◔	●	◔		
	M	Stainless Steel	●	◔	◔		
	N	Non-ferrous Metals				●	◔

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) Edge Width (CW)	Tolerance	RE	INSL	S	Angle PSIR$^{R}_{L}$	MEGACOAT NANO PR1535	MEGACOAT PR1225	MEGACOAT PR1215	DLC Coated Carbide PDL025	Carbide GW15	See Page for Applicable Toolholders
Cut-off / Low Feed		GDM	1316N-003PF	1.3	±0.04	0.03	16	3.7	-	●	●	●			H20 ~ H21
			1316N-015PF			0.15				●	●	●			
			1516N-003PF	1.5		0.03				●	●	●			
			1516N-015PF			0.15				●	●	●			
			2020N-003PF	2.0		0.03	20	4.3		●	●	●			H20 ~ H25
			2020N-015PF			0.15				●	●	●			
			2520N-003PF	2.5		0.03				●	●	●			
			2520N-015PF			0.15				●	●	●			
			3020N-003PF	3.0		0.03				●	●	●			H20 ~ H27
			3020N-015PF			0.15				●	●	●			
	 15° Lead Angle	GDM	1316$^{R}_{L}$-003PF-15D	1.3	±0.04	0.03	16	3.7	15°	●	●	●			H20 ~ H21
			1516$^{R}_{L}$-003PF-15D	1.5						●	●	●			
			1516R-015PF-15D			0.15				R	R	R			
			2020$^{R}_{L}$-003PF-15D	2.0		0.03	20	4.3		●	●	●			H20 ~ H25
			2020R-015PF-15D			0.15				R	R	R			
			2520$^{R}_{L}$-003PF-15D	2.5		0.03				●	●	●			
			2520R-015PF-15D			0.15				R	R	R			
			3020$^{R}_{L}$-003PF-15D	3.0		0.03				●	●	●			H20 ~ H27
			3020R-015PF-15D			0.15				R	R	R			
Cut-off / Medium Feed		GDM	2020N-010PQ	2.0	±0.03	0.1	20	4.3	-	●	●	●			H20 ~ H25
			2520N-010PQ	2.5						●	●	●			
			3020N-010PQ	3.0						●	●	●			H20 ~ H27
	 15° Lead Angle	GDM	2020R-010PQ-15D	2.0	±0.03	0.1	20	4.3	15°	R	R	R			H20 ~ H25
			2520R-010PQ-15D	2.5						R	R	R			
			3020R-010PQ-15D	3.0						R	R	R			H20 ~ H27
Cut-off / Low Cutting Force		GDG	2020N-005PG	2.0	±0.02	0.05	20	4.3	-	●	●		●	●	H20 ~ H25
			2520N-005PG	2.5						●	●		●	●	
			3020N-005PG	3.0						●	●		●	●	H20 ~ H27
	 15° Lead Angle	GDG	2020R-005PG-15D	2.0	±0.02	0.05	20	4.3	15°	R	R		R	R	H20 ~ H25
			2520R-005PG-15D	2.5						R	R		R	R	
			3020R-005PG-15D	3.0						R	R		R	R	H20 ~ H27

Note) 1. Using the PF / PM chipbreaker (for cut-off) for grooving cannot create a flat bottom (Ref. to the right figure).



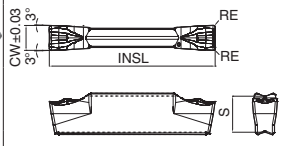
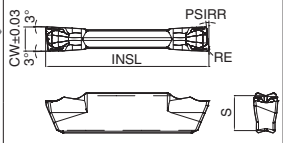
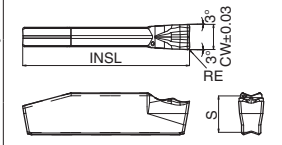
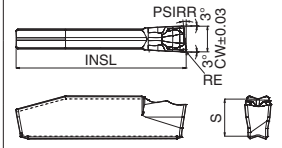
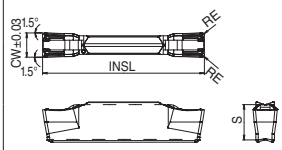
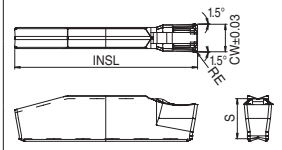
Groove bottom created by PF / PM chipbreaker

● : Std. Item
R : Std. Item (Right-hand Only)

Inserts are sold in 10 piece boxes

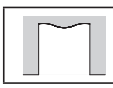
GDM / GDMS

Classification of usage					
◕ : Continuous-Light Interruption / 1st Choice ◔ : Continuous-Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	◔	◕	◔
	M	Stainless Steel	◕	◔	◔
	N	Non-ferrous Metals			

Insert (Handed Insert shows Right-hand)			Description		Dimension (mm)					Angle	MEGACOAT NANO	MEGACOAT		See Page for Applicable Toolholders
					Edge Width (CW)	Tolerance	RE	INSL	S	PSIR$^{R}_{L}$	PR1535	PR1225	PR1215	
Cut-off / General Purpose			GDM	2020N-020PM	2.0	±0.03	0.2	20	4.3	-	●	●	●	H20 ~ H25
				2520N-020PM	2.5						●	●	●	
				3020N-025PM	3.0		0.25				●	●	●	H20 ~ H27
				4020N-030PM	4.0		0.3				●	●	●	H20 H23 ~ H27
	6° Lead Angle		GDM	2020R-020PM-6D	2.0	±0.03	0.2	20	4.3	6°	R	R	R	H20 ~ H25
				2520R-020PM-6D	2.5						R	R	R	
				3020R-025PM-6D	3.0		0.25				R	R	R	H20 ~ H27
	1-edge		GDMS	2020N-020PM	2.0	±0.03	0.2	20	4.3	-	●	●	●	H20 ~ H25
				3020N-025PM	3.0		0.25				●	●	●	H20 ~ H27
				4020N-030PM	4.0		0.3				●	●	●	H20 H23 ~ H27
	6° Lead Angle 1-edge		GDMS	2020R-020PM-6D	2.0	±0.03	0.2	20	4.3	6°	R	R	R	H20 ~ H25
				3020R-025PM-6D	3.0		0.25				R	R	R	H20 ~ H27
				4020R-030PM-6D	4.0		0.3				R	R	R	H20 H23 ~ H27
Grooving and Cut-off / High feed rate			GDM	2020N-020PH	2.0	±0.03	0.2	20	4.3	-	●	●	●	H20 ~ H25
				3020N-030PH	3.0		0.3				●	●	●	H20 ~ H27
				4020N-030PH	4.0		0.3				●	●	●	H20 H23 ~ H27
	1-edge		GDMS	2020N-020PH	2.0	±0.03	0.2	20	4.3	-	●	●	●	H20 ~ H25
				3020N-030PH	3.0		0.3				●	●	●	H20 ~ H27
				4020N-030PH	4.0		0.3				●	●	●	H20 H23 ~ H27

Note) 1. Using the PF / PM chipbreaker (for cut-off) for grooving cannot create a flat bottom (Ref. to the right figure).

Recommended Cutting Conditions ➔ H28, H29



Groove bottom created by PF / PM chipbreaker

Inserts Identification System

(1) Series	(2) Tolerance Symbol	(3) No. of edge	(4) Edge Width	(5) Insert Length	(6) Hand of Tool	(7) Corner-R(RE)	(8) Chipbreaker Symbol	(9) Lead Angle
Grooving / Cut-off GD Series	G : Ground Insert M : M Class	No Indication : 2-edge S : 1-edge	13 : 1.3 mm 25 : 2.5 mm 15 : 1.5 mm 30 : 3 mm 20 : 2 mm 40 : 4 mm	16 : 16 mm 20 : 20 mm	R : Right-hand L : Left-hand N : Neutral	003 : 0.03 mm 020 : 0.2 mm 005 : 0.05 mm 025 : 0.25 mm 010 : 0.1 mm 030 : 0.3 mm 015 : 0.15 mm	PF : Cut-off (Low Feed) PQ : Cut-off (Medium Feed) PG : Cut-off (Low cutting force) PM : Cut-off (General Purpose) PH : Grooving and Cut-off (High feed rate)	No Indication : 0° 6D : 6° 15D : 15°

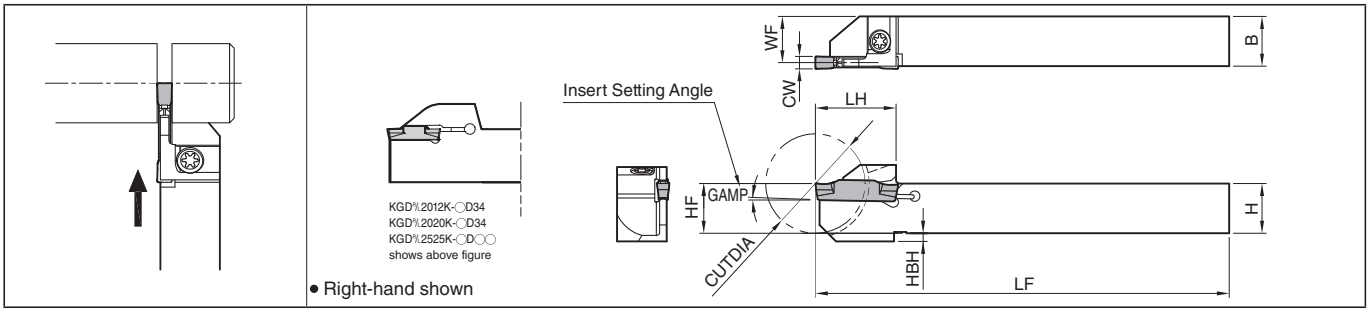
G	D	M	S	30	20	R	-	025	PM	-	6D

● : Std. Item
R : Std. Item (Right-hand Only)

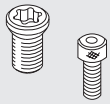
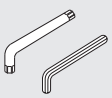
Inserts are sold in 10 piece boxes

KGD (for Automatic Lathe)

Edge Width : 1.3~4.0mm



Toolholder Dimensions

Description		Stock		Cut-off Dia.	Dimension (mm)							Angle	Edge Width CW (mm)		Spare Parts	
															Clamp Screw	Wrench
		R	L	CUTDIA	H	HF	HBH	B	LF	LH	WF	GAMP	MIN.	MAX.		
KGD□	1010JX-1.3D16	●	●	16	10	10	2	10	120	18	9.9	5°	1.3	1.3	SB-40120TR	LTW-15S
	1010JX-1.3	●	●	20							9.5					
	1212F-1.3D16	●	●	16	12	12		12	85	19.5	11.9					
	1212JX-1.3D16	●	●						120							
	1212F-1.3	●	●	24					85		11.5					
	1212JX-1.3	●	●						120							
KGD□	1010JX-1.5D16	●	●	16	10	10	2	10	120	18	9.7		1.5	1.5	SB-40120TR	LTW-15S
	1010JX-1.5	●	●	20							9.4					
	1212F-1.5D16	●	●	16	12	12		12	85	19.5	11.7					
	1212JX-1.5D16	●	●						120							
	1212F-1.5	●	●	24					85		11.4					
	1212JX-1.5	●	●						120							
KGD□	1010JX-2	●	●	20	10	10	2	10	120	18	9.2	1°	2.0	3.0	SB-40120TR	LTW-15S
	1212F-2	●	●	24	12	12		12	85	19.5	11.2					
	1212JX-2	●	●						120							
	1616JX-2	●	●	32	16	16	-	16		24.5	15.2					
	2012K-2D34	●	●	34	20	20		12	125	32.5	11.2	0°			HH5X16	LW-4
	2020K-2D34	●	●					20			19.2					
	2525K-2D34	●	●		25	25		25			24.2					
KGD□	1010JX-2.4	●	●	20	10	10	2	10	120	18	9	1°	2.4	3.0	SB-40120TR	LTW-15S
	1212F-2.4	●	●	24	12	12		12	85	19.5	11					
	1212JX-2.4	●	●						120							
	1616JX-2.4	●	●	32	16	16	-	16		24.5	15					
	2012K-2.4D34	●	●	34	20	20		12	125	32.5	11	0°			HH5X16	LW-4
	2020K-2.4D34	●	●					20			19					
	2525K-2.4D34	●	●		25	25		25			24					
KGD□	1212JX-3	●	●	24	12	12	2	12	120	19.5	10.8	1°	3.0	3.0	SB-40120TR	LTW-15S
	1616JX-3	●	●	32	16	16	-	16		24.5	14.8			4.0	SE-50125TR	LTW-20
	1616JX-3D38	●	●	38						29						
	1913K-3D38	●	●		19	19		13	125		11.8					
	2012JX-3D42	●	●	42	20	20		12	120	31	10.8					
	2012JX-3D51	●	●	51						36						
	2020JX-3D42	●	●	42				20		31	18.8					
	2020JX-3D51	●	●	51						36						
	2525K-3D51	●	●		25	25		25	125	41.5	23.8	0°			HH5X16	LW-4

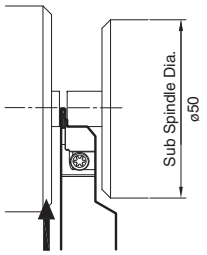
Note) 1. 4mm width insert cannot be installed in KGD□1212JX-3.
2. Recommended tightening torque of clamp screw
2.0N·m(SB-40120TR),2.5N·m(SE-50125TR),6.5N·m(HH5X16)
3. When machining the material greater than ø36mm with KGD□....-3D38, KGD□...-3D42 and KGD□...-3D51 toolholders, please use 1-edge inserts.
Maximum cuttinng diameter for 2-edge inserts is ø36mm.

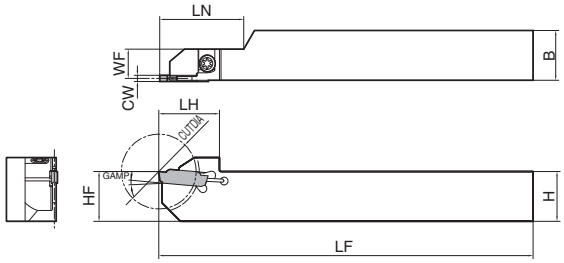
Applicable Inserts ➔ H18, H19
Recommended Cutting Conditions ➔ H28, H29

● : Std. Item

KGDS (for sub spindle tooling)

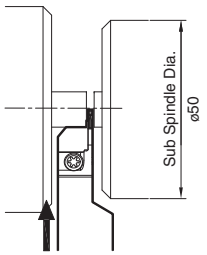
Right-hand

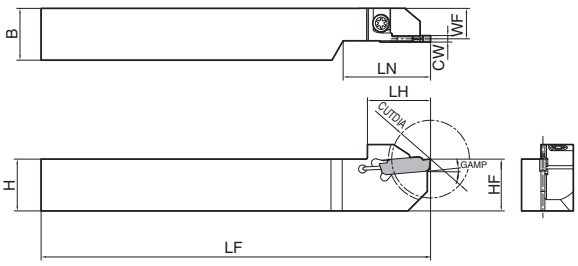




• Right-hand shown

Left-hand





• Left-hand shown

Toolholder Dimensions

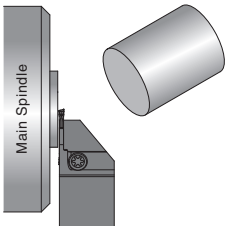
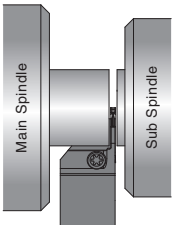
Description		Stock R	Stock L	Cut-off Dia. CUTDIA	Dimension (mm) H	HF	B	LF	LH	LN	WF	Angle GAMP	Edge Width CW (mm) MIN.	MAX.	Spare Parts: Clamp Screw	Spare Parts: Wrench
KGDS R/L	1616JX-1.3B	●	●	24	16	16	16	120	19.5	27	9.5	5°	1.3	1.3	SB-40120TR	LTW-15S
	1616JX-1.5B	●	●								9.4		1.5	1.5		
	1616JX-2B	●	●								9.2	1°	2.0	3.0		

Applicable Inserts ➡ H18, H19
Recommended Cutting Conditions ➡ H28, H29

KGD / KGDS Selection Reference

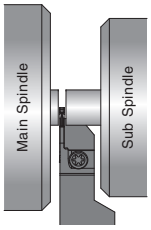
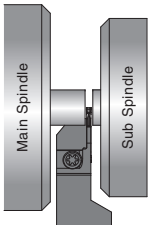
KGD

Standard type
· Both Right-hand and Left-hand types are applicable to gang tool post. · Basically Left-hand type is used for cut-off operation using a sub spindle.

KGDR (Right-hand toolholder)	KGDL (Left-hand toolholder)
	
<1st. Recommendation> Use insert with lead angle to remove boss. · Not using sub spindle · Cut-off operation near main spindle side	<1st. Recommendation> Use insert without lead angle. · Using sub spindle · Cut-off operation near sub spindle side

KGDS

Sub spindle type
· When machining workpiece with small diameter, use KGDS to reduce overhang distance from the main spindle.

KGDSR (Right-hand toolholder)	KGDSL (Left-hand toolholder)
	
· Long workpiece and more rigidity · Cut-off operation near main spindle side	· Short workpiece and less rigidity · Cut-off operation near sub spindle side

Toolholder Identification System (for Automatic Lathe)

K G D
KGDS

R	1616	JX	-	3 / 1.3	D38 / B
Toolholder Hand: R : Right-hand, L : Left-hand	Shank Size: 16 × 16 mm	Toolholder Length: 120 mm		Applicable Inserts: GDM/GDMS Edge Width : 3~4mm / GDM/GDMS Edge Width : 1.3mm	Others: D38 : CUTDIA 38mm / B : For sub spindle tooling

● : Std. Item

Great for High Pressure Coolant Cut-off Toolholders

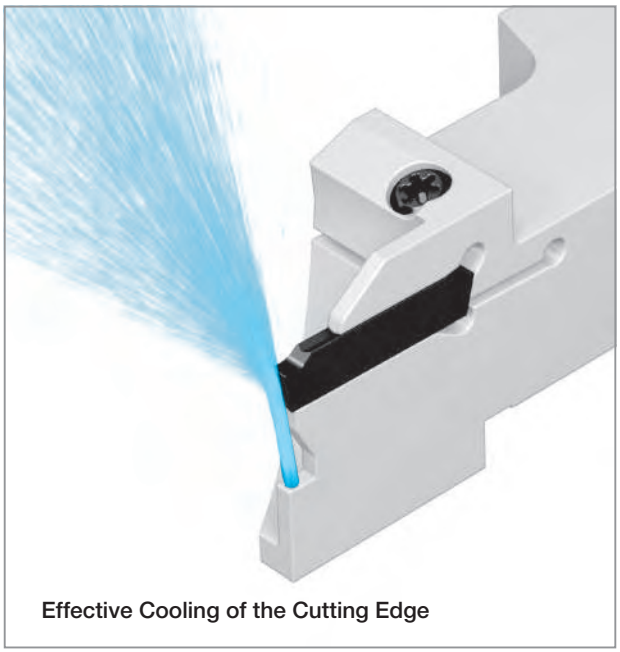
KGD-JCT NEW (for automatic lathe)

Cut-off Holders for High Pressure Coolant with Long Tool Life

The Optimized Coolant Hole Position Effectively Cools the Cutting Edge

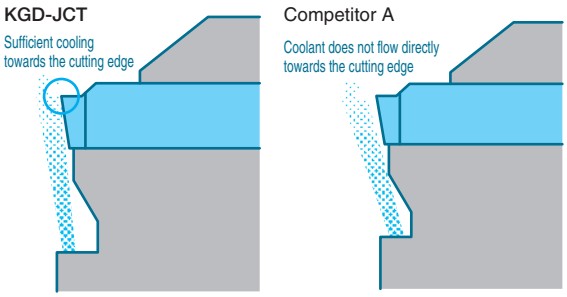
1 Optimized Coolant Hole Position

2 Discharge Coolant towards the Flank Face of the Insert

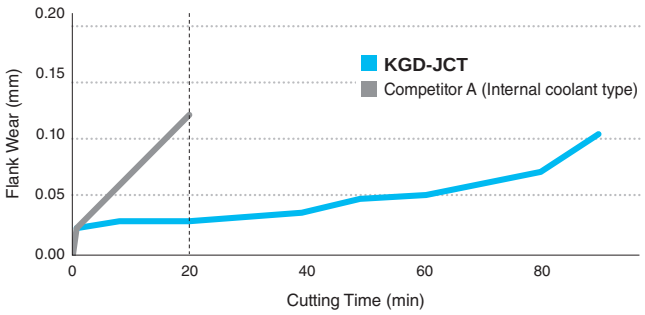


Effective Cooling of the Cutting Edge

Coolant Discharging (Image)



Wear Resistance Comparison (Internal evaluation)



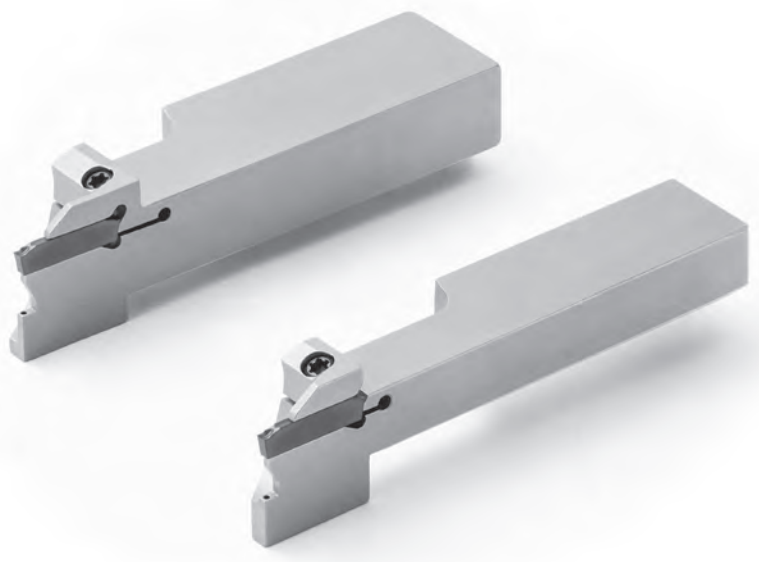
Cutting Conditions : Vc=80m/min, f=0.06mm/rev (~2mm : f=0.02mm/rev),
KGDR1625H-2JCT, GDM2020N-015PF PR1535 (Edge Width : 2.0mm)
Workpiece Material : SUS304 (ø25) Internal coolant (1.5MPa) Cut-off

Cutting edge condition (after machining 20min)

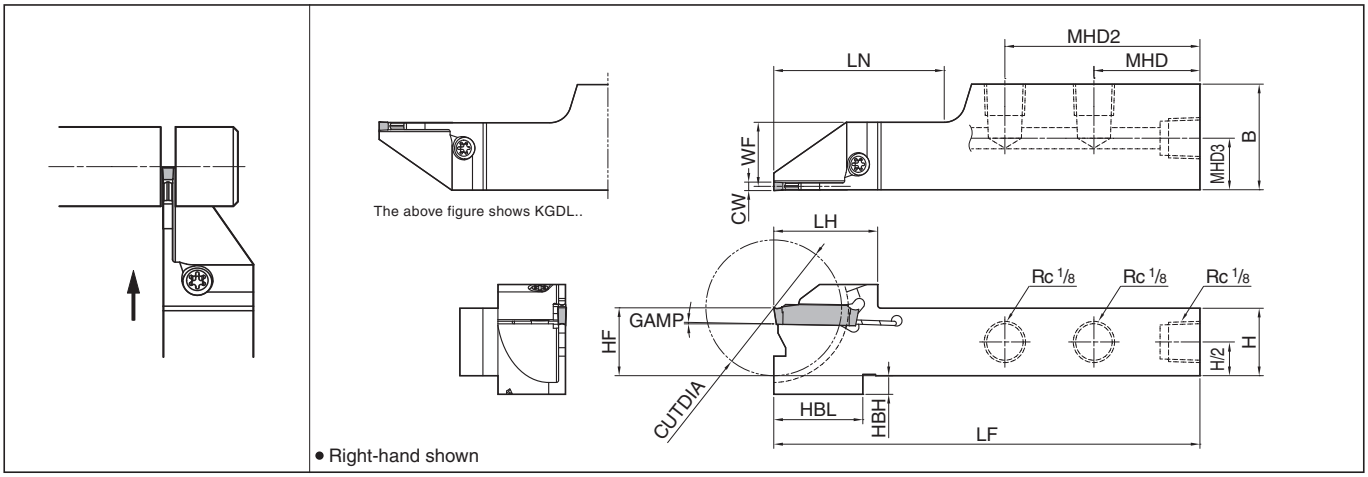




High density and high speeds coolant provides effective cooling of the cutting edge
Superior cooling action improves tool life



KGD-JCT (for automatic lathe) NEW

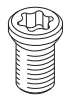
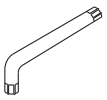


Toolholder Dimensions

Description	Stock	Cutting Dia.	Dimension (mm)											Angle	Edge Width CW (mm)		Applicable Inserts ➡ H18,H19
		CUTDIA	H=HF	HBH	B	LF	LH	HBL	LN	WF	MHD	MHD2	MHD3	GAMP	MIN.	MAX.	
KGDR 1220H-2JCT	●	24	12	8.5	20	100	19.5	21	44	11.2	35	-	8.4	1°	2.0	3.0	GDM type GDG type (GDMS type) (GDGS type)
KGDL 1220H-2JCT	●							21.5					7.7				
KGDR 1625H-2JCT	●	32	16	4.5	25		24.5	21	40	15.2	25	46	12.2				
KGDL 1625H-2JCT	●												7.7				
KGDR 1220H-2.4JCT	●	24	12	8.5	20	100	19.5	21	44	11	35	-	8.4	1°	2.4	3.0	
KGDL 1220H-2.4JCT	●							21.5					7.7				
KGDR 1625H-2.4JCT	●	32	16	4.5	25		24.5	21	40	15	25	46	12.2				
KGDL 1625H-2.4JCT	●												7.7				
KGDR 1220H-3JCT	●	24	12	8.5	20	100	19.5	21	44	10.8	35	-	8.6	1°	3.0	3.0	
KGDL 1220H-3JCT	●							21.5					7.7				
KGDR 1625H-3JCT	●	32	16	4.5	25		24.5	21	40	14.8	25	46	12.2			4.0	
KGDL 1625H-3JCT	●												7.7				

Recommended Cutting Conditions ➡ H28, H29

Spare Parts

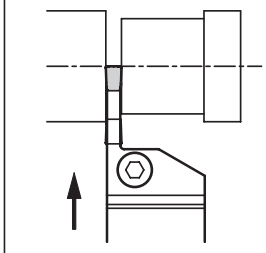
Clamp Screw	Wrench	Plug
		
SB-40120TR	LTW-15S	GP-1

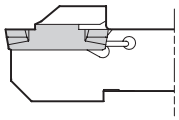
Toolholder Identification System

K G D	R	1220	H	-	2	JCT
	Toolholder Hand	Shank Size	Toolholder Length		Applicable Inserts	Others
	R : Right-hand L : Left-hand	12 × 20 mm	100 mm		GDM/GDMS 2~3 mm	Coolant-through Holders

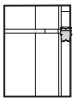
● : Std. Item

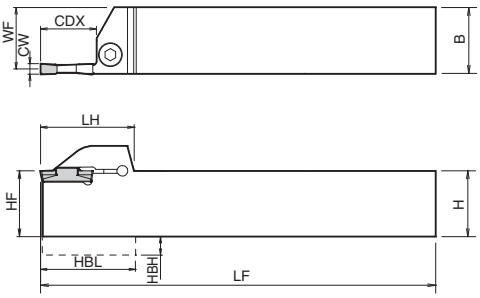
KGD (Integral Type)





KGD□1216JX-3T06
KGD□1216JX-4T06
shows above figure





• Right-hand shown

Toolholder Dimensions

Width (mm)	Max. depth of cut (mm)	Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	HBL	WF	CDX	Edge Width CW (mm) MIN.	Edge Width CW (mm) MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench
2	6	KGDR/L	1616H-2T06	●	●	16	16	4.0	16	100	27.7	28.0	15.2	6	2.0	3.0	HH5X16	LW-4
			2020K-2T06	●	●	20	20	-	20	125	28.0	-	19.2					
			2525M-2T06	●	●	25	25		25	150			24.2				HH5X25	
	10	KGDR/L	1616H-2T10	●	●	16	16	4.0	16	100	30.2	30.5	15.2	10			HH5X16	
			2020K-2T10	●	●	20	20	-	20	125	30.5	-	19.2					
			2525M-2T10	●	●	25	25		25	150			24.2				HH5X25	
	17	KGDR/L	1616H-2T17	●	●	16	16	4.0	16	100	31.2	31.5	15.2	17			HH5X16	
			2012K-2T17	●	●	20	20	-	12	125	32.5	-	11.2					
			2020K-2T17	●	●				20	125			19.2					
			2525M-2T17	●	●	25	25		25	150			24.2				HH5X25	
2.4	17	KGDR/L	2012K-2.4T17	●	●	20	20	-	12	125	32.5	-	11.0	17	2.4	3.0	HH5X16	LW-4
			2020K-2.4T17	●	●				20	125			19.0					
3	6	KGDR/L	1216JX-3T06	●	●	12	12	2.0	16	120	19.5	19	14.8	6	3.0	4.0	SE-50125TR	LTW-20
			1616H-3T06	●	●	16	16	4.0	16	100	27.7	28.0	14.8				HH5X16	LW-4
			2020K-3T06	●	●	20	20	-	20	125	28.0	-	18.8					
			2525M-3T06	●	●	25	25		25	150			23.8				HH5X25	
	10	KGDR/L	1616H-3T10	●	●	16	16	4.0	16	100	30.2	30.5	14.8	10			HH5X16	
			2020K-3T10	●	●	20	20	-	20	125	30.5	-	18.8					
			2525M-3T10	●	●	25	25		25	150			23.8				HH5X25	
	20	KGDR/L	1616H-3T20	●	●	16	16	4.0	16	100	34.2	34.5	14.8	20			HH5X16	
			2012K-3T20	●	●	20	20	-	12	125	34.5	-	10.8					
			2020K-3T20	●	●				20	125			18.8					
			2525M-3T20	●	●	25	25		25	150	35.5		23.8				HH5X25	
4	6	KGDR/L	1216JX-4T06	●	●	12	12	2.0	16	120	19.5	19	14.3	6	4.0	5.0	SE-50125TR	LTW-20
	10	KGDR/L	2020K-4T10	●	●	20	20	-	20	125	30.5	-	18.3	10			HH5X16	LW-4
			2525M-4T10	●	●	25	25		25	150			23.3				HH5X25	
	20	KGDR/L	2020K-4T20	●	●	20	20	-	20	125	34.5	-	18.3	20			HH5X16	
			2525M-4T20	●	●	25	25		25	150	35.5		23.3				HH5X25	
	25	KGDR/L	2525M-4T25	●	●	25	25		25	150	40.5		23.3	25				

Note) 1. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth of groove made by the 2-edge insert will be 18 mm.)
2. Recommended tightening torque of clamp bolt : 6.5N·m (HH5X○○), 2.5N·m (SE-50125TR)
3. Above toolholders are applicable to external grooving, too.

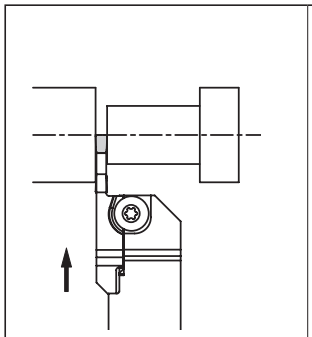
Applicable Inserts ➡ H18, H19
Recommended Cutting Conditions ➡ H28, H29

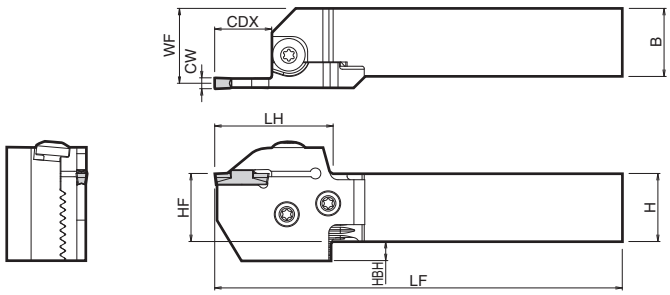
Toolholder Identification System (Integral Type)

K	G	D	R	1616	H	-	2	T	06
			Toolholder Hand	Shank Size	Toolholder Length		Applicable Inserts		Max. grooving depth
			R : Right-hand L : Left-hand	16 × 16mm	100 mm		GDM/GDMS 2~3 mm		06 : 6 mm

● : Std. Item

KGD-S (0° Separate Type)





• Right-hand shown (Right-hand Blade and Right-hand Toolholder)

Toolholder Dimensions (Blade + Toolholder)

Shank Angle	Width (mm)	Max. depth of cut (mm)	Shank Size (mm)	Unit Description (Standard Stock Description)	Stock R	Stock L	Blade Description ➡ G32	Toolholder Description ➡ G32	Dimension (mm) H	HF	HBH	B	LF	LH	WF	CDX	Edge Width CW (mm) MIN.	MAX.
0°	2	17	□20	KGD$^{R/L}$ 2020X-2T17S	●	-	KGD$^{R/L}$-2T17-C	KGD$^{R/L}$2020-C	20	20	12	20	122		23.4			
			□25	2525X-2T17S	●	●		KGD$^{R/L}$2525-C	25	25	7	25	147	40	28.4	17	2.0	3.0
			□32	No unit description ➡				KGD$^{R/L}$3232-C	32	32	-	32	167		35.4			
	3	10	□20	KGD$^{R/L}$ 2020X-3T10S	●	-	KGD$^{R/L}$-3T10-C	KGD$^{R/L}$2020-C	20	20	12	20	115		23.0			
			□25	2525X-3T10S	●	-		KGD$^{R/L}$2525-C	25	25	7	25	140	33	28.0	10		
			□32	No unit description ➡				KGD$^{R/L}$3232-C	32	32	-	32	160		35.0			
		20	□20	KGD$^{R/L}$ 2020X-3T20S	●	●	KGD$^{R/L}$-3T20-C	KGD$^{R/L}$2020-C	20	20	12	20	125		23.0		3.0	4.0
			□25	2525X-3T20S	●	●		KGD$^{R/L}$2525-C	25	25	7	25	150	43	28.0	20		
			□32	3232X-3T20S	●	-		KGD$^{R/L}$3232-C	32	32	-	32	170		35.0			
	4	10	□20	KGD$^{R/L}$ 2020X-4T10S	●	-	KGD$^{R/L}$-4T10-C	KGD$^{R/L}$2020-C	20	20	12	20	115		22.5			
			□25	2525X-4T10S	●	-		KGD$^{R/L}$2525-C	25	25	7	25	140	33	27.5	10		
			□32	No unit description ➡				KGD$^{R/L}$3232-C	32	32	-	32	160		34.5			
		20	□20	KGD$^{R/L}$ 2020X-4T20S	●	-	KGD$^{R/L}$-4T20-C	KGD$^{R/L}$2020-C	20	20	12	20	125		22.5			
			□25	2525X-4T20S	●	●		KGD$^{R/L}$2525-C	25	25	7	25	150	43	27.5	20	4.0	5.0
			□32	3232X-4T20S	●	-		KGD$^{R/L}$3232-C	32	32	-	32	170		34.5			
		25	□20	KGD$^{R/L}$ 2020X-4T25S	●	●	KGD$^{R/L}$-4T25-C	KGD$^{R/L}$2020-C	20	20	12	20	130		22.5			
			□25	2525X-4T25S	●	●		KGD$^{R/L}$2525-C	25	25	7	25	155	48	27.5	25		
			□32	3232X-4T25S	●	-		KGD$^{R/L}$3232-C	32	32	-	32	175		34.5			

Note) 1. When using the toolholder in normal mounting position, the lower jaw of toolholder may interfere with the tool presetter.
2. The toolholder and blade descriptions are printed on the toolholder body. (Unit description is not printed.)
KGD-S : Right-hand Blade for Right-hand Toolholder, Left-hand Blade for Left-hand Toolholder.
The toolholder is applicable for all blade with suitable hand.
3. When the unit description is not available (No unit description) and/or stock status is "-", please purchase toolholder and blade separately.
4. CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth made by the 2-edge insert will be 18 mm.)
5. Recommended tightening torque of clamp bolt for insert : 6.5N·m (Groove width 2 ~ 4mm)
6. Above toolholders are applicable to external grooving, too.

Applicable Inserts ➡ **H18, H19**
Recommended Cutting Conditions ➡ **H28, H29**

Toolholder Identification System (Separate type / Unit Description)

K G D R 2020 X - 2 T 17 S

Toolholder Hand	Shank Size	Toolholder Type	Applicable Inserts	Max. grooving depth
R : Right-hand L : Left-hand	20 × 20 mm	Unit Description	GDM/GDMS 2 ~ 3mm	17 : 17 mm

Spare Parts (Common with separate types)

* The parts are included in the toolholder and unit.

Unit Description	Spare Parts: Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
			
KGD$^{R/L}$...S	BH6X10TR	SB-60120TR	LTW-25

● : Std. Item

Great for High Pressure Coolant External Grooving and Cut-off

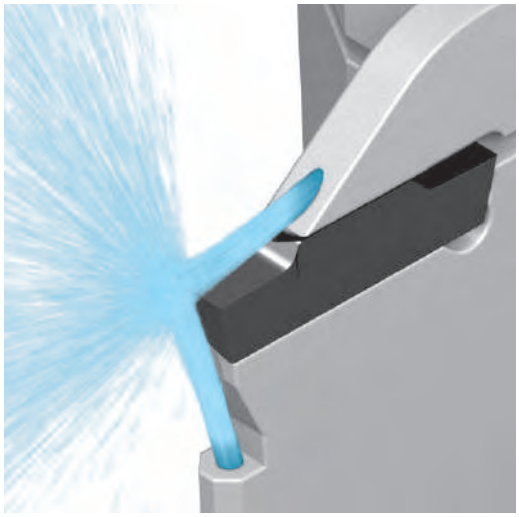
KGD-JCT

Coolant is directed from two directions towards the flank face of the insert
Improved Chip Control and Longer Tool Life for External Grooving and Cutting-off

1 Excellent Chip Control

Coolant towards the rake face

Coolant hole position and angle improve chip control



Chip Control Comparison (Internal evaluation)

KGD-JCT showed better chip control performance even at lower feed rates

f = 0.05 mm/rev (1.5MPa)

KGD-JCT



Competitor E



Competitor F



Competitor G



Cutting Conditions : Vc = 150 m/min, d = 8mm, f = 0.05 mm/rev, Wet
Edge Width 4 mm Workpiece Material : SCM415 Grooving

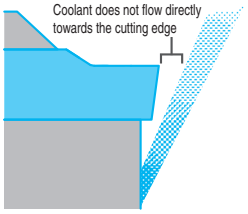
2 Cooling the Cutting Edge Leads to Longer Tool Life

Coolant towards the rake surface and the flank face of the insert
Directing coolant towards the cutting edge lengthens tool life

KGD-JCT



Competitor E



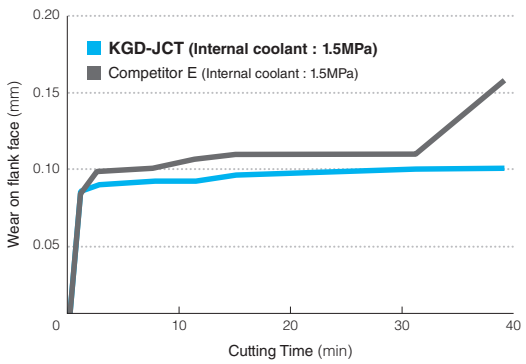
After Machining 39 min





Fracture

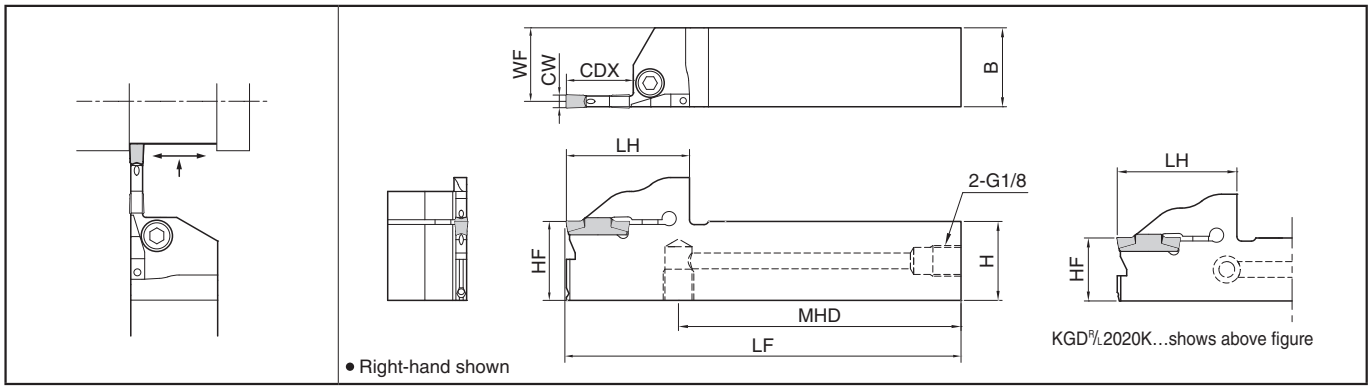
Wear Resistance Comparison (Internal evaluation)



Cutting Conditions : Vc = 180 m/min, d = 9 mm, f = 0.15 mm/rev, Wet
Edge Width 4 mm Workpiece Material : SCM415 Grooving

KGD-JCT Minimizes Wear and Provides Longer Tool Life without Insert Fracturing

KGD-JCT (Integral type / Coolant-through Holders)



Toolholder Dimensions

Pressure Resistance : ~15MPa

Width (mm)	Max. depth of cut (mm)	Description	Stock R	Stock L	H	HF	B	LF	LH	WF	CDX	MHD	Edge Width CW (mm) MIN.	Edge Width CW (mm) MAX.	Spare Parts: Clamp Bolt	Spare Parts: Wrench	Spare Parts: Plug
3	6	KGDR/L 2020K-3T06JCT	●	●	20	20	20	125	31.5	18.8	6	96.2	3.0	4.0	HH5X16	LW-4	HSG1/8X8.0
		2525K-3T06JCT	●	●	25	25	25			23.8		96.5			HH5X25		
	10	2020K-3T10JCT	●	●	20	20	20		34.0	18.8	10	94.2			HH5X16		
		2525K-3T10JCT	●	●	25	25	25			23.8		94.5			HH5X25		
	20	2020K-3T20JCT	●	●	20	20	20		38.0	18.8	20	90.2			HH5X16		
		2525K-3T20JCT	●	●	25	25	25		39.0	23.8		89.5			HH5X25		
4	10	KGDR/L 2020K-4T10JCT	●	●	20	20	20	125	34.0	18.3	10	94.2	4.0	5.0	HH5X16	LW-4	HSG1/8X8.0
		2525K-4T10JCT	●	●	25	25	25			23.3		94.5			HH5X25		
	20	KGDR/L 2020K-4T20JCT	●	●	20	20	20		38.0	18.3	20	90.2			HH5X16		
		2525K-4T20JCT	●	●	25	25	25		39.0	23.3		89.5			HH5X25		
	25	KGDR/L 2525K-4T25JCT	●	●	25	25	25		44.0	23.3	25	84.5					

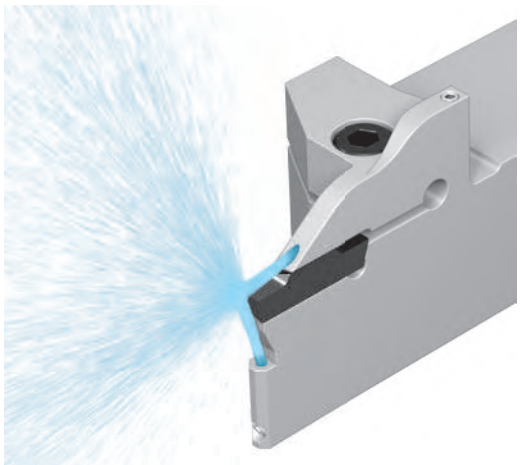
Please see page **D10** and **D11** for piping parts of coolant-through holders.

Applicable Inserts ➡ **H18, H19**
Recommended Cutting Conditions ➡ **H28, H29**

Coolant is directed from two directions

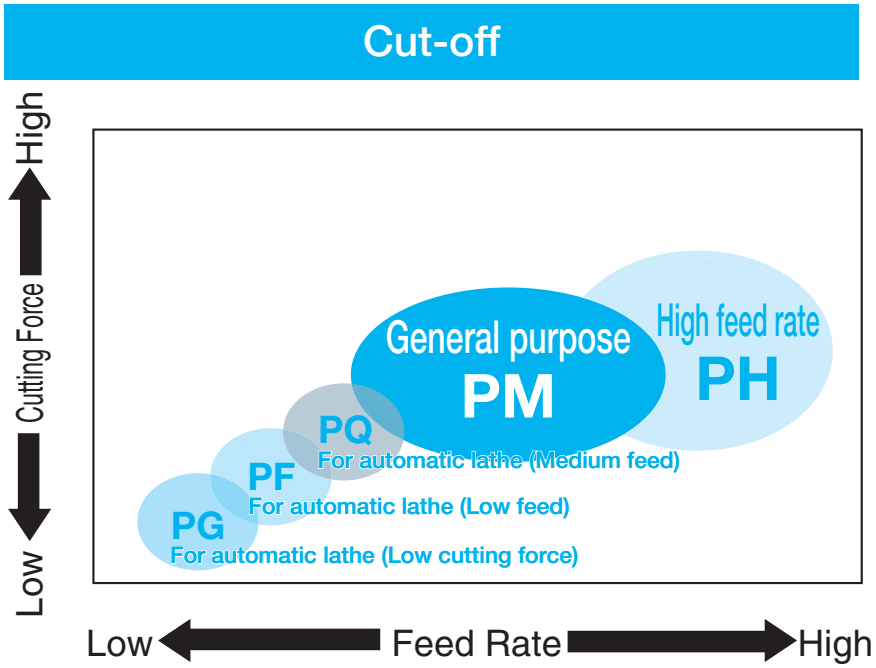
Discharges coolant in two directions toward both the rake surface and the flank face of the insert

Excellent Chip Control and Long Tool Life



● : Std. Item

Application Map



Recommended Cutting Conditions (PF / PQ / PG Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			f (mm/rev)						Remarks
				PF (RE = 0.03)			**PF** (RE = 0.15)			
	MEGACOAT NANO	MEGACOAT		Edge Width CW (mm)			Edge Width CW (mm)			
	PR1535	**PR1225**	**PR1215**	1.3 / 1.5	2.0	2.5 / 3.0	1.3 / 1.5	2.0	2.5 / 3.0	
Carbon Steel	☆ 70 ~ 150	★ 70 ~ 150	☆ 70 ~ 180	0.01 ~ 0.04	0.02 ~ 0.06	0.02 ~ 0.08	0.01 ~ 0.05	0.03 ~ 0.08	0.04 ~ 0.10	Coolant
Alloy Steel	☆ 70 ~ 150	★ 70 ~ 150	☆ 70 ~ 180							
Stainless Steel	★ 60 ~ 120	☆ 60 ~ 120	☆ 60 ~ 150	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.05	0.01 ~ 0.04	0.03 ~ 0.07	0.04 ~ 0.08	
Cast Iron	-	-	★ 80 ~ 200	0.01 ~ 0.05	0.02 ~ 0.07	0.03 ~ 0.08	0.01 ~ 0.06	0.03 ~ 0.09	0.04 ~ 0.10	

★ : 1st Recommendation ☆ : 2nd Recommendation

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)					f (mm/rev)				Remarks
						PQ		**PG**		
	MEGACOAT NANO	MEGACOAT		DLC Coated Carbide	Carbide	Edge Width CW (mm)		Edge Width CW (mm)		
	PR1535	**PR1225**	**PR1215**	**PDL025**	**GW15**	2.0	2.5 / 3.0	2.0	2.5 / 3.0	
Carbon Steel	☆ 70 ~ 150	★ 70 ~ 150	☆ 70 ~ 180	-	-	0.03 ~ 0.1	0.04 ~ 0.12	0.01 ~ 0.04	0.01 ~ 0.05	Coolant
Alloy Steel	☆ 70 ~ 150	★ 70 ~ 150	☆ 70 ~ 180	-	-					
Stainless Steel	★ 60 ~ 120	☆ 60 ~ 120	☆ 60 ~ 150	-	-	0.02 ~ 0.07	0.02 ~ 0.08	0.01 ~ 0.03	0.01 ~ 0.04	
Cast Iron	-	-	★ 80 ~ 200	-	☆ 50 ~ 100	0.04 ~ 0.1	0.04 ~ 0.12	0.01 ~ 0.04	0.01 ~ 0.05	
Aluminum Alloys	-	-	-	★ 200 ~ 500	☆ 200 ~ 450	-	-	0.01 ~ 0.05	0.01 ~ 0.06	
Brass	-	-	-	-	★ 100 ~ 200	-	-	0.01 ~ 0.07	0.01 ~ 0.08	

★ : 1st Recommendation ☆ : 2nd Recommendation

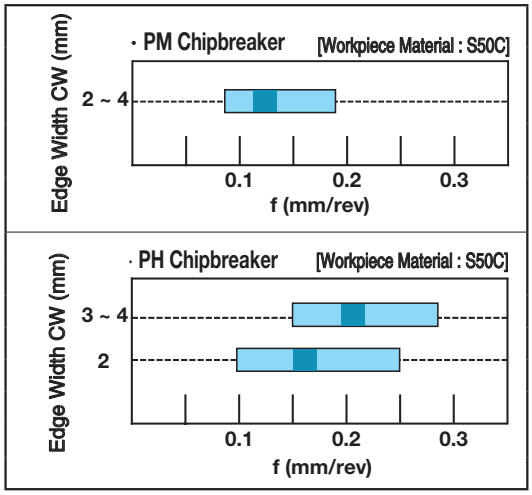
Recommended Cutting Conditions (PM / PH Chipbreaker)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			f (mm/rev)			Remarks
				PM	PH		
	MEGACOAT NANO	MEGACOAT		Edge Width CW (mm)	Edge Width CW (mm)		
	PR1535	PR1225	PR1215	2 ~ 4	2	3 ~ 4	
Carbon Steel	☆ 80 ~ 200	★ 80 ~ 200	☆ 100 ~ 200	0.08 ~ 0.18	0.10 ~ 0.25	0.15 ~ 0.28	Coolant
Alloy Steel	☆ 70 ~ 180	★ 70 ~ 180	☆ 80 ~ 180				
Stainless Steel	★ 60 ~ 150	☆ 60 ~ 150	☆ 60 ~ 150	0.06 ~ 0.12	0.05 ~ 0.12	0.08 ~ 0.15	
Cast Iron	-	-	★ 100 ~ 200	0.08 ~ 0.18	0.10 ~ 0.25	0.15 ~ 0.28	

★ : 1st Recommendation ☆ : 2nd Recommendation

Example of feed

[■In the graph below indicates the most recommended value of feed (f)]



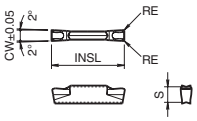
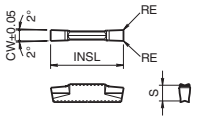
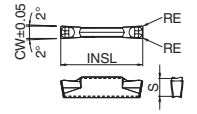
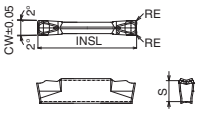
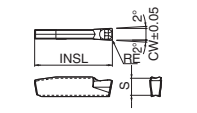
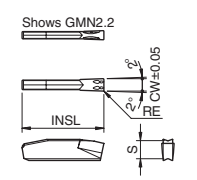
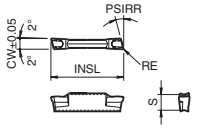
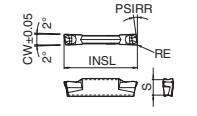
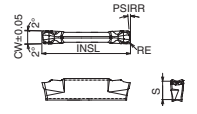
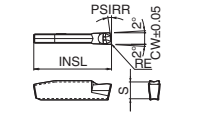
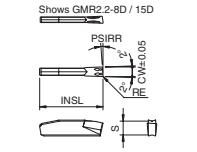
Caution (Cut-off)

1. Be sure to perform wet processing. Apply enough coolant to the cutting edge.
2. Keep a constant rate during processing so that optimum product life will be achieved.
3. Cut-off as close to the chuck as possible.
4. To prevent impacts, reduce feed rate by 1/2 ~ 1/3 when nearing the center of the workpiece.

GMM / GMN / GM$^{R}_{L}$

(Will be switched to GDM / GDG ➡ **H18**, **H19**)

Classification of usage											
◕ : Continuous-Light Interruption / 1st Choice ◔ : Continuous-Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	○		◕	◔	◕		
	M	Stainless Steel			◕	◔	◕		
	K	Cast Iron							◕
	N	Non-ferrous Metals							◕

	Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) CW	RE	INSL	S	Angle PSIR$^{R}_{L}$	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PR930	PR1115	Carbide KW10	See Page for Applicable Toolholders
Neutral	Sharp-Cutting 2-edge		GMM 1520-MT	1.5	0 0.05	20	4.3	-				▲		▲	H32
			GMM 2020-MT	2.0	0 0.05	20	4.3	-		▲	▲	▲		▲	H32 H33
			GMM 2520-MT	2.5	0 0.05	20	4.3	-			▲	▲		▲	
			GMM 3020-MT	3.0	0 0.05	20	4.3	-		▲	▲	▲		▲	
	Sharp-Cutting 2-edge Without Chipbreaker		GMM 1520-NB	1.5	0	20	4.3	-				▲		▲	H32
			GMM 2020-NB	2.0	0	20	4.3	-				▲		▲	H32 H33
			GMM 2520-NB	2.5	0	20	4.3	-				▲			
			GMM 3020-NB	3.0	0	20	4.3	-						▲	
	Stability Oriented 2-edge		GMM 2020-TK	2.0	0.20	20	4.3	-			▲	▲		▲	
			GMM 2520-TK	2.5	0.20	20	4.3	-			▲	▲		▲	
			GMM 3020-TK	3.0	0.25	20	4.3	-		▲	▲	▲		▲	
	High Feed Rate 2-edge		GMM 2020-TMR	2.0	0.20	20	4.3	-					▲		
			GMM 2520-TMR	2.5	0.20	20	4.3	-					▲		
			GMM 3020-TMR	3.0	0.25	20	4.3	-					▲		H32 H33
	Stability Oriented 1-edge		GMN 2-TK	2.0	0.20	20	4.3	-			▲	▲		▲	
			GMN 3-TK	3.0	0.25	20	4.3	-		▲	▲	▲		▲	
			GMN 4-TK	4.0	0.30	20	4.3	-		▲	▲	▲		▲	
	Shows GMN2.2 Sharp-Cutting 1-edge		GMN 2.2	2.2	0.17	20	4.3	-	▲	▲		▲		▲	
			GMN 3	3.0	0.20	20	4.3	-	▲	▲		▲		▲	
			GMN 4	4.0	0.25	20	4.3	-	▲	▲		▲		▲	
			GMN 5	5.0	0.80	20	4.3	-		▲		▲		▲	
			GMN 6	6.0	0.80	20	4.3	-		▲		▲		▲	
									R L	R L	R L	R L	R L	R L	
Lead Angle	Sharp-Cutting 2-edge		GMM 1520$^{R}_{L}$-MT-15D	1.5	0 0.05	20	4.3	15°				▲		▲	H32
			GMM 2020$^{R}_{L}$-MT-15D	2.0	0 0.05	20	4.3	15°		▲	▲	▲		▲	H32 H33
			GMM 2520$^{R}_{L}$-MT-15D	2.5	0 0.05	20	4.3	15°			▲	▲		▲	
			GMM 3020$^{R}_{L}$-MT-15D	3.0	0 0.05	20	4.3	15°		▲	▲	▲		▲	
	Stability Oriented 2-edge		GMM 2020R-TK-8D	2.0	0.20	20	4.3	8°			▲	▲		▲	
			GMM 2520R-TK-8D	2.5	0.20	20	4.3	8°				▲			
			GMM 3020R-TK-8D	3.0	0.25	20	4.3	8°		▲	▲	▲			
	High Feed Rate 2-edge		GMM 2020R-TMR-6D	2.0	0.20	20	4.3	6°					▲		
			GMM 2520R-TMR-6D	2.5	0.20	20	4.3	6°					▲		H32 H33
			GMM 3020R-TMR-6D	3.0	0.25	20	4.3	6°					▲		
	Stability Oriented 1-edge		GMR 2-TK-8D	2.0	0.20	20	4.3	8°				▲		▲	
			GMR 3-TK-8D	3.0	0.25	20	4.3	8°			▲	▲		▲	
			GMR 4-TK-8D	4.0	0.30	20	4.3	8°			▲	▲		▲	
	Shows GMR 2.2-8D / 15D Sharp-Cutting 1-edge		GM$^{R}_{L}$ 2.2-8D	2.2	0.17	20	4.3	8°	▲	▲		▲		▲	
			2.2-15D	2.2	0.00	20	4.3	15°	▲	▲		▲		▲	
			3-4D	3.0	0.20	20	4.3	4°	▲	▲		▲		▲	
			4-4D	4.0	0.25	20	4.3	4°		▲		▲			

Inserts are sold in 10 piece boxes

▲ : To be replaced by a new product

Edge Preparation

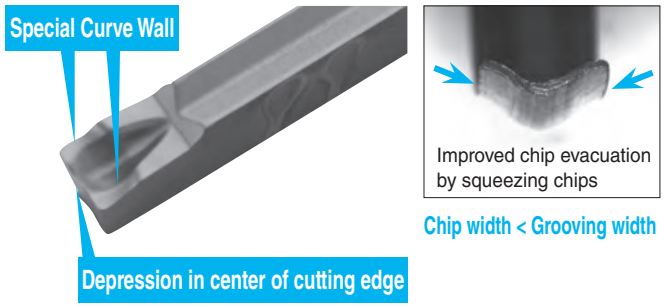
Series	MT Chipbreaker		TK Chipbreaker		TMR Chipbreaker	Without Chipbreaker (NB)	
Edge Prep.	Chamfered + R-honed	Chamfered + R-honed	Chamfered + R-honed	Sharp Edge	Chamfered + R-honed	R-honed	Sharp Edge
	Corner-R(RE) = 0.05	Sharp Corner	Corner-R(RE) = 0.2 ~ 0.3	Corner-R(RE) = 0.2 ~ 0.3	Corner-R(RE) = 0.2	Corner-R(RE) = 0.05	Sharp Corner
							
	CR9025 / PR915	**PR930 / KW10**	**CR9025 / PR915**	**PR930 / KW10**	**PR1115**	**CR9025**	**PR930 / KW10**

· Sharp Edge Spec. can reduce cutting force by 40% less than that of chamfer edge.

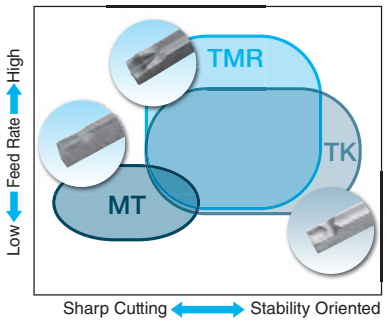
Series	Advantage
GMM MT	Specific chipbreaker for cut-off operations requiring sharp cutting performance. Minimizes the Boss.
GMM NB	Cutting edge is flat with non-chipbreaker. It works well for brass, etc.
GMM TK	Stable design with chipbreaker for cut-off and large corner-R. 2-edge for economical performance.
GMN TK	Same chipbreaker geometry as GMM TK. 1-edge. Wide application range.
GMN (Std.) (No Indication)	Mainly for deep grooving, but available for groove widening and turning due to projection near side cutting edge. 1-edge and wide application range. Available for cut-off applications.

TMR Chipbreaker

Advantages of Chipbreaker



GMM Chipbreaker MAP

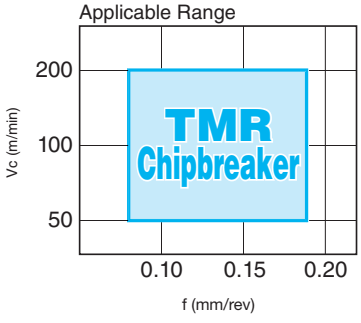


TMR-chipbreaker enables stable chip control also for high feed rates

Good chip control even when cutting speed (spindle revolution) is increased. (Workpiece Material: SCM415, ø30, constant spindle revolution)

Description	n=1,060min^{-1}(Vc=100m/min)		n=2,123min^{-1}(Vc=200m/min)	
	f=0.12mm/rev	f=0.18mm/rev	f=0.12mm/rev	f=0.18mm/rev
GMM 3020-TMR (Neutral)				
GMM 3020R-TMR-6D (Lead angle)				

Applicable Range



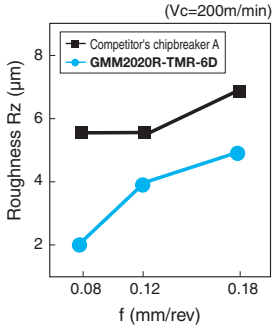
Recommended Cutting Conditions

Workpiece Material	Vc (m/min)	f (mm/rev)
Carbon Steel	60 ~ 200	0.08 ~ 0.18
Alloy Steel	60 ~ 150	
Stainless Steel	50 ~ 140	

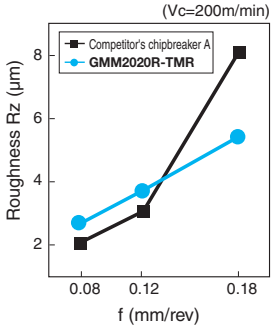
Workpiece Surface Roughness

TMR Chipbreaker provides good surface roughness on the workpiece end face at high feed rate ranges.

· GMM2020R-TMR-6D (Vc=200m/min)

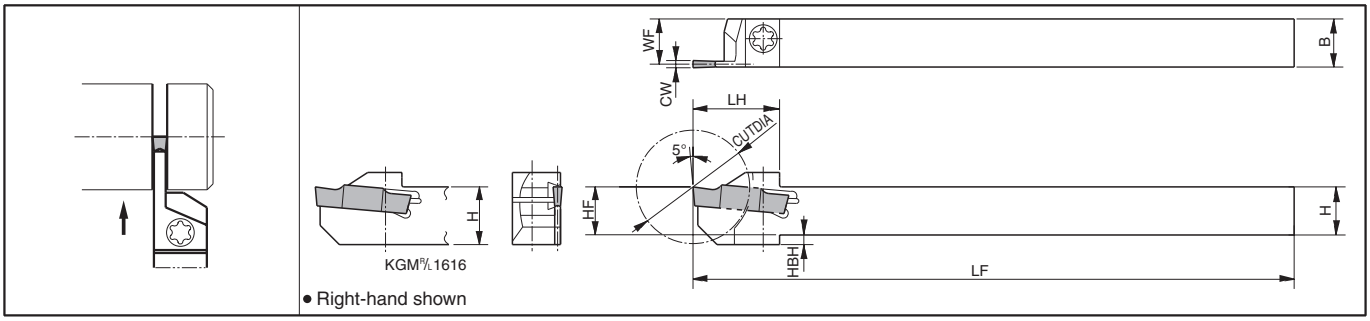


· GMM2020-TMR (Vc=200m/min)



KGM (for Automatic Lathe) (Will be switched to KGD ➡ H20)

Edge Width : 1.5 ~ 4.0 mm



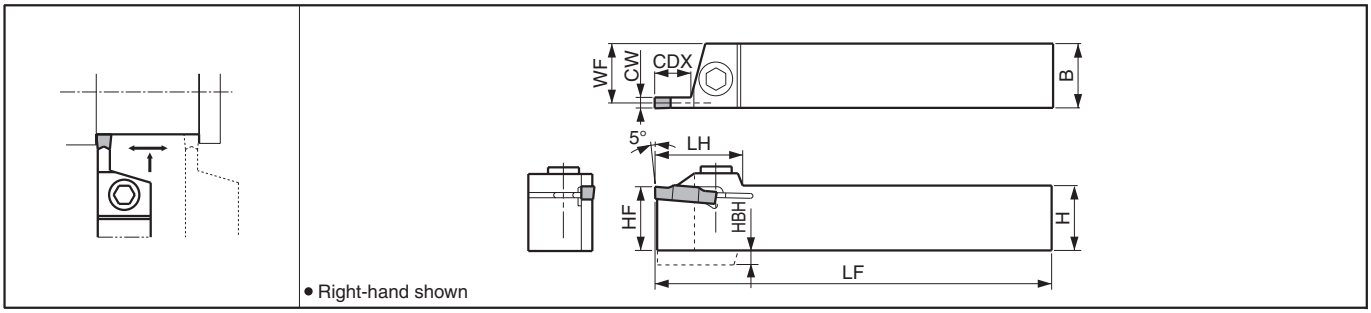
● Right-hand shown

Toolholder Dimensions

Description		Stock		Cut-off Dia.	Dimension (mm)							Edge Width CW (mm)		Spare Parts	
														Screw	Wrench
		R	L	CUTDIA	H	HF	HBH	B	LF	LH	WF	MIN.	MAX.		
KGMR/L	1010JX-1.5	▲	▲	18	10	10	2	10	120	18	9.4	1.5	2.0	SE-40120TR	LTW-15S
	1212JX-1.5	▲	▲	23	12	12		12		19	11.4				
KGMR/L	1010JX-2	▲	▲	18	10	10	2	10	120	18	9.15	2.0	3.0	SE-40120TR	LTW-15S
	1212JX-2	▲	▲	23	12	12		12		19	11.15				
	1616JX-2	▲	▲	30	16	16	-	16		24.5	15.15			SE-50125TR	LTW-20
KGMR/L	1212JX-2.5	▲	▲	23	12	12	2	12	120	19	11	2.4	3.0	SE-40120TR	LTW-15S
	1616JX-2.5	▲	▲	30	16	16	-	16		24.5	15			SE-50125TR	LTW-20
KGMR/L	1616JX-3	▲	▲	30	16	16	-	16	120	24.5	14.8	3.0	4.0	SE-50125TR	LTW-20
KGMR	1212F-1.5-85	▲		23	12	12	2	12	85	19	11.4	1.5	2.0	SE-40120TR	LTW-15S
KGMR/L	1212F-2-85	▲	▲	23	12	12	2	12	85	19	11.15	2.0	3.0	SE-40120TR	LTW-15S
KGMR	1212F-2.5-85	▲		23	12	12	2	12	85	19	11	2.4	3.0	SE-40120TR	LTW-15S

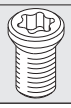
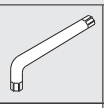
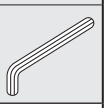
KGM (Will be switched to KGD ➡ H24)

Edge Width : 3.0 ~ 8.0 mm



● Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension(mm)								Edge Width CW (mm)		Spare Parts			
														Screw		Wrench	
		R	L	H	HF	HBH	B	LF	LH	WF	CDX	MIN.	MAX.				
KGMR/L	1212H-3	▲		12	12	4	12	100	27	10.8	9	3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	▲		16	16		16			14.8				-	HH5X16	-	LW-4
	2020K-3	▲	▲	20	20	-	20	125		18.8		3.0	4.0				
	2525M-3	▲	▲	25	25		25	150		23.8					HH5X25		
KGMR/L	2020K-4	▲		20	20	-	20	125	27	18.3	10	4.0	5.0	-	HH5X16	-	LW-4
	2525M-4	▲	▲	25	25		25	150		23.3					HH5X25		
KGMR	2020K-5	▲		20	20	-	20	125	27	17.8	10	5.0	6.0	-	HH5X16	-	LW-4
	2525M-5	▲		25	25		25	150		22.8					HH5X25		
KGMR/L	2525M-8	▲	▲	25	25	7.5	25	150	40	22.0	25	8.0	8.0	-	HH6X25	-	LW-5

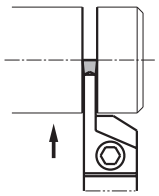
· CDX shows available grooving depth.

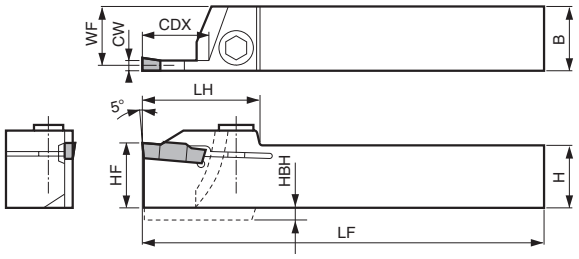
· 4mm width Insert can be installed in KGMR/L1212H-3, but is not recommended due to the toolholder's rigidity.

▲ : To be replaced by a new product

KGM-T (Will be switched to KGD ➡ H24)

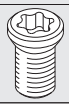
Edge Width : 2.0 ~ 6.0 mm





• Right-hand shown

Toolholder Dimensions

Description		Stock		Dimension (mm)								Edge Width CW (mm)		Spare Parts			
														Screw		Wrench	
		R	L	H	HF	HBH	B	LF	LH	WF	CDX	MIN.	MAX.				
KGM[R/L]	2012K-2T17		▲	20	20	-	12	125	33	11.15	17	2.0	3.0	SB-5TR	-	LTW-20	-
	2020K-2T17	▲	▲	20	20		20	125		19.15				-	HH5X16	-	LW-4
	2525M-2T17	▲	▲	25	25		25	150		24.15					HH5X25		
KGM[R/L]	1616H-3T20	▲		16	16	4	16	100	36	14.8	20	3.0	4.0	-	HH5X16	-	LW-4
	2012K-3T20		▲	20	20	-	12	125		10.8				SB-5TR	-	LTW-20	-
	2020K-3T20	▲	▲				20			18.8				-	HH5X16	-	LW-4
	2525M-3T20	▲	▲	25	25		25	150		23.8					HH5X25		
KGM[R/L]	2020K-4T20	▲		20	20	-	20	125	36	18.3	20	4.0	5.0	-	HH5X16	-	LW-4
	2525M-4T20	▲		25	25		25	150		23.3					HH5X25		
	2525M-4T25	▲	▲						41		25						
KGM[R/L]	2525M-5T25	▲	▲	25	25	-	25	150	42	22.8	25	5.0	6.0	-	HH5X25	-	LW-4
	3232P-5T25	▲		32	32		32	170		29.8							
KGM[R/L]	2525M-6T30	▲		25	25	-	25	150	45	22.4	30	6.0	6.0	-	HH5X25	-	LW-4

· CDX shows the distance from the toolholder to the cutting edge. Ref. to the Table **H35** for the relationship between the available Grooving Depth and the Cutting Dia.
· When using GMG / GMM (2-edge) insert, set the groove depth under 15mm.

Applicable Inserts

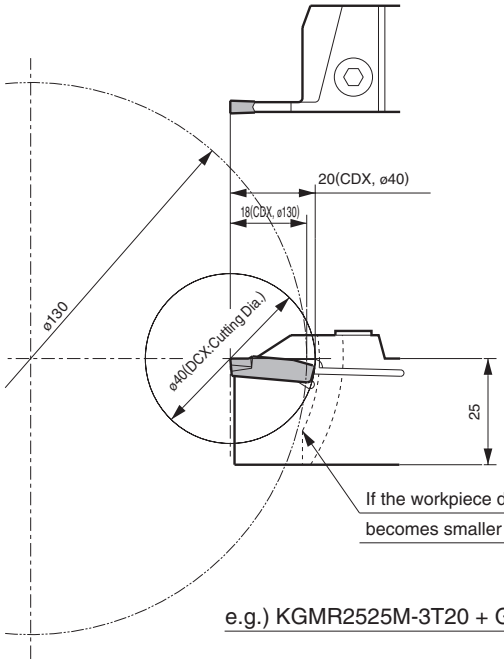
Applications	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Full-R / Copying	Cut Off / Deep Grooving	Cut Off / Deep Grooving	Cut Off / Deep Grooving	Cut Off / Deep Grooving	Cut Off / Deep Grooving
See Page	G38	G38	G38	G38	G39	H30	H30	H30	H30	H30
Insert / Toolholder Description	MW	MS	MG			MT	NB	TK / TMR	TK	
KGM[R/L]...1.5	-	-	-	-	-	GMM1520..MT GMM2020..MT GMM1520[R/L]..MT GMM2020[R/L]..MT	GMM1520..NB GMM2020..NB	GMM2020..T. GMM2020R..T.	GMN2..TK GMR2..TK	-
KGM[R/L]...2(T)	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2020..MT GMM2520..MT GMM3020..MT GMM2020[R/L]..MT GMM2520[R/L]..MT GMM3020[R/L]..MT	GMM2020..NB GMM2520..NB GMM3020..NB	GMM2020..T. GMM2520..T. GMM3020..T. GMM2020R..T. GMM2520R..T. GMM3020R..T.	GMN2..TK GMN3..TK GMR2..TK GMR3..TK	GMN2.2 GMN3 GM[R/L]2.2 GM[R/L]3
KGM[R/L]...2.5	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2520..MT GMM3020..MT GMM2520[R/L]..MT GMM3020[R/L]..MT	GMM2520..NB GMM3020..NB	GMM2520..T. GMM3020..T. GMM2520R..T. GMM3020R..T.	GMN3..TK GMR3..TK	GMN3 GM[R/L]3
KGM[R/L]...3(T)	GMM3020..MW GMM4020..MW	GMG3020..MS GMM3020..MS GMG4020..MS GMM4020..MS	GMG3020..MG GMG3520..MG GMG4020..MG	GMG3020..R GMM3020..R GMG4020..R GMM4020..R	-	GMM3020..MT GMM3020[R/L]..MT	GMM3020..NB	GMM3020..T. GMM3020R..T.	GMN3..TK GMN4..TK GMR3..TK GMR4..TK	GMN3 GMN4 GM[R/L]3 GM[R/L]4
KGM[R/L]...4(T)	GMM4020..MW GMM5020..MW	GMG4020..MS GMM4020..MS GMG5020..MS GMM5020..MS	GMG4020..MG GMG5020..MG	GMG4020..R GMM4020..R GMG5020..R GMM5020..R	-	-	-	-	GMN4..TK GMR4..TK	GMN4 GMN5 GM[R/L]4
KGM[R/L]...5T	GMM5020..MW GMM6020..MW	GMG5020..MS GMM5020..MS GMG6020..MS GMM6020..MS	GMG5020..MG GMG6020..MG	GMG5020..R GMM5020..R GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN5 GMN6
KGM[R/L]...6T	GMM6020..MW	GMG6020..MS GMM6020..MS	GMG6020..MG	GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN6
KGM[R/L]...8	GMM8030..MW	-	GMG8030..MG	-	GMGA8030..R	-	-	-	-	-

Recommended Cutting Conditions ➡ H47

▲ : To be replaced by a new product

Possible cutting diameter of KGM / KGM-T

There is a limit to available grooving depth depending on the workpiece diameter.



If the workpiece diameter is large, the available grooving depth becomes smaller due to interference with the toolholder.

e.g.) KGMR2525M-3T20 + GMN3

KGM (for automatic lathe) Possible Cutting Diameter and Available Grooving Depth Table

Toolholder Description		DCX (Cutting Dia.)															
KGMR/L	**1010□-1.5...**	-	-	-	-	-	-	-	18	21	26	38	76	∞			
	1212□-1.5...	-	-	-	-	23	27	37	71	∞	∞	∞	∞				
	1010□-2...	-	-	-	-	-	-	-	18	21	26	38	76				
	1212□-2...	-	-	-	-	23	27	37	71	∞							
	1616□-2...	30	37	47	68	89	131	∞	∞								
	1212□-2.5...	-	-	-	-	23	27	37	71								
	1616□-2.5...	30	37	47	68	89	131	∞	∞								
	1616□-3...	30	37	47	68	89	131										
Available Grooving Depth CDX (mm)		15	14	13	12	11.5	11	10	9	8	7	6	5	4	3	2	1

◆ KGM-T Possible Cutting Diameter and Available Grooving Depth Table (GMN, GM$^{R/L}$ when using 1-edge insert)

Toolholder Description		DCX (Cutting Dia.)												
KGM$^{R/L}$	**2012K-2T17**	-	-	-	-	-	-	-	-	66	80	130	260	∞
	2020K-2T17	-	-	-	-	-	-	-	-	66	80	130	260	
	2525M-2T17	-	-	-	-	-	-	-	-	66	80	130	260	
	1616H-3T20	-	-	-	-	-	40	54	70	100	180	∞	∞	
	2012K-3T20	-	-	-	-	-	40	90	130	240	∞			
	2020K-3T20	-	-	-	-	-	40	90	130	240				
	2525M-3T20	-	-	-	-	-	40	90	130	240				
	2020K-4T20	-	-	-	-	-	40	90	130	240				
	2525M-4T20	-	-	-	-	-	40	90	130	240				
	2525M-4T25	-	-	50	140	240	∞	∞	∞	∞				
	2525M-5T25	-	-	50	140	240								
	3232P-5T25	-	-	50	280	600								
	2525M-6T30	100	300	∞	∞	∞								
Available Grooving Depth CDX (mm)		30	27	25	23	22	20	19	18	17	16	15	14	13 or under

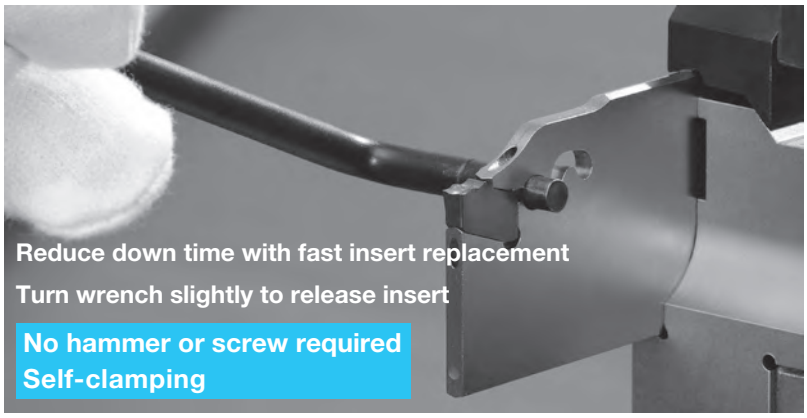
High-Performance Cut-Off Solutions

KPK Series NEW

Easy Insert Replacement Reduces Downtime

High Performance, Long Tool Life and Stable Machining with Strong Clamping Mechanism

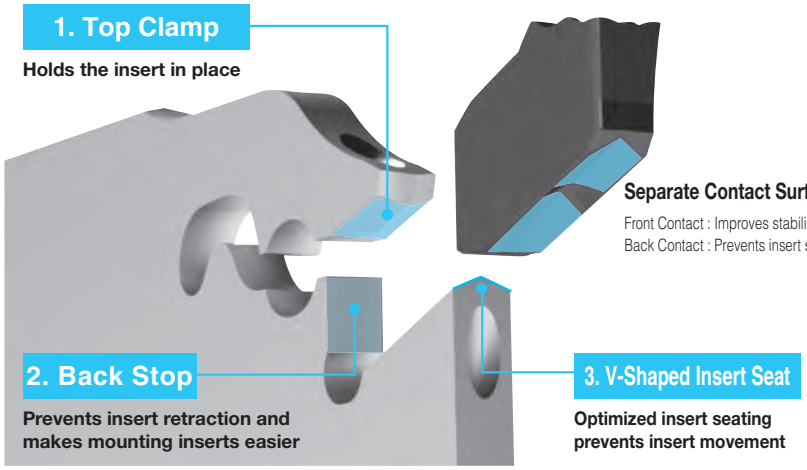
1 Easy Insert Replacement



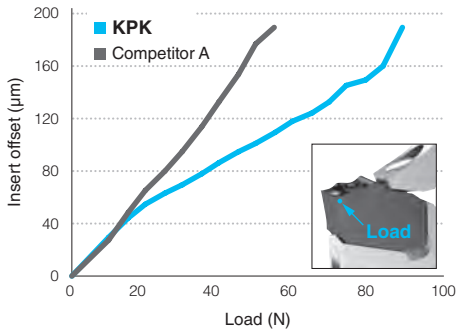


2 Firm Insert Clamp Ensures Added Safety and Security

The firmly secured insert uses three contact surfaces to eliminate sliding or chattering



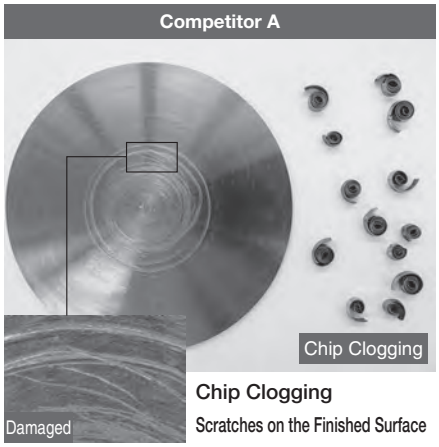
Insert Deviation Comparison (Internal evaluation)

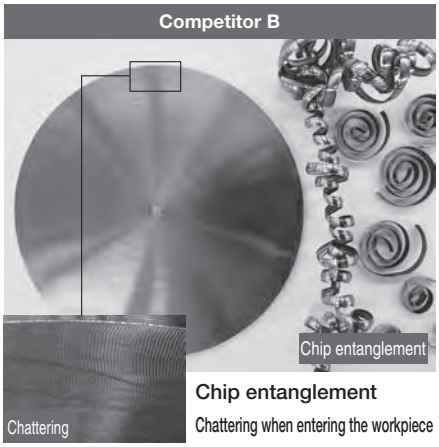


Measured tool : KPKB32-3 PKM30N-025PM

Cutting Performance Comparison (Internal evaluation)







Cutting Conditions : n = 320 min^{-1} (constant), Vc = ~100 m/min, f = 0.12 mm/rev, Wet (External coolant) Workpiece Material : SCM435 (ø100) Edge Width : 3mm

3 Unique Chipbreaker for Long Tool Life and Stable Machining

Advanced chipbreaker technology inherited from KGD lineup provides excellent chip control



General purpose
PM Chipbreaker

Insert grade

For Steel	: PR1625
For Stainless steel	: PR1535
For Cast Iron and Aluminum	: GW15

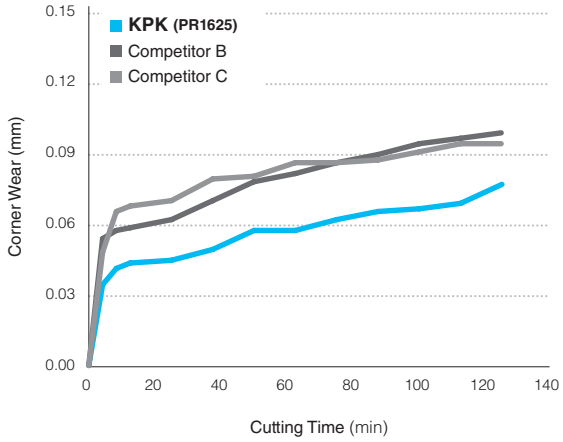


For Tough edge and High-feed machining
PH Chipbreaker

Insert grade

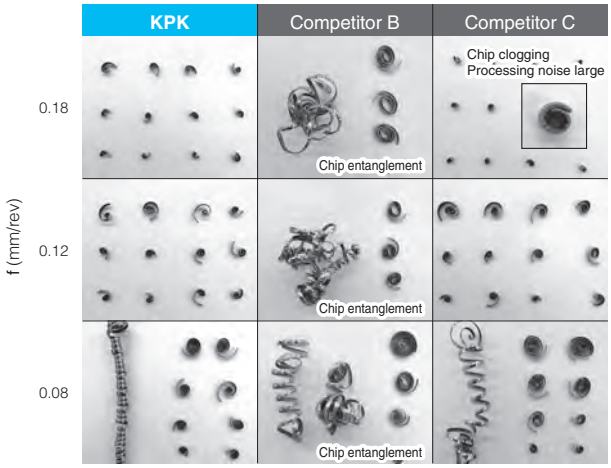
For Steel	: PR1625
For Stainless steel	: PR1535

Wear Resistance Comparison (Internal evaluation)



Cutting Conditions : n = 955 min^{-1} (constant), Vc = ~150 m/min
f = 0.12 mm/rev (~ø10 : f = 0.05 mm/rev) Wet (External coolant)
Workpiece Material : SCM415 (ø50) Edge Width : 3 mm (PM Chipbreaker)

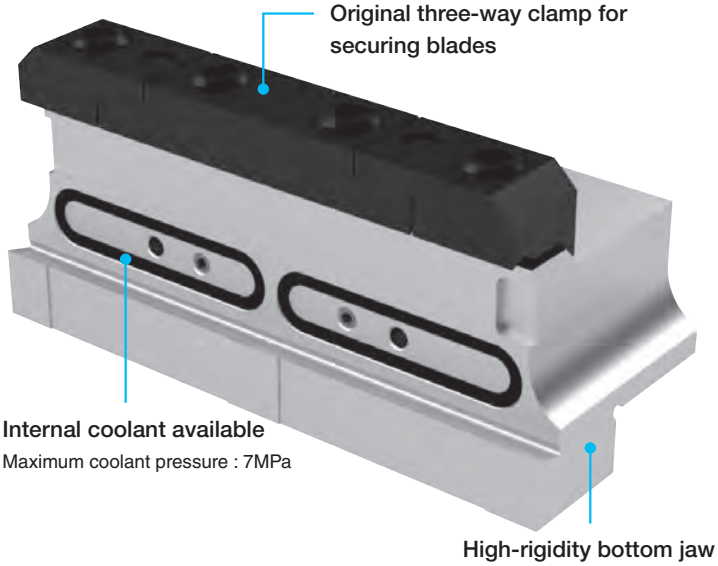
Chip Control Comparison (Internal evaluation)



Cutting Conditions : n = 780 min^{-1} (constant), Vc = ~120 m/min, Wet (External coolant)
Workpiece Material : SCM415 (ø50) Edge Width : 3 mm (PM Chipbreaker)

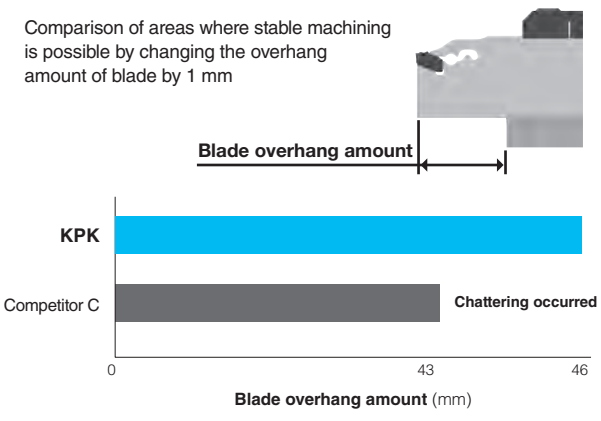
4 Rigid Toolblock Prevents Chattering and Provides Internal Coolant

KPKTB-JCT



Chattering Resistance Comparison (Internal evaluation)

Comparison of areas where stable machining is possible by changing the overhang amount of blade by 1 mm

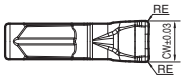
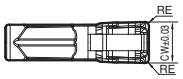
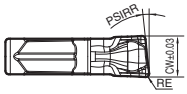


Cutting Conditions : n = 650 min^{-1} (constant), Vc = ~100m/min, f = 0.12 mm/rev
Wet (Internal Coolant : Normal pressure) Workpiece Material : SCM435(ø50),
Edge Width : 3 mm (PM Chipbreaker)

Check KTKTB type is compatible with internal coolant with an optional internal connector. (~ 1 MPa) *Refer to page H42 for the supply method (Type C).

Cut-off Inserts / Blade

PKM NEW

Insert (Handed Insert shows Right-hand)			Description		Dimension (mm) CW	Dimension (mm) RE	Angle PSIR R/L	MEGACOAT NANO PR1625	MEGACOAT NANO PR1535	Carbide GW15
Neutral	 General purpose		PKM	20N-020PM	2.0	0.20	-	●	●	●
				30N-025PM	3.0	0.25		●	●	●
				40N-030PM	4.0	0.30		●	●	●
	 Tough Edge		PKM	20N-020PH	2.0	0.20	-	●	●	
				30N-030PH	3.0	0.30		●	●	
				40N-030PH	4.0	0.30		●	●	
								R L	R L	R L
Lead Angle			PKM	20R/L-020PM-6D	2.0	0.20	6°	● ●	● ●	● ●
				30R/L-025PM-6D	3.0	0.25		● ●	● ●	● ●
				40R/L-030PM-6D	4.0	0.30		● ●	● ●	● ●

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min) MEGACOAT NANO PR1625	MEGACOAT NANO PR1535	Carbide GW15	f (mm/rev) PM Edge Width CW (mm) 2 ~ 4	PH Edge Width CW (mm) 2	PH Edge Width CW (mm) 3 ~ 4	Remarks
Carbon Steel	★ 80 - 220	☆ 80 - 220	-	0.08 - 0.18	0.10 - 0.22	0.15 - 0.28	Coolant
Alloy Steel	★ 70 - 200	☆ 70 - 200	-				
Stainless Steel	☆ 60 - 150	★ 60 - 150	-	0.06 - 0.12	0.05 - 0.12	0.08 - 0.15	
Cast Iron	-	-	★ 50 - 100	0.08 - 0.18	-	-	
Aluminum Alloys	-	-	★ 200 - 450		-	-	
Brass	-	-	★ 100 - 200		-	-	

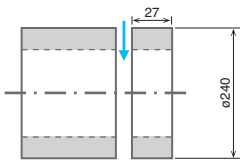
Reduce feed to 1/2 ~ 1/3 at the center of the workpiece.

★ : 1st Recommendation ☆ : 2nd Recommendation

Case Studies

Rings Forging

Vc = 90 m/min
f = 0.18 mm/rev
Wet (External coolant)
Overhang length : 70 mm
KPKB32-3 PKM30N-025PM PR1535



Machining Efficiency

KPK f=0.18mm/rev

Competitor G f=0.09mm/rev



Chip control Surface finish: Good

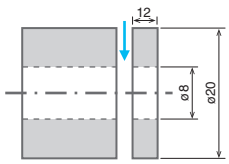
Machining Efficiency: x 2.0

KPK showed good chip control and finished surface with increased feed rates.
The machining efficiency ratio was doubled. KPK improves insert mounting speeds.

(User Evaluation)

Machine part SNCM20

n = 1,530 min^{-1} (Constant)
Vc = ~100 m/min
f = 0.09 mm/rev
Wet (External coolant)
Overhang length : 22 mm
KPKB26-3 PKM30N-025PM PR1625



Tool life

KPK 1,500 pcs/edge (Stable)

Competitor H 800 pcs/edge (Unstable)

Tool life: x 1.8

Competitor H was unstable with a sudden fracture.
KPK increased tool life by 1.8 times that of competitor.
Stable machining with good cutting edge

(User Evaluation)

● : Std. Item

KPKB-JCT (With Coolant holes) NEW

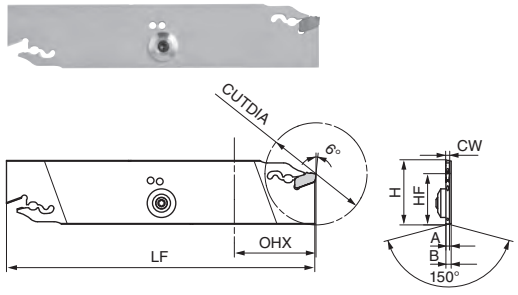


Fig.1

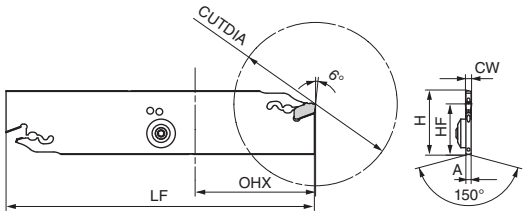


Fig.2

Blade Dimensions

Pressure Resistance : ~7MPa

Description	Stock	Cut-off Dia.	Dimension (mm)						Edge Width (mm)	Drawing	Spare Parts				Applicable Inserts	Applicable Toolblock H40
											Releasing Wrench	Coolant Plug	Screw	Wrench		
		CUTDIA	OHX*1	H*2	HF	B	LF	A	CW							
KPKB 26-2JCT	●	50	40	26	21.4	2.6	110	1.8	2.0	Fig. 1	LPW-5	CCP-4	SB-4065TR	FT-15	PKM20…	KPKTB○○-26JCT
26-3JCT	●	75				-		2.6	3.0	Fig. 2					PKM30…	KTKTB○○-26
26-4JCT	●	80						3.4	4.0						PKM40…	
KPKB 32-2JCT	●	50	59	32	25.0	2.6	150	1.8	2.0	Fig. 1		Coolant Plug Screw Tightening Torque 3.0 N·m			PKM20…	KPKTB○○-32JCT
32-3JCT	●	100				-		2.6	3.0	Fig. 2					PKM30…	KTKTB○○-32
32-4JCT	●	100						3.4	4.0						PKM40…	KTKTBF○○-32

See page **H41** for insert mounting and removal instructions
When using internal coolant with KTKTB, KTKTBF type toolblocks, coolant supply piping (CCN -5) sold separately.
*1. OHX: Maximum overhang length while using internal coolant
*2. H: Length between virtual vertices

KPKB (Without Coolant holes) NEW

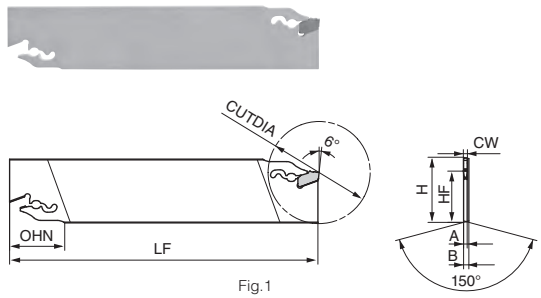


Fig.1

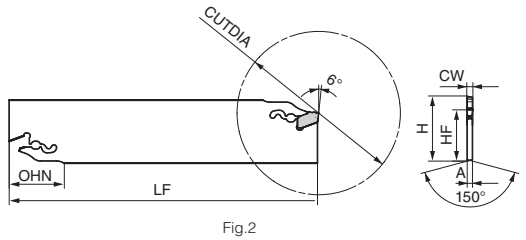


Fig.2

Blade Dimensions

Description	Stock	Cut-off Dia.	Dimension (mm)						Edge Width (mm)	Drawing	Spare Parts	Applicable Inserts	Applicable Toolblock H40
											Releasing Wrench		
		CUTDIA	OHN	H*2	HF	B	LF	A	CW				
KPKB 26-2	●	50	25	26	21.4	-	110	1.8	2.0	Fig. 2	LPW-5	PKM20…	KPKTB○○-26JCT
26-3	●	75						2.6	3.0			PKM30…	KTKTB○○-26
26-4	●	80	24					3.4	4.0			PKM40…	
32-2	●	50	27	32	25.0	2.6	150	1.8	2.0	Fig. 1		PKM20…	KPKTB○○-32JCT
32-3	●	100				-		2.6	3.0	Fig. 2		PKM30…	KTKTB○○-32
32-4	●	100						3.4	4.0			PKM40…	KTKTBF○○-32

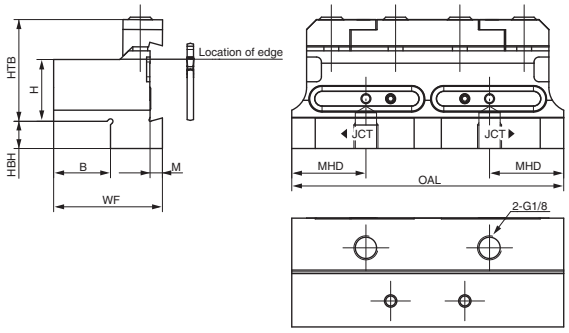
See page **H41** for insert mounting and removal instructions
*2. H: Length between virtual vertices

● : Std. Item

Toolblocks (for Holding Blade)

KPKTB-JCT (With Coolant holes) NEW





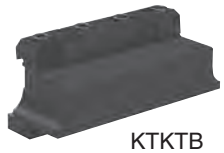
Toolblock Dimensions

Pressure Resistance : ~7MPa

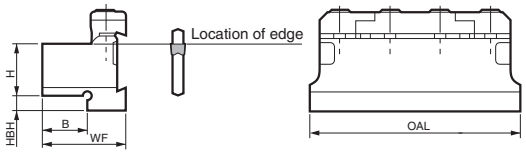
Description		Stock	Dimension (mm) H	HTB	HBH	B	WF	M	MHD	OAL	Spare Parts: Clamp Set (Separate Type)	Screw	Wrench	O-ring	Plug 1	Plug 2	Applicable blade ➡ H39 H45 G109
KPKTB	20-26JCT	●	20	33	12.4	19	39	4	23.5	86	BCS-2	HH6X16	LW-5	GR-020	HS3X4	HSG1/8X8.0	KPKB26-○JCT KTKB26-○
	20-32JCT	●	20	41	16		40	5	25	100	BCS-3			GR-026	HS4X4		KPKB32-○JCT KTKB32-○
	25-32JCT	●	25		11	23	44		30	110	BCS-4			GR-029			KFTB[R/L]○○○○○-4S
	32-32JCT	●	32		5	29	50										KFTB[R/L]○○○○○-5S

Includes only one HSG1/8X8.0 plug.
KPKTB-JCT type block is also compatible with conventional KTKB type blades.
See page **H43** for coolant piping parts.
When using internal coolant, the coolant may appear to leak slightly, but this should not affect machining performance.
(If the O-ring is damaged, order separately.)

KTKTB / KTKTBF (Without Coolant holes)

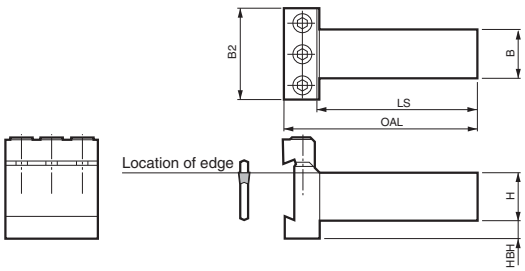


KTKTB





KTKTBF
(Square type)



Toolblock Dimensions

Description		Stock	Dimension (mm) H	HBH	B	WF B2	OAL	LS	Spare Parts: Clamp Set (Separate Type)	Clamp Set (Integral type)	Screw	Wrench	Applicable blade: Cut-off ➡ H39 H45	Face Grooving ➡ G109
KTKTB	16-19	●	16	4	15.5	29.5	76	-	-	BCS-1	HH5X25	LW-4	KTKB19-○S KTKB19-1SS	-
	20-19	●	20		19	34								
	16-26	●	16	13	15.5	31.5	86	-	BCS-2	-	HH6X30	LW-5	KPKB26-○(JCT) KTKB26-○S KTKB26-1SS	-
	20-26	●	20	9	19	36								
	20-32	●	20	13	19	38	100	-	BCS-3	-	HH6X30	LW-5	KPKB32-○(JCT) KTKB32-○S KTKB32-1SS KTKB[R/L]32-○S	KFTB[R/L]○○○○○-4S KFTB[R/L]○○○○○-5S
	25-32	●	25	8	23	42	110		BCS-4					
	32-32	●	32	5	29	48								
KTKTBF	25-32	●	25	9.5	25	48	102	84.5	-	BCS-5	HH6X30	LW-5	KPKB32-○(JCT) KTKB32-○S KTKB32-1SS KTKB[R/L]32-○S	KFTB[R/L]○○○○○-4S KFTB[R/L]○○○○○-5S
	32-32	●	32	2.5	32		117	99.5						

● : Std. Item

How to mount and remove the insert

1. Insert provide wrench and turn upwards as shown in (Fig. 1)
2. Slide insert into the blade's insert pocket from the front and push in until the back of the insert contacts the blade's back stop surface. (Fig. 2)

Completely eliminate chips from the insert pocket and the wrench insertion area by using compressed air.
Check to make sure the insert is straight and not tilted.
When removing the insert, follow the same procedure as shown in Fig. 2.



Fig. 1 Wrench Usage

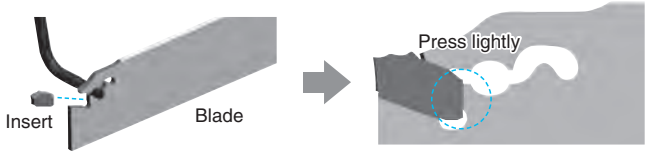
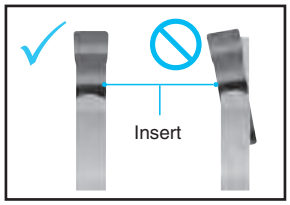
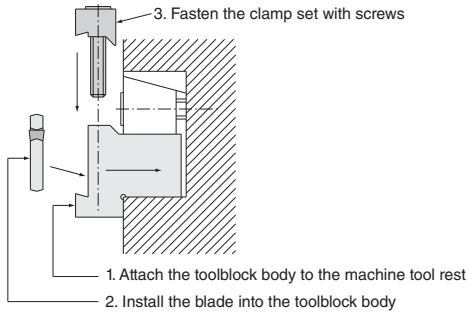


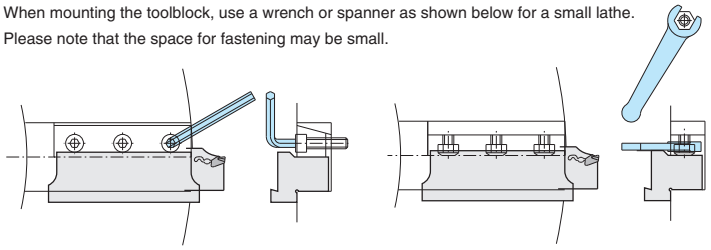
Fig. 2 Mounting Method



Installation Guide

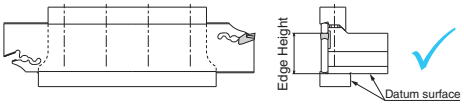


When mounting the toolblock, use a wrench or spanner as shown below for a small lathe.
Please note that the space for fastening may be small.

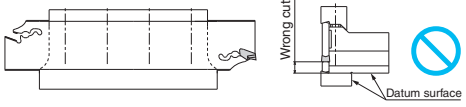


How to install the toolblock and blade

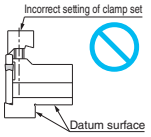
Correct blade installation



Incorrect blade installation



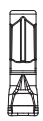
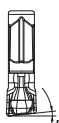
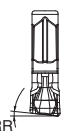
Incorrect setting of clamp set

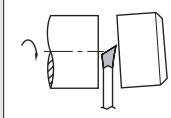
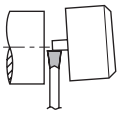
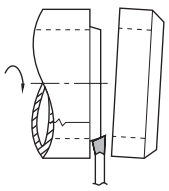
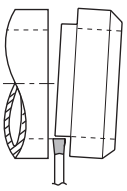


If the clamp set is mounted in the reverse direction, a large gap is created between the toolblock main body and the clamp set as shown in the left figure.
If you continue to use the product, the blade may break off.
Reinstall in the correct orientation.

Lead Angle Direction and Usage

1. If there is no restriction on the finished shape, use an insert without lead angle.
2. Insert with lead angle is recommended to prevent remaining boss.
3. If you want to make the remaining boss smaller when machining small or thin parts, use insert with lead angle.

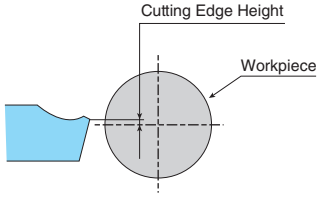
Hand of Lead Angle	N (Neutral)	R (Right hand)	L (Left hand)
		 PSIRR	 PSIRR
	· Inserts with lead angle (PSIR ℞) reduce burrs at cut-off machining. · The larger the lead angle (PSIR ℞), the smaller the cutting force. The feed also needs to be smaller.		

	Right hand (R) Lead angle	Neutral		Right hand (R) Lead angle	Neutral
Solid Workpiece			Hollow Workpiece (Pipe)		

Caution

1. Set cutting edge height 0.1mm above core height.
2. Machining with ample supply of coolant is recommended.
3. Keep a constant rate during processing so that optimum product life will be achieved.
4. Cut off as close to the chuck as possible.
5. To prevent impacts, reduce feed rate by 1/2 ~ 1/3 when nearing the center of the workpiece.

Overuse of insert and toolholder (blade) may cause insert breakage and toolholder (blade) damage.

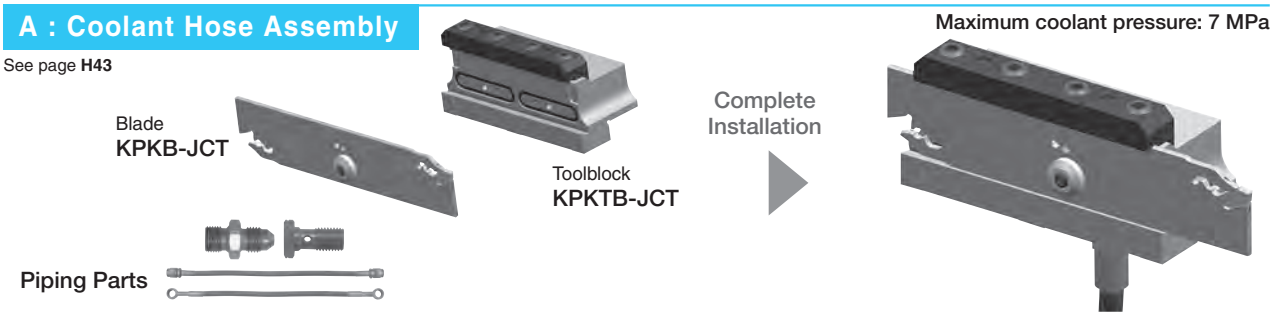


Internal coolant supply method Supplies according to machine specifications and requirements

A : Coolant Hose Assembly

Maximum coolant pressure: 7 MPa

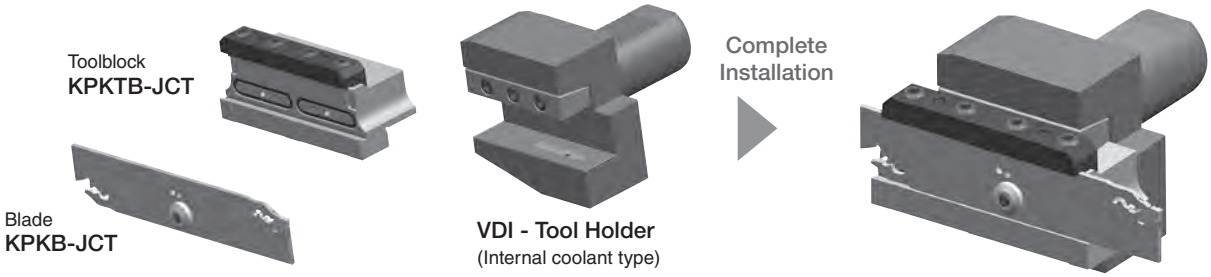
See page **H43**



B : VDI Holder Assembly

(Internal coolant type)

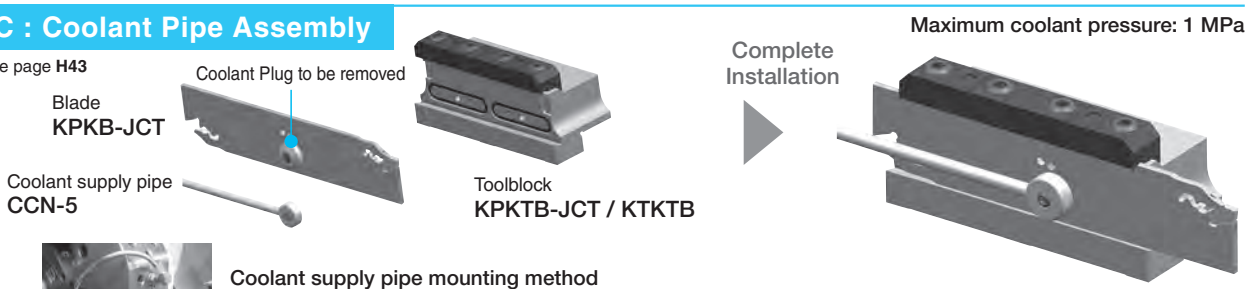
Maximum coolant pressure: 7 MPa



C : Coolant Pipe Assembly

Maximum coolant pressure: 1 MPa

See page **H43**



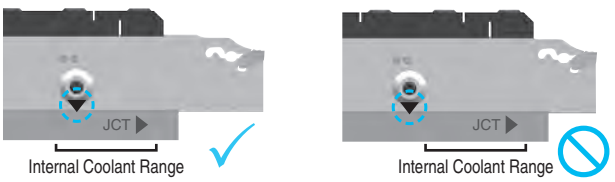


Coolant supply pipe mounting method
Attach to the blade with the supplied screw
Form pipe to the required shape and connect it to the piping of the machine.

Cautions

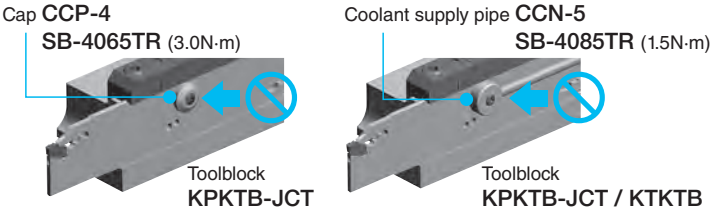
When mounting KPKB-JCT blade

When using internal coolant, keep the arrow (▼) on the blade within the range marked on the toolblock.



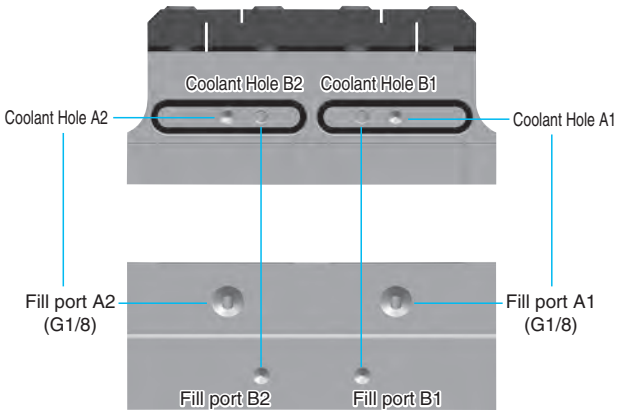
When the cap and coolant supply pipe are mounted

Coolant cannot be supplied correctly if it is mounted in the wrong position.



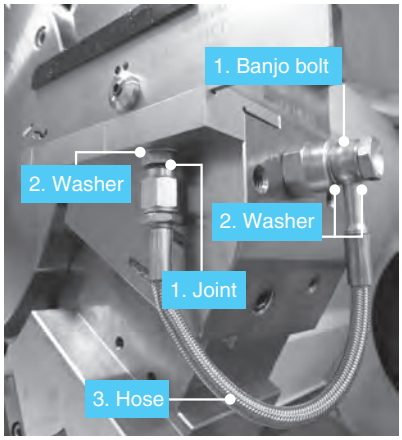
When using a toolblock

When using the discharge port B1 (B2), use a sealant for the filler cap (HSG 1/8 X 8.0) of the accessory part of the coolant supply port A1 (A2).



A : Coolant Hose Assembly

Connection method and piping parts

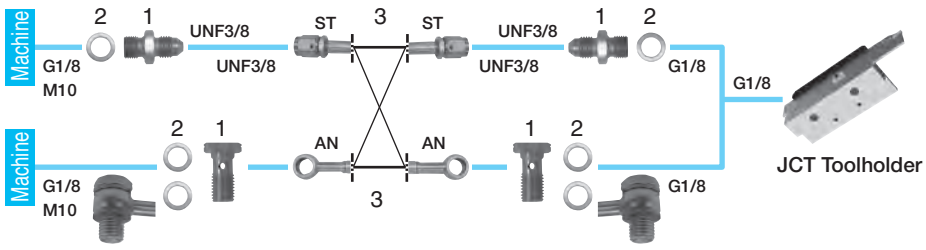


Easy Connection with High Pressure Hose and Joint

Even without a high pressure pump, internal coolant can be used at a normal pressure.

Banjo bolt available for angled hose connection

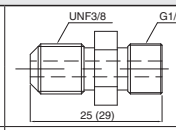
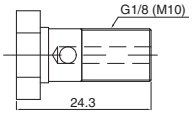
<Piping Installation Guide>



Depending on machine specifications and piping methods, 1.Joint / Banjo bolt x 2 2.Washer x 2-4 3.Hose x 1

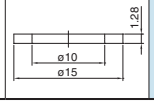
1. Joint / Banjo bolt (Sold separately)

Pressure Resistance : ~30MPa

Shape		Description	Stock	Thread Standard Thread connection to the machine
		J-G1/8-UNF3/8	●	G1/8
		J-M10X1.5-UNF3/8	●	M10X1.5
Banjo bolt (for angled hose)		BB-G1/8	●	G1/8
		BB-M10X1.5	●	M10X1.5

2.Washer (Sold separately)

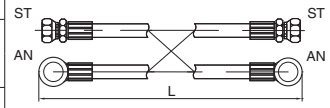
Pressure Resistance : ~30MPa

Shape		Description	Stock
		WS-10	●

*Use 2 washers for a banjo bolt

3.Hose (Sold separately)

Pressure Resistance : ~30MPa

Shape		Description	Stock	Thread Standard		Dimension (mm) L
Straight/Straight		HS-ST-ST-200	●	UNF3/8	UNF3/8	200
		HS-ST-ST-250	●			250
Straight/Angled		HS-ST-AN-200	●	UNF3/8	– (Banjo bolt)	200
		HS-ST-AN-250	●			250
Angled/Angled		HS-AN-AN-200	●	– (Banjo bolt)	– (Banjo bolt)	200
		HS-AN-AN-250	●			250

Cautions

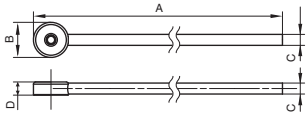
1. Make sure machine door is completely closed before use of these parts.
2. Use appropriate seal for the male thread of the piping parts and make sure the connection is secure.
   Use plugs to seal off unused coolant holes.
3. Connect and fasten the coolant hose firmly.
4. The use of copper washers may cause leakage but will have no effect on the performance.
5. Commercial piping parts can be used if the thread standards are same. Check the pressure resistance before use.
6. Regularly changing the coolant filter is recommended.

C : Coolant Pipe Assembly

Piping Parts

Coolant supply pipe (Sold separately)

Pressure Resistance : ~1MPa

Shape		Description	Stock	Dimension				Parts (Screw)
				A	B	C	D	
		CCN-5	●	190	16	5	6	SB-4085TR

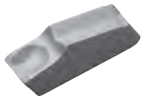
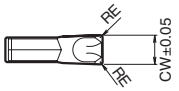
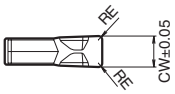
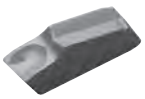
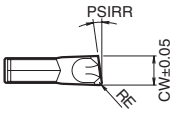
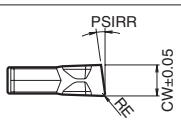
Use wrench (FT -15) supplied with the blade when connecting.

● : Std. Item

Cut-off Inserts

TKN / TK$^{R}/_{L}$

Classification of usage											
◕ : Continuous-Light Interruption / 1st Choice ◔ : Continuous-Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel	○		◕		○			
	M	Stainless Steel			◔	◕	○			
	K	Cast Iron						◕		
	N	Non-ferrous Metals						◕		

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)		Angle	Cermet		CVD Coated Carbide	MEGACOAT NANO	PVD Coated Carbide	Carbide	See Page for Applicable Toolholders
				CW	RE	PSIR$^{R}/_{L}$	TN620	TN90	CR9025	PR1535	PR930	KW10	
Neutral	 	TKN	1.6	1.6	0.15	-		●	●	●	●	●	H45
			2	2.2	0.20		●	●	●	●	●	●	
			2.4	2.4	0.20		●	●	●	●	●	●	
			3	3.1	0.25		●	●	●	●	●	●	H45
			4	4.1	0.30		●	●	●	●	●	●	H46
			4.8	4.8	0.30				●	●			
			5	5.1	0.30				●	●	●	●	
			6	6.4	0.35				●	●		●	
			8	8.0	0.40				●	●			H45
			9	9.6	0.45				●	●			
	 Low Feed		TKN	1.6-P	1.6	0.20	-		●	●		●	H45 H46
			2-P	2.2	0.20		●	●	●	●	●	●	
			3-P	3.1	0.25		●		●	●	●	●	
							R L	R L	R L	R L	R L	R L	
Lead Angle	 	TK$^{R}/_{L}$	1.6	1.6	0.15	8°			●	● ●	●	● ●	H45
			2	2.2	0.20		●	●	● ●	● ●	●	● ●	
			2.4	2.4	0.20				● ●	● ●	●	● ●	
			3	3.1	0.25		●	●	● ●	● ●	● ●	● ●	
			4	4.1	0.30		●	●	● ●	●		● ●	H45
			5	5.1	0.30				●	● ●		●	H46
	 Low Feed		TK$^{R}/_{L}$	1.6-P	1.6	0.20	8°			●			
			2-P	2.2	0.20				●	● ●	●	●	
			3-P	3.1	0.25		●	●	●	● ●	●	●	

Recommended Cutting Conditions ➡ H47

Cut-off Tools

Cutting Range	Chipbreaker		Advantage
General Cut-off	Standard (No Indication)		General cut-off type for feed rates 0.1mm/rev or over Superior chip evacuation
Low feed Cut-off	P		Chipbreaker specially designed for low feed machining on automatic lathes, etc. Chips are controlled at feed rate 0.03~0.08mm/rev

Inserts Edge Prep.

	Chamfered + R-honed	Sharp Edge	R-honed
Edge Prep.			
Std. Chipbreaker	TN90 / PR1535 CR9025 / PR660	PR930 / KW10	-
P Chipbreaker	-	-	TN620 / TN90 / CR9025 / PR1535 PR660 / PR930 / KW10

· Sharp Edge Spec. can reduce cutting force by 40% less than that of chamfer edge.

Set Up (TKN / TK$^{R}/_{L}$)

1. Tap the insert lightly with a plastic hammer to push it into the extent that it cannot be removed by hand. (Fig. 1)
   (Pull it to the point where it does not fall out when picked up lightly with fingers)
2. Remove the insert with the supplied wrench. (Fig. 2)

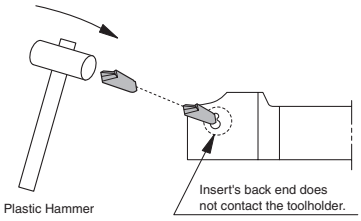


Fig. 1 How to attach inserts

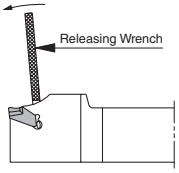
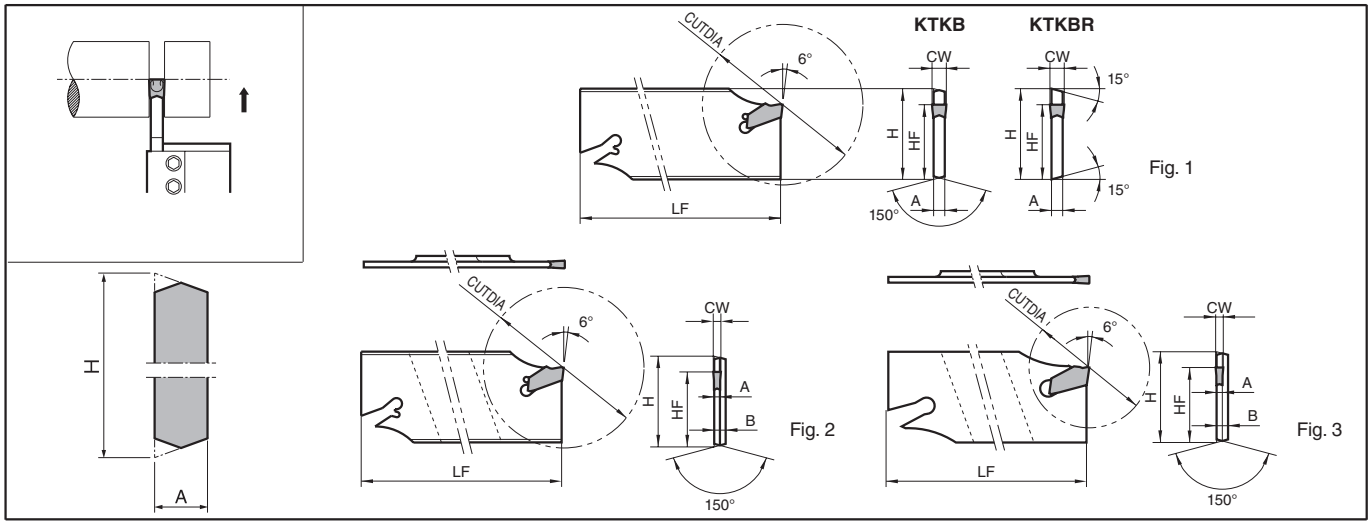


Fig. 2 How to detach inserts

● : Std. Item

Inserts are sold in 10 piece boxes

KTKB-SS / KTKB-S



Blade Dimensions

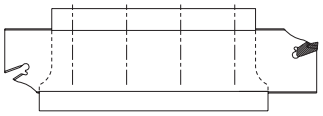
Description	Stock	Cut-off Dia.	Dimension (mm)					Edge Width (mm)	Drawing	Applicable Inserts ➡ H44				Applicable Toolblock ➡ H40
		CUTDIA	*H	HF	B	LF	A	CW			Low Feed	Lead Angle	Low Feed / Lead Angle	
KTKB 19-1SS	●	32	19	15.7	2.4	86	1.2	1.6	Fig. 3	TKN1.6	TKN1.6-P	TK$^{R/L}$1.6	TK$^{R/L}$1.6-P	KTKTB 16-19 20-19
KTKB 26-1SS	●	35	26	21.4	2.4	110	1.2	1.6	Fig. 3	TKN1.6	TKN1.6-P	TK$^{R/L}$1.6	TK$^{R/L}$1.6-P	KTKTB 16-26 20-26 KPKTB20-26JCT
KTKB 32-1SS	●	35	32	25	2.4	150	1.2	1.6	Fig. 3	TKN1.6	TKN1.6-P	TK$^{R/L}$1.6	TK$^{R/L}$1.6-P	KTKTB 20-32 25-32 32-32 KTKTBF 25-32 32-32 KPKTB20-32JCT KPKTB25-32JCT KPKTB32-32JCT
KTKB 19-2S	●	40	19	15.7	-	86	1.8	2.2 2.4	Fig. 1	TKN2 TKN2.4	TKN2-P	TK$^{R/L}$2 TK$^{R/L}$2.4	TK$^{R/L}$2-P	KTKTB 16-19 20-19
KTKB 26-2S	●	50	26	21.4	-	110	1.8	2.2 2.4	Fig. 1	TKN2 TKN2.4	TKN2-P	TK$^{R/L}$2 TK$^{R/L}$2.4	TK$^{R/L}$2-P	KTKTB 16-26 20-26 KPKTB20-26JCT
26-3S	●	75					2.6	3.1		TKN3	TKN3-P	TK$^{R/L}$3	TK$^{R/L}$3-P	
26-4S	●	80					3.4	4.1		TKN4	-	TK$^{R/L}$4	-	
26-5S	●	80					4.2	4.8 5.1		TKN4.8 TKN5	-	TK$^{R/L}$5	-	
KTKB 32-2S	●	50	32	25	2.6	150	1.8	2.2 2.4	Fig. 2	TKN2 TKN2.4	TKN2-P	TK$^{R/L}$2 TK$^{R/L}$2.4	TK$^{R/L}$2-P	KTKTB 20-32 25-32 32-32 KTKTBF 25-32 32-32 KPKTB20-32JCT KPKTB25-32JCT KPKTB32-32JCT
32-3S	●	100			-		2.6	3.1	Fig. 1	TKN3	TKN3-P	TK$^{R/L}$3	TK$^{R/L}$3-P	
32-4S	●	100					3.4	4.1		TKN4	-	TK$^{R/L}$4	-	
32-5S	●	120					4.2	4.8 5.1		TKN4.8 TKN5	-	TK$^{R/L}$5	-	
32-6S	●	120					5.4	6.4		TKN6	-	-	-	
KTKB$^{R/L}$ 32-8S	●	120	32	25	-	150	6.8	8.0	Fig. 1	TKN8	-	-	-	
32-9S	R	120					8.0	9.6		TKN9	-	-	-	

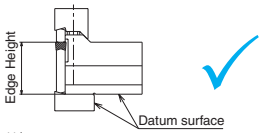
Note) 1. Suffix "-SS" means silver coating.
2. Releasing wrench is "LTK-5".
3. How to attach inserts, See Page **H44**.

* Dimension H shows virtual apex distance.

How to install the toolblock and blade

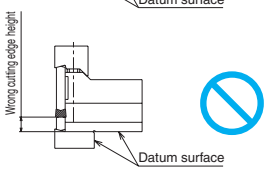
●Correct blade installation



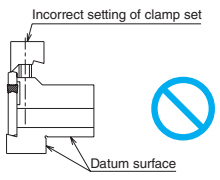


●Incorrect blade installation





●Incorrect setting of clamp set

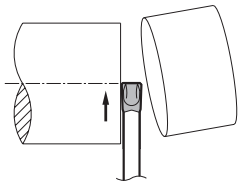


If the clamp set is mounted in the reverse direction, a large gap is created between the toolblock main body and the clamp. If you continue to use the product, the blade may break off. Reinstall in the correct orientation.

● : Std. Item
R : Std. Item (Right-hand Only)

Cut-off Toolholders (Integral Type)

KTKH-S



For General Cut-off (Self Clamp)

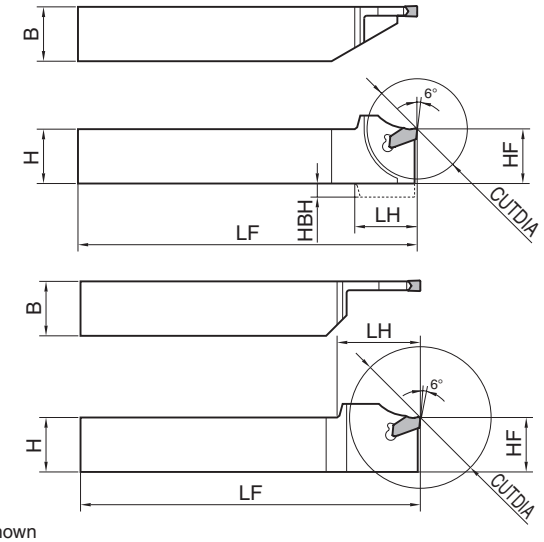


Fig. 1

Fig. 2

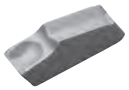
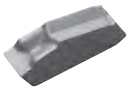
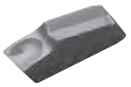
• Right-hand shown

Toolholder Dimensions

Description		Stock R	Stock L	Cut-off Dia. (mm) CUTDIA	Dimension (mm) H	HF	HBH	B	LF	LH	Edge Width (mm) CW	Drawing	Spare Parts: Releasing Wrench	See Page for Recommended Cutting Conditions
KTKH R/L	1010F-2S	●	●	28	10	10	5	10	80	18.6				
	1212H-2S	●	●	31	12	12	4	12	100	19.8				
	1612H-2S	●	●	31	16	16	-	12	100	19.8	2.2	Fig. 1		
	1616H-2S	●	●	31	16	16	-	16	100	19.8	2.4			
	2012K-2S	●	●	36	20	20	-	12	125	22.8				
	2020K-2S	●	●	36	20	20	-	20	125	22.8				
	1612H-3S	●	●	35	16	16	4	12	100	21.7				
	1616H-3S	●	●	35	16	16	4	16	100	21.7		Fig. 1	LTK-5	**H47**
	2012K-3S	●	●	40	20	20	-	12	125	25.3	3.1			
	2020K-3S	●	●	51	20	20	-	20	125	31.0		Fig. 2		
	2525M-3S	●	●	52	25	25	-	25	150	31.5				
	2012K-4S	●	●	43	20	20	-	12	125	26.3		Fig. 1		
	2020K-4S	●	●	59	20	20	-	20	125	35.0	4.1	Fig. 2		
	2525M-4S	●	●	66	25	25	-	25	150	38.0				
	2525M-5S	●	●	77	25	25	-	25	150	43.5	4.8, 5.1	Fig. 2		
KTKH R/L	2020K-3T17S	●	●	33	20	20	-	20	125	21.8	3.1	Fig. 1	LTK-5	**H47**
	2525M-3T22S	●	●	43	25	25	-	25	150	26.8				
	2020K-4T22S	●	●	44	20	20	-	20	125	26.8	4.1			
	2525M-4T22S	●	●	44	25	25	-	25	150	26.8				

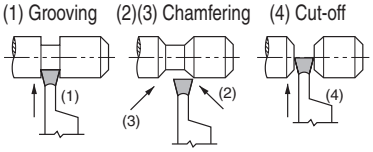
· How to attach inserts, See Page **H44**.

Applicable Inserts

See Page	H44			
Insert / Toolholder Description		 Low Feed	 Lead Angle	 Low Feed / Lead Angle
KTKH R/L ...-2...	TKN2 TKN2.4	TKN2-P	TK R/L2 TK R/L2.4	TK R/L2-P
KTKH R/L ...-3...	TKN3	TKN3-P	TK R/L3	TK R/L3-P
KTKH R/L ...-4...	TKN4	-	TK R/L4	-
KTKH R/L ...-5...	TKN4.8 TKN5	-	TK R/L5	-

Application Example of Cut-off

1. Cut-off after Chamfering

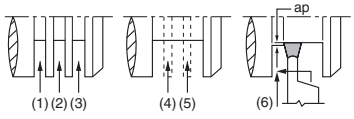


2. Wide Grooving

(1)~(5) Groove Widening

(6) Finishing

(Value of "ap" shall be under the value of Corner-R)



(In order to prevent both corners' unequal wear) ● : Std. Item

Recommended Cutting Conditions

TKF12/16

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)					TKF12 Edge Width CW (mm)						TKF16 Edge Width CW (mm)		Remarks
	MEGACOAT NANO PLUS	MEGACOAT NANO	MEGACOAT	DLC Coated Carbide	Carbide	0.5	0.7	1.0	1.25	1.5	2.0	1.5	2.0	
	PR1725	PR1535	PR1225	PDL025	KW10	f (mm/rev)						f (mm/rev)		
Carbon Steel	★ 70 ~ 170 (50 ~ 140)	☆ 70 ~ 150 (50 ~ 120)	☆ 70 ~ 150 (50 ~ 120)	-	-	0.01 ~ 0.02	0.01 ~ 0.03	0.01 ~ 0.04 (0.01 ~ 0.05)	0.01 ~ 0.04	0.01 ~ 0.04 (0.02 ~ 0.1)	0.01 ~ 0.04 (0.02 ~ 0.1)	0.02 ~ 0.07 (0.02 ~ 0.1)	0.02 ~ 0.07 (0.02 ~ 0.1)	Coolant
Alloy Steel	★ 70 ~ 170 (50 ~ 140)	☆ 70 ~ 150 (50 ~ 120)	☆ 70 ~ 150 (50 ~ 120)	-	-	0.01 ~ 0.02	0.01 ~ 0.03	0.01 ~ 0.04 (0.01 ~ 0.05)	0.01 ~ 0.04	0.01 ~ 0.04 (0.02 ~ 0.1)	0.01 ~ 0.04 (0.02 ~ 0.1)	0.02 ~ 0.07 (0.02 ~ 0.1)	0.02 ~ 0.07 (0.02 ~ 0.1)	
Stainless Steel	☆ 60 ~ 140 (40 ~ 120)	★ 60 ~ 120 (40 ~ 100)	☆ 60 ~ 120 (40 ~ 100)	-	-	0.005 ~ 0.015	0.01 ~ 0.02	0.01 ~ 0.02 (0.01 ~ 0.03)	0.01 ~ 0.02	0.01 ~ 0.02 (0.01 ~ 0.05)	0.01 ~ 0.02 (0.01 ~ 0.05)	0.01 ~ 0.04 (0.01 ~ 0.05)	0.01 ~ 0.04 (0.01 ~ 0.05)	
Cast Iron	-	-	-	-	★ 50 ~ 100	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.05	0.01 ~ 0.05	0.01 ~ 0.05	0.01 ~ 0.05	0.02 ~ 0.08	0.02 ~ 0.08	
Aluminum Alloys	-	-	-	★ 200 ~ 500	☆ 200 ~ 450	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.05	0.01 ~ 0.05	0.01 ~ 0.05	0.01 ~ 0.05	0.02 ~ 0.08	0.02 ~ 0.08	
Brass	-	-	-	-	★ 100 ~ 200	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.06	0.01 ~ 0.06	0.01 ~ 0.06	0.01 ~ 0.06	0.02 ~ 0.1	0.02 ~ 0.1	

*( ) : Tough edge type (TKF..T..)

★ : 1st Recommendation ☆ : 2nd Recommendation

In case of using GMM-MT, GMM-TK, GMM-NB inserts

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)				Edge Width CW (mm)				Remarks
	CVD Coated Carbide	PVD Coated Carbide		Carbide	1.5	2.0/2.5	3.0	4.0	
	CR9025	PR915	PR930	KW10	f (mm/rev)				
Carbon Steel	☆ 80 ~ 180	★ 60 ~ 150	☆ 60 ~ 130	-	0.01 ~ 0.04	0.02 ~ 0.15	0.03 ~ 0.20	0.08 ~ 0.30	Coolant
Alloy Steel	☆ 70 ~ 150	★ 60 ~ 150	☆ 60 ~ 130	-	0.01 ~ 0.04	0.02 ~ 0.15	0.03 ~ 0.20	0.08 ~ 0.30	
Stainless Steel	☆ 60 ~ 140	★ 50 ~ 140	☆ 50 ~ 120	-	0.01 ~ 0.03	0.02 ~ 0.10	0.03 ~ 0.15	0.08 ~ 0.25	
Cast Iron	-	-	-	★ 50 ~ 100	0.01 ~ 0.05	0.05 ~ 0.12	0.10 ~ 0.25	0.10 ~ 0.30	
Aluminum Alloys	-	-	-	★ 200 ~ 450	0.01 ~ 0.05	0.05 ~ 0.10	0.05 ~ 0.20	0.05 ~ 0.25	
Brass	-	-	-	★ 100 ~ 200	0.01 ~ 0.05	0.05 ~ 0.10	0.05 ~ 0.15	0.05 ~ 0.20	

· When machining Steel and Stainless Steel by Insert of PR930, decrease the Feed Rate by 20%.

★ : 1st Recommendation ☆ : 2nd Recommendation

In case of using TKN, TK$^{R}/_{L}$ inserts

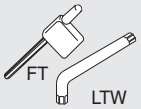
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)						Edge Width CW (mm)					Remarks
	Cermet		CVD Coated Carbide	MEGACOAT NANO	PVD Coated Carbide	Carbide	1.6	2.2/2.4	3.1	4.1	4.8 ~ 9.6	
	TN620	TN90	CR9025	PR1535	PR930	KW10	f (mm/rev)					
Carbon Steel	☆ 60 ~ 200	☆ 120 ~ 200	★ 80 ~ 180	☆ 60 ~ 150	☆ 60 ~ 130	-	0.02 ~ 0.08	0.04 ~ 0.18	0.05 ~ 0.25	0.08 ~ 0.30	0.15 ~ 0.40	Coolant
Alloy Steel	☆ 60 ~ 160	☆ 100 ~ 160	★ 70 ~ 150	☆ 60 ~ 150	☆ 60 ~ 130	-	0.02 ~ 0.08	0.04 ~ 0.18	0.05 ~ 0.25	0.08 ~ 0.30	0.15 ~ 0.40	
Stainless Steel	☆ 60 ~ 150	☆ 80 ~ 150	☆ 60 ~ 140	★ 50 ~ 120	☆ 60 ~ 140	-	0.02 ~ 0.06	0.04 ~ 0.12	0.05 ~ 0.18	0.08 ~ 0.25	0.10 ~ 0.30	
Cast Iron	-	-	-	-	-	★ 50 ~ 100	0.02 ~ 0.08	0.05 ~ 0.12	0.10 ~ 0.25	0.10 ~ 0.30	0.15 ~ 0.35	
Aluminum Alloys	-	-	-	-	-	★ 100 ~ 450	0.02 ~ 0.10	0.05 ~ 0.10	0.05 ~ 0.20	0.05 ~ 0.25	0.10 ~ 0.25	
Brass	-	-	-	-	-	★ 100 ~ 200	0.02 ~ 0.10	0.05 ~ 0.10	0.05 ~ 0.15	0.05 ~ 0.20	0.10 ~ 0.25	

★ : 1st Recommendation ☆ : 2nd Recommendation

In case of using GMM-TMR inserts

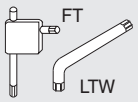
Workpiece Material	Vc (m/min)	f (mm/rev)	Remarks
Carbon Steel	60 ~ 200	0.08 ~ 0.18	Coolant
Alloy Steel	60 ~ 150		
Stainless Steel	50 ~ 140		

Alternative Toolholder Reference Table for Cut-off Toolholder (KTKF / KGM)

Conventional Toolholder						Alternative Toolholder			
Description	Overall length (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench		See Page	Description	Overall length (mm)	Remarks	See Page
									
KTKF R/L 1010K-12	125	SB-4590TRWN	FT-10		H9	KTKF R/L 1010JX-12	120		H9
KTKF R/L 1212M-12	150					KTKF R/L 1212JX-12	120		
KTKF R/L 1616M-12	150					KTKF R/L 1616JX-12	120		
KTKF R/L 1010K-16	125					KTKF R/L 1010JX-16	120		
KTKF R/L 1212M-16	150					KTKF R/L 1212JX-16	120		
KTKF R/L 1616M-16	150					KTKF R/L 1616JX-16	120		
KGM R/L 0810K-1.5-125	125	SE-40120TR	LTW-15S		H32	-	-	No Alternative	H32
KGM R/L 1010K-1.5-125	125					KGM R/L 1010JX-1.5	120		
KGM R/L 1212M-1.5-150	150					KGM R/L 1212JX-1.5	120		
KGM R/L 0810K-2-125	125	SE-40120TR	LTW-15S			-	-	No Alternative	
KGM R/L 1010K-2-125	125					KGM R/L 1010JX-2	120		
KGM R/L 1212M-2-150	150					KGM R/L 1212JX-2	120		
KGM R/L 1616M-2-150	150	SE-50125TR	LTW-20			KGM R/L 1616JX-2	120		
KGM R/L 1010K-2.5-125	125	SE-40120TR	LTW-15S			-	-	No Alternative	
KGM R/L 1212M-2.5-150	150					KGM R/L 1212JX-2.5	120		
KGM R/L 1616M-2.5-150	150	SE-50125TR	LTW-20			KGM R/L 1616JX-2.5	120		
KGM R/L 1616M-3-150	150	SE-50125TR	LTW-20			KGM R/L 1616JX-3	120		

Note) The corresponding alternative toolholder may be different from the conventional toolholder in insert clamping system or insert size.
Make sure of their specifications by referring to the catalog or other documents.

Alternative Toolholder Reference Table for Cut-off Toolholder (KTKH-B / KTKH-S)

Conventional Toolholder							Alternative Toolholder			
Description	Cut-off Dia.	Spare Parts: Releasing Wrench	Spare Parts: Clamp Screw	Spare Parts: Wrench		See Page	Description	Cut-off Dia.	Remarks	See Page
										
KTKH R/L 0808K-1.6-125B	ø10	-	SE-40120TR	FT-15		H32	-	-	No Alternative	H32
KTKH R/L 1010K-1.6-125B	ø20						KGM R/L 1010JX-1.5	ø20		
KTKH R/L 1212M-1.6-150B	ø25						KGM R/L 1212JX-1.5	ø25		
KTKH R/L 1414M-1.6-150B	ø26						-	-	No Alternative	
KTKH R/L 1010K-2-125B	ø20	-	SE-40120TR	FT-15			KGM R/L 1010JX-2	ø20		
KTKH R/L 1212M-2-150B	ø25						KGM R/L 1212JX-2	ø25		
KTKH R/L 1616M-2-150B	ø32	-	SE-50125TR	LTW-20			KGM R/L 1616JX-2	ø32		
KTKH R/L 1616M-3-150B	ø32						KGM R/L 1616JX-3	ø32		
KTKHR 1010K-2-125S	ø30	LTK-5	-	-			KGMR 1010JX-2	ø20	Processing dia. is small.	
KTKH R/L 1212M-2-150S	ø30						KGM R/L 1212JX-2	ø25	Processing dia. is small.	
KTKH R/L 1616M-2-150S	ø36						KGM R/L 1616JX-2	ø32	Processing dia. is small.	
KTKH R/L 1616M-3-150S	ø45						KGM R/L 1616JX-3	ø32	Processing dia. is small.	

Note) The corresponding alternative toolholder may be different from the conventional toolholder in processing diameter or insert size.
Make sure of their specifications by referring to the catalog or other documents.



Threading

J1~J54

J

Summary of External Threading / Summary of Internal Threading J2

Product Introduction J4

Summary of Threading Inserts J5

Threading Inserts (External / Internal) J6~J19

Metric (M) J6

Unified (UN) J8

Parallel Pipe [G (PF)] Whitworth (W) J10

Tapered Pipe [R, Rc(PT) (BSPT)] J12

American National Tapered Pipe (NPT) J14

60˚ Type (Partial Profile / M, UN) J16

55˚ Type [Partial Profile / G(PF), R, Rc(PT) (BSPT), W] J18

30˚ Trapezoidal J18

Threading Toolholders (External / Internal) J20~J37

KTN / KTNS		J20
KTN-JCT	Coolant-through Holders	J21
S-KTN	Sleeve Holder	J22
SIN / CIN		J23
KTKF	Small Parts Machining	J24
KTKF (Goose-neck Holder)	Small Parts Machining	J24
KTKF-Y Y-axis Toolholder	Small Parts Machining	J24
KTTX	Small Parts Machining	J28
S-KTTX	Sleeve Holder	J28
KTT		J30
KITG		J31
EZT	EZ Bars	J32
VNT	System Tip-Bars	J36
S-STWP / S-STWP-E		J37

Technical Information J38~J54

Recommended Cutting Conditions J38

Applicable Toolholders & Inserts J48

Threading Methods J52

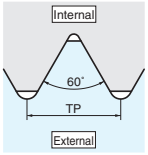
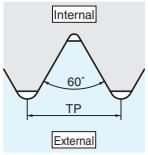
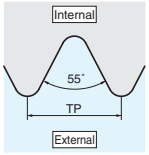
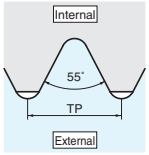
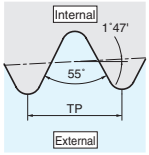
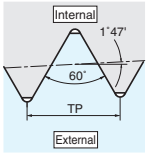
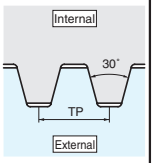
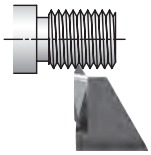
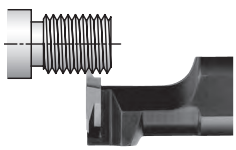
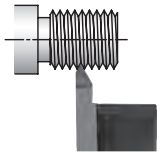
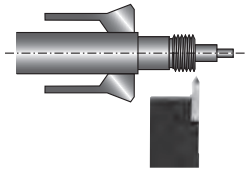
Lead Angle & Relief Angle of Thread J53

Thread Types & Basic Profile J54



Summary of External Threading

Tooling Application Table (External Thread)

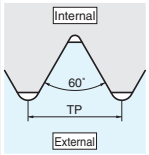
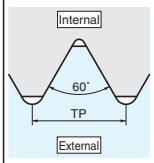
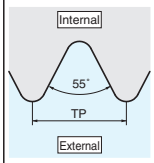
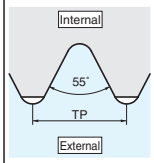
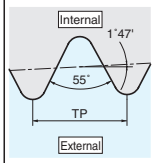
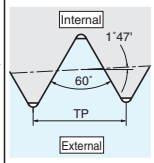
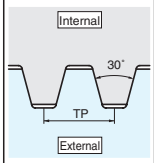
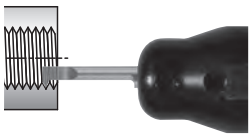
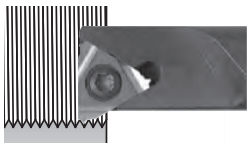
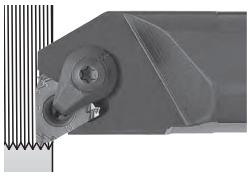
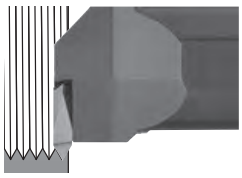
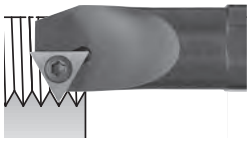
Thread Types		Metric	Unified	Parallel Pipe	Whitworth	Tapered Pipe	American National Tapered Pipe	30° Trapezoidal
		M	UN, UNC UNF, UNEF	G(PF)	W	R(PT) (BSPT)	NPT	Tr
Thread shape								
Pitch / Toolholder Shape		mm	TPI	TPI	TPI	TPI	TPI	mm
KTN ➡ J20 (KTN-JCT) ➡ J21 	Full Profile	0.5~5.0 (0.5~3.0) ➡ **J6**	24~8 (24~8) ➡ **J8**	19~11 (19~11) ➡ **J10**	16~11 (16~11) ➡ **J10**	28~11 (28~11) ➡ **J12**	18~11.5 (18~11.5) ➡ **J14**	-
	Partial Profile	0.5~5.0 (0.5~3.0) ➡ **J16**	48~5 (48~8) ➡ **J16**	28~11 (28~11) ➡ **J18**	40~5 (40~8) ➡ **J18**	28~11 (28~11) ➡ **J18**	-	2.0~5.0 (2.0~3.0) ➡ **J18**
KTNS ➡ J20  Sleeve Holder **S-KTN ➡ J22**	Full Profile	0.5~3.0 ➡ **J6**	24~8 ➡ **J8**	19~11 ➡ **J10**	16~11 ➡ **J10**	28~11 ➡ **J12**	18~11.5 ➡ **J14**	-
	Partial Profile	0.5~3.0 ➡ **J16**	48~8 ➡ **J16**	28~11 ➡ **J18**	40~8 ➡ **J18**	28~11 ➡ **J18**	-	2.0~3.0 ➡ **J18**
KTT ➡ J30 	Full Profile	1.0~2.0 ➡ **J30**	-	-	-	-	-	-
	Partial Profile	0.5~3.5 ➡ **J30**	56~8 ➡ **J30**	28~11 ➡ **J30**	24~7 ➡ **J30**	28~11 ➡ **J30**	-	-
KTTX ➡ J28 	Partial Profile	0.5~2.0 ➡ **J29**	56~14 ➡ **J29**	28~11 ➡ **J29**	24~11 ➡ **J29**	28~11 ➡ **J29**	-	-
S-KTTX ➡ J28 	Partial Profile	0.5~2.0 ➡ **J29**	56~14 ➡ **J29**	28~11 ➡ **J29**	24~11 ➡ **J29**	28~11 ➡ **J29**	-	-
KTKF ➡ J24 	Partial Profile	0.2~1.5 ➡ **J25**	64~18 ➡ **J25**	28~19 ➡ **J25**	40~16 ➡ **J25**	28~19 ➡ **J25**	-	-
KTKF / KTKF-Y ➡ J24 (Goose-neck Holder / Y-axis Toolholder) 								

· Threading Inserts Identification System
Full Profile ➡ **J6**
Partial Profile ➡ **J16**

· Pitch inside ( ) indicates KTN-JCT(Coolant-through Holders).

Summary of Internal Threading

Tooling Application Table (Internal Thread)

Thread Types		Metric	Unified	Parallel Pipe	Whitworth	Tapered Pipe	American National Tapered Pipe	30° Trapezoidal
		M	UN, UNC UNF, UNEF	G(PF) Rp(PS)	W	Rc(PT) (BSPT)	NPT	Tr
Thread shape								
Toolholder Shape \ Pitch		mm	TPI	TPI	TPI	TPI	TPI	mm
EZT ➡ J32 	Partial Profile	0.5~1.75 ➡ **J32**	36~16 ➡ **J32**	28~19 ➡ **J32**	24~18 ➡ **J32**	28~19 ➡ **J32**	18~14 ➡ **J32**	-
VNT ➡ J36 	Partial Profile	0.75~1.5 ➡ **J36**	28~18 ➡ **J36**	-	-	-	-	-
SIN ➡ J23 	Full Profile	0.5~5.0 ➡ **J7**	24~8 ➡ **J9**	19~11 ➡ **J11**	16~11 ➡ **J11**	28~11 ➡ **J13**	18~11.5 ➡ **J15**	-
	Partial Profile	0.5~5.0 ➡ **J17**	48~5 ➡ **J17**	28~11 ➡ **J19**	40~5 ➡ **J19**	28~11 ➡ **J19**	-	2.0~5.0 ➡ **J19**
CIN ➡ J23 	Full Profile	1.0~5.0 ➡ **J7**	24~8 ➡ **J9**	19~11 ➡ **J11**	16~11 ➡ **J11**	14~11 ➡ **J13**	18~11.5 ➡ **J15**	-
	Partial Profile	0.5~5.0 ➡ **J17**	48~5 ➡ **J17**	28~11 ➡ **J19**	40~5 ➡ **J19**	28~11 ➡ **J19**	-	2.0~5.0 ➡ **J19**
KITG ➡ J31 	Partial Profile	0.5~3.0 ➡ **J31**	48~8 ➡ **J31**	28~11 ➡ **J31**	24~8 ➡ **J31**	28~11 ➡ **J31**	-	-
STWP ➡ J37 	Partial Profile	0.75~3.5 ➡ **J37**	28~8 ➡ **J37**	-	-	-	-	-

· For parallel pipe and tapered pipe, the average values are only to be used if specifically recommendation.

Threading Insert with Molded Chipbreaker

TQ Chipbreaker

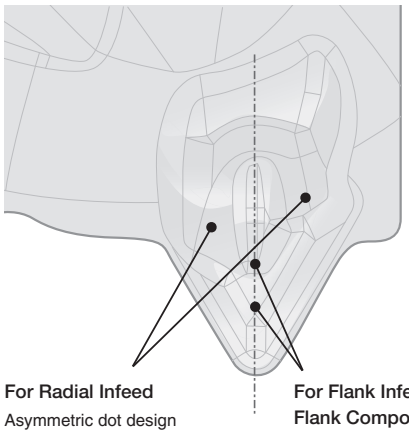
Advanced Productivity with Chip Control Improvement
Improved Tool Life with Newly Added Grades

1 Stable Chip Control

Stable Chip Control with Asymmetric Chipbreaker Design

Chipbreaker Geometry

Stable chip control regardless of cutting direction

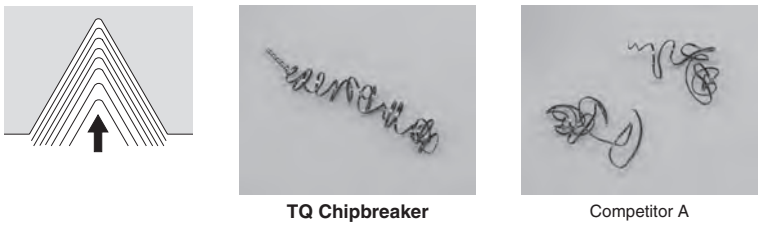


For Radial Infeed
Asymmetric dot design controls chip-flow direction

For Flank Infeed / Flank Compound Infeed
Breaks chips easily with shallow chipbreaker depth

Chip Control Comparison (Internal evaluation)

Radial Infeed



Flank Compound Infeed

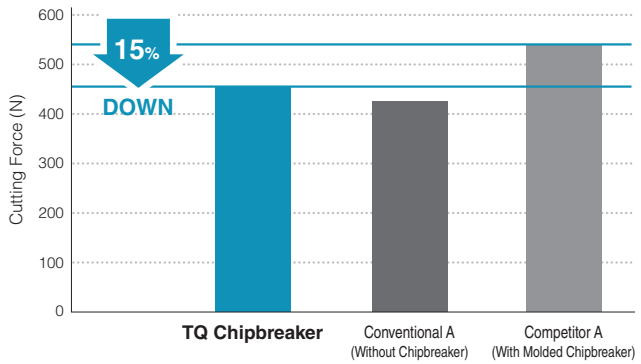


Cutting Conditions : Vc = 150m/min, ap = 0.12 mm (4th Pass), L = 25 mm, Wet,
16ER150ISO type, M45 × TP1.5 Workpiece Material : SCM415

2 Low Cutting Force and Resists Vibration

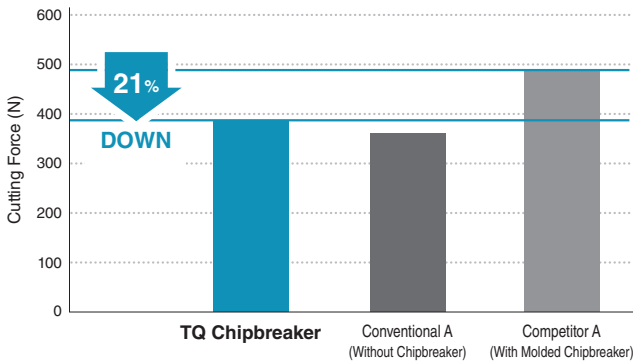
Strong Edge and Low Cutting Force

Cutting Force Comparison Radial Infeed (Internal evaluation)



Cutting Conditions : Vc = 150 m/min, Wet, 16ER150ISO type
Cutting force is average in total passes (6 passes), M35 x TP1.5 Workpiece Material : SCM415

Cutting Force Comparison Flank Compound Infeed (Internal evaluation)



Cutting Conditions : Vc= 150 m/min, Adjusted Angle : 5°, Wet, 16ER150ISO type
Cutting force is average in total passes (6 passes), M35 x TP1.5 Workpiece Material : SCM415

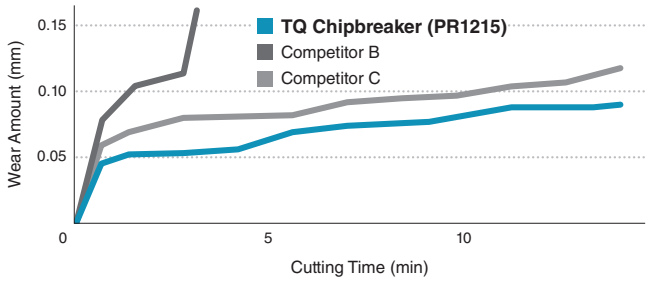
3 Improved Tool Life with Newly Added Grades

For Steel Machining **PR1215**

For Stainless Steel Machining **PR1515 PR1535 (Stability Oriented)**

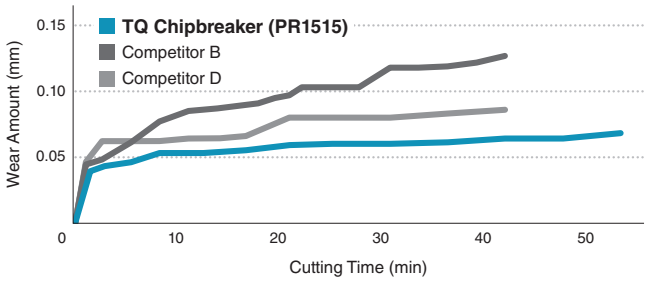
Wear Resistance Comparison (Internal evaluation)

Workpiece Material : SCM435



Cutting Conditions : Vc = 150 m/min, TP = 1.5 mm, No. of Passes = 6, Wet, 16ER150ISO type Radial Infeed

Workpiece Material : SUS304



Cutting Conditions : Vc = 100 m/min, TP = 1.5 mm, No. of Passes = 8, Wet, 16ER150ISO type Radial Infeed

KTKF J24,J25

Threading

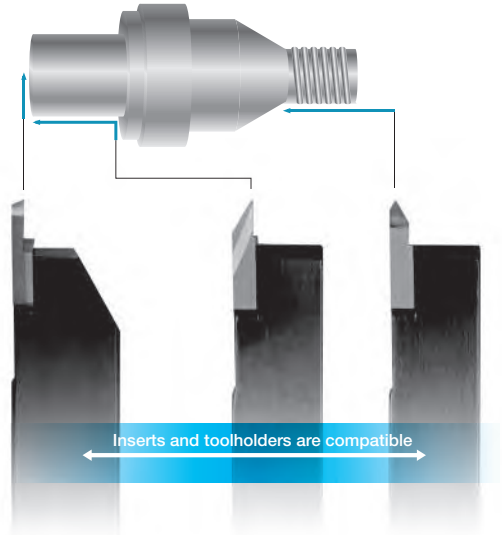
For Threading

TKFT



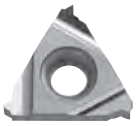
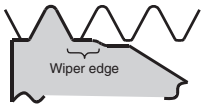
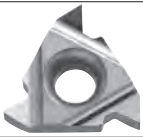
● Applicable for various type of threading

Metric (M)	Parallel Pipe [G (PF)]
Unified (UN)	Tapered Pipe [R(PT) (BSPT)]



Threading Insert Features

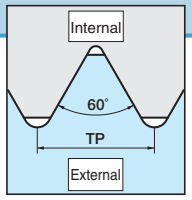
● Full Profile and Partial Profile

	Insert shape	Function	Features
Full Profile			(1) Burr-free thread surface; high quality (Smooth feeling) (2) Leave the workpiece diameter slightly oversized for full topping (3) Every pitch size requires a specific insert
Partial Profile			(1) Thread's corner tends to be sharp edged (2) Thread's O.D. or I.D. need to be finished to the size before threading (3) One insert can machine various pitch sizes

● Thread Precision

Thread Types		Thread Precision Strict ◀——▶ Loose		
Metric	External	4h (1st Class)	6g (2nd Class)	8g (3rd Class)
	Internal	5H (1st Class)	6H (2nd Class)	7H (3rd Class)
Unified	External	3A	2A	1A
	Internal	3B	2B	1B
Applicable precision with		*⊘	✓	✓

* Not recommended if strict thread precision is required.



External Threading Inserts

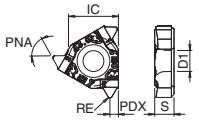
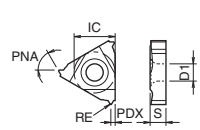
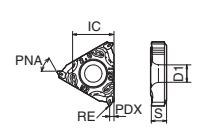
Metric (M)

Full Profile **60°** (mm)

Description	IC	S	D1
16E$^{R}_{L}$	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel		○			●	
M	Stainless Steel				●		
K	Cast Iron						●
N	Non-ferrous Metals						●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread M Pitch mm	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
Full Profile			**16ER**	**100ISO-TF**	1.0	0.12	0.80	60°			●		●		●		●				J39
				125ISO-TF	1.25	0.15	0.90				●		●		●		●				
				150ISO-TF	1.5	0.19	1.00				●		●		●		●				
				175ISO-TF	1.75	0.22	1.60				●		●		●		●				
				200ISO-TF	2.0	0.25	1.50				●		●		●		●				
				250ISO-TF	2.5	0.33	1.60				●		●		●		●				
				300ISO-TF	3.0	0.41	1.60				●		●		●		●				
			**16E$^{R}_{L}$**	**050ISO**	0.5	0.06	0.40	60°	●								●	●	●		
				075ISO	0.75	0.09	0.53		●								●	●	●		
				100ISO	1.0	0.12	0.80		●								●	●	●		
				125ISO	1.25	0.15	0.90		●								●	●	●		
				150ISO	1.5	0.19	1.00		●								●	●	●		
				175ISO	1.75	0.22	1.50		●								●				
				200ISO	2.0	0.25	1.50		●								●	●	●		
				250ISO	2.5	0.32	1.60		●								●		●		
			22ER	**300ISO**	3.0	0.41	2.10		●								●				
				350ISO	3.5	0.48	2.10		●								●				
				400ISO	4.0	0.55	2.80	60°	●								●				
				450ISO	4.5	0.62	2.80		●								●				
				500ISO	5.0	0.70	2.80		●								●				
	 With Molded Chipbreaker		**16ER**	**100ISO-TQ**	1.0	0.12	0.80	60°			●		●		●						
				125ISO-TQ	1.25	0.15	0.90				●		●		●						
				150ISO-TQ	1.5	0.19	1.00				●		●		●						
				175ISO-TQ	1.75	0.22	1.60				●		●		●						
				200ISO-TQ	2.0	0.25	1.50				●		●		●						
				250ISO-TQ	2.5	0.33	1.60				●		●		●						
				300ISO-TQ	3.0	0.41	1.60				●		●		●						

Recommended Cutting Conditions ➡ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	**KTNR..-16(JCT) / KTNSR..-16 S..-KTNL16**	**J20~J22**
16EL...	**KTNL..-16**	
22ER...	**KTNR..-22**	

Applicable Thread		
	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

Threading Inserts Identification System (Full Profile) ➡ J6~J15

16 (1) **E** (2) **R** (3) **100** (4) **ISO** (5) **-TF** (6)

(1) Insert Size	
11	6.35
16	9.525
22	12.70
Symbol	I.C. Size (mm)

(2) External / Internal	
E	External Threading
I	Internal Threading

(3) Insert Hand	
R	Right-hand
L	Left-hand

(4) Pitch	
Metric	
100	Pitch 1mm
150	Pitch 1.5mm
Inch Screw Thread	
24	24 TPI
20	20 TPI
Full Profile	

(5) Type of Applicable Thread	
ISO	Metric
M	Metric
UN	Unified
W	Whitworth
BSPT	Tapered Pipe
NPT	American National Tapered Pipe
Full Profile	

(6) Manufacture's Option	
-TF	TF Cutting Edge
-TQ	With Molded Chipbreaker

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

● : Std. Item

Internal Threading Inserts

Metric (M)

Full Profile **60°** (mm)

Description	IC	S	D1
11IR/L	6.35	3.18	3.0
16IR/L	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage: ● : 1st Choice, ○ : 2nd Choice

		Cermet	MEGACOAT MEGACOAT NANO			PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel		○			●	
M	Stainless Steel				●		
K	Cast Iron						●
N	Non-ferrous Metals						●

Insert (Handed Insert shows Right-hand)	Description		Applicable Thread M Pitch mm	Dimension (mm) RE	PDX	Angle PNA	Cermet TC60M R	TC60M L	MEGACOAT PR1215 R	PR1215 L	MEGACOAT NANO PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
Full Profile	11IR	100ISO-TF	1.0	0.07	0.80	60°			●		●		●		●				
		125ISO-TF	1.25	0.08	1.10				●		●		●		●				
		150ISO-TF	1.5	0.11	1.10				●		●		●		●				
		175ISO-TF	1.75	0.12	1.10				●		●		●		●				
	16IR	100ISO-TF	1.0	0.07	0.80	60°			●		●		●		●				
		125ISO-TF	1.25	0.08	1.10				●		●		●		●				
		150ISO-TF	1.5	0.11	1.10				●		●		●		●				
		175ISO-TF	1.75	0.12	1.10				●		●		●		●				
		200ISO-TF	2.0	0.14	1.50				●		●		●		●				
		250ISO-TF	2.5	0.17	1.50				●		●		●		●				
		300ISO-TF	3.0	0.19	1.60				●		●		●		●				
	11IR/L	050ISO	0.5	0.03	0.55	60°	●								●		●		
		075ISO	0.75	0.05	0.68		●								●		●		
		100ISO	1.0	0.07	0.80		●								●	●	●		
		125ISO	1.25	0.08	1.10		●								●		●		
		150ISO	1.5	0.11	1.10		●								●	●	●		
		175ISO	1.75	0.12	1.10		●								●				
		200ISO	2.0	0.14	0.90										●				
	16IR/L	100ISO	1.0	0.07	0.80	60°	●								●	●	●		J39
		125ISO	1.25	0.08	1.10		●								●				
		150ISO	1.5	0.11	1.10		●								●	●	●		
		175ISO	1.75	0.12	1.10		●								●				
		200ISO	2.0	0.14	1.50		●								●	●	●		
		250ISO	2.5	0.16	1.50		●								●		●		
		300ISO	3.0	0.19	1.60										●		●		
	22IR	300ISO	3.0	0.19	1.80	60°	●												
		350ISO	3.5	0.23	2.10		●								●				
		400ISO	4.0	0.26	2.80		●								●				
		450ISO	4.5	0.30	2.80		●								●				
		500ISO	5.0	0.34	2.80		●								●				
With Molded Chipbreaker	11IR	100ISO-TQ	1.0	0.07	0.80	60°			●		●		●						
		125ISO-TQ	1.25	0.08	1.10				●		●		●						
		150ISO-TQ	1.5	0.11	1.10				●		●		●						
		175ISO-TQ	1.75	0.12	1.10				●		●		●						
With Molded Chipbreaker	16IR	100ISO-TQ	1.0	0.07	0.80	60°			●		●		●						
		125ISO-TQ	1.25	0.08	1.10				●		●		●						
		150ISO-TQ	1.5	0.11	1.10				●		●		●						
		175ISO-TQ	1.75	0.12	1.10				●		●		●						
		200ISO-TQ	2.0	0.14	1.50				●		●		●						
		250ISO-TQ	2.5	0.17	1.50				●		●		●						
		300ISO-TQ	3.0	0.19	1.60				●		●		●						

Recommended Cutting Conditions ➡ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
11IR...	**SINR..-11E** **SINR..-11**	**J23**
11IL...	**SINL..-11E** **SINL..-11**	

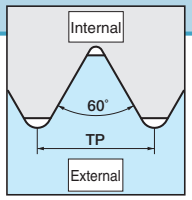
Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16IR...	**SINR..-16** **CINR..-16**	**J23**
16IL...	**SINL..-16** **CINL..-16**	
22IR...	**SINR..-22** **CINR..-22**	

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

● : Std. Item

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes



External Threading Inserts

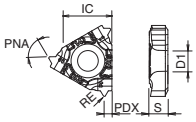
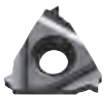
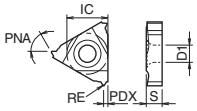
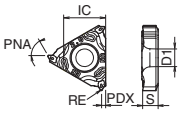
Unified (UN)

Full Profile **60°** (mm)

Description	IC	S	D1
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage
●: 1st Choice
○: 2nd Choice

P	Carbon Steel / Alloy Steel		○			●				
M	Stainless Steel				●					
K	Cast Iron									
N	Non-ferrous Metals									

Insert (Handed Insert shows Right-hand)			Description	Applicable Thread UN, UNF Pitch TPI	Dimension (mm) RE	PDX	Angle PNA	Cermet TC60M R	L	MEGACOAT MEGACOAT NANO PR1215 R	L	PR1515 R	L	PR1535 R	L	PVD Coated Carbide PR1115 R	L	Carbide GW15 R	L	See Page for Depth of Cut & Number of Passes
Full Profile			**16ER 24UN-TF**	24	0.12	0.80	60°			●		●		●		●				J39
			20UN-TF	20	0.15	1.00				●		●		●		●				
			18UN-TF	18	0.18	1.00				●		●		●		●				
			16UN-TF	16	0.20	1.10				●		●		●		●				
			14UN-TF	14	0.23	1.50				●		●		●		●				
			13UN-TF	13	0.25	1.50				●		●		●		●				
			12UN-TF	12	0.27	1.50				●		●		●		●				
			10UN-TF	10	0.34	1.50				●		●		●		●				
			08UN-TF	8	0.43	1.75				●		●		●		●				
			**16ER 24UN**	24	0.13	0.80	60°	●								●				
			20UN	20	0.16	1.00		●								●				
			18UN	18	0.18	1.00		●								●				
			16UN	16	0.20	1.10		●								●				
			14UN	14	0.23	1.50		●								●				
			12UN	12	0.27	1.50		●								●				
			22ER 08UN	8	0.43	2.10		●								●				
	 With Molded Chipbreaker		**16ER 24UN-TQ**	24	0.12	0.80	60°			●		●		●						
			20UN-TQ	20	0.15	1.00				●		●		●						
			18UN-TQ	18	0.18	1.00				●		●		●						
			16UN-TQ	16	0.20	1.10				●		●		●						
			14UN-TQ	14	0.23	1.50				●		●		●						
			13UN-TQ	13	0.25	1.50				●		●		●						
			12UN-TQ	12	0.27	1.50				●		●		●						
			10UN-TQ	10	0.34	1.50				●		●		●						
			08UN-TQ	8	0.43	1.75				●		●		●						

Recommended Cutting Conditions ➡ **J38**

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	**KTNR..-16(JCT) KTNSR..-16 S..-KTNL16**	**J20~J22**
22ER...	**KTNR ..-22**	

Applicable Thread		
	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

● : Std. Item

Internal Threading Inserts

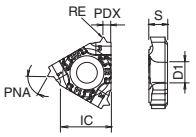
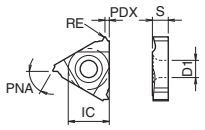
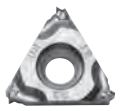
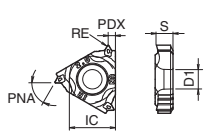
Unified (UN)

Full Profile 60° (mm)

Description	IC	S	D1
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage
●: 1st Choice
○: 2nd Choice

P	Carbon Steel / Alloy Steel		○			●			
M	Stainless Steel				●				
K	Cast Iron								
N	Non-ferrous Metals								

Insert Handed Insert shows Right-hand			Description		Applicable Thread UN , UNF Pitch TPI	Dimension (mm) RE	 PDX	Angle PNA	Cermet TC60M R	 L	MEGACOAT MEGACOAT NANO PR1215 R	 L	 PR1515 R	 L	 PR1535 R	 L	PVD Coated Carbide PR1115 R	 L	Carbide GW15 R	 L	See Page for Depth of Cut & Number of Passes
Full Profile			**16IR**	**24UN-TF**	24	0.06	0.80	60°			●		●		●		●				**J39**
				20UN-TF	20	0.08	1.00				●		●		●		●				
				18UN-TF	18	0.09	1.00				●		●		●		●				
				16UN-TF	16	0.10	1.10				●		●		●		●				
				14UN-TF	14	0.12	1.50				●		●		●		●				
				13UN-TF	13	0.13	1.50				●		●		●		●				
				12UN-TF	12	0.14	1.50				●		●		●		●				
				10UN-TF	10	0.17	1.50				●		●		●		●				
				08UN-TF	8	0.21	1.80				●		●		●		●				
			**16IR**	**24UN**	24	0.05	0.80	60°	●								●				
				20UN	20	0.07	1.00		●								●				
				18UN	18	0.09	1.00		●								●				
				16UN	16	0.10	1.10		●								●				
				14UN	14	0.12	1.50		●								●				
				12UN	12	0.14	1.50		●								●				
			22IR	**08UN**	8	0.20	1.80		●								●				
	 With Molded Chipbreaker		**16IR**	**24UN-TQ**	24	0.06	0.80	60°			●		●		●						
				20UN-TQ	20	0.08	1.00				●		●		●						
				18UN-TQ	18	0.09	1.00				●		●		●						
				16UN-TQ	16	0.10	1.10				●		●		●						
				14UN-TQ	14	0.12	1.50				●		●		●						
				13UN-TQ	13	0.13	1.50				●		●		●						
				12UN-TQ	12	0.14	1.50				●		●		●						
				10UN-TQ	10	0.17	1.50				●		●		●						
				08UN-TQ	8	0.21	1.80				●		●		●						

Recommended Cutting Conditions ➔ **J38**

Applicable Toolholders

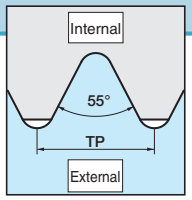
Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16IR...	**SINR..-16** **CINR..-16**	**J23**
22IR...	**SINR..-22** **CINR..-22**	

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

● : Std. Item

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes



External Threading Inserts

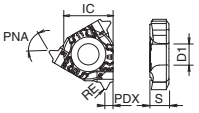
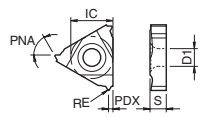
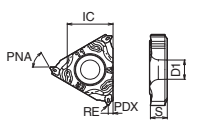
Parallel Pipe [G (PF)] Whitworth (W)

Full Profile 55° (mm)

Description	IC	S	D1
16ER	9.525	3.68	4.0

Classification of usage
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel		○			●	
M	Stainless Steel				●		
K	Cast Iron						
N	Non-ferrous Metals						

Insert (Handed Insert shows Right-hand)			Description	Applicable Thread G (PF) Pitch TPI	Applicable Thread W Pitch TPI	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
Full Profile			16ER 19W-TF	19	-	0.16	1.00	55°			●		●		●		●				J40
			16ER 16W-TF	-	16	0.19	1.10				●		●		●		●				
			16ER 14W-TF	14	14	0.23	1.50				●		●		●		●				
			16ER 11W-TF	11	11	0.30	1.50				●		●		●		●				
			16ER 19W	19	-	0.16	1.00	55°	●								●				
			16ER 14W	14	14	0.23	1.50		●								●				
			16ER 11W	11	11	0.30	1.50		●								●				
	 With Molded Chipbreaker		16ER 19W-TQ	19	-	0.16	1.00	55°			●		●		●						
			16ER 16W-TQ	-	16	0.19	1.10				●		●		●						
			16ER 14W-TQ	14	14	0.23	1.50				●		●		●						
			16ER 11W-TQ	11	11	0.30	1.50				●		●		●						

Recommended Cutting Conditions ➡ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	KTNR..-16(JCT) KTNSR..-16 S..-KTNL16	J20~J22

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

● : Std. Item

Internal Threading Inserts

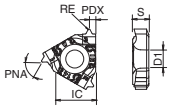
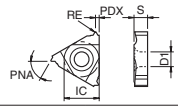
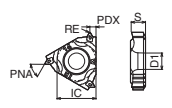
Parallel Pipe [G (PF)] Whitworth (W)

Full Profile 55˚ (mm)

Description	IC	S	D1
16IR	9.525	3.68	4.0

Classification of usage
●: 1st Choice
○: 2nd Choice

P	Carbon Steel / Alloy Steel		○			●	
M	Stainless Steel				●		
K	Cast Iron						
N	Non-ferrous Metals						

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread G (PF)	Applicable Thread W	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
					Pitch TPI																	
Full Profile			**16IR**	**19W-TF**	19	-	0.16	1.00	55˚			●		●		●		●				
				16W-TF	-	16	0.19	1.10				●		●		●		●				
				14W-TF	14	14	0.23	1.50				●		●		●		●				
				11W-TF	11	11	0.30	1.50				●		●		●		●				
			**16IR**	**14W**	14	14	0.23	1.50		●								●				**J40**
				11W	11	11	0.30	1.50		●								●				
	 With Molded Chipbreaker		**16IR**	**19W-TQ**	19	-	0.16	1.00	55˚			●		●		●						
				16W-TQ	-	16	0.19	1.10				●		●		●						
				14W-TQ	14	14	0.23	1.50				●		●		●						
				11W-TQ	11	11	0.30	1.50				●		●		●						

Recommended Cutting Conditions ➡J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16IR...	**SINR..-16** **CINR..-16**	**J23**

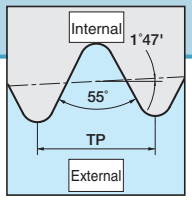
· No wiper effect is expected when threading the internal whitworth screw using 16IR ○○ W (TNN32IR ○○ W) insert.

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30˚ Trapezoidal

● : Std. Item

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes



External Threading Inserts

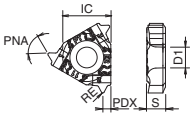
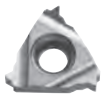
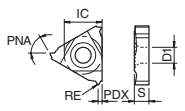
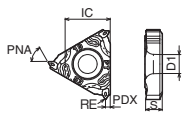
Tapered Pipe [R(PT) (BSPT)]

Full Profile 55° (mm)

Description	IC	S	D1
16ER	9.525	3.68	4.0

Classification of usage
●: 1st Choice
○: 2nd Choice

P	Carbon Steel / Alloy Steel		○			●		
M	Stainless Steel				●			
K	Cast Iron							●
N	Non-ferrous Metals							●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread R(PT) (BSPT) Pitch TPI	Dimension (mm) RE	PDX	Angle PNA	Cermet TC60M R	TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
Full Profile			16ER	28BSPT-TF	28	0.10	0.80	55°			●		●		●		●				J40
				19BSPT-TF	19	0.16	1.00				●		●		●		●				
				14BSPT-TF	14	0.22	1.60				●		●		●		●				
				11BSPT-TF	11	0.29	1.60				●		●		●		●				
			16ER	28BSPT	28	0.10	0.80	55°	●								●		●		
				19BSPT	19	0.16	1.00		●								●		●		
				14BSPT	14	0.22	1.60		●								●		●		
				11BSPT	11	0.29	1.60		●								●		●		
	 With Molded Chipbreaker		16ER	28BSPT-TQ	28	0.10	0.80	55°			●		●		●						
				19BSPT-TQ	19	0.16	1.00				●		●		●						
				14BSPT-TQ	14	0.22	1.60				●		●		●						
				11BSPT-TQ	11	0.29	1.60				●		●		●						

Recommended Cutting Conditions ➔ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	KTNR..-16(JCT) KTNSR..-16 S..-KTNL16	J20~J22

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

● : Std. Item

Internal Threading Inserts

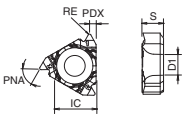
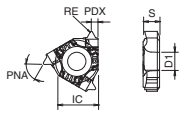
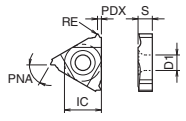
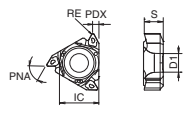
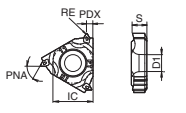
Tapered Pipe [Rc (PT) (BSPT)]

Full Profile 55˚ (mm)

Description	IC	S	D1
11IR	6.35	3.18	3.0
16IR	9.525	3.68	4.0

Classification of usage
●: 1st Choice
○: 2nd Choice

P	Carbon Steel / Alloy Steel		○			●		
M	Stainless Steel				●			
K	Cast Iron							●
N	Non-ferrous Metals							●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread Rc(PT) (BSPT) Pitch TPI	Dimension (mm) RE	PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	Carbide GW15 L	See Page for Depth of Cut & Number of Passes
Full Profile			11IR	28BSPT-TF	28	0.10	0.60	55˚			●		●		●		●				J40
				19BSPT-TF	19	0.16	0.78				●		●		●		●				
				14BSPT-TF	14	0.22	0.97				●		●		●		●				
			16IR	14BSPT-TF	14	0.22	0.97				●		●		●		●				
				11BSPT-TF	11	0.29	1.50				●		●		●		●				
			11IR	28BSPT	28	0.10	0.60	55˚	●								●		●		
				19BSPT	19	0.16	0.78		●								●		●		
				14BSPT	14	0.22	0.97		●								●		●		
			16IR	14BSPT	14	0.22	0.97		●								●		●		
				11BSPT	11	0.29	1.50		●								●		●		
	 With Molded Chipbreaker		11IR	28BSPT-TQ	28	0.10	0.60	55˚			●		●		●						
				19BSPT-TQ	19	0.16	0.78				●		●		●						
				14BSPT-TQ	14	0.22	0.97				●		●		●						
	 With Molded Chipbreaker		16IR	14BSPT-TQ	14	0.22	0.97				●		●		●						
				11BSPT-TQ	11	0.29	1.50				●		●		●						

Recommended Cutting Conditions ➔ J38

Applicable Toolholders

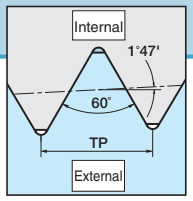
Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
11IR..	SINR..-11E SINR..-11	J23
16IR..	SINR..-16 CINR..-16	

Applicable Thread		
	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30˚ Trapezoidal

● : Std. Item

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes



External Threading Inserts

American National Tapered Pipe (NPT)

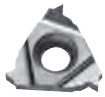
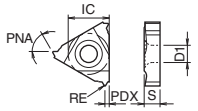
Full Profile 60°

(mm)

Description	IC	S	D1
16ER	9.525	3.68	4.0

Classification of usage ● : 1st Choice

		Carbon Steel / Alloy Steel	Stainless Steel	Cast Iron	Non-ferrous Metals
P	Carbon Steel / Alloy Steel				
M	Stainless Steel				
K	Cast Iron				
N	Non-ferrous Metals				

Insert			Description		Applicable Thread	Dimension (mm)		Angle	Cermet		MEGACOAT MEGACOAT NANO						PVD Coated Carbide		Carbide		See Page for Depth of Cut & Number of Passes
Handed Insert shows Right-hand					NPT																
					Pitch	RE	PDX	PNA	TC60M		PR1215		PR1515		PR1535		PR1115		GW15		
					TPI				R	L	R	L	R	L	R	L	R	L	R	L	
Full Profile			16ER	18NPT	18	0.04	0.9	60°	●								●		●		J40
				14NPT	14	0.05	1.5		●								●		●		
				11.5NPT	11.5	0.06	1.5		●								●		●		

Recommended Cutting Conditions ➡ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	KTNR..-16(JCT) KTNSR..-16 S..-KTNL16	J20~J22

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

● : Std. Item

Internal Threading Inserts

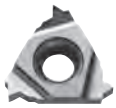
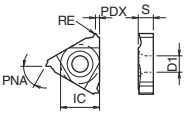
American National Tapered Pipe (NPT)

Full Profile 60˚ (mm)

Description	IC	S	D1
16IR	9.525	3.68	4.0

Classification of usage ● : 1st Choice

		Cermet	MEGACOAT MEGACOAT NANO			PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel					●	
M	Stainless Steel					●	
K	Cast Iron						●
N	Non-ferrous Metals						●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread NPT / Pitch / TPI	Dimension (mm) RE	PDX	Angle PNA	Cermet TC60M R	L	MEGACOAT MEGACOAT NANO PR1215 R	L	PR1515 R	L	PR1535 R	L	PVD Coated Carbide PR1115 R	L	Carbide GW15 R	L	See Page for Depth of Cut & Number of Passes
Full Profile			**16IR**	**18NPT**	18	0.04	0.9	60˚	●								●		●		**J40**
				14NPT	14	0.05	1.5		●								●		●		
				11.5NPT	11.5	0.06	1.5		●								●		●		

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16IR...	**SINR..-16** **CINR..-16**	**J23**

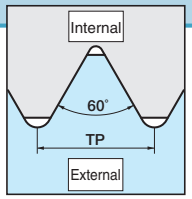
Recommended Cutting Conditions ➡ **J38**

Applicable Thread		
	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30˚ Trapezoidal

● : Std. Item

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes



External Threading Inserts

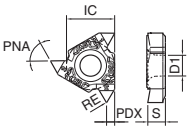
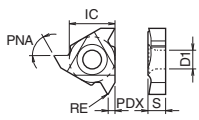
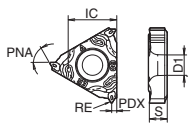
60° Type [Partial Profile / M, UN]

Partial Profile 60° (mm)

Description	IC	S	D1
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel		○			●	
M	Stainless Steel				●		
K	Cast Iron						●
N	Non-ferrous Metals						●

Insert (Handed Insert shows Right-hand)			Description	Applicable Thread M	Applicable Thread UN UNF	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
				Pitch mm	Pitch TPI																
Partial Profile			16ER A60-TF	0.5~1.5	48~16	0.06	1.00	60°			●		●		●		●				J40 J41
			G60-TF	1.75~3	14~8	0.22	1.60				●		●		●		●				
			AG60-TF	0.5~3	48~8	0.06	1.60				●		●		●		●				
			16ER A60	0.5~1.5	48~16	0.06	1.00	60°											●		
			G60	1.75~3	14~8	0.22	1.70												●		
			AG60	0.5~3	48~8	0.06	1.70												●		
			22ER N60	3.5~5	7~5	0.48	2.50										●		●		
			16ER 6001	1.0~2.5	24~11	0.10	1.50		●												J44
			6002	1.5~2.5	16~11	0.20	1.50		●												
	 With Molded Chipbreaker		16ER A60-TQ	0.5~1.5	48~16	0.06	1.00	60°			●		●		●						J40 J41
			G60-TQ	1.75~3	14~8	0.22	1.60				●		●		●						
			AG60-TQ	0.5~3	48~8	0.06	1.60				●		●		●						

Recommended Cutting Conditions ➡ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	KTNR..-16(JCT) KTNSR..-16 S..-KTNL16	J20~J22
22ER...	KTNR ..-22	

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

Threading Inserts Identification System (Partial Profile) ➡ J16~J19

16 (1) **E** (2) **R** (3) **A60** (4) **-TF** (5)

(1) Insert Size	
06	3.97
08	4.76
11	6.35
16	9.525
22	12.70
Symbol	I.C. Size (mm)

(2) External / Internal	
E	External Threading
I	Internal Threading

(3) Insert Hand	
R	Right-hand
L	Left-hand

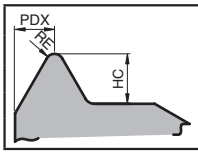
(4) Pitch		
60°	A60	60° Type (Partial Profile) 0.5~1.5mm
	G60	60° Type (Partial Profile) 1.75~3mm
	AG60	60° Type (Partial Profile) 0.5~3mm
55°	A55	55° Type (Partial Profile) 40~16 TPI
	G55	55° Type (Partial Profile) 14~8 TPI
	AG55	55° Type (Partial Profile) 40~8 TPI
Vertex angle	Partial Profile	

(5) Manufacture's Option	
-TF	TF Cutting Edge
-TQ	With Molded Chipbreaker

(4) Pitch		
60°	6001	60° Type (Partial Profile) Corner-R(RE)=0.1mm 1.0~2.5mm
55°	5501	55° Type (Partial Profile) Corner-R(RE)=0.1mm 28~11 TPI
Vertex angle	Partial Profile	

Note) Pitch and threads per inch of an insert without wiper depend on the size of insert.

· Example of shape of A, G and AG



Description	Dimension (mm) RE	PDX	HC
16ER A60-TF	0.06	1.00	1.5
16ER G60-TF	0.22	1.60	2.6
16ER AG60-TF	0.06	1.60	2.7

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

● : Std. Item

Internal Threading Inserts

60˚ Type (Partial Profile / M, UN)

Partial Profile 60˚ (mm)

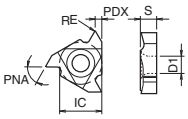
Description	IC	S	D1
06IR	3.97	1.91	2.3
08IR	4.76	2.38	2.3
11IR	6.35	3.18	3.0
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage ● : 1st Choice

		Cermet	MEGACOAT MEGACOAT NANO				PVD Coated Carbide	Carbide
P	Carbon Steel / Alloy Steel						●	
M	Stainless Steel						●	
K	Cast Iron							●
N	Non-ferrous Metals							●

Insert (Handed Insert shows Right-hand)	Description	Applicable Thread M Pitch mm	Applicable Thread UN UNF Pitch TPI	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT NANO PR1215 R	MEGACOAT NANO PR1215 L	MEGACOAT NANO PR1515 R	MEGACOAT NANO PR1515 L	MEGACOAT NANO PR1535 R	MEGACOAT NANO PR1535 L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	See Page for Depth of Cut & Number of Passes
Partial Profile	**11IR A60**	0.5~1.5	48~16	0.02	1.00	60˚									●		●		**J41 J42**
	16IR A60	0.5~1.5	48~16	0.02	1.00										●		●		
	G60	1.75~3	14~8	0.11	1.70										●		●		
	AG60	0.5~3	48~8	0.02	1.70										●		●		
	22IR N60	3.5~5	7~5	0.22	2.50										●		●		
	06IR 60005	0.75~1.25	28~20	0.05	0.60										●				
	08IR 60007	1.0~1.75	20~16	0.07	0.80										●				
	11IR 60005	0.75~1.5	32~16	0.05	1.00	60˚	●												**J44**
	16IR 6001	1.5~2.5	16~10	0.10	1.50		●												
	60015	2.5	11~10	0.15	1.50		●												





Recommended Cutting Conditions ➡ **J38**

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
06IR..	**SINR..-06E**	**J23**
08IR..	**SINR..-08E**	
11IR..	**SINR..-11E** **SINR..-11**	
16IR..	**SINR..-16** **CINR..-16**	
22IR..	**SINR..-22** **CINR..-22**	

Applicable Thread	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30˚ Trapezoidal

Corner-R(RE) Selection for Partial Profiling Insert

	External Threading	Internal Threading
Metric Unified	RE≦0.1443TP	RE≦0.0720TP
Parallel Pipe (Whitworth) Tapered Pipe	(For Both External and Internal Thread) RE ≦ 0.1373TP	

RE : Corner-R TP : Pitch (= $\frac{25.4}{n}$) n : TPI

● Metric, Unified Thread

Corner-R(RE) at Internal Threading is almost half of that of External

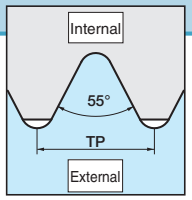
● Parallel Pipe, Tapered Pipe, Whitworth Thread

Same Corner-R(RE) for both External and Internal Threading

● : Std. Item

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes



External Threading Inserts

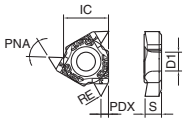
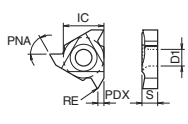
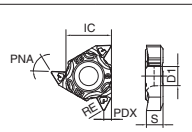
55° Type [Partial Profile / G (PF), R (PT)(BSPT), (W)]

Partial Profile 55° (mm)

Description	IC	S	D1
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage
● : 1st Choice
○ : 2nd Choice

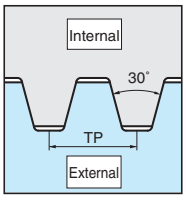
P	Carbon Steel / Alloy Steel		○			●	
M	Stainless Steel				●		
K	Cast Iron						●
N	Non-ferrous Metals						●

Insert (Handed Insert shows Right-hand)			Description	Applicable Thread G(PF) R(PT)	Applicable Thread W	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT NANO PR1215 R	MEGACOAT NANO PR1215 L	MEGACOAT NANO PR1515 R	MEGACOAT NANO PR1515 L	MEGACOAT NANO PR1535 R	MEGACOAT NANO PR1535 L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	See Page for Depth of Cut & Number of Passes
				Pitch																
				TPI																
Partial Profile			16ER A55-TF	28, 19	40~16	0.06	1.00	55°			●		●		●		●				J42
			G55-TF	14, 11	14~8	0.22	1.60				●		●		●		●				
			AG55-TF	28~11	40~8	0.06	1.60				●		●		●		●				
			16ER A55	28, 19	40~16	0.06	1.00	55°											●		J43
			G55	14, 11	14~8	0.22	1.70												●		
			AG55	28~11	40~8	0.06	1.65												●		
			22ER N55	-	7~5	0.47	2.50										●		●		
			16ER 5501	28~11	24~10	0.10	1.50	55°	●												J44
			5502	14, 11	16~9	0.20	1.50		●												
	 With Molded Chipbreaker		16ER A55-TQ	28, 19	40~16	0.06	1.00	55°			●		●		●						J42
			G55-TQ	14, 11	14~8	0.22	1.60				●		●		●						
			AG55-TQ	28~11	40~8	0.06	1.60				●		●		●						

Recommended Cutting Conditions ➔ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	KTNR..-16(JCT) KTNSR..-16 S..-KTNL16	J20~J22
22ER...	KTNR..-22	



External Threading Inserts

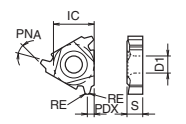
30° Trapezoidal (Tr)

Partial Profile 30° (mm)

Description	IC	S	D1
16ER	9.525	3.68	4.0
22ER	12.70	4.9	4.85

Classification of usage
● : 1st Choice

P	Carbon Steel / Alloy Steel					●	
M	Stainless Steel					●	
K	Cast Iron						
N	Non-ferrous Metals						

Insert (Handed Insert shows Right-hand)			Description	Applicable Thread Tr	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT NANO PR1215 R	MEGACOAT NANO PR1215 L	MEGACOAT NANO PR1515 R	MEGACOAT NANO PR1515 L	MEGACOAT NANO PR1535 R	MEGACOAT NANO PR1535 L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	See Page for Depth of Cut & Number of Passes
				Pitch																
				mm																
Partial Profile			16ER 200TR	2.0	0.20	1.6	30°	●								●				J43
			300TR	3.0	0.20	1.6		●								●				
			22ER 400TR	4.0	0.20	2.5	30°	●								●				
			500TR	5.0	0.20	2.5		●								●				

Recommended Cutting Conditions ➔ J38

Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16ER...	KTNR..-16(JCT) KTNSR..-16 S..-KTNL16	J20~J22
22ER...	KTNR ..-22	

Applicable Thread		
	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

● : Std. Item

Internal Threading Inserts

55° Type [Partial Profile / G(PF), Rc(PT)(BSPT), (W)]

Partial Profile 55° (mm)

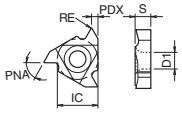
Description	IC	S	D1
06IR	3.97	1.91	2.3
08IR	4.76	2.38	2.3
11IR	6.35	3.18	3.0
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage ● : 1st Choice

		Cermet		MEGACOAT MEGACOAT NANO				PVD Coated Carbide		Carbide	
P	Carbon Steel / Alloy Steel							●			
M	Stainless Steel							●			
K	Cast Iron									●	
N	Non-ferrous Metals									●	

Insert (Handed Insert shows Right-hand)	Description	Applicable Thread: G(PF) Rc(PT)	Applicable Thread: W Pitch TPI	Dimension (mm): RE	Dimension (mm): PDX	Angle: PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
Partial Profile	11IR A55	28, 19	40~16	0.06	1.10	55°									●		●		J42 J43
	16IR A55	28, 19	40~16	0.06	1.00										●		●		
	G55	14, 11	14~8	0.22	1.70										●		●		
	AG55	28~11	40~8	0.06	1.70										●		●		
	22IR N55	-	7~5	0.47	2.50										●		●		
	06IR 5501	28	24	0.10	0.60	55°									●				
	08IR 5501	28, 19	24, 20	0.10	0.80										●				
	11IR 55005	28~14	24~14	0.05	1.10		●												J44
	16IR 5501	28~11	24~11	0.10	1.50		●												
	5502	14~11	16~11	0.20	1.50		●												





Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
06IR...	SINR..-06E	J23
08IR...	SINR..-08E	
11IR...	SINR..-11E SINR..-11	

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16IR...	SINR..-16 CINR..-16	J23
22IR...	SINR..-22 CINR..-22	

Recommended Cutting Conditions J38

Internal Threading Inserts

30° Trapezoidal (Tr)

Partial Profile 30° (mm)

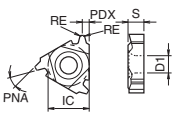
Description	IC	S	D1
16IR	9.525	3.68	4.0
22IR	12.70	4.9	4.85

Classification of usage ● : 1st Choice

		Cermet		MEGACOAT MEGACOAT NANO				PVD Coated Carbide		Carbide	
P	Carbon Steel / Alloy Steel							●			
M	Stainless Steel							●			
K	Cast Iron										
N	Non-ferrous Metals										

Insert (Handed Insert shows Right-hand)	Description	Applicable Thread: Tr Pitch mm	Dimension (mm): RE	Dimension (mm): PDX	Angle: PNA	Cermet TC60M R	Cermet TC60M L	MEGACOAT MEGACOAT NANO PR1215 R	PR1215 L	PR1515 R	PR1515 L	PR1535 R	PR1535 L	PVD Coated Carbide PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	See Page for Depth of Cut & Number of Passes
Partial Profile	16IR 200TR	2.0	0.20	1.6	30°									●				J43
	300TR	3.0	0.20	1.6										●				
	22IR 400TR	4.0	0.20	2.5	30°									●				
	500TR	5.0	0.20	2.5										●				





Applicable Toolholders

Insert Description	Applicable Toolholders	See Page for Applicable Toolholders
16IR...	SINR..-16 CINR..-16	J23
22IR...	SINR..-22 CINR..-22	

Recommended Cutting Conditions J38

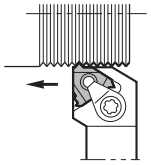
Applicable Thread		
	M : Metric	R, Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	Tr : 30° Trapezoidal

● : Std. Item

Threading inserts are sold in 5 piece boxes

TC60M (Threading) are sold in 10 piece boxes

KTN / KTNS



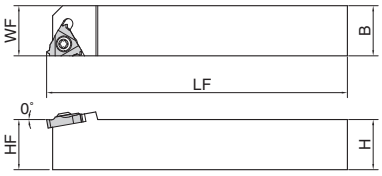


Fig. 1

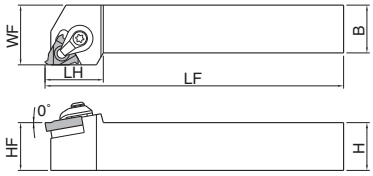
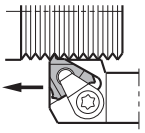
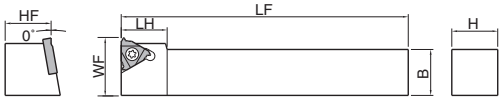


Fig. 2

●Right-hand shown

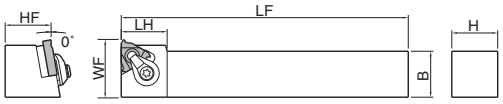
Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.





KTNSR1010H-16
1212K-16

Fig. 3



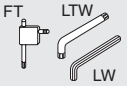
KTNSR1616K-16
2020K-16

Fig. 4

●Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description		Stock		Dimension (mm)						Drawing	Spare Parts					Applicable Inserts
											Clamp Set	Clamp Screw	Wrench	Shim	Shim Screw	
		R	L	H	HF	B	LF	LH	WF		 5S 6S		 FT LTW LW			
KTN[R/L]	1216JX-16F	●	●	12	12	16	120	-	16	Fig. 1	-	SB-3.5TR	LTW-15S	-	-	16E[R/L]...
	1616H-16	●	●	16	16	16	100	25	20	Fig. 2	CPS-5S	-	FT-15	TN-32	SP3X8	
	1616JX-16F	●	●				120	-	16	Fig. 1	-	SB-3.5TR	LTW-15S	-	-	
	2020H-16*	●		20	20	20	100	25	25	Fig. 2	CPS-5S	-	FT-15	TN-32	SP3X8	
	2020JX-16F	●	●				120	-	20	Fig. 1	-	SB-3.5TR	LTW-15S	-	-	
	2020K-16	●	●				125	25	25	Fig. 2	CPS-5S	-	FT-15	TN-32	SP3X8	
	2525M-16	●	●	25	25	25	150		30							
	2525M-22	●		25	25	25	150	29	32		CPS-6S	-	LW-3	TN-43	SP3X8	22ER...
	3225P-22	●		32	32		170	34								
KTNSR	1010H-16	●		10	10	10	100	16	16	Fig. 3	-	SB-3.5TR	FT-15	-	-	16ER...
	1212K-16	●		12	12	12	125	18	18							
	1616K-16	●		16	16	16			22	Fig. 4	CPS-5S	-		TN-32	SP3X8	
	2020K-16	●		20	20	20		20	27.4							

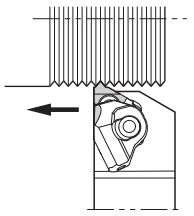
*mark indicates short shank type.

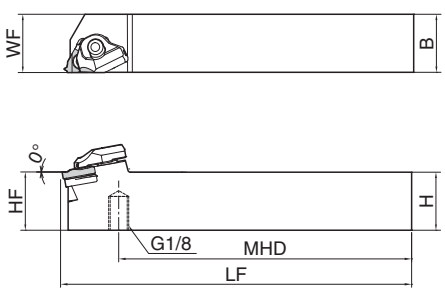
See page for applicable inserts

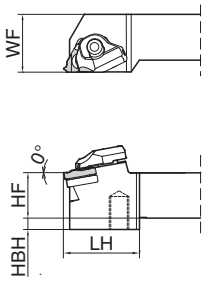
Nominal Thread	Full Profile	Partial Profile	Nominal Thread	Full Profile	Partial Profile
M : Metric	**J6**	**J16**	R(PT)(BSPT) Tapered Pipe	**J12**	**J18**
UN : Unified UNF : Unified Fine Thread	**J8**	**J16**	W : Whitworth	**J10**	**J18**
			NPT American National Tapered Pipe	**J14**	**-**
G (PF) : Parallel Pipe	**J10**	**J18**	Tr : 30° Trapezoidal	**-**	**J18**

● : Std. Item

KTN-JCT (Coolant-through Holders)







KTNR2020K-16JCT shows above figure

• Right-hand shown

Toolholder Dimensions

Pressure Resistance : ~15MPa

Description		Stock		Dimension (mm)								Spare Parts					Applicable Inserts
												Clamp Set	Pipe Connection (*1 with O-ring)	Wrench	Shim	Shim Screw	
		R	L	H	HF	HBH	B	WF	LF	LH	MHD						
KTNR	2020K-16JCT	●		20	20	5	20	25	125	33.3	100.7	CPS-5S-R-JCT	FP-12	FT-15	TN-32	SP3X8	16ER...
	2525M-16JCT	●		25	25	-	25	25	150	-	125.7						

Please see page **D10** and **D11** for piping parts of coolant-through holders.

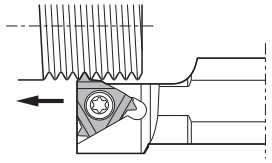
*1 It is possible to order just an O-ring (**SS-035**).

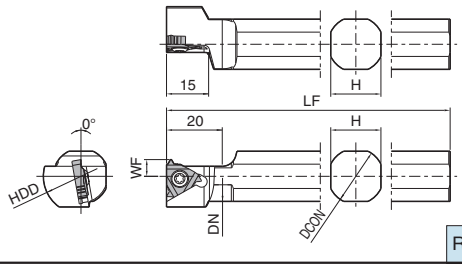
See page for applicable inserts

Nominal Thread	Full Profile	Partial Profile	Nominal Thread	Full Profile	Partial Profile
M : Metric	**J6**	**J16**	R(PT)(BSPT) Tapered Pipe	**J12**	**J18**
UN : Unified UNF : Unified Fine Thread	**J8**	**J16**	W : Whitworth	**J10**	**J18**
			NPT American National Tapered Pipe	**J14**	**-**
G (PF) : Parallel Pipe	**J10**	**J18**	Tr : 30˚ Trapezoidal	**-**	**J18**

● : Std. Item

S-KTN (Sleeve Holder)





●Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts		Applicable Inserts
		DCON	LF	WF	DN	HDD	H	Clamp Screw	Wrench	
S16F-KTNL16	●	16	85	6	15	27	15	SB-3.5TR	LTW-15S	**16ER...**
S19K-KTNL16	●	19.05	120		18		17			
S20K-KTNL16	●	20			19		18			
S22K-KTNL16	●	22			21		20			
S25.0H-KTNL16	●	25	100	10	24	32	23			
S25K-KTNL16	●	25.4	120							

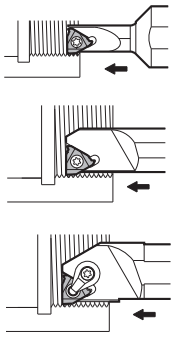
See page for applicable inserts

Nominal Thread	Full Profile	Partial Profile	Nominal Thread	Full Profile	Partial Profile
M : Metric	**J6**	**J16**	R(PT)(BSPT) Tapered Pipe	**J12**	**J18**
UN : Unified UNF : Unified Fine Thread	**J8**	**J16**	W : Whitworth	**J10**	**J18**
			NPT American National Tapered Pipe	**J14**	**-**
G (PF) : Parallel Pipe	**J10**	**J18**	Tr : 30˚ Trapezoidal	**-**	**J18**

● : Std. Item

Internal Threading Toolholders

SIN / CIN



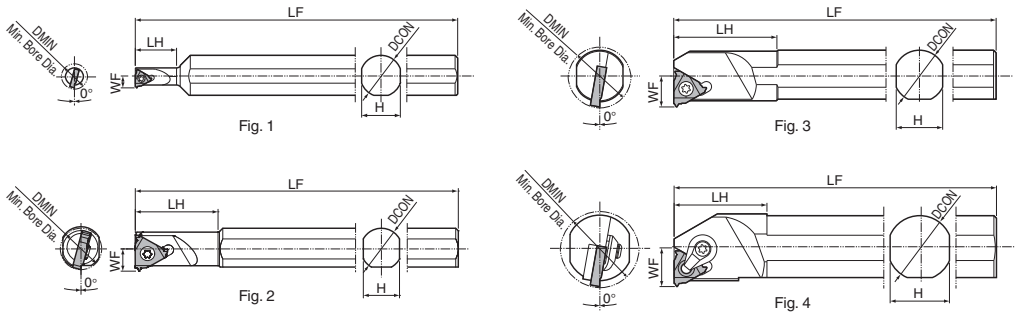


Fig. 1 Fig. 2 Fig. 3 Fig. 4

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	Drawing	Spare Parts: Clamp Screw	Clamp Set	Wrench	Shim	Shim Screw	Applicable Inserts
SIN$^{R}_{L}$	0612S-06E	●		6.4	12	11	100	10	3.8	Fig. 1	SB-2040TR	-	FT-6	-	-	06 IR...
	0816S-08E	●		7.8	16	15	125	16	4.0		SB-2050TR	-	FT-6	-	-	08 IR...
	1216S-11E	●	●	12	16	14	150	25	6.3		SB-2TR	-	FT-8	-	-	11 I$^{R}_{L}$...
	1516S-11	●	●	15				30	7.5							
	1616S-16	●	●	16	16	14	150	32	8.6	Fig. 2	SB-3.5TR	-	FT-15	-	-	16 I$^{R}_{L}$...
	2016S-16	●	●	20				37	10.0	Fig. 3						
	2420S-16	●	●	24	20	18	180	40	12.0							
	2420S-22	●		24	20	18	180	40	13.5		SB-4085TR	-	FT-15	-	-	22 IR...
CIN$^{R}_{L}$	3025S-16	●	●	30	25	23	200	36	15.0	Fig. 4	-	CPS-5S	FT-15	TN-32	SP3X8	16 I$^{R}_{L}$...
	3732S-16	●		37	32	30	250	45	18.5							
	3025S-22	●		30	25	23	200	40	16.5		-	CPS-6S	LW-3	TN-43	SP3X8	22 IR...
	3732S-22	●		37	32	30	250	45	20							

See page for applicable inserts

Nominal Thread	Full Profile	Partial Profile	Nominal Thread	Full Profile	Partial Profile
M : Metric	**J7**	**J17**	Rc(PT)(BSPT) Tapered Pipe	**J13**	**J19**
UN : Unified UNF : Unified Fine Thread	**J9**	**J17**	W : Whitworth	**J11**	**J19**
			NPT American National Tapered Pipe	**J15**	**-**
G (PF) : Parallel Pipe	**J11**	**J19**	Tr : 30° Trapezoidal	**-**	**J19**

Guide for Internal Threading

For the internal threading, pay extra attention to “Stabilizing Bore Dia.” and “Chip evacuation”.

1 “Stabilizing Bore Dia.”

Because small pitch internal threading has small corner-R(RE), there is variation in the Bore Dia. which may greatly influence the tool life of an insert.
In order to eliminate the variation in the Bore Dia., “0” cutting (zero cutting) should be performed as the zero pass, before the first pass in threading.
The Bore Dia. is cut with the specified dimension, and the first pass of threading becomes stable.

2 “Chip evacuation”

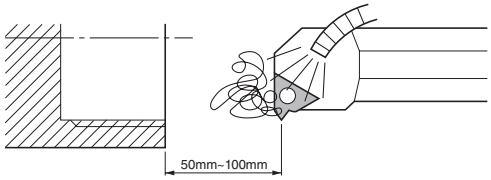
If machining process is continued when chips are tangled with a toolholder and other parts of the machine, it may cause damages to the insert.
Therefore, please ensure that there are no tangled chips in the machine by the following method.

<When processing the first workpiece>

Set the program with the “single block”
Keep the threading starting point 50mm~100mm away from the side of workpiece, and confirm that coolant is flushing down the chips for each pass.

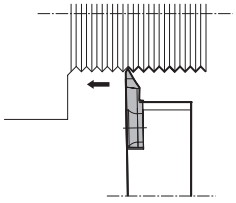
<When processing the second workpiece and later>

Ensure that chips are not tangled; then, start the continuous run.



● : Std. Item

KTKF / KTKF Goose-neck Holder / KTKF Y-axis Toolholder NEW



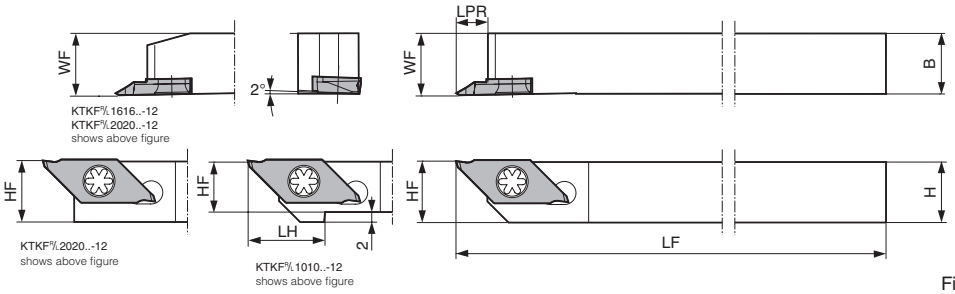


Fig. 1

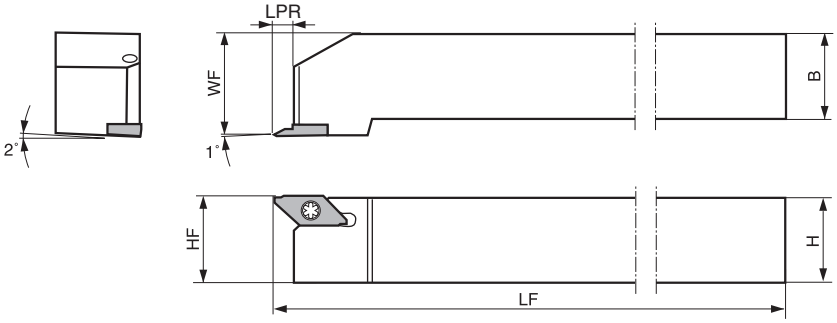
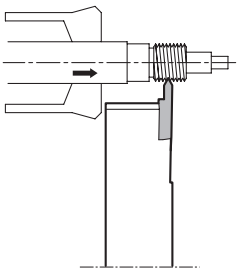


Fig. 2

●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.



<Goose-neck Holder>

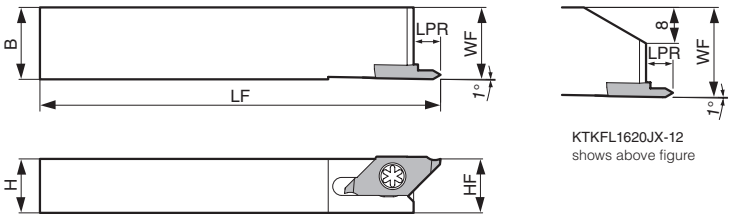
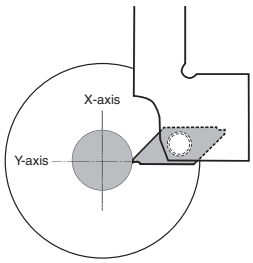


Fig. 3

●Left-hand shown

Left-hand Insert for Left-hand Toolholder.



<Y-axis Toolholder>

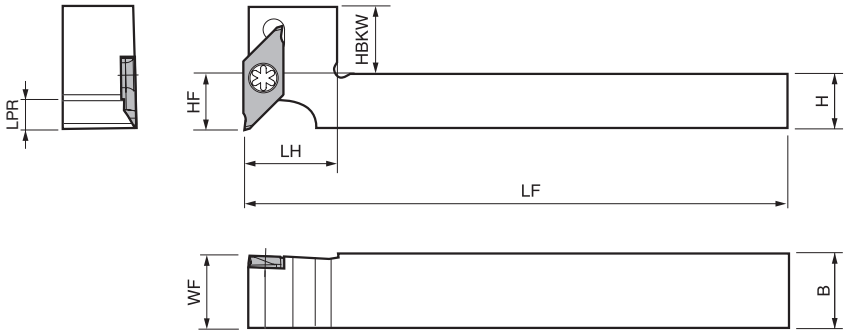


Fig. 4

●Right-hand shown

Right-hand Insert for Right-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	H	HF	B	LF	LH	WF	LPR	HBKW	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts
KTKF$^{R}_{L}$	1010JX-12	●	●	10	10	10	120	15	10	6	-	Fig. 1	SB-4590TRWN	FT-10	TKFT12$^{R}_{L}$ ...
	1212JX-12	●	●	12	12	12		-	12						
	1616JX-12	●	●	16	16	16			16						
	2020JX-12	●	●	20	20	20			20						
KTKFR	2525M-12	●		25	25	25	150	-	30	6	-	Fig. 2	SB-4590TRWN	FT-10	TKFT12R..
KTKF$^{R}_{L}$	1212F-12	●	●	12	12	12	85	-	12	6	-	Fig. 1	SB-4590TRWN	FT-10	TKFT12$^{R}_{L}$ ...
KTKFL	1216JX-12		●	12	12	16	120	-	16	6	-	Fig. 3	SB-4590TRWN	FT-10	TKFT12L..
	1620JX-12		●	16	16	20			20						
KTKFR	1216JX-12-Y	●		12	12	16	120	20	16	6	15	Fig. 4	SB-4590TRWN	FT-10	TKFT12R..
NEW	1616JX-12-Y	●		16	16	16		25	16		11				

· LPR shows the distance from the toolholder to the cutting edge.
· See page **H13** for internal coolant type (coolant-through holders)
· Please see the precautions in **J27** when using Y-axis toolholder.

Applicable Inserts

Classification of usage
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel	●	○	○	
M	Stainless Steel	○	●	○	
K	Cast Iron				●
N	Non-ferrous Metals				●

Insert (Photo shows Right-hand)	Description	Applicable Thread	Pitch mm	Pitch TPI	W1	CW	S	D1	RE	PDX	PDX1	Angle PNA	MEGACOAT NANO PLUS PR1725	MEGACOAT NANO PR1535	MEGA COAT PR1225	Carbide KW10	Applicable Toolholders
Partial Profile	TKFT 12RA6000	M UN	0.2~0.6	64~48	3.0	2.5	8.7	5.2	Max. 0.05 Flat	0.4	2.1	60°	●	●	●	●	KTKFR ...12(-Y)
	12RB6000									2.1	0.4		●	●	●	●	
	12RA60005		0.5~1.25	48~24					0.05	0.8	1.7		●	●	●	●	
	12RB60005									1.7	0.8		●	●	●	●	
	12RN6001		1~1.5	24~18					0.1	1.25	1.25		●	●	●	●	
	12RA55005	G,R W	-	40~16					0.05	0.8	1.7	55°	●	●	●	●	
	12RB55005									1.7	0.8		●	●		●	
	TKFT 12LA6000	M UN	0.2~0.6	64~48	3.0	2.5	8.7	5.2	Max. 0.05 Flat	2.1	0.4	60°	●	●		●	KTKFL ...12
	12LB6000									0.4	2.1		●	●		●	
	12LA60005		0.5~1.25	48~24					0.05	1.7	0.8		●	●	●	●	
	12LB60005									0.8	1.7		●	●	●	●	
	12LN6001		1~1.5	24~18					0.1	1.25	1.25		●	●	●	●	
	12LA55005	G,R W	-	40~16					0.05	1.7	0.8	55°	●	●		●	
	12LB55005									0.8	1.7		●	●		●	

· Right-hand shown
· Left-hand shown

● : Std. Item

Inserts are sold in 10 piece boxes

Inserts Identification System (Ref. to Table 1)

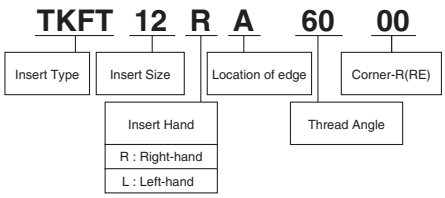
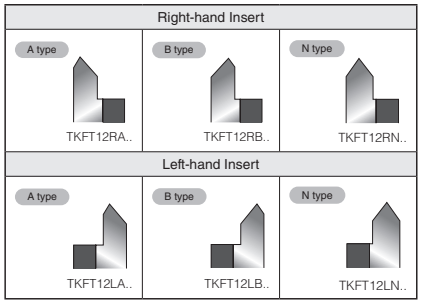


Table 1



Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades			
	MEGACOAT NANO PLUS	MEGACOAT NANO	MEGACOAT	Carbide
	PR1725	**PR1535**	**PR1225**	**KW10**
Carbon Steel	Vc = 70 ~170 m/mim			-
	First ap (Radial) : 0.2mm and under			
Alloy Steel	Vc = 70 ~170 m/mim			-
	First ap (Radial) : 0.2mm and under			
Stainless Steel	Vc = 60 ~100 m/mim			-
	First ap (Radial) : 0.15mm and under			
Cast Iron	-			Vc = 100 m/mim
				First ap (Radial) : 0.2mm and under
Aluminum Alloys	-			Vc = 150 ~400 m/mim
				First ap (Radial) : 0.2mm and under
Brass	-			Vc = 150 ~300 m/mim
				First ap (Radial) : 0.15mm and under

· Coolant is recommended.
· In case of threading stainless steel, please set two to three passes more than <ap - passes> listed below.

Depth of Cut & Number of Passes

TKFT 60˚ / 55˚ Partial Profile

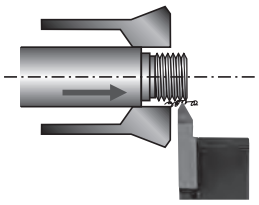
(ap shows the value of radial ap)

Type		Pitch mm / TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12
Metric	External Thread	0.20mm	TKFT 12R/L A/B6000	Max. 0.05 Flat	0.15	4	0.06	0.04	0.03	0.02								
		0.25mm			0.19	4	0.07	0.06	0.04	0.02								
		0.30mm			0.23	4	0.08	0.07	0.06	0.02								
		0.35mm			0.27	5	0.08	0.07	0.06	0.04	0.02							
		0.40mm			0.30	5	0.10	0.08	0.06	0.04	0.02							
		0.45mm			0.34	6	0.10	0.08	0.06	0.04	0.04	0.02						
		0.50mm	TKFT 12R/L A/B6000		0.38	6	0.10	0.10	0.07	0.05	0.04	0.02						
			12R/L A/B60005	0.05	0.33	5	0.10	0.10	0.07	0.04	0.02							
		0.60mm	TKFT 12R/L A/B6000	Max. 0.05 Flat	0.45	7	0.10	0.10	0.08	0.06	0.05	0.04	0.02					
			12R/L A/B60005	0.05	0.40	6	0.10	0.10	0.08	0.06	0.04	0.02						
		0.70mm	TKFT 12R/L A/B60005	0.05	0.48	6	0.10	0.10	0.10	0.10	0.06	0.02						
		0.75mm		0.05	0.52	7	0.10	0.10	0.10	0.08	0.07	0.05	0.02					
		0.80mm		0.05	0.56	7	0.10	0.10	0.10	0.10	0.08	0.06	0.02					
		1.00mm	TKFT 12R/L A/B60005 12R/L N6001	0.05	0.71	8	0.15	0.15	0.12	0.10	0.08	0.06	0.03	0.02				
				0.10	0.66	7	0.18	0.15	0.12	0.10	0.06	0.03	0.02					
		1.25mm		0.05	0.90	9	0.20	0.18	0.13	0.10	0.10	0.07	0.05	0.05	0.02			
				0.10	0.85	8	0.20	0.18	0.13	0.10	0.10	0.07	0.05	0.02				
		1.50mm	TKFT 12R/L N6001	0.10	1.04	10	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02		
Parallel Pipe	External Thread	28 TPI	TKFT 12R/L A/B55005	0.05	0.67	7	0.18	0.15	0.12	0.10	0.06	0.04	0.02					
		19 TPI		0.05	1.01	9	0.20	0.18	0.14	0.12	0.12	0.10	0.08	0.05	0.02			
Whitworth	External Thread	24 TPI	TKFT 12R/L A/B55005	0.05	0.79	8	0.18	0.18	0.12	0.10	0.08	0.07	0.04	0.02				
		20 TPI		0.05	0.96	9	0.20	0.20	0.15	0.10	0.10	0.08	0.06	0.05	0.02			
		18 TPI		0.05	1.07	10	0.20	0.18	0.15	0.12	0.10	0.10	0.08	0.07	0.05	0.02		
		16 TPI		0.05	1.21	11	0.20	0.18	0.15	0.15	0.12	0.10	0.10	0.08	0.07	0.04	0.02	

Swiss Tool Automatic Lathe (Guide Bush System)

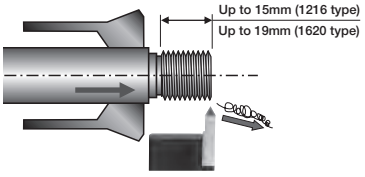
Goose-neck holder is applicable to automatic lathes whose toolholder does not move to longitudinal direction (Z-axis direction).

Conventional Tool



Chips may come into the guide bush and scratch the thread surface.

Goose-neck Holder

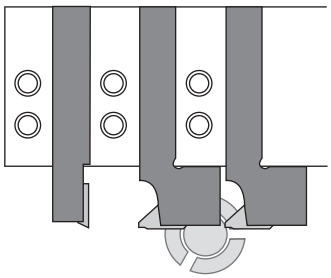


Goose-neck holder is capable of threading without returning the thread part into the guide bush (thread length up to 15 mm or 19 mm).

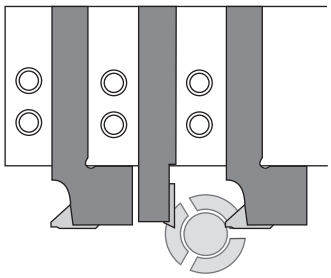
Precautions for using Y-axis toolholder

Do not use Y-axis toolholders side by side to prevent interference. (Only two Y-axis holder can be used at the same time)

With interference

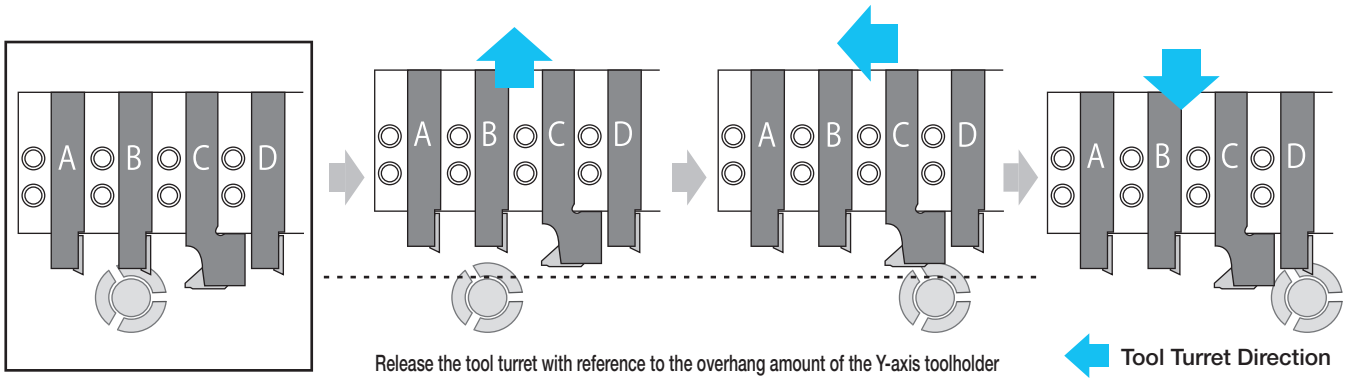


Without interference



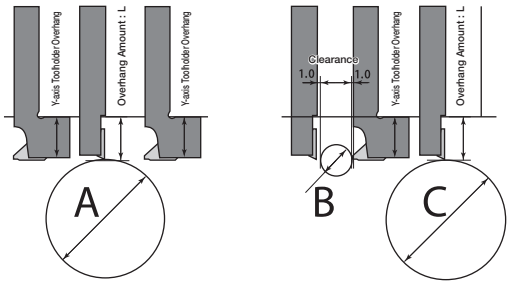
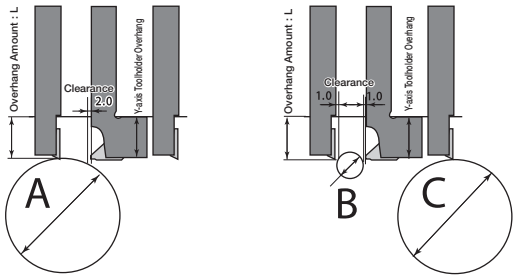
Standard toolholders may be mounted between two Y-axis toolholders

When changing the tool, set the retracted position with reference to the cutting edge of the Y-axis holder. (When exchanging from tool B to D)

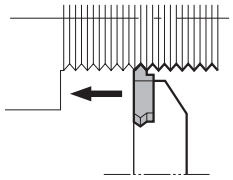


Note that using other toolholders together will result in dierent outside diameters

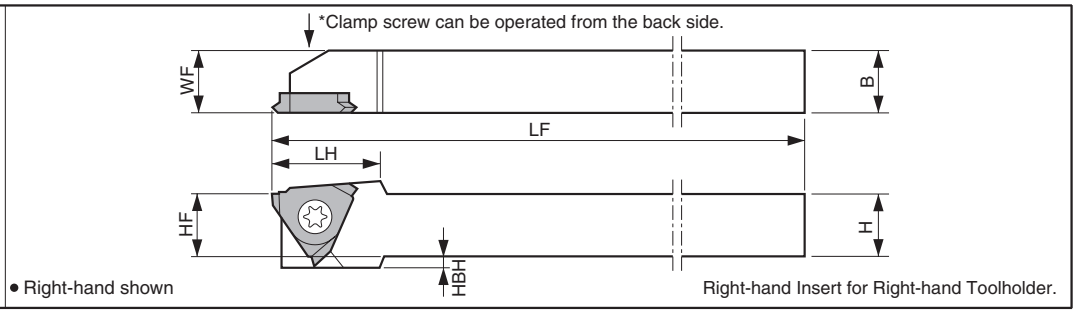
(Unit : mm)

Y-axis Toolholder Overhang	Examples	Available Outside Cutting Diameter(ø) \ Overhang Amount L	20	22	25
20		A	Without Restriction	Without Restriction	Without Restriction
		B	13.0	13.0	13.0
		C	Without Restriction	Without Restriction	Without Restriction
25		A	38.0	58.0	Without Restriction
		B	14.9	13.6	13.0
		C	45.0	60.0	Without Restriction

KTTX



Thread to shoulder



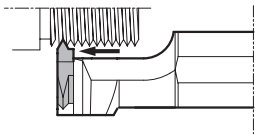
• Right-hand shown

Right-hand Insert for Right-hand Toolholder.

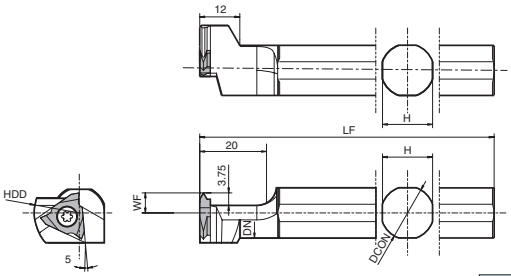
Toolholder Dimensions

Description		Stock	Dimension (mm)							Spare Parts			
			H	HF	HBH	B	LF	LH	WF	Clamp Screw	Wrench		
KTTXR	1010JX-16F	●	10	10	2	10	120	17.6	10	SB-4070TRW	FT-8		
	1212JX-16F	●	12	12	-	12			12				
	1616JX-16F	●	16	16		16			16				
KTTXR	1212F -16F	●	12	12	-	12	85	17.6	12	SB-4070TRW	FT-8		
	2020K -16F	●	20	20		20	125		20				

S-KTTX (External Sleeve Holder)



Thread to shoulder



•Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts			
		DCON	LF	WF	DN	HDD	H	Clamp Screw	Wrench		
S12F-KTTXL16	●	12	80	6.0	11.0	27	11	SB-4070TRW	FT-8		
S14H-KTTXL16	●	14	100		13.0		13				
S15F-KTTXL16	●	15.875	85		14.6		15				
S16F-KTTXL16	●	16									
S19G-KTTXL16	●	19.05	90		17.6		17				
S19K-KTTXL16	●		120								
S20G-KTTXL16	●	20	90		18.6		18				
S20K-KTTXL16	●		120								
S25.0H-KTTXL16	●	25	100	10.0	23.6	32	23				
S25K-KTTXL16	●	25.4	120								

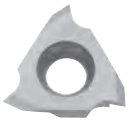
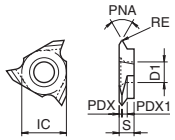
● : Std. Item

Applicable Inserts

(mm)

Description	IC	S	D1
TTX32R	9.525	3.18	4.4

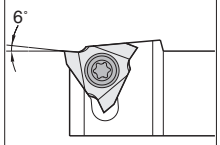
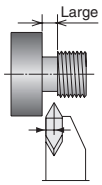
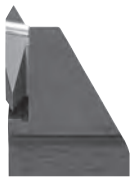
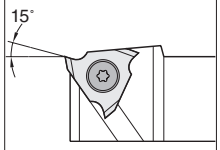
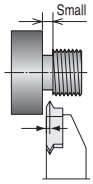
					Classification of usage
P	Carbon Steel / Alloy Steel	○	○	●	● : 1st Choice
M	Stainless Steel		○	●	○ : 2nd Choice
K	Cast Iron				●
N	Non-ferrous Metals				●

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) RE	PDX	PDX1	Angle PNA	Cermet TC60M	PVD Coated Carbide PR930	PVD Coated Carbide PR1115	Carbide KW10	Applicable Toolholders	See Page for Depth of Cut & Number of Passes
Partial Profile			**TTX32R**	**6000**	M UN	0.5~1.0 -	- 56~32	0.00	0.6	1.12	60°				●	**KTTXR...-16 S...KTTXL16**	**J46**
				60005	M UN	0.5~1.0 -	- 48~32	0.05	0.6	1.12		●	●	●	●		
				6001	M UN	1.0~2.0 -	- 28~14	0.10	1.1	1.62		●	●	●	●		
			TTX32R	**6000S**	M UN	0.5 -	- 56~48	0.00	0.3	1.12	60°		●	●	●		
				60005S	M UN	0.5 -	- 48	0.05	0.3	1.12			●	●	●		
			TTX32R	**5501**	G, R W	-	28~19 24~20	0.10	0.75	1.01	55°	●	●	●	●		
				55015	G, R W	-	19~11 20~11	0.15	1.20	1.46		●			●		

Applicable Thread		
	M : Metric	R (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	

Recommended Cutting Conditions ➡ J38

TT and TTX

Type	Shape	Features: Rake Angle after Installation	Features: Condition	Features: Dead Space
TT			· One insert can machine various pitch sizes	
TTX			· The Least Cutting Force · Thread to shoulder (Less dead space) · One Insert can machine various pitch sizes (less than TT)	

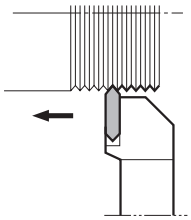
● : Std. Item

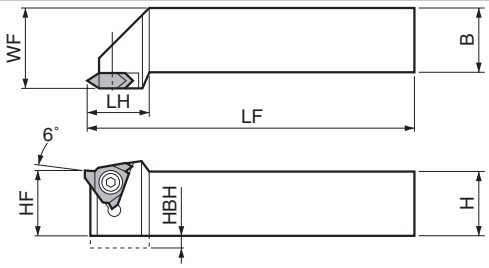
PR930 / PR1115 (Threading) are sold in 5 piece boxes

TC60M / KW10 (Threading) are sold in 10 piece boxes

External Threading Toolholders [TT Insert]

KTT





• Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

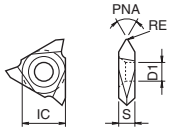
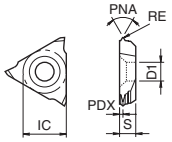
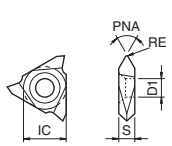
Description		Stock R	Stock L	H	HF	HBH	B	LF	LH	WF	Spare Parts: Clamp Screw	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Wrench
KTT$^{R}_{L}$	1010F-16	●	●	10	10	4	10	80		12				
	1212H-16	●	●	12	12	2	12	100		16	SB-4070TRS	-	FT-10	-
	1616H-16	●	●	16	16		16	100	18	20				
	2020K-16	●	●	20	20	-	20	125		25	SB-4TR	-	FT-15	-
	2525M-16	●	●	25	25		25	150		30				
	2020K-22	●	●	20	20	-	20	125	25	25	-	GS-50	-	LW-3
	2525M-22	●	●	25	25		25	150		30				

Applicable Inserts

(mm)

Description	IC	S	D1
TT32$^{R}_{L}$	9.525	3.18	4.4
TT43$^{R}_{L}$	12.70	4.76	5.5

P	Carbon Steel / Alloy Steel	○	○	●		Classification of usage
M	Stainless Steel		○	●		● : 1st Choice
K	Cast Iron				●	○ : 2nd Choice
N	Non-ferrous Metals				●	

Insert (Handed Insert shows Right-hand)			Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) RE	Dimension (mm) PDX	Angle PNA	Cermet TC60M R	Cermet TC60M L	PVD Coated Carbide PR930 R	PVD Coated Carbide PR930 L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide KW10 R	Carbide KW10 L	Applicable Toolholders	See Page for Depth of Cut & Number of Passes
Partial Profile			TT32$^{R}_{L}$	6000	M UN	0.5~2.5 -	- 56~10	0.0	-	60°	●	●	●	●	●	●			KTT$^{R}_{L}$...-16	J45
				6001	M UN	1.0~2.5 -	- 24~10	0.1			●	●	●	●	●	●	●	●		
				6002	M UN	1.5~2.5 -	- 16~10	0.2			●	●	●	●	●	●	●	●		
				6003	M UN	2.5 -	- 11~10	0.3			●	●	●		●					
			TT32$^{R}_{L}$	5501	G, PT W	-	28~11 24~10	0.1	-	55°	●		●	●	●		●	●		
				5502	G, PT W	-	14~11 14~10	0.2			●		●	●	●		●	●		
Full Profile			TT43ER	100M	M	1.00	-	0.12	0.8	60°	●		●		●				KTT$^{R}_{L}$...-22	J46
				125M		1.25		0.15	0.9		●		●		●					
				150M		1.50		0.19	1.0		●		●		●					
				200M		2.00		0.25	1.7		●		●		●					
Partial Profile			TT43$^{R}_{L}$	6001	M UN	1.0~3.5 -	- 24~8	0.1	-	60°	●		●	●	●	●	●	●		J45
				6002	M UN	1.5~3.5 -	- 16~8	0.2			●	●	●	●	●	●	●	●		
				6003	M UN	2.5~3.5 -	- 11~8	0.3			●	●	●	●	●					
				6004	M UN	3.0~3.5 -	- 8	0.4			●	●	●	●	●					
			TT43$^{R}_{L}$	5501	G, PT W	-	28~11 24~7	0.1	-	55°	●		●		●		●	●		
				5502	G, PT W	-	14~11 16~7	0.2			●	●	●		●		●	●		
				5503	G, PT W	-	11 10~7	0.3			●		●		●					
				5504	G, PT W	-	- 8~7	0.4			●	●								

Applicable Thread	M : Metric	R (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	

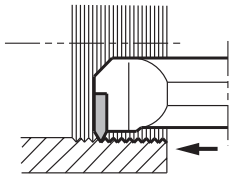
Recommended Cutting Conditions ➔ J38

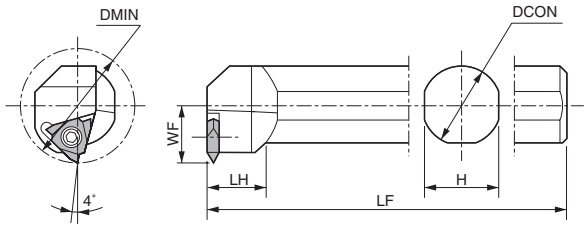
PR930 / PR1115 (Threading) are sold in 5 piece boxes

TC60M / KW10 (Threading) are sold in 10 piece boxes

● : Std. Item

KITG

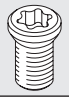
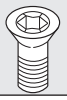
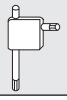
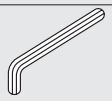




●Right-hand shown

Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock R	Stock L	Min. Bore Dia. DMIN	Dimension (mm) DCON	H	LF	LH	WF	Spare Parts: Clamp Screw		Spare Parts: Wrench	
													
KITG$^{R}_{L}$	3525T-16	●	●	35	25	23	220	18	17.5	SB-4TR	-	FT-15	-
	4532T-22	●	●	45	32	30	250	20	22.5	-	GS-50	-	LW-3

· Max. available Pitch : KITG$^{R}_{L}$3525T-16···P2.5 or 10TPI, KITG$^{R}_{L}$4532T-22···P3.0 or 8TPI.

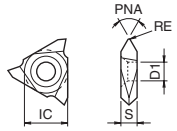
Applicable Inserts

(mm)

Description	IC	S	D1
TT32$^{R}_{L}$	9.525	3.18	4.4
TT43$^{R}_{L}$	12.70	4.76	5.5

		Cermet TC60M	PVD Coated Carbide PR930	PR1115	Carbide KW10
P	Carbon Steel / Alloy Steel	○	○	●	
M	Stainless Steel		○	●	
K	Cast Iron				●
N	Non-ferrous Metals				●

Classification of usage: ● : 1st Choice, ○ : 2nd Choice

Insert (Handed Insert shows Right-hand)	Description	Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) RE	Angle PNA	TC60M R	TC60M L	PR930 R	PR930 L	PR1115 R	PR1115 L	KW10 R	KW10 L	Applicable Toolholders	See Page for Depth of Cut & Number of Passes
Partial Profile  	TT32$^{R}_{L}$ 6000	M UN	0.5~2.5 -	- 48~10	0.0	60°	●	●	●	●	●	●			KITG$^{R}_{L}$...-16	J45 J46
	6001	M UN	1.5~2.5 -	- 16~10	0.1		●	●	●	●	●	●	●	●		
	TT32$^{R}_{L}$ 5501	G,PT W	-	28~11 24~10	0.1	55°	●		●	●	●		●	●		
	5502	G,PT W		- 16~18	0.2		●		●	●	●		●	●		
	TT43$^{R}_{L}$ 6001	M UN	1.5~3.0 -	- 16~10	0.1	60°	●		●	●	●	●	●	●	KITG$^{R}_{L}$...-22	
	6002	M UN	3.0 -	- 8	0.2		●	●	●	●	●	●	●	●		
	TT43$^{R}_{L}$ 5501	G,PT W	-	28~11 24~8	0.1	55°	●		●		●		●	●		
	5502	G,PT W		14~11 16~8	0.2		●	●	●		●		●	●		
	5503	G,PT W		11 11~8	0.3		●		●		●					
	5504	G,PT W		- 8	0.4		●	●								

Recommended Cutting Conditions ➔ J38

Applicable Thread		
	M : Metric	Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	

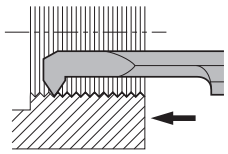
● : Std. Item

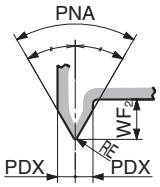
PR930 / PR1115 (Threading) are sold in 5 piece boxes

TC60M / KW10 (Threading) are sold in 10 piece boxes

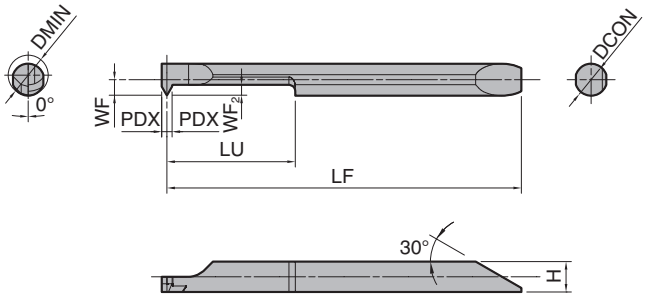
Micro Internal Threading EZ Bars

EZT





Detail of edge



• Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)									MEGA COAT	Carbide	Applicable Thread					
														Metric		Unified		American National Tapered Pipe	
		DMIN	DCON	H	LF	LU	WF	WF_2	PDX	RE	PNA	PR1225	GW05	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)	Nominal Thread	Pitch (TPI)
EZTR	030025-60-002	3.0	2.5	2.3	34.5	6.0	1.19	1.0	0.5	$0.02^{\pm0.01}$	60°	●	●	M4 and over (Fine Thread : M3.5 and over)	0.35~0.8	No.8-32UNC No.8-36UNF and over	36~32	-	-
	035030-60-002	3.5	3.0	2.8	38.4	8.4	1.44	1.2	0.6			●	●	M4.5 and over (Fine Thread : M4.5 and over)	0.5~1.0	No.10-24UNC No.8-36UNF and over	36~24	-	-
	040035-60-004	4.0	3.5	3.3	41.4	10.4	1.69	1.2	0.6	$0.04^{\pm0.01}$		●	●	M5 and over (Fine Thread : M6 and over)	0.75~1.25	No.12-24UNC No.12-28UNF and over	28~20	-	-
	050040-60-004	5.0	4.0	3.8	44.35	15.35	1.94	1.3	0.65			●	●	M7 and over (Fine Thread : M6 and over)	0.75~1.5	1/4-20UNC 1/4-28UNF and over	28~18	-	-
	060050-60-004	6.0	5.0	4.8	52.4	19.2	2.44	1.6	0.8			●	●	M8 and over (Fine Thread : M7 and over)	0.75~1.5	5/16-18UNC 5/16-24UNF and over	24~16	1/4NPT 3/8NPT	18
	070060-60-004	7.0	6.0	5.8	60.2	24.0	2.94	2.0	1.0			●	●	M9 and over (Fine Thread : M8 and over)	0.75~1.75	3/8-16UNC 3/8-24UNF and over	24~16	1/4NPT and over	18,14
														Whitworth		Parallel Pipe / Tapered Pipe			
EZTR	060050-55-008	6.0	5.0	4.8	52.4	19.2	2.44	1.6	0.8	$0.085^{\pm0.015}$	55°	●	●	W10 TPI24 and over	24~20	G1/16 and over R1/16 and over	28	-	-
	080070-55-008	8.0	7.0	6.8	63.2	24.0	3.44	2.0	1.0			●	●	W11 TPI20 and over	20~18	G1/8 and over R1/8 and over	28,19	-	-

· For American National Tapered Pipe (NPT), use EZTR..-60-004 J35
Applicable Sleeves J33

EZ Bars are sold in 1 piece boxes

● : Std. Item

Applicable Sleeves

Sleeve Description			Applicable Inserts		Applicable Machine Manufacturer
EZH-CT (Adjustable overhang length / with coolant hole) ➡ F26	EZH-HP (Adjustable overhang length) ➡ F28	EZH-ST ➡ F30	Sleeve Shank Dia. DCON(mm)	EZT	Shank Dia. DCON(mm)	
-	-	EZH 02512ST-80	12	EZTR030025-...	2.5	(General purpose)
		03012ST-80		EZTR035030-...	3	
		03512ST-80		EZTR040035-...	3.5	
		04012ST-80		EZTR050040-...	4	
		05012ST-80		EZTR060050-...	5	
		06012ST-80		EZTR070060-...	6	
		07012ST-80		EZTR080070-...	7	
-	EZH 02516HP-100	EZH 02516ST-100	16	EZTR030025-...	2.5	(General purpose)
	03016HP-100	03016ST-100		EZTR035030-...	3	
	03516HP-100	03516ST-100		EZTR040035-...	3.5	
	04016HP-100	04016ST-100		EZTR050040-...	4	
	05016HP-100	05016ST-100		EZTR060050-...	5	
	06016HP-100	06016ST-100		EZTR070060-...	6	
	07016HP-100	07016ST-100		EZTR080070-...	7	
EZH 02519CT-120	EZH 02519HP-120	EZH 02519ST-120	19.05	EZTR030025-...	2.5	Citizen Machinery
03019CT-120	03019HP-120	03019ST-120		EZTR035030-...	3	
03519CT-120	03519HP-120	03519ST-120		EZTR040035-...	3.5	
04019CT-120	04019HP-120	04019ST-120		EZTR050040-...	4	
05019CT-120	05019HP-120	05019ST-120		EZTR060050-...	5	
06019CT-120	06019HP-120	06019ST-120		EZTR070060-...	6	
07019CT-120	07019HP-120	07019ST-120		EZTR080070-...	7	
EZH 02520CT-120	EZH 02520HP-120	EZH 02520ST-120	20	EZTR030025-...	2.5	Eguro Tsugami Citizen Machinery (General purpose)
03020CT-120	03020HP-120	03020ST-120		EZTR035030-...	3	
03520CT-120	03520HP-120	03520ST-120		EZTR040035-...	3.5	
04020CT-120	04020HP-120	04020ST-120		EZTR050040-...	4	
05020CT-120	05020HP-120	05020ST-120		EZTR060050-...	5	
06020CT-120	06020HP-120	06020ST-120		EZTR070060-...	6	
07020CT-120	07020HP-120	07020ST-120		EZTR080070-...	7	
EZH 02522CT-135	EZH 02522HP-135	EZH 02522ST-135	22	EZTR030025-...	2.5	Star Micronics Nomura DS Tsugami
03022CT-135	03022HP-135	03022ST-135		EZTR035030-...	3	
03522CT-135	03522HP-135	03522ST-135		EZTR040035-...	3.5	
04022CT-135	04022HP-135	04022ST-135		EZTR050040-...	4	
05022CT-135	05022HP-135	05022ST-135		EZTR060050-...	5	
06022CT-135	06022HP-135	06022ST-135		EZTR070060-...	6	
07022CT-135	07022HP-135	07022ST-135		EZTR080070-...	7	
EZH 02525.0CT-135	EZH 02525.0HP-135	EZH 02525.0ST-135	25	EZTR030025-...	2.5	Eguro Tsugami Citizen Machinery (General purpose)
03025.0CT-135	03025.0HP-135	03025.0ST-135		EZTR035030-...	3	
03525.0CT-135	03525.0HP-135	03525.0ST-135		EZTR040035-...	3.5	
04025.0CT-135	04025.0HP-135	04025.0ST-135		EZTR050040-...	4	
05025.0CT-135	05025.0HP-135	05025.0ST-135		EZTR060050-...	5	
06025.0CT-135	06025.0HP-135	06025.0ST-135		EZTR070060-...	6	
07025.0CT-135	07025.0HP-135	07025.0ST-135		EZTR080070-...	7	
EZH 02525.4CT-120	EZH 02525.4HP-120	EZH 02525.4ST-120	25.4	EZTR030025-...	2.5	Citizen Machinery
03025.4CT-120	03025.4HP-120	03025.4ST-120		EZTR035030-...	3	
03525.4CT-120	03525.4HP-120	03525.4ST-120		EZTR040035-...	3.5	
04025.4CT-120	04025.4HP-120	04025.4ST-120		EZTR050040-...	4	
05025.4CT-120	05025.4HP-120	05025.4ST-120		EZTR060050-...	5	
06025.4CT-120	06025.4HP-120	06025.4ST-120		EZTR070060-...	6	
07025.4CT-120	07025.4HP-120	07025.4ST-120		EZTR080070-...	7	

· Choose sleeves (DCB) to meet with DCON dimension of bar.
· Adjustment Pin cannot be installed to EZH-ST sleeves. To adjust overhang of the bar, please use EZH-CT / HP sleeves.
· Machine manufacturers in random order.

Recommended Cutting Conditions (EZT)

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)	
	MEGACOAT	Carbide
	PR1225	**GW05**
Carbon Steel / Alloy Steel	★ 30~50	-
Stainless Steel	★ 30~50	-
Non-ferrous Metals	-	★ 30~50

★ : 1st Recommendation

<Note>
1) The standard cutting speed is Vc=30~50m/min. The table feed may not follow the expected conditions when machining small diameter workpieces at high speeds.
2) Coolant is recommended.

Depth of Cut & Number of Passes (Metric : M)

Pitch (mm)	Total ap (mm)	No. of Passes	1Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11 Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass	18 Pass	19 Pass	20 Pass
0.5	0.3	9	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02											
0.7	0.42	10	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02										
0.75	0.45	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03										
0.8	0.48	11	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03									
1.00	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03								
1.25	0.77	14	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03						
1.50	0.93	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03			
1.75	1.1	20	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03

Depth of Cut & Number of Passes (Whitworth)

TPI	Total ap (mm)	No. of Passes	1Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11 Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass
24	0.65	13	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03				
20	0.81	15	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03		
18	0.91	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03

Depth of Cut & Number of Passes (Unified : UN, UNC, UNF, UNEF)

TPI	Total ap (mm)	No. of Passes	1Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11 Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass	18 Pass
36	0.44	10	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.02	0.02								
32	0.5	11	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03							
28	0.55	12	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03						
24	0.65	12	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.03						
20	0.78	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.03				
18	0.88	17	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	
16	0.99	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03

Application of Parallel Pipe / Tapered Pipe Thread

Parallel Pipe : G(PF), Rp(PS)

Nominal Thread Symbol (Previous Symbol)	TPI	Internal Thread (G, Rp) Insert	Bore Dia.	Same Root's Radius
G1/16 (-)	28	EZTR 060050-55-008	6.56	0.12
G 1/8 (PF 1/8)		080070-55-008	8.57	
G 1/4 (PF 1/4)	19	EZTR 080070-55-008	11.45	0.18
G 3/8 (PF 3/8)			14.95	

Tapered Pipe : R, Rc(PT)(BSPT)

Nominal Thread Symbol (Previous Symbol)	TPI	Internal Thread (Rc) Insert	Bore Dia.	Same Root's Radius
R1/16, Rc1/16 (-)	28	EZTR 060050-55-008	-	0.12
R 1/8, Rc 1/8 (PT 1/8)		080070-55-008	-	
R 1/4, Rc 1/4 (PT 1/4)	19	EZTR 080070-55-008	-	0.18
R 3/8, Rc 3/8 (PT 3/8)			-	

· When using "EZT type" for Parallel Pipe / Tapered Pipe threading, thread's corners become sharp edged due to its partial profile, and the shape will not be the same as the standard shape for Parallel Pipe / Tapered Pipe.

Depth of Cut & Number of Passes (Parallel Pipe / Tapered Pipe)

TPI	Total ap (mm)	No. of Passes	1Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11 Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass	18 Pass
28	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03						
19	0.95	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03

Application of American National Tapered Pipe Thread (NPT)

Nominal Thread	TPI	Internal Thread Toolholder	Insert Partial Profile	Insert Full Profile
1/16 NPT 1/8 NPT	27	No Tools Available		
1/4 NPT 3/8 NPT	18	EZH Sleeves	EZTR060050-60-004 EZTR070060-60-004	-
1/2 NPT 3/4 NPT	14	EZH Sleeves	EZTR070060-60-004	-
1/2 NPT	14	SINR1616S-16	-	16IR14NPT
3/4 NPT		SINR2016S-16		

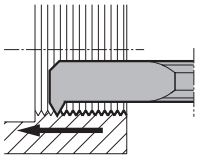
• Application of NPTF Thread
NPTF is the thread for sealing pipes without using any sealing material.
Thread symbol is similar to NPT but the tolerance is different from that of NPT, therefore the above inserts are not available for NPTF.

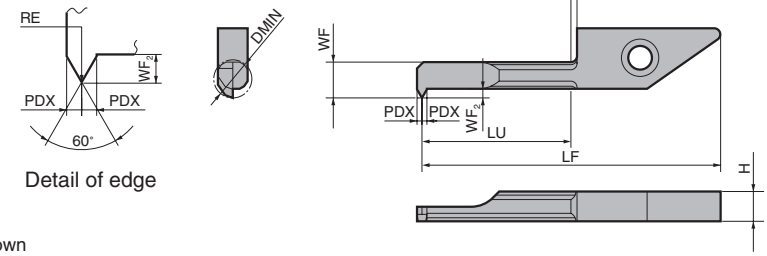
Depth of Cut & Number of Passes (American National Tapered Pipe)

TPI	Total ap (mm)	No. of Passes	1Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass	18 Pass	19 Pass
18	1.23	16	0.18	0.14	0.12	0.12	0.10	0.09	0.08	0.08	0.07	0.06	0.05	0.04	0.03	0.03	0.02	0.02			
14	1.56	19	0.18	0.16	0.14	0.14	0.12	0.10	0.09	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.04	0.04	0.03	0.03	0.02

System-Bars for Micro Internal Threading

VNT (System Tip-Bars)





●Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)							Insert Grades			Applicable Thread			
										MEGA COAT	PVD Coated Carbide	Carbide	Metric		Unified	
		DMIN	H	LF	LU	WF	WF_2	PDX	RE	PR1225	PR930	KW10	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)
VNTR	**045-11**	4.5	3.9	30.2	10.4	3.6	1.3	0.6	$^{+0}_{-0.02}$ 0.05	●	●	●	M6 and over	0.75 ~1.25	1/4-20UNC, 1/4-28UNF and over	28~20
	060-11	6.0		30.0	10.2	4.6	1.6	0.8		●	●	●	M8 and over	0.75 ~1.50	5/16-18UNC, 5/16-24UNF and over	24~18

For applicable Toolholder, See Page **F34 ~ F35 .**

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		
	MEGACOAT	PVD Coated Carbide	Carbide
	PR1225	PR930	KW10
Carbon Steel / Alloy Steel	★ 30~50	☆ 30~50	
Stainless Steel	★ 30~50	☆ 30~50	
Non-ferrous Metals			★ 30~50

★ : 1st Recommendation ☆ : 2nd Recommendation

<Note>
1) The standard cutting speed is Vc=30~50m/min. The table feed may not follow the expected conditions when machining small diameter workpieces at high speeds.
2) Coolant is recommended.

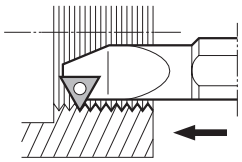
Depth of Cut & Number of Passes (Metric : M)

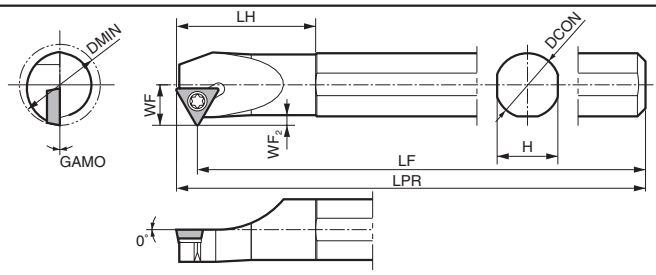
Pitch (mm)	Total ap (mm)	No. of Passes	1 Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11 Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass
0.75	0.44	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03							
1.00	0.60	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03					
1.25	0.76	14	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03			
1.50	0.92	17	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03

System Tip-Bars are sold in 5 piece boxes

● : Std. Item

S-STWP

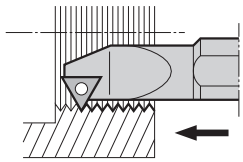


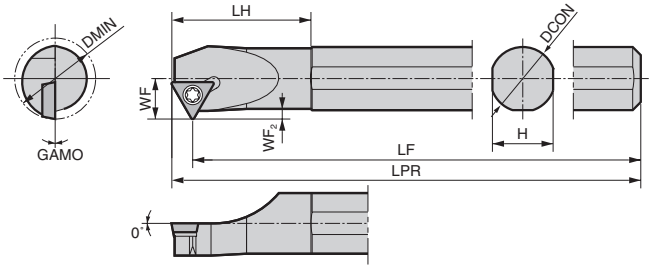


●Right-hand shown

This Tool can also be used as a boring bar.

S-STWP-E Excellent Bar

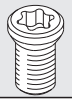
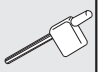




●Right-hand shown

This Tool can also be used as a boring bar.

Toolholder Dimensions

Description	Stock		Min. Bore Dia.	Dimension (mm)								Available Pitch (mm)	Spare Parts	
													Clamp Screw	Wrench
	R	L	DMIN	DCON	H	LPR	LF	LH	WF	WF_2	GAMO			
S10M -STWPR11-12	●		12	10	9.2	150	144.5	23	6	1.0	0°	1.5 or less	SB-3STR	FT-10
S12M -STWPR11-16	●		16	12	11	150	144.5	30	8	1.5		2.0 or less		
S16Q -STWPR11-20	●		20	16	15	180	174.5	35	10	2.0		3.0 or less	SB-3TR	
S20R -STWPR11-25	●		25	20	19	200	194.5	40	12.5	2.5		3.5 or less		
S10M -STWP R/L11-12E	●	●	12	10	9.2	150	144.5	23	6	1.0	0°	1.5 or less	SB-3STR	FT-10
S12M -STWP R/L11-16E	●	●	16	12	11	150	144.5	30	8	1.5		2.0 or less		
S16R -STWP R/L11-20E	●	●	20	16	15	200	194.5	35	10	2.0		3.0 or less	SB-3TR	
S20X -STWP R/L11-25E	●	●	25	20	19	220	214.5	40	12.5	2.5		3.5 or less		

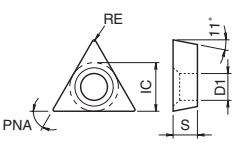
· WF_2 : shows the Max. available ap.

Applicable Inserts

(mm)

Description	IC	S	D1
TPGB1102...	6.35	2.38	3.5
TPGB1103...	6.35	3.18	3.3

						Classification of usage
P	Carbon Steel / Alloy Steel		○	●	○	● : 1st Choice
M	Stainless Steel					○ : 2nd Choice
K	Cast Iron					●
N	Non-ferrous Metals					●

Insert			Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) RE		Angle PNA	Cermet TN620	Cermet TN60	PVD PV720	PVD PV730	Carbide KW10	Applicable Toolholders	See Page for Depth of Cut & Number of Passes
Partial Profile			**TPGB**	**1102005**	M UN	0.75~1.5 -	- 28~16	0.05		60°		●			●	**...STWP R/L11-12(E)**	**J47**
				110201	M UN	1.5 -	- 16	0.10				●			●		
			TPGB	**1103005**	M UN	0.75~3.5 -	- 28~11	0.05				●			●	**...STWP R/L11-16(E)**	
				110301	M UN	1.5~3.5 -	- 16~8	0.10				●			●	**...STWP R/L11-20(E)**	
				110302	M UN	3.0~3.5 -	- 8	0.20			●	●	●	●	●	**...STWP R/L11-25(E)**	

Recommended Cutting Conditions ➡ J38

Applicable Thread		
	M : Metric	Rc (PT) (BSPT) : Tapered Pipe
	UN : Unified	W : Whitworth
	UNF : Unified Fine Thread	NPT : American National Tapered Pipe
	G (PF) : Parallel Pipe	

● : Std. Item

Inserts are sold in 10 piece boxes

Recommended Cutting Conditions

KTN / KTNS / SIN / CIN / S-KTN

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)					
	Cermet	MEGACOAT	MEGACOAT NANO		PVD Coated Carbide	Carbide
	TC60M	**PR1215**	**PR1515**	**PR1535**	**PR1115**	**GW15**
Carbon Steel	☆ 100~150	★ 100~150	-	-	☆ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less			0.3mm or less	
Alloy Steel	☆ 100~150	★ 100~150	-	-	☆ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less			0.3mm or less	
Stainless Steel	☆ 60~80	-	★ 60~100	☆ 40~80	☆ 60~80	-
First ap (Radial)	0.25mm or less		0.25mm or less	0.25mm or less	0.25mm or less	
Cast Iron	-	-	-	-	-	★ 100
First ap (Radial)						0.3mm or less
Aluminum Alloys	-	-	-	-	-	★ 150~400
First ap (Radial)						0.3mm or less
Brass	-	-	-	-	-	★ 150~300
First ap (Radial)						0.3mm or less

• For 06IR / 08IR, please lower it to a figure under 40% of above condition list

KTT

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60M	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less	0.3mm or less	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less	0.3mm or less	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm or less	0.25mm or less	0.25mm or less	
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.3mm or less
Aluminum Alloys	-	-	-	★ 150~400
First ap (Radial)				0.3mm or less
Brass	-	-	-	★ 150~300
First ap (Radial)				0.3mm or less

S-STWP(-E)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)			
	Cermet		PVD Coated Cermet	Carbide
	TN620	**TN60**	**PV720**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.25mm or less	0.25mm or less	0.25mm or less	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.25mm or less	0.25mm or less	0.25mm or less	
Stainless Steel	-	-	-	-
First ap (Radial)				
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.25mm or less
Aluminum Alloys	-	-	-	★ 150~400
First ap (Radial)				0.25mm or less
Brass	-	-	-	★ 150~300
First ap (Radial)				0.25mm or less

KTTX / S-KTTX

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60M	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less	0.3mm or less	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less	0.3mm or less	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm or less	0.25mm or less	0.25mm or less	
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.3mm or less
Aluminum Alloys	-	-	-	★ 150~400
First ap (Radial)				0.3mm or less
Brass	-	-	-	★ 150~300
First ap (Radial)				0.3mm or less

KITG

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc : m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60M	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less	0.3mm or less	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	0.3mm or less	0.3mm or less	0.3mm or less	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	0.25mm or less	0.25mm or less	0.25mm or less	
Cast Iron	-	-	-	★ 100
First ap (Radial)				0.3mm or less
Aluminum Alloys	-	-	-	★ 150~400
First ap (Radial)				0.3mm or less
Brass	-	-	-	★ 150~300
First ap (Radial)				0.3mm or less

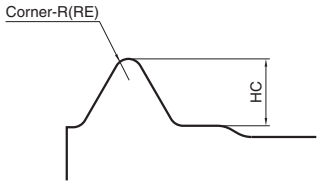
★ : 1st Recommendation ☆ : 2nd Recommendation

- Coolant is recommended.
- In case of using cermet insert, honing the edge with hand lapper enables higher stability.
- In case of threading stainless steel, please set two to three passes more than previous description of <Depth of Cut & Number of Passes>.

Depth of Cut & Number of Passes

Cautions for Usage of Full Profile Insert.

1) Max. ap is based on the value of 0.05~0.08mm.
2) Finishing ap should be 0.02~0.05mm.
3) Prepare chamfering for C0.3~C0.5 to the workpiece to prevent the insert cracking during the 1st pass.
4) Coolant is recommended.



(ap shows the value of radial ap)

11/16/22 (Full Profile) type

Type		Pitch / TPI (mm · TPI)	Description	HC (mm)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric	External Thread	1.00mm	16ER 100ISO-TF/TQ	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05														
		1.25mm	125ISO-TF/TQ	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05													
		1.50mm	150ISO-TF/TQ	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05													
		1.75mm	175ISO-TF/TQ	1.11	1.19	8	0.26	0.22	0.19	0.16	0.13	0.10	0.08	0.05											
		2.00mm	200ISO-TF/TQ	1.27	1.35	10	0.26	0.21	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05									
		2.50mm	250ISO-TF/TQ	1.57	1.65	12	0.26	0.23	0.21	0.18	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05							
		3.00mm	300ISO-TF/TQ	1.87	1.95	14	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.02					
		0.50mm	16ER/L 050ISO	0.33	0.38	4	0.14	0.12	0.08	0.04															
		0.75mm	075ISO	0.48	0.53	5	0.17	0.14	0.10	0.08	0.04														
		1.00mm	100ISO	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05														
		1.25mm	125ISO	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05													
		1.50mm	150ISO	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05													
		2.00mm	200ISO	1.27	1.35	10	0.26	0.21	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05									
		2.50mm	250ISO	1.57	1.65	12	0.26	0.23	0.21	0.18	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05							
		3.00mm	22ER 300ISO	1.87	1.95	14	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.02					
		3.50mm	350ISO	2.18	2.26	15	0.28	0.25	0.22	0.20	0.20	0.18	0.16	0.15	0.15	0.12	0.10	0.10	0.08	0.05	0.02				
		4.00mm	400ISO	2.48	2.56	17	0.28	0.25	0.24	0.22	0.20	0.18	0.16	0.15	0.15	0.14	0.12	0.12	0.10	0.10	0.08	0.05	0.02		
		4.50mm	450ISO	2.79	2.87	18	0.30	0.28	0.26	0.24	0.22	0.20	0.18	0.16	0.16	0.14	0.14	0.13	0.12	0.10	0.10	0.07	0.05	0.02	
		5.00mm	500ISO	3.10	3.18	19	0.30	0.28	0.27	0.26	0.23	0.20	0.18	0.18	0.17	0.16	0.16	0.15	0.15	0.13	0.12	0.10	0.07	0.05	0.02
	Internal Thread	1.00mm	11IR 100ISO-TF/TQ	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO-TF/TQ	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO-TF/TQ	0.88	0.96	8	0.24	0.18	0.14	0.10	0.10	0.08	0.07	0.05											
		1.75mm	175ISO-TF/TQ	1.02	1.10	9	0.24	0.18	0.16	0.14	0.10	0.10	0.08	0.05	0.05										
		0.50mm	11IR/L 050ISO	0.31	0.36	4	0.14	0.10	0.08	0.04															
		0.75mm	075ISO	0.45	0.50	5	0.15	0.14	0.10	0.07	0.04														
		1.00mm	100ISO	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO	0.88	0.96	8	0.24	0.18	0.14	0.10	0.10	0.08	0.07	0.05											
		1.75mm	175ISO	1.02	1.10	9	0.24	0.18	0.16	0.14	0.10	0.10	0.08	0.05	0.05										
		2.00mm	200ISO	1.18	1.26	10	0.24	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05									
		1.00mm	16IR 100ISO-TF/TQ	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO-TF/TQ	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO-TF/TQ	0.88	0.96	8	0.22	0.18	0.14	0.12	0.10	0.08	0.07	0.05											
		1.75mm	175ISO-TF/TQ	1.02	1.10	9	0.22	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05										
		2.00mm	200ISO-TF/TQ	1.18	1.26	10	0.24	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05									
		2.50mm	250ISO-TF/TQ	1.46	1.54	12	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.05							
		3.00mm	300ISO-TF/TQ	1.76	1.84	14	0.26	0.24	0.21	0.18	0.16	0.15	0.13	0.12	0.10	0.10	0.07	0.05	0.05	0.02					
		1.00mm	16IR/L 100ISO	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25mm	125ISO	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50mm	150ISO	0.88	0.96	8	0.22	0.18	0.14	0.12	0.10	0.08	0.07	0.05											
		2.00mm	200ISO	1.18	1.26	10	0.24	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05									
		2.50mm	250ISO	1.46	1.54	12	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.05	0.05							
		3.00mm	300ISO	1.76	1.84	14	0.26	0.24	0.21	0.18	0.16	0.15	0.13	0.12	0.10	0.10	0.07	0.05	0.05	0.02					
		3.00mm	22IR 300ISO	1.76	1.84	14	0.26	0.24	0.21	0.18	0.16	0.15	0.13	0.12	0.10	0.10	0.07	0.05	0.05	0.02					
		3.50mm	350ISO	2.05	2.13	15	0.26	0.24	0.22	0.20	0.17	0.17	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.05	0.02				
		4.00mm	400ISO	2.34	2.42	17	0.26	0.24	0.22	0.20	0.18	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.10	0.10	0.05	0.05	0.02		
		4.50mm	450ISO	2.63	2.71	18	0.26	0.25	0.24	0.22	0.22	0.20	0.18	0.17	0.15	0.13	0.13	0.12	0.12	0.10	0.10	0.05	0.05	0.02	
		5.00mm	500ISO	2.92	3.00	19	0.28	0.26	0.24	0.22	0.20	0.20	0.18	0.18	0.16	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.10	0.05	0.02
Unified	External Thread	24 TPI	16ER 24UN-TF/TQ	0.67	0.75	5	0.24	0.20	0.16	0.10	0.05														
		20 TPI	20UN-TF/TQ	0.80	0.88	6	0.24	0.20	0.16	0.13	0.10	0.05													
		18 TPI	18UN-TF/TQ	0.89	0.97	6	0.26	0.22	0.18	0.15	0.11	0.05													
		16 TPI	16UN-TF/TQ	1.01	1.09	7	0.26	0.22	0.18	0.15	0.12	0.11	0.05												
		14 TPI	14UN-TF/TQ	1.15	1.23	8	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.05											
		13 TPI	13UN-TF/TQ	1.24	1.32	9	0.26	0.22	0.18	0.16	0.14	0.12	0.11	0.08	0.05										
		12 TPI	12UN-TF/TQ	1.34	1.42	11	0.26	0.22	0.18	0.16	0.13	0.12	0.10	0.08	0.07	0.05	0.05								
		10 TPI	10UN-TF/TQ	1.59	1.67	12	0.26	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.07	0.05	0.05							
		8 TPI	08UN-TF/TQ	1.98	2.06	14	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.08	0.05	0.05					
		24 TPI	16ER 24UN	0.67	0.75	5	0.24	0.20	0.16	0.10	0.05														
		20 TPI	20UN	0.80	0.88	6	0.24	0.20	0.16	0.13	0.10	0.05													
		18 TPI	18UN	0.89	0.97	6	0.26	0.22	0.18	0.15	0.11	0.05													
		16 TPI	16UN	1.01	1.09	7	0.26	0.22	0.18	0.15	0.12	0.11	0.05												
		14 TPI	14UN	1.15	1.23	8	0.26	0.22	0.18	0.16	0.14	0.12	0.10	0.05											
		12 TPI	12UN	1.34	1.42	11	0.26	0.22	0.18	0.16	0.13	0.12	0.10	0.08	0.07	0.05	0.05								
		8 TPI	22ER 08UN	1.98	2.06	15	0.30	0.26	0.22	0.20	0.16	0.15	0.14	0.13	0.10	0.10	0.10	0.07	0.06	0.05	0.02				
	Internal Thread	24 TPI	16IR 24UN-TF/TQ	0.62	0.70	5	0.22	0.19	0.15	0.10	0.04														
		20 TPI	20UN-TF/TQ	0.75	0.83	6	0.22	0.20	0.16	0.12	0.08	0.05													
		18 TPI	18UN-TF/TQ	0.83	0.91	6	0.24	0.20	0.18	0.14	0.10	0.05													
		16 TPI	16UN-TF/TQ	0.94	1.02	7	0.24	0.20	0.18	0.14	0.11	0.10	0.05												
		14 TPI	14UN-TF/TQ	1.07	1.15	8	0.24	0.22	0.18	0.14	0.12	0.10	0.10	0.05											
		13 TPI	13UN-TF/TQ	1.15	1.23	9	0.24	0.22	0.18	0.14	0.12	0.10	0.10	0.08	0.05										
		12 TPI	12UN-TF/TQ	1.24	1.32	11	0.24	0.22	0.16	0.15	0.12	0.10	0.10	0.07	0.07	0.05	0.04								
		10 TPI	10UN-TF/TQ	1.48	1.56	12	0.24	0.22	0.20	0.16	0.15	0.12	0.12	0.10	0.09	0.07	0.05	0.04							
		8 TPI	08UN-TF/TQ	1.86	1.94	14	0.24	0.22	0.20	0.18	0.16	0.16	0.14	0.14	0.12	0.12	0.10	0.07	0.05	0.04					
		24 TPI	16IR 24UN	0.62	0.70	5	0.22	0.19	0.15	0.10	0.04														
		20 TPI	20UN	0.75	0.83	6	0.22	0.20	0.16	0.12	0.08	0.05													
		18 TPI	18UN	0.83	0.91	6	0.24	0.21	0.17	0.14	0.10	0.05													
		16 TPI	16UN	0.94	1.02	7	0.24	0.20	0.18	0.14	0.11	0.10	0.05												
		14 TPI	14UN	1.07	1.15	8	0.24	0.22	0.18	0.14	0.12	0.10	0.10	0.05											
		12 TPI	12UN	1.24	1.32	11	0.24	0.22	0.16	0.15	0.12	0.10	0.10	0.07	0.07	0.05	0.04								
		8 TPI	22IR 08UN	1.84	1.92	15	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.10	0.10	0.09	0.05	0.05	0.02				

Depth of Cut & Number of Passes

11/16 (Full Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm·TPI	Description	HC (mm)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Parallel Pipe	External Thread	19 TPI	16ER 19W-TF/TQ	0.89	0.97	6	0.27	0.22	0.18	0.15	0.10	0.05													
		14 TPI	14W-TF/TQ	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF/TQ	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	19 TPI	16IR 19W-TF/TQ	0.88	0.96	6	0.25	0.21	0.20	0.15	0.10	0.05													
		14 TPI	14W-TF/TQ	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF/TQ	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
Whitworth	External Thread	16 TPI	16ER 16W-TF/TQ	1.05	1.13	8	0.25	0.21	0.18	0.16	0.12	0.08	0.08	0.05											
		14 TPI	14W-TF/TQ	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF/TQ	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	16 TPI	16IR 16W-TF/TQ	1.05	1.13	8	0.25	0.21	0.18	0.16	0.12	0.08	0.08	0.05											
		14 TPI	14W-TF/TQ	1.19	1.27	9	0.27	0.22	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TF/TQ	1.50	1.58	12	0.27	0.22	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
Tapered Pipe	External Thread	28 TPI	16ER 28BSPT-TF/TQ	0.58	0.63	5	0.20	0.15	0.13	0.11	0.04														
		19 TPI	19BSPT-TF/TQ	0.86	0.94	6	0.26	0.20	0.18	0.15	0.10	0.05													
		14 TPI	14BSPT-TF/TQ	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT-TF/TQ	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
		28 TPI	16ER 28BSPT	0.58	0.63	5	0.20	0.15	0.13	0.11	0.04														
		19 TPI	19BSPT	0.86	0.94	6	0.26	0.20	0.18	0.15	0.10	0.05													
		14 TPI	14BSPT	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	28 TPI	11IR 28BSPT-TF/TQ	0.58	0.63	5	0.20	0.16	0.13	0.10	0.04														
		19 TPI	19BSPT-TF/TQ	0.86	0.94	7	0.22	0.20	0.18	0.14	0.10	0.06	0.04												
		14 TPI	14BSPT-TF/TQ	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		28 TPI	11IR 28BSPT	0.58	0.63	5	0.20	0.16	0.13	0.10	0.04														
		19 TPI	19BSPT	0.86	0.94	7	0.22	0.20	0.18	0.14	0.10	0.06	0.04												
		14 TPI	14BSPT	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		14 TPI	16IR 14BSPT-TF/TQ	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT-TF/TQ	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
		14 TPI	16IR 14BSPT	1.16	1.24	9	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.04										
		11 TPI	11BSPT	1.48	1.56	12	0.26	0.22	0.18	0.16	0.12	0.12	0.11	0.10	0.10	0.07	0.07	0.05							
American National Tapered Pipe	External Thread	18 TPI	16ER 18NPT	1.14	1.22	13	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.05	0.04	0.02						
		14 TPI	14NPT	1.46	1.54	15	0.20	0.18	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.04	0.02				
		11.5 TPI	11.5NPT	1.77	1.85	16	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.04	0.02			
	Internal Thread	18 TPI	16IR 18NPT	1.14	1.22	13	0.20	0.16	0.14	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.05	0.04	0.02						
		14 TPI	14NPT	1.46	1.54	15	0.20	0.18	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.04	0.02				
		11.5 TPI	11.5NPT	1.77	1.85	16	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.10	0.08	0.08	0.07	0.06	0.04	0.02			

60˚/ 55˚ (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric	External Thread	0.5mm	16ER A60-TF/TQ	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
			AG60-TF/TQ	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
		0.75mm	16ER A60-TF/TQ	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
			AG60-TF/TQ	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
		1.00mm	16ER A60-TF/TQ	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
			AG60-TF/TQ	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
		1.25mm	16ER A60-TF/TQ	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
			AG60-TF/TQ	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
		1.50mm	16ER A60-TF/TQ	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG60-TF/TQ	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		1.75mm	16ER G60-TF/TQ	0.22	1.11	8	0.24	0.20	0.18	0.16	0.13	0.10	0.06	0.04											
			AG60-TF/TQ	0.06	1.27	11	0.22	0.20	0.18	0.13	0.11	0.09	0.09	0.08	0.07	0.06	0.04								
		2.00mm	16ER G60-TF/TQ	0.22	1.30	10	0.24	0.20	0.18	0.16	0.14	0.12	0.09	0.07	0.06	0.04									
			AG60-TF/TQ	0.06	1.46	11	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.04								
		2.50mm	16ER G60-TF/TQ	0.22	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.06	0.04							
			AG60-TF/TQ	0.06	1.84	13	0.25	0.22	0.20	0.19	0.17	0.16	0.14	0.11	0.10	0.09	0.09	0.07	0.05						
		3.00mm	16ER G60-TF/TQ	0.22	2.05	14	0.25	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
			AG60-TF/TQ	0.06	2.22	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				
		0.5mm	16ER A60	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
			AG60	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
		0.75mm	16ER A60	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
			AG60	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
		1.00mm	16ER A60	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
			AG60	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
		1.25mm	16ER A60	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
			AG60	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
		1.50mm	16ER A60	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG60	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		1.75mm	16ER G60	0.22	1.11	8	0.24	0.20	0.18	0.16	0.13	0.10	0.06	0.04											
			AG60	0.06	1.27	11	0.22	0.20	0.18	0.13	0.11	0.09	0.09	0.08	0.07	0.06	0.04								
		2.00mm	16ER G60	0.22	1.30	10	0.24	0.20	0.18	0.16	0.14	0.12	0.09	0.07	0.06	0.04									
			AG60	0.06	1.46	11	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.04								
		2.50mm	16ER G60	0.22	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.06	0.04							
			AG60	0.06	1.84	13	0.25	0.22	0.20	0.19	0.17	0.16	0.14	0.11	0.10	0.09	0.09	0.07	0.05						
		3.00mm	16ER G60	0.22	2.05	14	0.25	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
			AG60	0.06	2.22	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				

60°/ 55° (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric	External Thread	3.50mm	22ER N60	0.48	2.17	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.05				
		4.00mm			2.55	17	0.28	0.26	0.24	0.22	0.20	0.18	0.17	0.16	0.14	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05		
		4.50mm			2.93	18	0.30	0.28	0.26	0.25	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05	
		5.00mm			3.31	19	0.30	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.09	0.08	0.07	0.06	0.05
	Internal Thread	0.75mm	06IR 60005	0.05	0.44	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03									
		1.00mm	06IR 60005	0.05	0.60	12	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.04	0.03							
			08IR 60007	0.07	0.58	12	0.07	0.06	0.06	0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.03	0.03							
		1.25mm	06IR 60005	0.05	0.76	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03					
			08IR 60007	0.07	0.74	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03					
		1.5mm	08IR 60007	0.07	0.90	17	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03		
		1.75mm		0.07	1.07	19	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03
		0.50mm	11IR A60	0.02	0.30	5	0.08	0.07	0.06	0.05	0.04														
		1.00mm			0.63	6	0.16	0.14	0.12	0.10	0.07	0.04													
		1.50mm			0.95	9	0.18	0.16	0.13	0.12	0.10	0.08	0.08	0.06	0.04										
		0.5mm	16IR A60	0.02	0.30	5	0.08	0.07	0.06	0.05	0.04														
			AG60	0.02	0.30	5	0.08	0.07	0.06	0.05	0.04														
		0.75mm	16IR A60	0.02	0.47	6	0.12	0.10	0.08	0.07	0.06	0.04													
			AG60	0.02	0.47	6	0.12	0.10	0.08	0.07	0.06	0.04													
		1.00mm	16IR A60	0.02	0.63	6	0.16	0.14	0.12	0.10	0.07	0.04													
			AG60	0.02	0.63	6	0.16	0.14	0.12	0.10	0.07	0.04													
		1.25mm	16IR A60	0.02	0.79	7	0.16	0.15	0.14	0.13	0.10	0.07	0.04												
			AG60	0.02	0.79	7	0.16	0.15	0.14	0.13	0.10	0.07	0.04												
		1.50mm	16IR A60	0.02	0.95	9	0.18	0.16	0.13	0.12	0.10	0.08	0.08	0.06	0.04										
			AG60	0.02	0.95	9	0.18	0.16	0.13	0.12	0.10	0.08	0.08	0.06	0.04										
		1.75mm	16IR G60	0.11	1.03	9	0.20	0.17	0.15	0.13	0.11	0.10	0.08	0.05	0.04										
			AG60	0.02	1.12	10	0.20	0.18	0.16	0.13	0.12	0.10	0.08	0.06	0.05	0.04									
		2.00mm	16IR G60	0.11	1.19	10	0.20	0.18	0.17	0.15	0.13	0.11	0.08	0.07	0.06	0.04									
			AG60	0.02	1.28	12	0.20	0.17	0.15	0.13	0.12	0.11	0.10	0.09	0.07	0.06	0.04	0.04							
		2.50mm	16IR G60	0.11	1.51	14	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05	0.04	0.02					
			AG60	0.02	1.60	16	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.05	0.05	0.04	0.04	0.02			
		3.00mm	16IR G60	0.11	1.84	16	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.10	0.10	0.08	0.07	0.06	0.04	0.02			
			AG60	0.02	1.93	18	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.13	0.12	0.10	0.10	0.08	0.07	0.06	0.05	0.04	0.03	0.02	
		3.50mm	22IR N60	0.22	2.05	14	0.26	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.08	0.06	0.05					
		4.00mm			2.38	16	0.26	0.24	0.23	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05			
		4.50mm			2.70	18	0.26	0.24	0.23	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05	
		5.00mm			3.03	19	0.30	0.27	0.25	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05
Unified	External Thread	48 TPI	16ER A60-TF/TQ	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
			AG60-TF/TQ	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
		24 TPI	16ER A60-TF/TQ	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
			AG60-TF/TQ	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
		20 TPI	16ER A60-TF/TQ	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
			AG60-TF/TQ	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
		18 TPI	16ER A60-TF/TQ	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			AG60-TF/TQ	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
		16 TPI	16ER A60-TF/TQ	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
			AG60-TF/TQ	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
		14 TPI	16ER G60-TF/TQ	0.22	1.15	9	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.07	0.05										
			AG60-TF/TQ	0.06	1.32	11	0.22	0.20	0.18	0.15	0.13	0.10	0.09	0.08	0.07	0.06	0.04								
		13 TPI	16ER G60-TF/TQ	0.22	1.26	9	0.24	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05										
			AG60-TF/TQ	0.06	1.43	11	0.25	0.23	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G60-TF/TQ	0.22	1.38	10	0.25	0.22	0.20	0.17	0.15	0.12	0.10	0.07	0.06	0.04									
			AG60-TF/TQ	0.06	1.55	12	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.09	0.07	0.06	0.04							
		10 TPI	16ER G60-TF/TQ	0.22	1.71	12	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.06	0.05							
			AG60-TF/TQ	0.06	1.87	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
		9 TPI	16ER G60-TF/TQ	0.22	1.92	13	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
			AG60-TF/TQ	0.06	2.08	14	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
		8 TPI	16ER G60-TF/TQ	0.22	2.19	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
			AG60-TF/TQ	0.06	2.35	16	0.30	0.25	0.23	0.20	0.18	0.17	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.05	0.05			
		48 TPI	16ER A60	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
			AG60	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
		24 TPI	16ER A60	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
			AG60	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
		20 TPI	16ER A60	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
			AG60	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
		18 TPI	16ER A60	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			AG60	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
		16 TPI	16ER A60	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
			AG60	0.06	1.15	10	0.22	0.18	0.15	0.13	0.11	0.10	0.08	0.08	0.06	0.04									
		14 TPI	16ER G60	0.22	1.15	9	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.07	0.05										
			AG60	0.06	1.32	11	0.22	0.20	0.18	0.15	0.13	0.10	0.09	0.08	0.07	0.06	0.04								
		13 TPI	16ER G60	0.22	1.26	9	0.24	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05										
			AG60	0.06	1.43	11	0.25	0.23	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G60	0.22	1.38	10	0.25	0.22	0.20	0.17	0.15	0.12	0.10	0.07	0.06	0.04									
			AG60	0.06	1.55	12	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.09	0.07	0.06	0.04							
		10 TPI	16ER G60	0.22	1.71	12	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.06	0.05							
			AG60	0.06	1.87	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
		9 TPI	16ER G60	0.22	1.92	13	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.06	0.04						
			AG60	0.06	2.08	14	0.27	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.07	0.05					
		8 TPI	16ER G60	0.22	2.19	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
			AG60	0.06	2.35	16	0.30	0.25	0.23	0.20	0.18	0.17	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.05	0.05			
		7 TPI	22ER N60	0.48	2.27	15	0.27	0.25	0.24	0.23	0.20	0.18	0.15	0.13	0.12	0.11	0.10	0.10	0.08	0.06	0.05				
		6 TPI			2.73	18	0.27	0.25	0.23	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.10	0.10	0.08	0.06	0.05	
		5 TPI			3.37	19	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.09	0.08	0.07	0.06	0.05

Depth of Cut & Number of Passes

60°/ 55° (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Unified	Internal Thread	28 TPI	06IR 60005	0.05	0.54	12	0.07	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.03							
		24 TPI		0.05	0.64	12	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.03							
		20 TPI	06IR 60005	0.05	0.77	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03					
			08IR 60007	0.07	0.75	14	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.03	0.03					
		18 TPI	08IR 60007	0.07	0.85	17	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03		
		16 TPI	08IR 60007	0.07	0.96	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	
		48 TPI			0.32	5	0.08	0.07	0.07	0.06	0.04														
		24 TPI			0.67	7	0.14	0.13	0.12	0.10	0.08	0.06	0.04												
		20 TPI	11IR A60	0.02	0.8	8	0.14	0.13	0.12	0.12	0.11	0.08	0.06	0.04											
		18 TPI			0.9	9	0.15	0.14	0.13	0.12	0.11	0.08	0.07	0.06	0.04										
		16 TPI			1.01	10	0.15	0.14	0.13	0.12	0.12	0.10	0.08	0.07	0.06	0.04									
		48 TPI	16IR A60	0.02	0.32	5	0.08	0.07	0.07	0.06	0.04														
			AG60	0.02	0.32	5	0.08	0.07	0.07	0.06	0.04														
		24 TPI	16IR A60	0.02	0.67	7	0.14	0.13	0.12	0.10	0.08	0.06	0.04												
			AG60	0.02	0.67	7	0.14	0.13	0.12	0.10	0.08	0.06	0.04												
		20 TPI	16IR A60	0.02	0.80	8	0.14	0.13	0.12	0.12	0.11	0.08	0.06	0.04											
			AG60	0.02	0.80	8	0.14	0.13	0.12	0.12	0.11	0.08	0.06	0.04											
		18 TPI	16IR A60	0.02	0.90	9	0.15	0.14	0.13	0.12	0.11	0.08	0.07	0.06	0.04										
			AG60	0.02	0.90	9	0.15	0.14	0.13	0.12	0.11	0.08	0.07	0.06	0.04										
		16 TPI	16IR A60	0.02	1.01	10	0.15	0.14	0.13	0.12	0.12	0.10	0.08	0.07	0.06	0.04									
			AG60	0.02	1.01	10	0.15	0.14	0.13	0.12	0.12	0.10	0.08	0.07	0.06	0.04									
		14 TPI	16IR G60	0.11	1.07	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.04										
			AG60	0.02	1.16	11	0.15	0.14	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.06	0.04								
		13 TPI	16IR G60	0.11	1.16	10	0.20	0.18	0.16	0.14	0.12	0.11	0.08	0.07	0.06	0.04									
			AG60	0.02	1.25	12	0.18	0.16	0.15	0.13	0.12	0.11	0.10	0.09	0.07	0.06	0.04	0.04							
		12 TPI	16IR G60	0.11	1.26	11	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.08	0.06	0.05	0.04								
			AG60	0.02	1.35	13	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.04	0.04						
		10 TPI	16IR G60	0.11	1.54	14	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.06	0.05	0.04	0.02					
			AG60	0.02	1.63	16	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.06	0.05	0.05	0.04	0.04	0.02			
		9 TPI	16IR G60	0.11	1.72	16	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.04	0.02			
			AG60	0.02	1.81	17	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.11	0.10	0.10	0.08	0.07	0.06	0.05	0.03	0.02		
		8 TPI	16IR G60	0.11	1.95	17	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.03	0.02		
			AG60	0.02	2.04	19	0.20	0.19	0.18	0.17	0.15	0.14	0.14	0.13	0.13	0.11	0.10	0.09	0.07	0.06	0.05	0.04	0.04	0.03	0.02
		7 TPI	22IR N60		2.14	14	0.26	0.24	0.23	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.07	0.06	0.05					
		6 TPI	22IR N60	0.22	2.53	17	0.28	0.26	0.23	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.10	0.09	0.08	0.07	0.06	0.05		
		5 TPI	22IR N60		3.08	19	0.30	0.28	0.26	0.25	0.23	0.22	0.20	0.17	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.08	0.06	0.05
Parallel Pipe / Tapered Pipe	External Thread	28 TPI	16ER A55-TF/TQ	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
			AG55-TF/TQ	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	16ER A55-TF/TQ	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
			AG55-TF/TQ	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		14 TPI	16ER G55-TF/TQ	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55-TF/TQ	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		11 TPI	16ER G55-TF/TQ	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55-TF/TQ	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		28 TPI	16ER A55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
			AG55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	16ER A55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
			AG55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		14 TPI	16ER G55	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		11 TPI	16ER G55	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
	Internal Thread	28 TPI	06IR 5501	0.10	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03							
			08IR 5501																						
		19 TPI	08IR 5501	0.10	0.95	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03	
		28 TPI	11IR A55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	11IR A55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		28 TPI	16IR A55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
			AG55	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	16IR A55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
			AG55	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
		14 TPI	16IR G55	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		11 TPI	16IR G55	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
Whitworth	External Thread	48 TPI	16ER A55-TF/TQ	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
			AG55-TF/TQ	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
		24 TPI	16ER A55-TF/TQ	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
			AG55-TF/TQ	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
		20 TPI	16ER A55-TF/TQ	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
			AG55-TF/TQ	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
		18 TPI	16ER A55-TF/TQ	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG55-TF/TQ	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		16 TPI	16ER A55-TF/TQ	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
			AG55-TF/TQ	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
		14 TPI	16ER G55-TF/TQ	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55-TF/TQ	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G55-TF/TQ	0.22	1.44	10	0.24	0.22	0.20	0.18	0.15	0.12	0.12	0.09	0.07	0.05									
			AG55-TF/TQ	0.06	1.64	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.05							
		11 TPI	16ER G55-TF/TQ	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55-TF/TQ	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		10 TPI	16ER G55-TF/TQ	0.22	1.78	12	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.13	0.12	0.09	0.07	0.05							
			AG55-TF/TQ	0.06	1.98	14	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.05					
		9 TPI	16ER G55-TF/TQ	0.22	2.01	14	0.24	0.22	0.20	0.19	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.08	0.07	0.05					
			AG55-TF/TQ	0.06	2.20	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
		8 TPI	16ER G55-TF/TQ	0.22	2.29	15	0.28	0.26	0.24	0.22	0.19	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				
			AG55-TF/TQ	0.06	2.49	16	0.30	0.28	0.26	0.24	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.06	0.05			

60˚/ 55˚ (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Whitworth	External Thread	48 TPI	16ER A55	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
			AG55	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
		24 TPI	16ER A55	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
			AG55	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
		20 TPI	16ER A55	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
			AG55	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
		18 TPI	16ER A55	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
			AG55	0.06	1.07	9	0.20	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		16 TPI	16ER A55	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
			AG55	0.06	1.22	11	0.20	0.18	0.16	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04								
		14 TPI	16ER G55	0.22	1.20	9	0.22	0.19	0.17	0.15	0.13	0.12	0.10	0.08	0.04										
			AG55	0.06	1.40	11	0.24	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
		12 TPI	16ER G55	0.22	1.44	10	0.24	0.22	0.20	0.18	0.15	0.12	0.12	0.09	0.07	0.05									
			AG55	0.06	1.64	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.09	0.08	0.06	0.05							
		11 TPI	16ER G55	0.22	1.60	12	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		10 TPI	16ER G55	0.22	1.78	12	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.13	0.12	0.09	0.07	0.05							
			AG55	0.06	1.98	14	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.05					
		9 TPI	16ER G55	0.22	2.01	14	0.24	0.22	0.20	0.19	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.08	0.07	0.05					
			AG55	0.06	2.20	15	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
		8 TPI	16ER G55	0.22	2.29	15	0.28	0.26	0.24	0.22	0.19	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.05				
			AG55	0.06	2.49	16	0.30	0.28	0.26	0.24	0.20	0.18	0.16	0.14	0.12	0.12	0.11	0.10	0.09	0.08	0.06	0.05			
		7 TPI	22ER N55	0.47	2.43	16	0.30	0.27	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.11	0.10	0.10	0.09	0.08	0.06	0.05			
		6 TPI			2.92	18	0.30	0.27	0.25	0.23	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.06	0.05	
		5 TPI			3.60	21	0.30	0.28	0.27	0.26	0.25	0.24	0.22	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.11	0.10	0.09	0.07
							0.05	0.04																	
	Internal Thread	28 TPI	06IR 5501 08IR 5501	0.10	0.65	13	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03						
		19 TPI	08IR 5501	0.10	0.81	15	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03				
		24 TPI	11IR A55	0.06	0.72	7	0.16	0.14	0.12	0.10	0.08	0.07	0.05												
		20 TPI			0.87	8	0.16	0.15	0.14	0.13	0.11	0.08	0.06	0.04											
		18 TPI			0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
		16 TPI			1.10	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.05										
		24 TPI	16IR A55	0.06	0.72	7	0.16	0.14	0.12	0.10	0.08	0.07	0.05												
			AG55	0.06	0.72	7	0.16	0.14	0.12	0.10	0.08	0.07	0.05												
		20 TPI	16IR A55	0.06	0.87	8	0.16	0.15	0.14	0.13	0.11	0.08	0.06	0.04											
			AG55	0.06	0.87	8	0.16	0.15	0.14	0.13	0.11	0.08	0.06	0.04											
		18 TPI	16IR A55	0.06	0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
			AG55	0.06	0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
		16 TPI	16IR A55	0.06	1.10	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.05										
			AG55	0.06	1.10	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.05										
		14 TPI	16IR G55	0.22	1.06	8	0.21	0.19	0.17	0.15	0.12	0.10	0.07	0.05											
			AG55	0.06	1.27	11	0.20	0.18	0.17	0.15	0.13	0.10	0.09	0.08	0.07	0.06	0.04								
		12 TPI	16IR G55	0.22	1.28	9	0.22	0.20	0.19	0.17	0.15	0.13	0.10	0.08	0.04										
			AG55	0.06	1.48	11	0.24	0.22	0.20	0.18	0.16	0.13	0.11	0.09	0.06	0.05	0.04								
		11 TPI	16IR G55	0.22	1.42	10	0.24	0.22	0.20	0.18	0.15	0.12	0.10	0.09	0.07	0.05									
			AG55	0.06	1.62	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05							
		10 TPI	16IR G55	0.22	1.59	12	0.24	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04							
			AG55	0.06	1.79	13	0.25	0.22	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05	0.03						
		9 TPI	16IR G55	0.22	1.79	12	0.24	0.22	0.20	0.18	0.17	0.16	0.15	0.13	0.12	0.10	0.07	0.05							
			AG55	0.06	1.99	14	0.25	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.05					
		8 TPI	16IR G55	0.22	2.05	14	0.24	0.23	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.08	0.07	0.05					
			AG55	0.06	2.25	15	0.28	0.26	0.24	0.21	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.10	0.09	0.08	0.05				
		7 TPI	22IR N55	0.47	2.09	14	0.24	0.23	0.22	0.20	0.19	0.17	0.15	0.14	0.13	0.12	0.10	0.08	0.07	0.05					
		6 TPI			2.53	16	0.30	0.28	0.25	0.23	0.21	0.20	0.18	0.16	0.13	0.11	0.10	0.10	0.09	0.08	0.06	0.05			
		5 TPI			3.14	19	0.30	0.28	0.27	0.26	0.24	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.12	0.11	0.10	0.10	0.08	0.06	0.05
30˚ Trapezoidal	External Thread	2.0mm	16ER 200TR	-	1.25	10	0.22	0.20	0.17	0.16	0.13	0.12	0.10	0.07	0.05	0.03									
		3.0mm	16ER 300TR	-	1.75	14	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.10	0.10	0.07	0.05	0.03					
		4.0mm	22ER 400TR	-	2.24	15	0.26	0.23	0.22	0.20	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03				
		5.0mm	22ER 500TR	-	2.73	17	0.28	0.26	0.24	0.22	0.21	0.20	0.19	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03		
	Internal Thread	2.0mm	16IR 200TR	-	1.25	10	0.22	0.20	0.17	0.16	0.13	0.12	0.10	0.07	0.05	0.03									
		3.0mm	16IR 300TR	-	1.75	14	0.24	0.20	0.18	0.16	0.15	0.14	0.12	0.11	0.10	0.10	0.10	0.07	0.05	0.03					
		4.0mm	22IR 400TR	-	2.24	15	0.26	0.23	0.22	0.20	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03				
		5.0mm	22IR 500TR	-	2.73	17	0.28	0.26	0.24	0.22	0.21	0.20	0.19	0.18	0.16	0.15	0.14	0.13	0.12	0.10	0.07	0.05	0.03		

Corner-R(RE) Selection for Partial Profiling Insert

	External Threading	Internal Threading
Metric Unified	RE ≤ 0.1443TP	RE ≤ 0.0720TP
Parallel Pipe (Whitworth) Tapered Pipe	(For Both External and Internal Thread) RE ≤ 0.1373TP	

RE : Corner-R TP : Pitch (= $\frac{25.4}{n}$) n : TPI

- Metric, Unified Thread

  Corner-R(RE) at Internal Threading is almost half of that of External

- Parallel Pipe, Tapered Pipe, Whitworth Thread

  Same Corner-R(RE) for both External and Internal Threading

Depth of Cut & Number of Passes

11 / 16 (60° / 55°, Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric (60°)	External Thread	1.00mm	16ER 6001	0.10	0.66	5	0.21	0.19	0.12	0.09	0.05														
		1.25mm	16ER 6001	0.10	0.85	6	0.25	0.21	0.15	0.12	0.07	0.05													
		1.50mm	16ER 6001	0.10	1.04	8	0.23	0.21	0.19	0.15	0.11	0.06	0.05	0.04											
			6002	0.20	0.94	7	0.23	0.20	0.18	0.14	0.10	0.05	0.04												
		1.75mm	16ER 6001	0.10	1.23	9	0.25	0.22	0.20	0.17	0.14	0.09	0.07	0.05	0.04										
			6002	0.20	1.13	8	0.25	0.22	0.20	0.16	0.14	0.07	0.05	0.04											
		2.00mm	16ER 6001	0.10	1.42	11	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.04								
			6002	0.20	1.32	10	0.25	0.22	0.20	0.16	0.14	0.12	0.08	0.07	0.04	0.04									
		2.50mm	16ER 6001	0.10	1.79	13	0.25	0.22	0.20	0.18	0.16	0.16	0.14	0.12	0.10	0.09	0.08	0.05	0.04						
			6002	0.20	1.69	12	0.25	0.22	0.20	0.18	0.16	0.16	0.12	0.12	0.10	0.08	0.06	0.04							
	Internal Thread	0.75mm	11IR 60005	0.05	0.44	5	0.14	0.12	0.10	0.06	0.02														
		1.00mm	11IR 60005	0.05	0.60	6	0.18	0.15	0.10	0.08	0.05	0.04													
		1.25mm	11IR 60005	0.05	0.76	7	0.18	0.15	0.12	0.10	0.10	0.07	0.04												
		1.50mm	11IR 60005	0.05	0.92	9	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.06	0.04										
			16IR 6001	0.10	0.87	8	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.05											
		1.75mm	16IR 6001	0.10	1.04	9	0.20	0.18	0.15	0.12	0.12	0.10	0.08	0.05	0.04										
		2.00mm	16IR 6001	0.10	1.20	11	0.20	0.18	0.15	0.12	0.12	0.10	0.10	0.08	0.06	0.05	0.04								
		2.50mm	16IR 6001	0.10	1.52	14	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.06	0.04	0.02					
			60015	0.15	1.47	13	0.20	0.18	0.16	0.15	0.14	0.12	0.12	0.10	0.10	0.08	0.06	0.04	0.02						
Parallel Pipe / Tapered Pipe (55°)	External Thread	28 TPI	16ER 5501	0.10	0.61	5	0.20	0.16	0.12	0.08	0.05														
		19 TPI	16ER 5501	0.10	0.95	7	0.22	0.20	0.16	0.14	0.10	0.08	0.05												
		14 TPI	16ER 5501	0.10	1.34	10	0.24	0.20	0.18	0.16	0.13	0.10	0.10	0.10	0.08	0.05									
			5502	0.20	1.22	9	0.24	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	16ER 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02						
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02							
	Internal Thread	28 TPI	11IR 55005	0.05	0.67	7	0.18	0.15	0.12	0.08	0.06	0.05	0.03												
			16IR 5501	0.10	0.61	6	0.18	0.15	0.12	0.08	0.05	0.03													
		19 TPI	11IR 55005	0.05	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			16IR 5501	0.10	0.95	7	0.20	0.18	0.16	0.14	0.12	0.10	0.05												
		14 TPI	11IR 55005	0.05	1.39	11	0.20	0.18	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.05								
			16IR 5501	0.10	1.34	10	0.20	0.18	0.18	0.16	0.14	0.14	0.11	0.10	0.08	0.05									
			5502	0.20	1.22	9	0.20	0.18	0.18	0.16	0.15	0.12	0.10	0.08	0.05										
		11 TPI	16IR 5501	0.10	1.73	12	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.07	0.05							
			5502	0.20	1.62	11	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.11	0.07	0.05								
Whitworth (55°)	External Thread	24 TPI	16ER 5501	0.10	0.73	6	0.22	0.18	0.12	0.09	0.07	0.05													
		20 TPI	16ER 5501	0.10	0.90	6	0.22	0.18	0.17	0.16	0.12	0.05													
		18 TPI	16ER 5501	0.10	1.01	7	0.24	0.20	0.18	0.16	0.10	0.08	0.05												
		16 TPI	16ER 5501	0.10	1.15	9	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.06	0.05										
			5502	0.20	1.04	8	0.24	0.20	0.16	0.14	0.10	0.08	0.07	0.05											
		14 TPI	16ER 5501	0.10	1.34	10	0.24	0.20	0.18	0.16	0.13	0.10	0.10	0.10	0.08	0.05									
			5502	0.20	1.22	9	0.24	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		12 TPI	16ER 5501	0.10	1.58	12	0.25	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.08	0.07	0.05							
			5502	0.20	1.46	11	0.25	0.20	0.18	0.16	0.15	0.14	0.10	0.08	0.08	0.07	0.05								
		11 TPI	16ER 5501	0.10	1.73	12	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.07	0.05							
			5502	0.20	1.62	11	0.25	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.10	0.08	0.05								
		10 TPI	16ER 5501	0.10	1.92	14	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.12	0.10	0.10	0.08	0.08	0.05	0.02					
			5502	0.20	1.80	13	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.05	0.02						
		9 TPI	16ER 5502	0.20	2.03	14	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.12	0.12	0.10	0.08	0.08	0.06	0.02					
	Internal Thread	24 TPI	11IR 55005	0.05	0.71	7	0.18	0.15	0.12	0.10	0.08	0.05	0.03												
			16IR 5501	0.10	0.65	6	0.18	0.15	0.12	0.10	0.07	0.03													
		20 TPI	11IR 55005	0.05	0.87	8	0.18	0.16	0.14	0.12	0.10	0.06	0.06	0.05											
			16IR 5501	0.10	0.81	7	0.18	0.16	0.14	0.12	0.10	0.06	0.05												
		18 TPI	11IR 55005	0.05	0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
			16IR 5501	0.10	0.91	7	0.20	0.18	0.16	0.14	0.10	0.08	0.05												
		16 TPI	11IR 55005	0.05	1.09	9	0.20	0.18	0.16	0.14	0.10	0.10	0.08	0.08	0.05										
			16IR 5501	0.10	1.04	8	0.20	0.18	0.16	0.15	0.12	0.10	0.08	0.05											
			5502	0.20	0.92	7	0.20	0.18	0.16	0.15	0.10	0.08	0.05												
		14 TPI	11IR 55005	0.05	1.26	10	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.10	0.08	0.05									
			16IR 5501	0.10	1.20	9	0.20	0.18	0.17	0.16	0.14	0.12	0.10	0.08	0.05										
			5502	0.20	1.08	8	0.20	0.18	0.18	0.16	0.13	0.10	0.08	0.05											
		12 TPI	16IR 5501	0.10	1.42	10	0.25	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.05									
			5502	0.20	1.30	9	0.25	0.22	0.18	0.16	0.14	0.12	0.10	0.08	0.05										
		11 TPI	16IR 5501	0.10	1.56	11	0.25	0.20	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.08	0.05								
			5502	0.20	1.44	10	0.25	0.20	0.18	0.16	0.16	0.14	0.12	0.10	0.08	0.05									

<Note> 1) Select the insert with suitable corner-R(RE) determined by the pitch.
2) Do not exceed 0.3mm for the 1st ap.
3) Finishing ap should be 0.02~0.05mm.
4) Prepare chamfering for C0.3~C0.5 to the workpiece to prevent the insert cracking during the 1st pass.
5) Coolant is recommended.

TT (60° / 55°, Partial Profile) Part 1

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric (60°)	External Thread	0.50mm	TT32R/L 6000	0.00	0.38	6	0.10	0.10	0.07	0.05	0.04	0.02											
		0.70mm	TT32R/L 6000	0.00	0.53	7	0.10	0.10	0.10	0.08	0.07	0.06	0.02										
		0.75mm	TT32R/L 6000	0.00	0.57	8	0.10	0.10	0.10	0.08	0.08	0.05	0.04	0.02									
		0.80mm	TT32R/L 6000	0.00	0.61	8	0.10	0.10	0.10	0.10	0.08	0.06	0.05	0.02									
		1.00mm	TT32R/L 6000	0.00	0.76	8	0.15	0.12	0.12	0.11	0.10	0.08	0.06	0.02									
			TT32/43R/L 6001	0.10	0.66	6	0.20	0.15	0.12	0.10	0.07	0.02											
		1.25mm	TT32R/L 6000	0.00	0.95	9	0.18	0.16	0.14	0.12	0.10	0.10	0.08	0.05	0.02								
			TT32/43R/L 6001	0.10	0.85	7	0.25	0.20	0.13	0.10	0.10	0.05	0.02										
		1.50mm	TT32R/L 6000	0.00	1.14	10	0.20	0.18	0.16	0.14	0.12	0.10	0.10	0.07	0.05	0.02							
			TT32/43R/L 6001	0.10	1.04	9	0.25	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.02								
			6002	0.20	0.94	8	0.25	0.18	0.14	0.12	0.10	0.08	0.05	0.02									
		1.75mm	TT32R/L 6000	0.00	1.33	11	0.25	0.23	0.20	0.13	0.10	0.10	0.10	0.08	0.07	0.05	0.02						
			TT32/43R/L 6001	0.10	1.23	10	0.25	0.23	0.20	0.13	0.10	0.10	0.08	0.07	0.05	0.02							
			6002	0.20	1.13	9	0.25	0.23	0.20	0.13	0.10	0.08	0.07	0.05	0.02								
		2.00mm	TT32R/L 6000	0.00	1.52	12	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.10	0.10	0.08	0.05	0.02					
			TT32/43R/L 6001	0.10	1.42	11	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.10	0.08	0.05	0.02						
			6002	0.20	1.32	10	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.08	0.05	0.02							
		2.50mm	TT32R/L 6000	0.00	1.89	13	0.27	0.25	0.20	0.18	0.17	0.15	0.14	0.14	0.13	0.10	0.08	0.06	0.02				
			TT32/43R/L 6001	0.10	1.79	12	0.27	0.25	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.10	0.06	0.02					
			6002	0.20	1.69	11	0.27	0.25	0.20	0.18	0.17	0.15	0.14	0.13	0.10	0.08	0.02						
			6003	0.30	1.59	11	0.27	0.25	0.20	0.18	0.17	0.15	0.12	0.10	0.08	0.05	0.02						
		3.00mm	TT43R/L 6001	0.10	2.17	14	0.30	0.25	0.23	0.20	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.05	0.02			
			6002	0.20	2.07	13	0.30	0.25	0.23	0.20	0.20	0.18	0.15	0.14	0.13	0.12	0.10	0.05	0.02				
			6003	0.30	1.97	12	0.30	0.25	0.23	0.20	0.20	0.18	0.15	0.14	0.12	0.10	0.08	0.02					
			6004	0.40	1.87	12	0.30	0.25	0.23	0.20	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.02					
		3.50mm	TT43R/L 6001	0.10	2.55	16	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.08	0.05	0.02	
			6002	0.20	2.45	15	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.10	0.10	0.05	0.02		
			6003	0.30	2.35	14	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.02			
			6004	0.40	2.25	14	0.30	0.27	0.23	0.22	0.20	0.18	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.02			
	Internal Thread	0.50mm	TT32R/L 6000	0.00	0.32	5	0.12	0.08	0.06	0.04	0.02												
		0.70mm	TT32R/L 6000	0.00	0.45	6	0.15	0.10	0.08	0.06	0.04	0.02											
		0.75mm	TT32R/L 6000	0.00	0.49	6	0.15	0.12	0.08	0.07	0.05	0.02											
		0.80mm	TT32R/L 6000	0.00	0.52	6	0.15	0.12	0.10	0.08	0.05	0.02											
		1.00mm	TT32R/L 6000	0.00	0.65	7	0.15	0.14	0.12	0.10	0.08	0.04	0.02										
		1.25mm	TT32R/L 6000	0.00	0.81	8	0.18	0.16	0.14	0.12	0.10	0.05	0.04	0.02									
		1.50mm	TT32R/L 6000	0.00	0.97	9	0.20	0.18	0.16	0.14	0.10	0.08	0.05	0.04	0.02								
			TT32/43R/L 6001	0.10	0.87	8	0.20	0.18	0.16	0.14	0.08	0.05	0.04	0.02									
		1.75mm	TT32R/L 6000	0.00	1.14	10	0.20	0.18	0.16	0.13	0.12	0.10	0.10	0.08	0.05	0.02							
			TT32/43R/L 6001	0.10	1.04	9	0.20	0.18	0.16	0.13	0.12	0.10	0.08	0.05	0.02								
		2.00mm	TT32R/L 6000	0.00	1.30	12	0.20	0.18	0.16	0.13	0.13	0.12	0.10	0.10	0.08	0.05	0.03	0.02					
			TT32/43R/L 6001	0.10	1.20	11	0.20	0.18	0.16	0.13	0.13	0.12	0.10	0.08	0.05	0.03	0.02						
		2.50mm	TT32R/L 6000	0.00	1.62	14	0.23	0.20	0.18	0.18	0.13	0.13	0.12	0.10	0.10	0.08	0.07	0.05	0.03	0.02			
			TT32/43R/L 6001	0.10	1.52	13	0.23	0.20	0.18	0.18	0.13	0.13	0.12	0.10	0.08	0.07	0.05	0.03	0.02				
		3.00mm	TT43R/L 6001	0.10	1.85	15	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.10	0.08	0.07	0.05	0.05	0.02		
			6002	0.20	1.75	14	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.08	0.07	0.05	0.05	0.02			
Parallel Pipe / Tapered Pipe (55°)	External Thread	28 TPI	TT32R/L 5501	0.10	0.61	5	0.20	0.18	0.15	0.06	0.02												
		19 TPI	TT32/43R/L 5501	0.10	0.95	8	0.20	0.18	0.15	0.13	0.12	0.10	0.05	0.02									
		14 TPI	TT32/43R/L 5501	0.10	1.34	10	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.08	0.05	0.02							
			5502	0.20	1.22	9	0.25	0.22	0.20	0.18	0.12	0.10	0.08	0.05	0.02								
		11 TPI	TT32/43R/L 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02				
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02					
			5503	0.30	1.50	11	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.04	0.02						
	Internal Thread	28 TPI	TT32/43R/L 5501	0.10	0.61	6	0.18	0.15	0.12	0.08	0.06	0.02											
		19 TPI	TT32/43R/L 5501	0.10	0.95	7	0.20	0.18	0.16	0.14	0.12	0.10	0.05										
		14 TPI	TT32/43R/L 5501	0.10	1.34	10	0.20	0.18	0.18	0.16	0.14	0.14	0.11	0.10	0.08	0.05							
			5502	0.20	1.22	9	0.20	0.18	0.18	0.16	0.15	0.12	0.10	0.08	0.05								
		11 TPI	TT32/43R/L 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02				
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02					
			5503	0.30	1.50	11	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.04	0.02						
Whitworth (55°)	External Thread	24 TPI	TT32/43R/L 5501	0.10	0.73	6	0.20	0.18	0.16	0.12	0.05	0.02											
		20 TPI	TT32/43R/L 5501	0.10	0.90	7	0.20	0.18	0.16	0.14	0.12	0.08	0.02										
		18 TPI	TT32/43R/L 5501	0.10	1.01	8	0.20	0.18	0.18	0.16	0.12	0.10	0.05	0.02									
		16 TPI	TT32/43R/L 5501	0.10	1.15	9	0.25	0.20	0.18	0.14	0.12	0.10	0.08	0.06	0.02								
			5502	0.20	1.04	8	0.25	0.20	0.18	0.14	0.10	0.08	0.07	0.02									
		14 TPI	TT32/43R/L 5501	0.10	1.34	10	0.25	0.22	0.20	0.16	0.14	0.12	0.10	0.08	0.05	0.02							
			5502	0.20	1.22	9	0.25	0.22	0.20	0.18	0.12	0.10	0.08	0.05	0.02								
		12 TPI	TT32/43R/L 5501	0.10	1.58	12	0.25	0.20	0.18	0.16	0.15	0.14	0.12	0.12	0.10	0.08	0.06	0.02					
			5502	0.20	1.46	11	0.25	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.06	0.02						
		11 TPI	TT32/43R/L 5501	0.10	1.73	13	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.05	0.02				
			5502	0.20	1.62	12	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.08	0.05	0.04	0.02					
			TT43R/L 5503	0.30	1.50	11	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.04	0.02						
		10 TPI	TT32/43R/L 5501	0.10	1.92	14	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.12	0.10	0.10	0.08	0.08	0.05	0.02			
			5502	0.20	1.80	13	0.25	0.23	0.23	0.20	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.05	0.02				
			TT43R/L 5503	0.30	1.68	12	0.25	0.23	0.20	0.18	0.18	0.14	0.13	0.12	0.10	0.08	0.05	0.02					
		9 TPI	TT43R/L 5501	0.10	2.14	14	0.25	0.23	0.23	0.20	0.20	0.18	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.02			
			5502	0.20	2.03	13	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.02				
			5503	0.30	1.91	12	0.30	0.25	0.23	0.23	0.20	0.18	0.15	0.12	0.10	0.08	0.05	0.02					
		8 TPI	TT43R/L 5501	0.10	2.43	15	0.27	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.16	0.14	0.12	0.12	0.10	0.05	0.02		
			5502	0.20	2.31	14	0.27	0.25	0.23	0.23	0.20	0.20	0.18	0.16	0.16	0.14	0.12	0.10	0.05	0.02			
			5503	0.30	2.19	13	0.30	0.27	0.25	0.23	0.20	0.18	0.18	0.15	0.14	0.12	0.10	0.05	0.02				
			5504	0.40	2.08	12	0.30	0.27	0.25	0.23	0.23	0.20	0.18	0.15	0.12	0.08	0.05	0.02					

Depth of Cut & Number of Passes

TT (60˚ / 55˚, Partial Profile) Part 2

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Whitworth (55°)	Internal Thread	24 TPI	TT32/43R/L 5501	0.10	0.65	6	0.20	0.16	0.12	0.10	0.05	0.02											
		20 TPI	TT32/43R/L 5501	0.10	0.81	7	0.20	0.18	0.16	0.12	0.08	0.05	0.02										
		18 TPI	TT32/43R/L 5501	0.10	0.91	8	0.20	0.18	0.16	0.15	0.10	0.05	0.05	0.02									
		16 TPI	TT32/43R/L 5501	0.10	1.04	9	0.20	0.18	0.15	0.14	0.12	0.10	0.08	0.05	0.02								
			5502	0.20	0.92	8	0.20	0.18	0.16	0.13	0.10	0.08	0.05	0.02									
		14 TPI	TT32/43R/L 5501	0.10	1.20	10	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.08	0.05	0.02							
			5502	0.20	1.08	9	0.20	0.18	0.16	0.15	0.14	0.10	0.08	0.05	0.02								
		12 TPI	TT32/43R/L 5501	0.10	1.42	10	0.23	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.05	0.02							
			5502	0.20	1.30	9	0.25	0.22	0.20	0.18	0.16	0.12	0.10	0.05	0.02								
		11 TPI	TT32/43R/L 5501	0.10	1.56	11	0.25	0.22	0.22	0.18	0.16	0.14	0.12	0.10	0.10	0.05	0.02						
			5502	0.20	1.44	10	0.25	0.22	0.20	0.18	0.16	0.14	0.12	0.10	0.05	0.02							
			TT43R/L 5503	0.30	1.33	9	0.25	0.22	0.20	0.18	0.16	0.14	0.10	0.06	0.02								
		10 TPI	TT32/43R/L 5501	0.10	1.73	12	0.25	0.22	0.20	0.18	0.16	0.15	0.14	0.14	0.12	0.10	0.05	0.02					
			5502	0.20	1.61	11	0.25	0.22	0.20	0.18	0.17	0.16	0.14	0.12	0.10	0.05	0.02						
			TT43R/L 5503	0.30	1.50	10	0.25	0.22	0.22	0.20	0.18	0.14	0.12	0.10	0.05	0.02							
		9 TPI	TT43R/L 5501	0.10	1.93	13	0.25	0.23	0.22	0.20	0.18	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.02				
			5502	0.20	1.82	12	0.25	0.23	0.22	0.20	0.18	0.16	0.15	0.14	0.12	0.10	0.05	0.02					
			5503	0.30	1.70	11	0.25	0.22	0.22	0.20	0.20	0.18	0.14	0.12	0.10	0.05	0.02						
		8 TPI	TT43R/L 5501	0.10	2.19	15	0.27	0.25	0.23	0.21	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.08	0.06	0.05	0.02		
			5502	0.20	2.07	14	0.27	0.25	0.23	0.21	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.06	0.05	0.02			
			5503	0.30	1.96	13	0.30	0.25	0.23	0.22	0.20	0.18	0.15	0.12	0.10	0.08	0.06	0.05	0.02				
			5504	0.40	1.84	12	0.30	0.25	0.23	0.21	0.20	0.18	0.14	0.12	0.08	0.06	0.05	0.02					

TT (60˚, Full Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	HC (mm)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric	External Thread	1.00mm	TT43ER/L 100M	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05												
		1.25mm	125M	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05											
		1.50mm	150M	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05											
		2.00mm	200M	1.27	1.35	10	0.26	0.21	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05							

TTX (60˚ / 55˚, Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric (60°)	External Thread	0.50mm	TTX32R 6000 6000S	0.00	0.38	6	0.10	0.10	0.07	0.05	0.04	0.02											
			60005 60005S	0.05	0.33	5	0.10	0.10	0.07	0.04	0.02												
		0.70mm	TTX32R 6000	0.00	0.53	7	0.10	0.10	0.10	0.08	0.07	0.06	0.02										
			60005	0.05	0.48	6	0.10	0.10	0.10	0.10	0.06	0.02											
		0.75mm	TTX32R 6000	0.00	0.57	8	0.10	0.10	0.10	0.08	0.08	0.05	0.04	0.02									
			60005	0.05	0.52	7	0.10	0.10	0.10	0.08	0.07	0.05	0.02										
		0.80mm	TTX32R 6000	0.00	0.61	8	0.10	0.10	0.10	0.10	0.08	0.06	0.05	0.02									
			60005	0.05	0.56	7	0.10	0.10	0.10	0.10	0.08	0.06	0.02										
		1.00mm	TTX32R 6000	0.00	0.76	8	0.15	0.13	0.12	0.12	0.10	0.08	0.04	0.02									
			60005	0.05	0.71	7	0.18	0.15	0.12	0.10	0.08	0.06	0.02										
			6001	0.10	0.66	6	0.20	0.15	0.12	0.10	0.07	0.02											
		1.25mm	TTX32R 6001	0.10	0.85	7	0.25	0.20	0.13	0.10	0.10	0.05	0.02										
		1.50mm		0.10	1.04	9	0.25	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.02								
		1.75mm		0.10	1.23	10	0.25	0.23	0.20	0.13	0.10	0.10	0.08	0.07	0.05	0.02							
		2.00mm		0.10	1.42	11	0.25	0.23	0.20	0.16	0.13	0.10	0.10	0.10	0.08	0.05	0.02						
Parallel Pipe / Tapered Pipe (55°)	External Thread	28 TPI	TTX32R 5501	0.10	0.61	5	0.20	0.18	0.15	0.06	0.02												
		19 TPI	TTX32R 5501	0.10	0.95	8	0.20	0.18	0.15	0.13	0.12	0.10	0.05	0.02									
			55015	0.15	0.90	7	0.20	0.18	0.16	0.14	0.12	0.08	0.02										
		14 TPI	TTX32R 55015	0.15	1.28	10	0.25	0.20	0.18	0.16	0.12	0.12	0.10	0.08	0.05	0.02							
		11 TPI		0.15	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.06	0.02					
Whitworth (55°)	External Thread	24 TPI	TTX32R 5501	0.10	0.73	6	0.20	0.18	0.16	0.12	0.05	0.02											
		20 TPI	TTX32R 5501	0.10	0.90	7	0.20	0.18	0.16	0.14	0.12	0.08	0.02										
			TTX32R 55015	0.15	0.84	7	0.20	0.18	0.16	0.12	0.10	0.06	0.02										
		18 TPI	TTX32R 55015	0.15	0.95	8	0.20	0.18	0.15	0.14	0.12	0.10	0.04	0.02									
		16 TPI		0.15	1.10	9	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.06	0.02								
		14 TPI		0.15	1.28	10	0.25	0.20	0.18	0.16	0.12	0.12	0.10	0.08	0.05	0.02							
		12 TPI		0.15	1.52	11	0.25	0.20	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.05	0.02						
		11 TPI		0.15	1.67	12	0.25	0.22	0.20	0.18	0.16	0.14	0.14	0.12	0.10	0.08	0.06	0.02					

<Note> 1) Select the insert with suitable corner-R(RE) determined by the pitch.
2) Do not exceed 0.3mm for the 1st ap.
3) Finishing ap should be 0.02~0.05mm.
4) Prepare chamfering for C0.3~C0.5 to the workpiece to prevent the insert cracking during the 1st pass.
5) Coolant is recommended.

TTX

Suitable for threading of smaller pitch sizes or more TPI than TT. Suitable for threading to the shoulder.

Thread Types / Insert Description	Metric (mm)	Unified (TPI)	Parallel Pipe (TPI)	Whitworth (TPI)
TTX32R 6000	0.5~1.0	56~32	-	-
60005	0.5~1.0	48~32	-	-
6001	1.0~2.0	28~14	-	-
TTX32R 6000S	0.5	56~48	-	-
60005S	0.5	48	-	-
TTX32R 5501	-	-	28~19	24~20
55015	-	-	19~11	20~14

TPGB (60°, Partial Profile)

(ap shows the value of radial ap)

Type		Pitch / TPI mm · TPI	Description	Corner-R (RE)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric (60°)	Internal Thread	0.75mm	TPGB1102005 1103005	0.05	0.44	5	0.15	0.12	0.10	0.05	0.02												
		0.80mm	TPGB1102005 1103005	0.05	0.47	5	0.15	0.14	0.10	0.06	0.02												
		1.00mm	TPGB1102005 1103005	0.05	0.60	6	0.18	0.14	0.12	0.10	0.04	0.02											
		1.25mm	TPGB1102005 1103005	0.05	0.76	7	0.18	0.16	0.14	0.12	0.10	0.04	0.02										
		1.50mm	TPGB1102005 1103005	0.05	0.92	8	0.20	0.18	0.16	0.14	0.10	0.08	0.04	0.02									
			110201 110301	0.10	0.87	8	0.20	0.18	0.16	0.14	0.08	0.05	0.04	0.02									
		1.75mm	TPGB1102005 1103005	0.05	1.09	9	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.04	0.02								
			110301	0.10	1.04	9	0.20	0.18	0.16	0.13	0.12	0.10	0.08	0.05	0.02								
		2.00mm	TPGB1102005 1103005	0.05	1.25	11	0.20	0.18	0.16	0.14	0.13	0.12	0.10	0.10	0.06	0.04	0.02						
			110301	0.10	1.20	11	0.20	0.18	0.16	0.13	0.13	0.12	0.10	0.08	0.05	0.03	0.02						
		2.50mm	TPGB1102005 1103005	0.05	1.57	13	0.23	0.20	0.18	0.18	0.14	0.13	0.12	0.10	0.08	0.07	0.07	0.05	0.02				
			110301	0.10	1.52	13	0.23	0.20	0.18	0.18	0.13	0.13	0.12	0.10	0.08	0.07	0.05	0.03	0.02				
		3.00mm	TPGB1102005 1103005	0.05	1.90	15	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.12	0.10	0.08	0.08	0.07	0.05	0.02		
			110301	0.10	1.85	15	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.10	0.08	0.07	0.05	0.05	0.02		
			110302	0.20	1.75	14	0.25	0.22	0.20	0.18	0.14	0.14	0.13	0.12	0.10	0.08	0.07	0.05	0.05	0.02			
		3.50mm	TPGB1102005 1103005	0.05	2.22	16	0.25	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.12	0.10	0.10	0.08	0.05	0.02	
			110301	0.10	2.17	16	0.25	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.10	0.08	0.07	0.05	0.02	
			110302	0.20	2.07	15	0.25	0.22	0.20	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.10	0.08	0.07	0.05	0.02		

Guide for Internal Threading

For the internal threading, pay extra attention to “Stabilizing Bore Dia.” and “Chip evacuation”.

1. “Stabilizing Bore Dia.”

Because small pitch internal threading has small corner-R(RE), there is variation in the Bore Dia. which may greatly influence the tool life of an insert.
In order to eliminate the variation in the Bore Dia., “0” cutting (zero cutting) should be performed as the zero pass, before the first pass in threading.
The Bore Dia. is cut with the specified dimension, and the first pass of threading becomes stable.

2. “Chip evacuation”

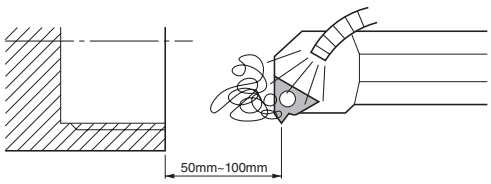
If machining process is continued when chips are tangled with a toolholder and other parts of the machine, it may cause damages to the insert.
Therefore, please ensure that there are no tangled chips in the machine by the following method.

<When processing the first workpiece>

Set the program with the “single block”
Keep the threading starting point 50mm~100mm away from the side of workpiece,
and confirm that coolant is flushing down the chips for each pass.

<When processing the second workpiece and later>

Ensure that chips are not tangled; then, start the continuous run.



Applicable Toolholders & Inserts

In Applicable Toolholder / Insert Lists on **J48**~**J51**, Right-hand Insert / Right-hand Toolholder descriptions are listed based on the previous TNN type inserts.
For other applicable inserts / toolholders or stock availability of Left-hand, see each relevant page and **J54**.

Parallel Pipe [G(PF), Rp(PS)]

Nominal Thread Symbol (Previous Symbol)	TPI	External Thread (G) Toolholder	External Thread (G) Insert Partial Profile	External Thread (G) Insert Full Profile	Internal Thread (G, Rp) Toolholder	Internal Thread (G, Rp) Insert Partial Profile	Internal Thread (G, Rp) Insert Full Profile	Bore Dia.	Same Root's Radius
G1/16 (-)	28	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	16ERA55-TF/TQ 16ERAG55-TF/TQ 16ERA55 16ERAG55	-	**SINR0612S-06E** (EZT➡**J32**)	06IR5501	-	6.56	0.12
G 1/8 (PF 1/8)								8.57	
G 1/4 (PF 1/4)	19		16ERA55-TF/TQ 16ERAG55-TF/TQ 16ERA55 16ERAG55	16ER19W-TF/TQ 16ER19W	**SINR0816S-08E** (EZT➡**J32**)	08IR5501	-	11.45	0.18
G 3/8 (PF 3/8)					**SINR1216S-11E** (EZT➡**J32**)	11IRA55 11IR55005	-	14.95	
G 1/2 (PF 1/2)	14		16ERAG55-TF/TQ 16ERG55-TF/TQ 16ERAG55 16ERG55	16ER14W-TF/TQ 16ER14W	**SINR1516S-11**	11IR55005	-	18.63	0.25
					SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	16IR14W-TF/TQ 16IR14W		
G 5/8 (PF 5/8)					**SINR2016S-16**			20.59	
G 3/4 (PF 3/4)								24.12	
G 7/8 (PF 7/8)					**SINR2420S-16**			27.88	
G 1 (PF 1)	11	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	16ERAG55-TF/TQ 16ERG55-TF/TQ 16ERAG55 16ERG55	16ER11W-TF/TQ 16ER11W	**SINR2420S-16**	16IRAG55 16IRG55 16IR5501 16IR5502	16IR11W-TF/TQ 16IR11W	30.29	0.32
G 1 1/8 (PF 1 1/8)					**CINR3025S-16**			34.94	
G 1 1/4 (PF 1 1/4)					**CINR3732S-16**			38.95	
		Hereafter, all the threads are 11 TPI and the root's radius 0.32. The same tool for G1 1/4 is recommended.							

Tapered Pipe [R, Rc(PT) (BSPT)]

Nominal Thread Symbol (Previous Symbol)	TPI	External Thread (R) Toolholder	External Thread (R) Insert Partial Profile	External Thread (R) Insert Full Profile	Internal Thread (Rc) Toolholder	Internal Thread (Rc) Insert Partial Profile	Internal Thread (Rc) Insert Full Profile		Same Root's Radius
R1/16, Rc1/16 (-)	28	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	(16ERA55-TF/TQ) (16ERAG55-TF/TQ) (16ERA55) (16ERAG55)	16ER28BSPT-TF/TQ 16ER28BSPT	**SINR0612S-06E** (EZT➡**J32**)	06IR5501	-		0.12
R 1/8, Rc 1/8 (PT 1/8)									
R 1/4, Rc 1/4 (PT 1/4)	19		(16ERA55-TF/TQ) (16ERAG55-TF/TQ) (16ERA55) (16ERAG55)	16ER19BSPT-TF/TQ 16ER19BSPT	**SINR0816S-08E** (EZT➡**J32**)	08IR5501	-		0.18
R 3/8, Rc 3/8 (PT 3/8)					**SINR1216S-11E** (EZT➡**J32**)	(11IRA55) (11IR55005)	11IR19BSPT-TF/TQ 11IR19BSPT		
R 1/2, Rc 1/2 (PT 1/2)	14		(16ERAG55-TF/TQ) (16ERG55-TF/TQ) (16ERAG55) (16ERG55)	16ER14BSPT-TF/TQ 16ER14BSPT	**SINR1516S-11**	(11IR55005)	11IR14BSPT-TF/TQ 11IR14BSPT		0.25
					SINR1616S-16	(16IRAG55) (16IRG55) (16IR5501) (16IR5502)			
R 3/4, Rc 3/4 (PT 3/4)					**SINR2016S-16**		16IR14BSPT-TF/TQ 16IR14BSPT		
R 1, Rc 1 (PT 1)	11	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	(16ERAG55-TF/TQ) (16ERG55-TF/TQ) (16ERAG55) (16ERG55)	16ER11BSPT-TF/TQ 16ER11BSPT	**SINR2420S-16**		16IR11BSPT-TF/TQ 16IR11BSPT		0.32
R 1 1/4, Rc 1 1/4 (PT 1 1/4)					**CINR3025S-16**				
R 1 1/2, Rc 1 1/2 (PT 1 1/2)					**CINR3732S-16**				
		Hereafter, all the threads are 11 TPI and the root's radius 0.32. The same tool for R1 1/2 is recommended.			Hereafter, all the threads are 11 TPI and the root's radius 0.32. The same tool for Rc1 1/2 is recommended.				

1) The largest size of minimum diameter toolholder is recommended for internal threading toolholders.
Therefore it is available if minimum diameter is smaller than recommended toolholders.
(e.g.) SINR2420S-16 (Min. Bore Dia.: ø24mm) is recommended for the Tool of G7/8 Internal Threading from the above Table, but SINR2016S-16 can also be used.
2) When using "Partial Profile" for Tapered Pipe threading, thread's corners become sharp edged, and the shape will not be the same as the standard shape for Tapered Pipe.

American National Tapered Pipe (NPT)

Nominal Thread	TPI	External Thread			Internal Thread		
		Toolholder	Insert		Toolholder	Insert	
			Partial Profile	Full Profile		Partial Profile	Full Profile
1/16 NPT 1/8 NPT	27	**KTTR○○○○□-16** **KTTXR○○○○□-16F**	TT32R6000 TTX32R6000	-	No Tools Available		
1/4 NPT 3/8 NPT	18	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	-	16ER18NPT	**EZH Sleeves** **(See Page J33)**	**EZTR060050-60-004** **EZTR070060-60-004**	-
1/2 NPT 3/4 NPT	14	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	-	16ER14NPT	**EZH Sleeves** **(See Page J33)**	**EZTR070060-60-004**	-
1/2 NPT	14	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	-	16ER14NPT	**SINR1616S-16**	-	16IR14NPT
3/4 NPT					**SINR2016S-16**		
1 NPT	11.5	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	-	16ER11.5NPT	**SINR2420S-16**	-	16IR11.5NPT
1 1/4 NPT					**CINR3025S-16**		
1 1/2 NPT 2 NPT					**CINR3732S-16**		

• Application of NPTF Thread
NPTF is the thread for sealing pipes without using any sealing material.
Thread symbol is similar to NPT but the tolerance is different from that of NPT, therefore the above inserts are not available for NPTF.

30° Trapezoidal (Tr)

The JIS Standard Trapezoidal Size to be machined by TNN Insert are shown.

Nominal Thread	Pitch (mm)	External Thread			Internal Thread			Bore Dia.
		Toolholder	Insert		Toolholder	Insert		
			Partial Profile	Full Profile		Partial Profile	Full Profile	
Tr 16X2	2	No Tools Available			No Tools Available	-	-	14.00
Tr 18X2 Tr 20X2		**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	16ER200TR	-	**SINR1616S-16**	16IR200TR	-	16.00 18.00
Tr 22X3	3	**KTNR○○○○□-16** **KTNSR○○○○□-16** **S○○□-KTNL16**	16ER300TR	-	**SINR1616S-16**	16IR300TR	-	19.00
Tr 24X3 Tr 26X3	3				**SINR2016S-16**	16IR300TR	-	21.00 23.00
Tr 28X3 Tr 30X3 Tr 32X3	3				**SINR2420S-16**	16IR300TR	-	25.00 27.00 29.00
Tr 34X3 Tr 36X3 Tr 38X3 Tr 40X3	3				**CINR3025S-16**	16IR300TR	-	31.00 33.00 35.00 37.00
Tr 42X3 Tr 44X3 Tr 46X3 Tr 48X3 Tr 50X3 Tr 52X3 Tr 55X3 Tr 60X3 Tr 65X3	3				**CINR3732S-16**	16IR300TR	-	39.00 41.00 43.00 45.00 47.00 49.00 52.00 57.00 62.00
Tr 70X4 Tr 75X4 Tr 80X4 Tr 90X4 Tr 95X4 Tr 100X4 Tr 105X4 Tr 110X4	4	**KTNR○○○○□-22**	22ER400TR	-	**CINR3732S-22**	22IR400TR	-	66.00 71.00 76.00 86.00 91.00 96.00 101.00 106.00

• TM Thread
TM Thread (old JIS 30° Trapezoidal Thread) has been discontinued. But if the "Nominal Dia. X Pitch" is the same, the above Tr Thread can be used.
• TW Thread
TW Thread is 29° Trapezoidal Thread, therefore the above inserts are not available.
• Pitch 5 is not listed in the table above because there is no designation of screws specified in the Japanese Industrial Standards (JIS).

Metric Coarse Thread : M

Nominal Thread	Pitch (mm)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
M1 . . . M3	0.25 0.5	No Tools Available	-	-	0.73 . . . 2.46
M4	0.7		EZTR030025-60-002		3.24
M5	0.8		EZTR040035-60-004		4.13
M6	1.0	-	VNTR045-11	-	4.92
M7	1.0		EZTR050040-60-004	-	5.92
			VNTR045-11	-	
M8	1.25	-	EZTR060050-60-004	-	6.65
			VNTR060-11	-	
		SINR0612S-06E	06IR60005	-	
M9	1.25	-	EZTR070060-60-004	-	7.65
		SINR0612S-06E	06IR60005	-	
M10 M11	1.5 1.5	SINR0816S-08E	08IR60007	-	8.38 9.38
M12	1.75	SINR0816S-08E	08IR60007	-	10.11
M16	2.0	SINR1216S-11E	-	11IR200ISO	13.84
M18	2.5	No Tools Available			15.29
M20 M22	2.5 2.5	SINR1616S-16	Table 5	16IR250ISO-□□	17.29 19.29
M24 M27	3.0 3.0	SINR2016S-16	Table 4	16IR300ISO-□□	20.75 23.75
M30 M33	3.5 3.5	SINR2420S-22	22IRN60	22IR350ISO	26.21 29.21
M36 M39	4.0 4.0	CINR3025S-22		22IR400ISO	31.67 34.67
M42 M45	4.5 4.5	CINR3732S-22		22IR450ISO	37.13 40.13
M48 M52	5.0 5.0	CINR3732S-22		22IR500ISO	42.59 46.59
M56 . . .	5.5	* Threading of M56 and over is not available due to too large pitch size.			50.05 . . .

Metric Fine Thread : M

Part 1

Nominal Thread	Pitch (mm)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
M1x0.2 . . . M3x0.35	0.2 0.35	No Tools Available	-	-	0.78 . . . 2.62
M3.5x0.35	0.35	-	EZTR030025-60-002		3.12
M4.5x0.5	0.5	-	EZTR035030-60-002		3.96
M5x0.5	0.5	-			4.46
M6x0.75	0.75	-	VNTR045-11	-	5.19
M7x0.75	0.75	-	EZTR050040-60-004	-	6.20
			VNTR060-11	-	
M8x1.0	1.0	-	EZTR060050-60-004	-	6.92
			VNTR060-11	-	
		SINR0612S-06E	06IR60005	-	
M8x0.75	0.75	-	EZTR060050-60-004	-	7.19
			VNTR060-11	-	
		SINR0612S-06E	06IR60005	-	
M9x1.0	1.0	-	EZTR070060-60-004	-	7.92
			VNTR060-11	-	
		SINR0612S-06E	06IR60005	-	
		SINR0816S-08E	08IR60007		
M9x0.75	0.75	-	EZTR070060-60-004	-	8.19
			VNTR060-11	-	
		SINR0612S-06E	06IR60005	-	
M10x1.25	1.25	-	VNTR060-11	-	8.65
		SINR0816S-08E	08IR60007	-	
M10x1.0	1.0	-	VNTR060-11	-	8.92
		SINR0816S-08E	08IR60007	-	
M10x0.75	0.75	-	VNTR060-11	-	9.19
		SINR0612S-06E	06IR600005	-	
M11x1.0	1.0	-	VNTR060-11	-	9.92
		SINR0816S-08E	08IR60007	-	
M11x0.75	0.75	-	VNTR060-11	-	10.19
		SINR0612S-06E	06IR60005	-	
M12x1.5	1.5	SINR0816S-08E	08IR60007	-	10.38
M12x1.25	1.25				10.65
M12x1.0	1.0				10.92

Metric Fine Thread : M

Part 2

Nominal Thread	Pitch (mm)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
M14x1.5 M14x1.25 M14x1.0	1.5 1.25 1.0	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-□□ 11IR125ISO-□□ 11IR100ISO-□□	12.38 12.65 12.92
M15x1.5 M15x1.0	1.5 1.0	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-□□ 11IR100ISO-□□	13.38 13.92
M16x1.5 M16x1.0	1.5 1.0	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-□□ 11IR100ISO-□□	14.38 14.92
M17x1.5 M17x1.0	1.5 1.0	SINR1516S-11	11IRA60 11IR60005	11IR150ISO-□□ 11IR100ISO-□□	15.38 15.92
M18x2.0	2.0	SINR1516S-11	-	11IR200ISO	15.84
M18x1.5	1.5	SINR1616S-16	Table 2	16IR150ISO-□□	16.38
M18x1.0	1.0		Table 3	16IR100ISO-□□	16.92
M20x2.0	2.0	SINR1616S-16	Table 1	16IR200ISO-□□	17.84
M20x1.5	1.5		Table 2	16IR150ISO-□□	18.38
M20x1.0	1.0		Table 3	16IR100ISO-□□	18.92
M22x2.0	2.0	SINR1616S-16	Table 1	16IR200ISO-□□	19.84
M22x1.5	1.5	SINR2016S-16	Table 2	16IR150ISO-□□	20.38
M22x1.0	1.0		Table 3	16IR100ISO-□□	20.92
M24x2.0	2.0	SINR2016S-16	Table 1	16IR200ISO-□□	21.84
M24x1.5	1.5		Table 2	16IR150ISO-□□	22.38
M24x1.0	1.0		Table 3	16IR100ISO-□□	22.92
M25x2.0	2.0	SINR2016S-16	Table 1	16IR200ISO-□□	22.84
M25x1.5	1.5		Table 2	16IR150ISO-□□	23.38
M25x1.0	1.0		Table 3	16IR100ISO-□□	23.92
M26x1.5	1.5	SINR2420S-16	Table 2	16IR150ISO-□□	24.38
M27x2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	24.84
M27x1.5	1.5		Table 2	16IR150ISO-□□	25.38
M27x1.0	1.0		Table 3	16IR100ISO-□□	25.92
M28x2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	25.84
M28x1.5	1.5		Table 2	16IR150ISO-□□	26.38
M28x1.0	1.0		Table 3	16IR100ISO-□□	26.92
M30x3.0	3.0	SINR2420S-22	-	22IR300ISO	26.75
		SINR2420S-16	Table 4	16IR300ISO-□□	
M30x2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	27.84
M30x1.5	1.5		Table 2	16IR150ISO-□□	28.38
M30x1.0	1.0		Table 3	16IR100ISO-□□	28.92
M32x2.0	2.0	SINR2420S-16	Table 1	16IR200ISO-□□	29.84
M32x1.5	1.5	CINR3025S-16	Table 2	16IR150ISO-□□	30.38
M33x3.0	3.0	SINR2420S-22	-	22IR300ISO	29.75
		SINR2420S-16	Table 4	16IR300ISO-□□	
M33x2.0	2.0	CINR3025S-16	Table 1	16IR200ISO-□□	30.84
M33x1.5	1.5		Table 2	16IR150ISO-□□	31.38
M35x1.5	1.5	CINR3025S-16	Table 2	16IR150ISO-□□	33.38
M36x3.0	3.0	CINR3025S-22	-	22IR300ISO	32.75
		CINR3025S-16	Table 4	16IR300ISO-□□	
M36x2.0	2.0	CINR3025S-16	Table 1	16IR200ISO-□□	33.84
M36x1.5	1.5		Table 2	16IR150ISO-□□	34.38
M38x1.5	1.5	CINR3025S-16	Table 2	16IR150ISO-□□	36.38
M39x3.0	3.0	CINR3025S-22	-	22IR300ISO	35.75
		CINR3025S-16	Table 4	16IR300ISO-□□	
M39x2.0	2.0	CINR3025S-16	Table 1	16IR200ISO-□□	36.84
M39x1.5	1.5	CINR3732S-16	Table 2	16IR150ISO-□□	37.38
M40x3.0	3.0	CINR3025S-22	-	22IR300ISO	36.75
		CINR3025S-16	Table 4	16IR300ISO-□□	
M40x2.0	2.0	CINR3732S-16	Table 1	16IR200ISO-□□	37.84
M40x1.5	1.5		Table 2	16IR150ISO-□□	38.38
M42x4.0	4.0	CINR3732S-22	22IRN60	22IR400ISO	37.67
M42x3.0	3.0		-	22IR300ISO	38.75
		CINR3732S-16	Table 4	16IR300ISO-□□	
M42x2.0	2.0	CINR3732S-16	Table 1	16IR200ISO-□□	39.84
M42x1.5	1.5		Table 2	16IR150ISO-□□	40.38
M45x4.0 . . .	4.0	* Threading of M45 and over can be machined by the same tool for M42. (P=4.0, 3.0, 2.0, 1.5)			40.67 . . .

Table 1(P=2.0mm)

16IRG60
16IRAG60
16IR6001

Table 2(P=1.5mm)

16IRA60
16IRAG60
16IR6001

Table 3(P=1.0mm)

16IRA60
16IRAG60

Table 4(P=3.0mm)

16IRG60
16IRAG60

Table 5(P=2.5mm)

16IRG60
16IRAG60
16IR6001
16IR60015

- Above shows the usage example of applicable Toolholder / Insert.

Unified Coarse Thread : UNC

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
2-56 UNC · · · 6-32 UNC	56 32	No Tools Available	-	-	1.69 · · · 2.65
8-32 UNC	32	-	EZTR030025-60-002	-	3.31
10-24 UNC	24	-	EZTR035030-60-002	-	3.68
12-24 UNC	24	-	EZTR040035-60-004	-	4.34
1/4-20 UNC	20	-	EZTR050040-60-004	-	4.98
		-	VNTR045-11	-	
5/16-18 UNC	18	-	EZTR060050-60-004	-	6.41
		-	VNTR060-11	-	
3/8-16 UNC	16	-	EZTR070060-60-004	-	7.81
7/16-14 UNC	14	No Tools Available			9.15
1/2-13 UNC	13				10.58
9/16-12 UNC	12				12.00
5/8-11 UNC	11				13.38
3/4-10 UNC	10	SINR1616S-16	16IRAG60 16IRG60	16IR10UN-□□	16.30
7/8- 9 UNC	9			-	19.17
1- 8 UNC	8	SINR2016S-16		16IR08UN-□□	21.96
1 1/8- 7 UNC 1 1/4- 7 UNC	7	SINR2420S-22	22IRN60	-	24.65 27.82
1 3/8- 6 UNC 1 1/2- 6 UNC	6	CINR3025S-22			30.34 33.52
1 3/4- 5 UNC	5	CINR3732S-22			38.95
2-4 1/2 UNC · · ·	4 1/2	* 2-4 1/2 UNC and over cannot be machined, because no inserts are available for the TPI.			44.69 · · ·

Unified Fine Thread : UNF

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
0-80 UNF · · · 6-40 UNF	80 40	No Tools Available	-	-	1.18 · · · 2.82
8-36 UNF	36	-	EZTR030025-60-002	-	3.40
10-32 UNF	32	-	EZTR035030-60-002	-	3.97
12-28 UNF	28	-	EZTR040035-60-004	-	4.50
1/4-28 UNF	28	-	EZTR050040-60-004	-	5.37
		-	VNTR045-11	-	
5/16-24 UNF	24	-	EZTR060050-60-004	-	6.79
		-	VNTR060-11	-	
		SINR0612S-06E	06IR60005	-	
3/8-24 UNF	24	-	EZTR070060-60-004	-	8.38
		SINR0612S-06E	06IR60005	-	
7/16-20 UNF 1/2-20 UNF	20	SINR0816S-08E	08IR60007	-	9.74 11.33
9/16-18 UNF 5/8-18 UNF	18	SINR1216S-11E	11IRA60 11IR60005	-	12.76 14.35
3/4-16 UNF	16	SINR1516S-11	11IRA60 11IR60005	-	17.33
		SINR1616S-16	16IRAG60 16IRG60 16IR6001	16IR16UN(-□□)	
7/8-14 UNF	14	SINR2016S-16		16IR14UN(-□□)	20.26
1-12 UNF	12	SINR2016S-16		16IR12UN(-□□)	23.10
1 1/8-12 UNF 1 1/4-12 UNF	12	SINR2420S-16			26.28 29.46
1 3/8-12 UNF 1 1/2-12 UNF	12	CINR3025S-16			32.63 36.81

Whitworth Coarse Thread : W

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
W 1/4 W 5/16	20 18	No Tools Available	-	-	4.91 6.34
W 3/8	16	No Tools Available			7.73
W 7/16	14				9.06
W 1/2 W 9/16	12				10.30 11.89
W 5/8	11				13.26
W 3/4	10	SINR1616S-16	16IRAG55 16IRG55	-	16.17
W 7/8	9				19.03
W 1	8	SINR2016S-16		-	21.80
W 1 1/8 W 1 1/4	7	SINR2420S-22	22IRN55	-	24.47 27.64
W 1 3/8 W 1 1/2	6	CINR3025S-22	22IRN55	-	30.13 33.30
W 1 5/8	5				35.52
W 1 3/4	5	CINR3732S-22	22IRN55	-	38.69
W 1 7/8 W 2	4 1/2	No Tools Available			41.23 44.41
W 2 1/4	4				49.96

Whitworth Fine Thread : W

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
W9.5 TPI 24 W10 TPI 24 W10.5 TPI 24	24	SINR0816S-08E	08IR5501	-	8.30 8.80 9.30
		-	EZTR060050-55-008		
W9.5 TPI 20 W10 TPI 20 W10.5 TPI 20 W11 TPI 20 W11.5 TPI 20 W12 TPI 20 W12.5 TPI 20 W13 TPI 20	20	SINR0816S-08E	08IR5501	-	8.06 8.56 9.06 9.56 10.06 10.56 11.06 11.56
		-	EZTR060050-55-008 EZTR080070-55-008		
W13.5 TPI 20	20	SINR1216S-11E	11IRA55 11IR55005	-	12.06
W11 TPI 18 W11.5 TPI 18 W12 TPI 18 W12.5 TPI 18	18	No Tools Available			9.40 9.90 10.40 10.90
W14 TPI 18 W14.5 TPI 18 W15 TPI 18 W16 TPI 18	18	SINR1216S-11E	11IRA55 11IR55005	-	12.40 12.90 13.40 14.40
W13 TPI 16 W13.5 TPI 16	16	No Tools Available			11.20 11.70
W14 TPI 16 W14.5 TPI 16 W15 TPI 16	16	SINR1216S-11E	11IRA55 11IR55005	-	12.20 12.70 13.20
W17 TPI 16	16	SINR1516S-11			15.20
W18 TPI 16 W19 TPI 16 W20 TPI 16	16	SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	(16IR16W-□□)	16.20 17.20 18.20
W16 TPI 14 W17 TPI 14	14	SINR1216S-11E	11IRA55 11IR55005	-	13.94 14.94
W18 TPI 14	14	SINR1516S-11			15.94
W21 TPI 14 W22 TPI 14	14	SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	(16IR14W-□□) (16IR14W)	18.94 19.94
W23 TPI 14 W24 TPI 14 W25 TPI 14 W26 TPI 14	14	SINR2016S-16			20.94 21.94 22.94 23.94
W19 TPI 12 W20 TPI 12 W21 TPI 12 W22 TPI 12	12	SINR1616S-16	16IRAG55 16IRG55 16IR5501 16IR5502	-	16.60 17.60 18.60 19.60
W28 TPI 12 W30 TPI 12 W32 TPI 12	12	SINR2420S-16		-	25.60 27.60 29.60
W34 TPI 12 W35 TPI 12 W36 TPI 12 W38 TPI 12	12	CINR3025S-16		-	31.60 32.60 33.60 35.60
W40 TPI 12 W42 TPI 12 W44 TPI 12 W45 TPI 12 W46 TPI 12 W48 TPI 12 W50 TPI 12 · · ·	12	CINR3732S-16		-	37.60 39.60 41.60 42.60 43.60 45.60 47.60 · · ·
		* Hereafter, 12 TPI Whitworth Fine Thread can be machined by the same tool as above.			
W23 TPI 10 W24 TPI 10 W25 TPI 10 W26 TPI 10	10	SINR2016S-16	16IRAG55 16IRG55	-	20.12 21.12 22.12 23.12
W28 TPI 9 W30 TPI 9 W32 TPI 9	9	SINR2420S-16		-	24.80 26.80 28.80
W34 TPI 8 W35 TPI 8 W36 TPI 8 W38 TPI 8 W40 TPI 8 W42 TPI 8	8	CINR3025S-16		-	30.40 31.40 32.40 34.40 36.40 38.40
W44 TPI 7 W45 TPI 7 W46 TPI 7 W48 TPI 7 W50 TPI 7 W52 TPI 7	7	CINR3732S-22	22IRN55	-	39.89 40.89 41.89 43.89 45.89 47.89
W55 TPI 6 W58 TPI 6 W60 TPI 6 W62 TPI 6 · W72 TPI 6	6	CINR3732S-22	22IRN55	-	50.20 53.20 55.20 57.20 · 67.20
W75 TPI 5 · · W105 TPI 5	5	CINR3732S-22	22IRN55	-	69.24 · · 99.24
W110 TPI 4 · ·	4	No Tools Available			102.8 · ·

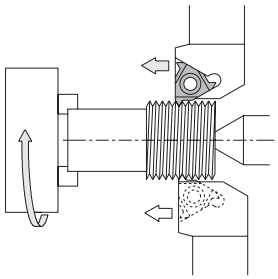
● Above shows the usage example of applicable Toolholder / Insert.

External Threading (Left-hand Thread / Right-hand Thread)

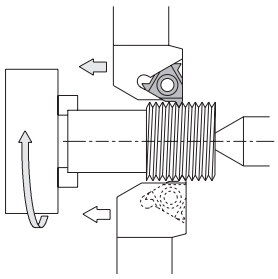
External Thread

Left-hand Thread

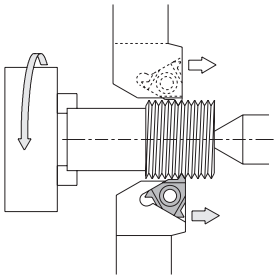
Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04



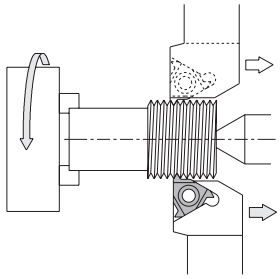
Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M04



Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M03

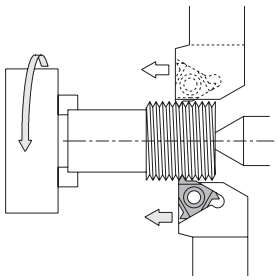


Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03

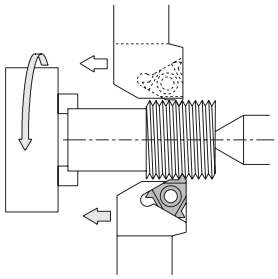


Right-hand Thread

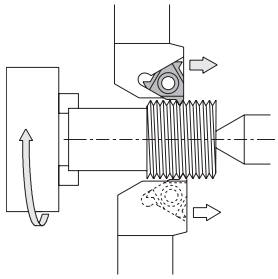
Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03



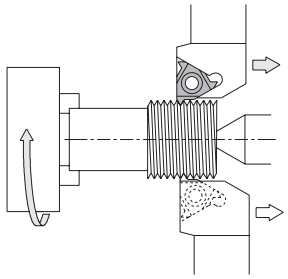
Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M03



Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M04



Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04

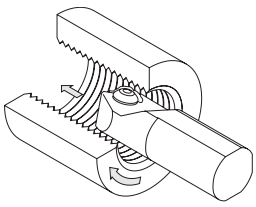


* These tables are based on KTN / KTNS / KTT / KTTX Toolholder.

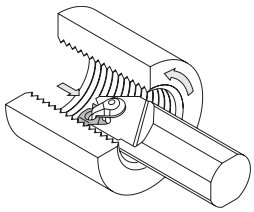
Internal Threading (Left-hand Thread / Right-hand Thread)

Internal Thread

Left-hand Thread

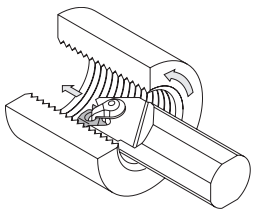


Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04

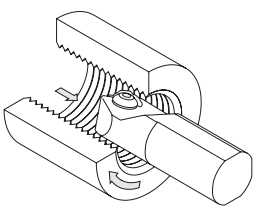


Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03

Right-hand Thread



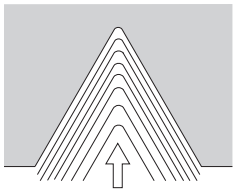
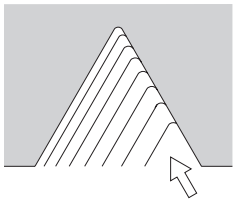
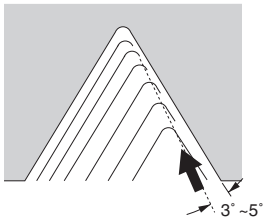
Toolholder	Right-hand
Insert	Right-hand
The direction of spindle revolution	M03



Toolholder	Left-hand
Insert	Left-hand
The direction of spindle revolution	M04

* These tables are based on SIN / CIN Toolholder.
For KITG (for large internal threading), Left-hand Insert for Right-hand Toolholder, Right-hand Insert for Left-hand Toolholder.

Infeed Methods

Infeed Methods	Features
 Radial Infeed	• The most common threading method. The cutting edge moves toward the center of the workpiece every pass. • Suitable for relatively small pitch size threading. • V-shape chips are generated and chip control may be difficult depending on workpiece material.
 Flank Infeed	• Suitable for large pitch size threading. • The wear on the right side edge of the figure (no ap) tends to become greater. • Chips flow to one side.
 Flank Compound Infeed	• Revised compound methods of the above flank infeed method. • No “No ap.” condition. • Chips flow to one side.

Lead Angle of Thread

Thread's Lead Angle β as shown in Fig. 1 decides from the Workpiece Diameter “D”(Pitch Dia.) and the Lead “L” (in case of Single-start Thread, it is the same as Pitch “TP”). By rolling a right-angled Triangle around a Cylinder and the Angle ACB in Fig. 2 becomes the Lead Angle β. The calculation formula is shown as follows.

$$\tan\beta = \frac{L}{\pi D} = \frac{nTP}{\pi D}$$

β : Lead Angle D : Pitch Dia. n : Number of Thread TP : Pitch
L : Lead (In case of single-start thread, it is equal to TP. In case of n-start thread, it is equal to n x TP.)

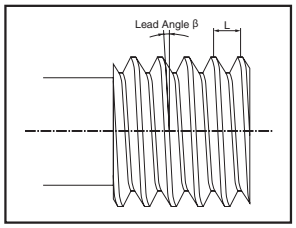


Fig. 1

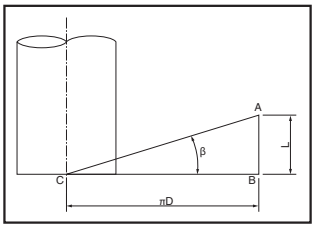


Fig. 2

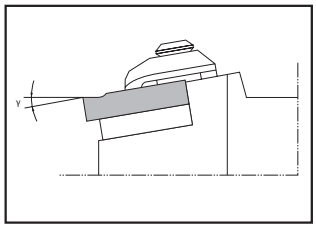


Fig. 3

Relief Angle of Thread

Against this lead angle, the threading insert requires a side relief angle α. Negative type threading insert has no relief angle. When a negative insert is mounted in the holder, the edge inclination angle γ (Fig. 3) is set, and at the same time, the front and side relief angles are generated on the insert. Side relief angle is described by the following formula. (Fig. 4)

$$\tan\alpha = \tan\gamma \times \tan\left(\frac{\theta}{2}\right)$$

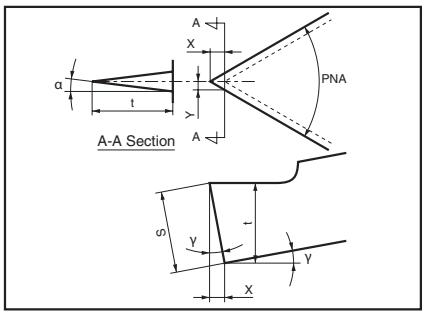


Fig. 4

Symbol	e.g.)
α : Side Relief Angle	
γ : Inclination Angle after Installing Insert	External Insert : 10˚ Internal Insert : 15˚
PNA : Insert's Thread Angle	Metric : 60˚ Tapered Pipe : 55˚ 30˚ Trapezoidal : 30˚
S : Insert Thickness	

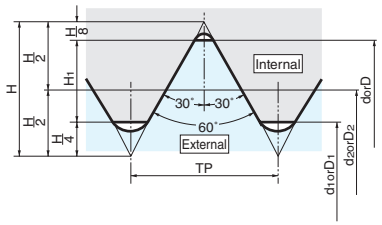
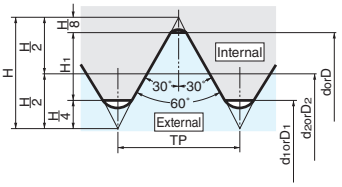
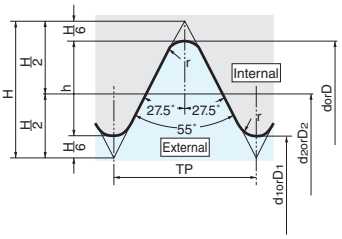
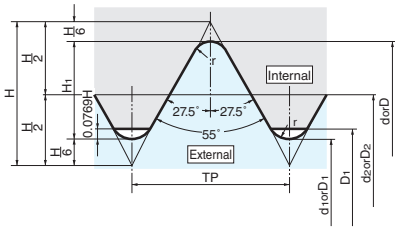
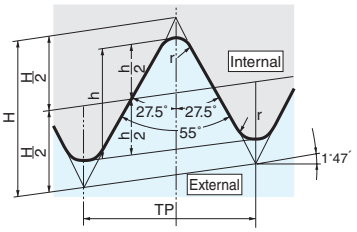
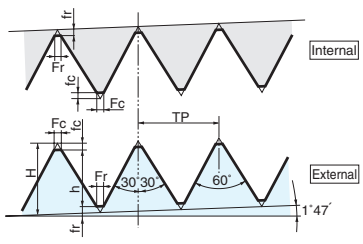
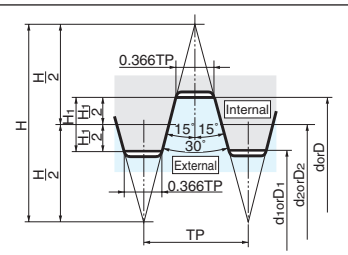
X=S・sinγ
Y=X・tan (θ/2) = t・tanα
t=S・cosγ

Table 1

Inserts	Side Relief Angle α	
	External	Internal
60˚ Thread (M, UN, NPT)	5˚49´	8˚47´
55˚ Thread (W, G, PT)	5˚14´	7˚56´
30˚ Trapezoidal (Tr)	2˚43´	5˚7´

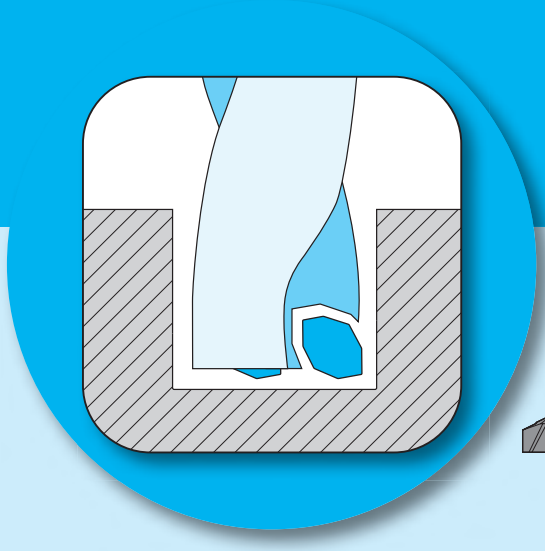
Ref. to Table 1 for the Side Relief Angle depending on the insert type.
However, the side relief angle is set for 1˚ in the traveling direction by the toolholder itself, so that the actual side relief angle becomes α+1˚.

Thread Types & Basic Profile / Applicable Toolholders & Inserts

	Basic Profile	Symbol (Previous Symbol)	Type	Applicable Inserts	Applicable Toolholders
Metric		**M** e.g.) **M30**	External	○○E$^{R}_{L}$○○○ISO(-TF/TQ) ○○ER□□60(-TF/TQ) 16ER60○○	KTN$^{R}_{L}$○○○○□-○○ KTNSR○○○○□-16 S○○□-KTNL16
				TT43E$^{R}_{L}$○○○M TT○○$^{R}_{L}$60○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R60○○	KTTXR○○○○□-16F, S○○□-KTTXL16
			Internal	○○I$^{R}_{L}$○○○ISO(-TF/TQ) ○○IR□□60 ○○IR60○○(○)	SIN$^{R}_{L}$○○○○S-○○(E) CIN$^{R}_{L}$○○○○S-○○
				TT○○$^{L}_{R}$60○○	KITG$^{R}_{L}$○○○○T-○○
				TPGB11○○○○(○)	S○○□-STWP$^{R}_{L}$11-○○(E)
Unified		**UN** **UNC** **UNF** **UNEF** e.g.) **¾ -16 UNF**	External	○○ER○○UN(-TF/TQ) ○○ER□□60(-TF/TQ) 16ER60○○	KTNR○○○○□-○○ KTNSR○○○○□-16 S○○□-KTNL16
				TT○○$^{R}_{L}$60○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R60○○	KTTXR○○○○□-16F, S○○□-KTTXL16
			Internal	○○IR○○UN-(TF/TQ) ○○IR□□60 ○○IR60○○(○)	SINR○○○○S-○○(E) CINR○○○○S-○○
				TT○○$^{L}_{R}$60○○	KITG$^{R}_{L}$○○○○T-○○
				TPGB11○○○○(○)	S○○□-STWP$^{R}_{L}$11-○○(E)
Parallel Pipe		External : **G(PF)** Internal : **G(PF)** **Rp(PS)** e.g.) **G¾ (PF¾)**	External	○○ER○○W(-TF/TQ) ○○ER□□55 16ER55○○	KTNR○○○○□-○○ KTNSR○○○○□-16 S○○□-KTNL16
				TT○○$^{R}_{L}$55○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R55○○	KTTXR○○○○□-16F, S○○□-KTTXL16
			Internal	○○IR○○W(-TF/TQ) ○○IR□□55 ○○IR55○○(○)	SINR○○○○S-○○(E) CINR○○○○S-○○
				TT○○$^{L}_{R}$55○○	KITG$^{R}_{L}$○○○○T-○○
Whitworth		**W** e.g.) **W⅜**	External	○○ER○○W(-TF/TQ) ○○ER□□55 16ER55○○	KTNR○○○○□-○○ KTNSR○○○○□-16 S○○□-KTNL16
				TT○○$^{R}_{L}$55○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32R55○○	KTTXR○○○○□-16F, S○○□-KTTXL16
			Internal	○○IR○○W(-TF/TQ) ○○IR□□55 ○○IR55○○(○)	SINR○○○○S-○○(E) CINR○○○○S-○○
				TT○○$^{L}_{R}$55○○	KITG$^{R}_{L}$○○○○T-○○
Tapered Pipe		External : **R(PT)** **(BSPT)** Internal : **Rc(PT)** **(BSPT)** e.g.) **R½ (PT½)**	External	16ER○○BSPT(-TF/TQ)	KTNR○○○○□-○○ KTNSR○○○○□-16 S○○□-KTNL16
				TT○○$^{R}_{L}$55○○*	KTT$^{R}_{L}$○○○○□-○○
				TTX32R55○○*	KTTXR○○○○□-16F, S○○□-KTTXL16
			Internal	○○IR○○BSPT(-TF/TQ)	SINR○○○○S-○○(E) CINR○○○○S-○○
				TT○○$^{L}_{R}$55○○*	KITG$^{R}_{L}$○○○○T-○○
American National Tapered Pipe		**NPT** e.g.) **⅜ -18 NPT**	External	16ER○○(.○)NPT	KTNR○○○○□-○○ KTNSR○○○○□-16 S○○□-KTNL16
			Internal	16IR○○(.○)NPT	SINR○○○○S-○○ CINR○○○○S-○○
30° Trapezoidal		**Tr** e.g.) **Tr 26x3**	External	○○ER○○○TR	KTNR○○○○□-○○ KTNSR○○○○□-16 S○○□-KTNL16
			Internal	○○IR○○○TR	SINR○○○○S-○○ CINR○○○○S-○○

* For the case when the thread root's corner-R(RE) can be smaller than the standard.

●Above shows the usage example of applicable Toolholder / Insert.

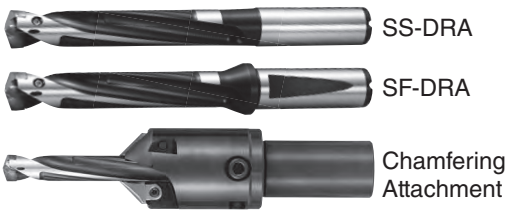
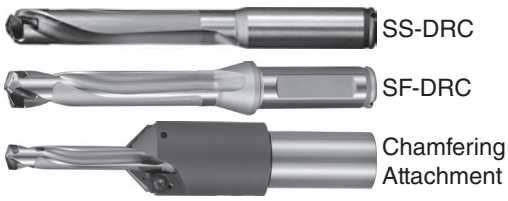
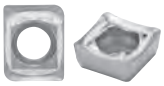
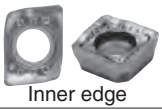
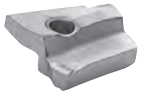
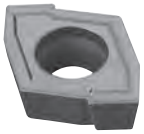


Drilling

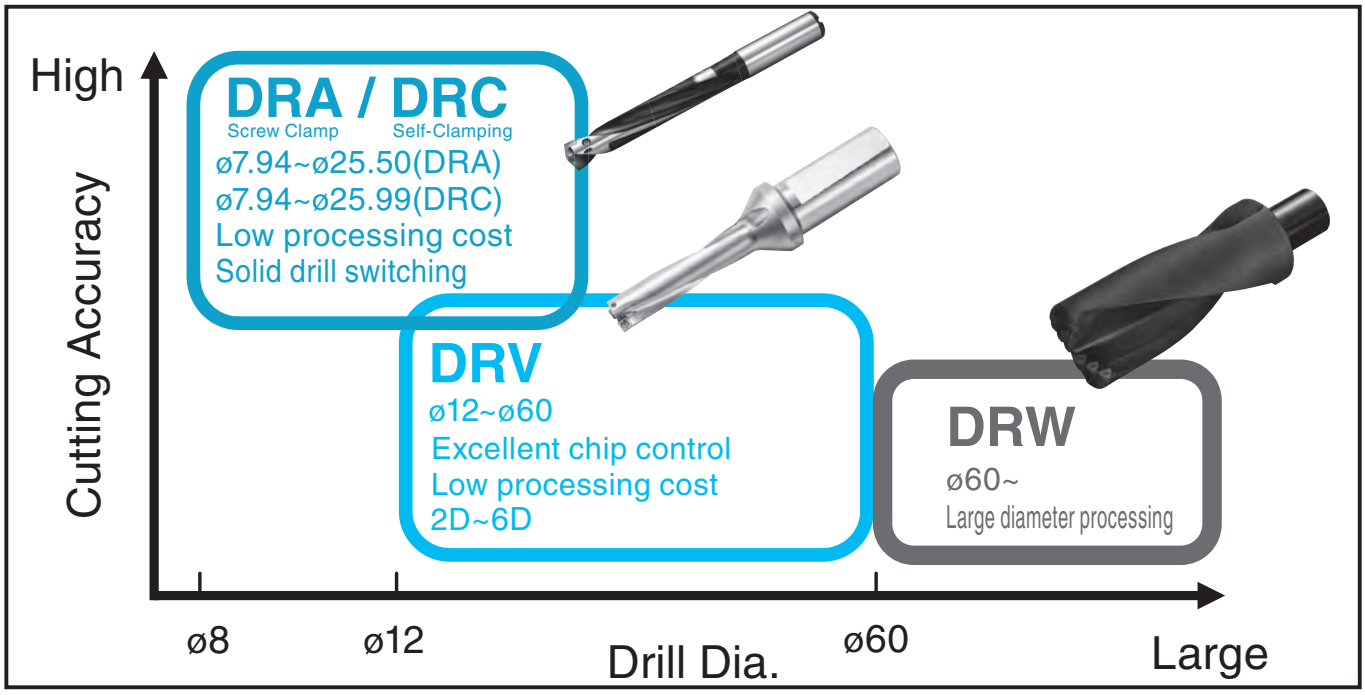
K1~K99

Product Lineup			K2~K3
MagicDrill DRA			K4~K25
SS-DRA	Drilling Depth : 1.5 x DC type	Straight Shank	K12
SS-DRA	Drilling Depth : 3 x DC type	Straight Shank	K13
SS-DRA	Drilling Depth : 5 x DC type	Straight Shank	K14
SS-DRA	Drilling Depth : 8 x DC type	Straight Shank	K15
Chamfering Attachment	for Straight Shank SS-DRA		K16
SF-DRA	Drilling Depth : 1.5 x DC type	Flanged Shank	K18
SF-DRA	Drilling Depth : 3 x DC type	Flanged Shank	K19
SF-DRA	Drilling Depth : 5 x DC type	Flanged Shank	K20
SF-DRA	Drilling Depth : 8 x DC type	Flanged Shank	K21
SF-DRA	Drilling Depth : 12 x DC type	Flanged Shank	K22
MagicDrill DRC			K26~K41
SS-DRC	Drilling Depth : 3 x DC type	Straight Shank	K29
SS-DRC	Drilling Depth : 5 x DC type	Straight Shank	K30
SS-DRC	Drilling Depth : 8 x DC type	Straight Shank	K31
Chamfering Attachment	for Straight Shank SS-DRC		K32
SF-DRC	Drilling Depth : 3 x DC type	Flanged Shank	K34
SF-DRC	Drilling Depth : 5 x DC type	Flanged Shank	K35
SF-DRC	Drilling Depth : 8 x DC type	Flanged Shank	K36
MagicDrill DRV			K42~K64
DRV	Drilling Depth : 2 x DC type	ø12~ø60	K46
DRV	Drilling Depth : 3 x DC type	ø12~ø60	K48
DRV	Drilling Depth : 4 x DC type	ø12~ø60	K50
DRV	Drilling Depth : 5 x DC type	ø12~ø60	K52
DRV	Drilling Depth : 6 x DC type	ø12~ø60	K54
MagicDrill DRS & DRZ			K65~K79
DRS (MagicDrill Mini)		ø10~ø12.5	K66
DRZ	Drilling Depth : 2 x DC type	ø13~ø59	K68
DRZ	Drilling Depth : 3 x DC type	ø13~ø59	K70
DRZ	Drilling Depth : 4 x DC type	ø13~ø50	K72
DRZ	Drilling Depth : 5 x DC type	ø27~ø50	K74
DRZ-CR	Cartridge type	ø60~	K75
MagicDrill DRX			K80~K90
DRX		ø12~ø60	K82
MagicDrill DRW			K91~K95
DRW	Drilling Depth : 1 x DC type	ø60~ø100	K92
DRW	Drilling Depth : 2 x DC type	ø60~ø100	K92
DRW	Drilling Depth : 3 x DC type	ø60~ø100	K93
Fine Micro Drill			K96~K99
FDM			K96

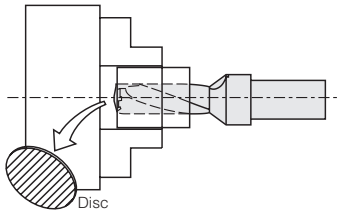
Product Lineup

Type	Shape	Drill Dia. (Drilling Depth)	Cutting Edge	Remarks
DRA K4	 Screw Clamp	ø7.94~ø25.50 (1.5D/3D/5D/8D) ø12~ø25.5 (12D)	Module type with double edges 	Line up  SS-DRA SF-DRA Chamfering Attachment
DRC K26	 Self-Clamping	ø7.94~ø25.99 (3D/5D/8D)	Module type with double edges 	Line up  SS-DRC SF-DRC Chamfering Attachment
DRV K42	 Silver Coating	ø12~ø60 (2D/3D/4D 5D/6D)	Individually designed Inner & Outer Edges  Outer edge  Inner edge	Chip Shape (Workpiece Material : S50C) Drill Dia.ø20 Chip from outer edge  Chip from inner edge 
DRS **[MagicDrill Mini]** K66	 Silver Coating	ø10~ø12.5 (3.5D)	Inner & Outer Edges on One Insert 	Chip Shape (Workpiece Material : S50C) Drill Dia.ø10 Chip from outer edge  Chip from inner edge 
DRZ K68	 DRZ DRZ-CR	ø13~ø59 (2D/3D) ø13~ø50 (4D) ø27~ø50 (5D)	Inner & Outer Edges on One Insert 	Chip Shape (Workpiece Material : S50C) Drill Dia.ø23 Chip from outer edge  Chip from inner edge 
DRZ-CR **[Cartridge type]** (Made to order) K75		ø60~ (2D/3D/4D)		
DRX K80	 Silver Coating	ø12 ø12.5 ø13 (2D/3D/4D) ø12,ø13 (5D)	2 Cutting Edges per Insert  Outer edge Inner edge ZXMT03	Chip Shape (Workpiece Material : S50C) Drill Dia.ø12 Chip from outer edge  Chip from inner edge 
		ø13.5~ø60 (2D/3D/4D) ø14~ø60 (5D)	Inner & Outer Edges on One Insert  ZXMT	Chip Shape (Workpiece Material : S50C) Drill Dia.ø24 Chip from outer edge  Chip from inner edge 
DRW (Made to order for some products) K91		ø60~ (1D/2D/3D)	Inner & Outer Edges on One Insert 	Custom-order item  BT integral arbor type is also available.  Maximum drilling diameter is ø200.

MagicDrill Series Application Map



Caution



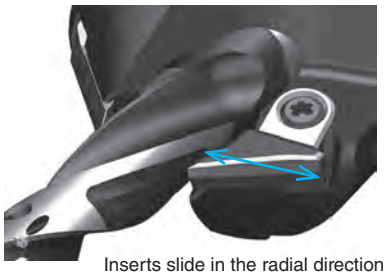
When drilling through the workpiece, a disk may be ejected.
Proper machine guarding is necessary to prevent injury.
The safety cover is necessary for the conventional lathe machines to prevent any accidents.

For MagicDrill DRA

Chamfering Attachment K16

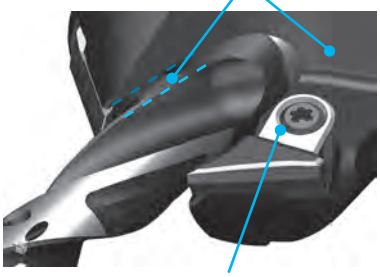
·Excellent stability and chip evacuation

Easy-to-adjust chamfering insert slides in radial direction with a clamp structure that provides good chip evacuation



Inserts slide in the radial direction to adjust with drilling diameter

Large chip pockets along drill flutes



Smooth chip evacuation with large pocket design

·Fully Adjustable for a Wide Range of Drilling Depths



High Efficiency Modular Drill

MagicDrill DRA

Excellent hole accuracy with a low cutting force design

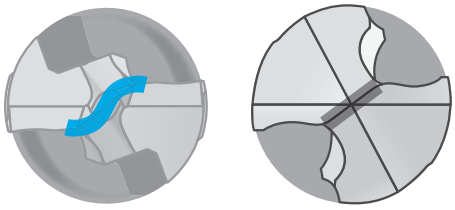
5 advantages to efficiently solve common drilling difficulties

12D holder for deep hole drilling added to lineup (ø12~ø25.5)

1 Low cutting force design improves hole accuracy

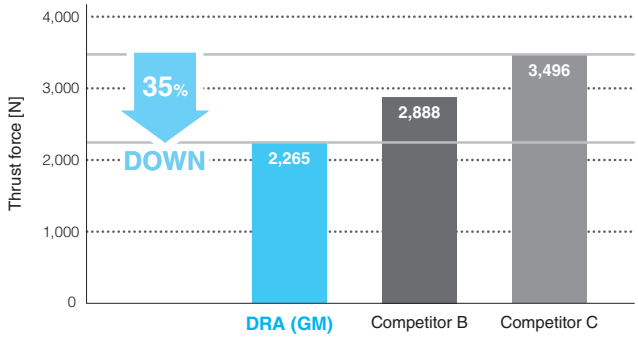
Special chisel edge with S-curve reduces thrust force and controls vibration

Cutting edge image



Cutting Force Comparison
(Internal evaluation)

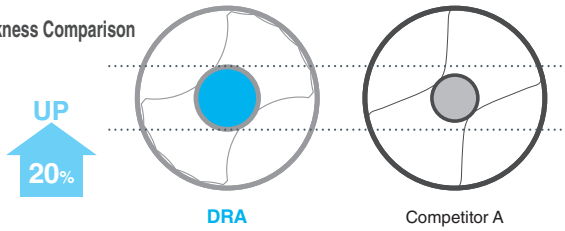
Cutting Conditions : Vc=120m/min, f=0.25mm/rev
Drill Dia.ø14, 5D Type, Drilling Depth 45mm, Wet
Workpiece Material : S50C



2 Optimal web thickness limits deflection

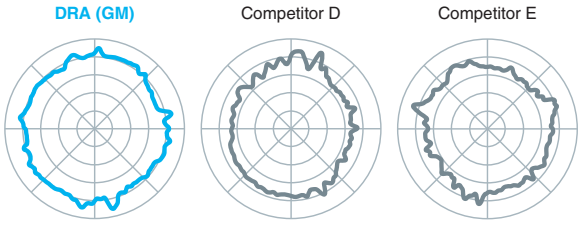
Improved hole accuracy by controlling drill deflection with a 20% thicker web compared with Competitor A

Web Thickness Comparison



Roundness · Cylindricity Comparison
(Internal evaluation)

Cutting Conditions : Vc=120m/min, f=0.3mm/rev
Drill Dia.ø14, 5D Type, Measurement point 55mm, Wet
Workpiece Material : S50C



	DRA (GM)	Competitor D	Competitor E
Roundness	18.7µm	31.1µm	27.3µm
Cylindricity	23.6µm	34.3µm	30.1µm

3 Fine chip breaking even in deep hole drilling applications

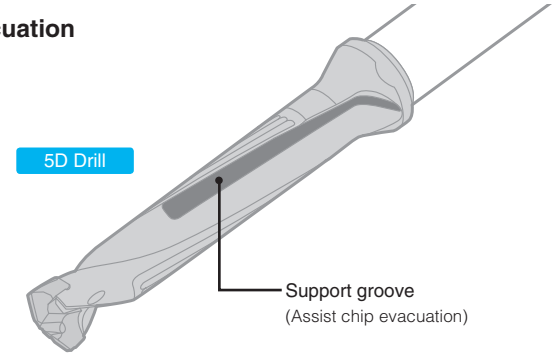
Optimized chip thinning for stable chip evacuation

Support groove with wider flute (5D, 8D) enables smooth chip evacuation

Chip Comparison
(Internal evaluation)

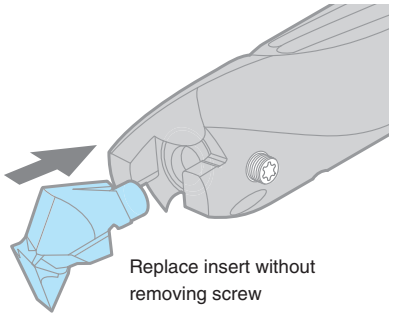
Cutting Conditions : Vc=60m/min, f=0.2mm/rev,Drill Dia.ø14,
5DType Drilling Depth 70mm, Wet
Workpiece Material : SUS304



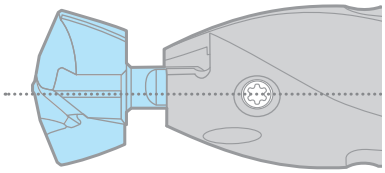


4 Easy insert replacement

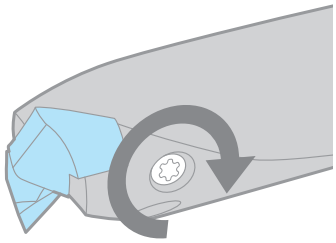
Replace insert without removing screw



Replace insert without removing screw



Install the insert onto toolholder (align insert guide line with screw position)



Fix the insert by tightening the screw

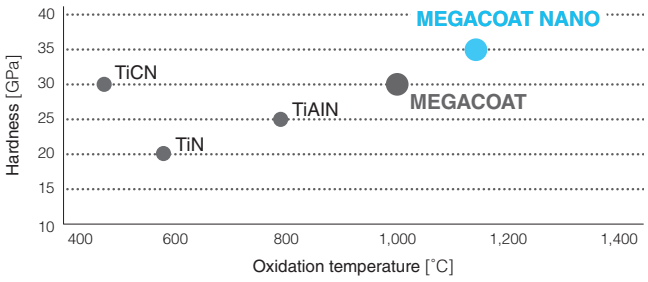
5 Long tool life and stable machining of various workpieces

MEGACOAT NANO grade PR1535 is used to machine various materials from steel to stainless steel, with the combination of a tough substrate and a special nano layer coating

Recommended Insert Grades

Steel, Stainless Steel	Cast Iron
PR1535	PR1525

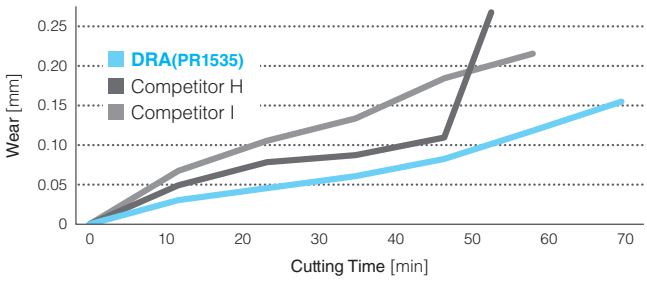
Properties of PVD Coating



Low — Oxidation resistance — High

Wear Resistance Comparison

(Internal evaluation)

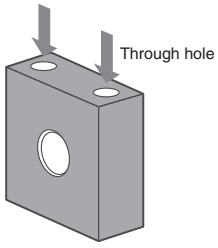


Cutting Conditions : Vc=100m/min, f=0.25mm/rev, Drill Dia.ø14, 5DType, Drilling Depth 45mm, Wet Workpiece Material : SCM440H

Case Studies

Attachment SS400

Vc=70m/min (n=1,240min^{-1})
f=0.23mm/rev (Vf=285mm/min)
Drilling Depth 100mm
Wet (Internal coolant)
With spot drilling
SF25-DRA180M-8
DA1800M-GM PR1535



Cutting Time

DRA ø18-8D — 45 sec

30% Cutting Time

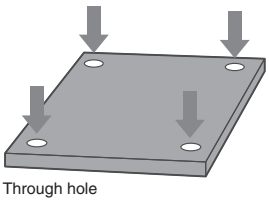
Competitor J ø18-7D (Modular Drill) — 65 sec

Competitor J applied a step feeding to avoid chip clogging.
DRA controlled chip evacuation without pecking.

(User Evaluation)

Plate SUS304

Vc=60m/min (n=2,120min^{-1})
f=0.12mm/rev (Vf=254mm/min)
Drilling Depth 15mm
Wet (Internal coolant)
SS10-DRA090M-3
DA0900M-GM PR1535



Number of holes

DRA ø9-3D — 500 holes

Tool life x 5

Competitor K ø9-3D (Modular Drill) — 100 holes

DRA extended the tool life by 5 times compared to Competitor K.
DRA maintained stable machining and excellent surface finish with less cutting noise.

(User Evaluation)

High Efficiency Modular Drill

DRA High Precision Insert for Steel Machining HQP

Improved Centripetal Forces with Special Two-step Bottom

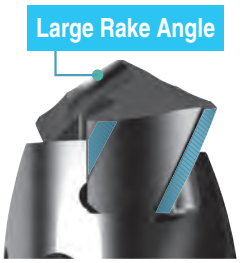
Excellent Cylindricity, Roundness and Surface Finish in Steel Machining



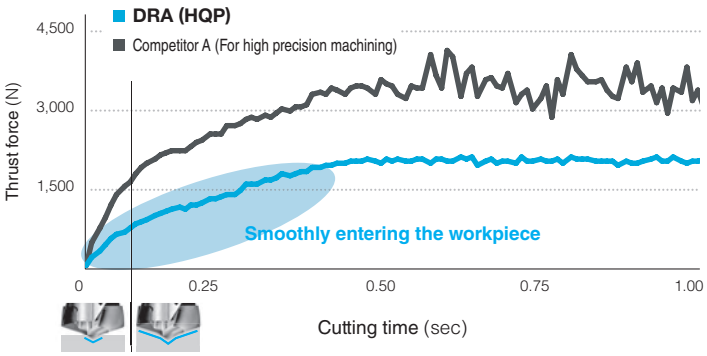
1 Improved Centripetal Forces Delivers High-precision Machining Capabilities for both Machining Centers and Lathes

Special two-step bottom, large rake angle and double margin design reduce initial shock for higher-precision machining





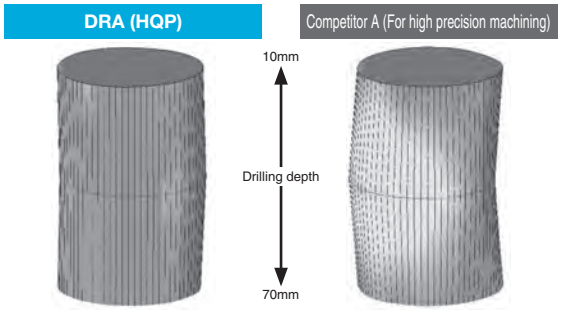
Cutting force comparison when entering the workpiece (Internal evaluation)



Cutting Conditions : Vc = 100 m/min, f = 0.25 mm/rev, H = 30 mm, Wet Workpiece : S50C ø16 (3D)

Cylindricity and roundness comparison (Internal evaluation)

Machining Center (BT50)

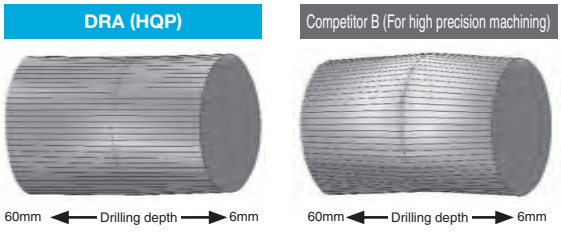


Cylindricity : 19μm
Roundness : 17μm (70mm)

Cylindricity : 52μm
Roundness : 19μm (70mm)

Cutting Conditions : Vc = 100 m/min, f = 0.25 mm/rev, H = 80 mm, Wet
Workpiece : S50C ø16 (5D)

Lathes



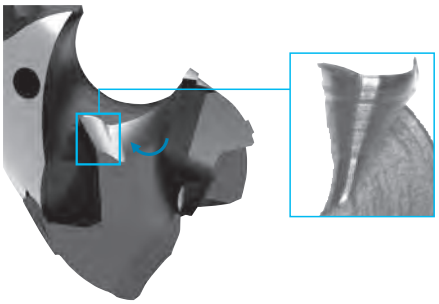
Cylindricity : 19μm
Roundness : 9μm (60mm)

Cylindricity : 71μm
Roundness : 12μm (60mm)

Cutting Conditions : Vc = 120 m/min, f = 0.3 mm/rev, H = 65 mm, Wet
Workpiece : SCM435 ø13 (5D)

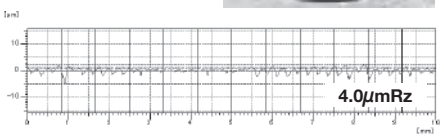
2 Excellent Surface Finish with Unique Flute Shape

Controlled chips reduce scratches on the hole wall



Hole wall surface finish comparison
(Internal evaluation)

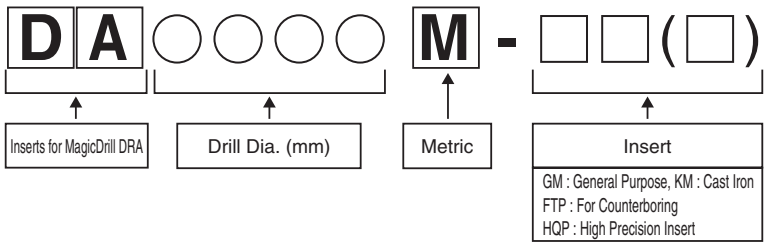




Cutting Conditions : Vc = 100 m/min, f = 0.25 mm/rev, H = 80 mm, Wet
Workpiece : S50C ø16 (5D)

Inserts for MagicDrill DRA NEW

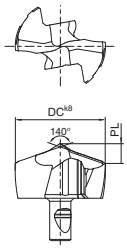
Description Identification System (Insert)



Applicable Inserts

High Precision Insert HQP





k8 tolerance

DC	k8 (mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 19.90	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

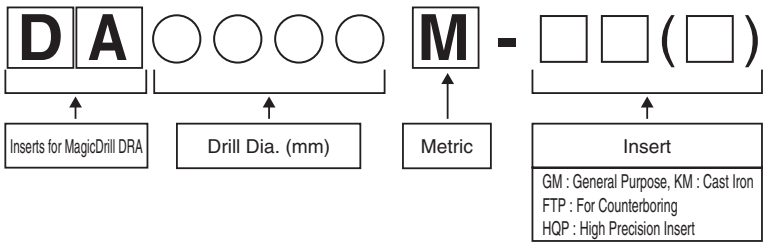
Description		Dimension (mm) DC	PL	MEGACOAT NANO PR1525	Applicable Toolholders ⇒ K12~K22
DA	0794M-HQP	7.94	1.90	●	SS10-DRA080M-○ SF12-DRA080M-○
	0800M-HQP	8.00	1.91	●	
	0810M-HQP	8.10	1.93	●	
	0820M-HQP	8.20	1.94	●	
	0830M-HQP	8.30	1.96	●	
	0840M-HQP	8.40	1.98	●	
DA	0850M-HQP	8.50	1.99	●	SS10-DRA085M-○ SF12-DRA085M-○
	0860M-HQP	8.60	2.01	●	
	0870M-HQP	8.70	2.03	●	
	0880M-HQP	8.80	2.05	●	
	0890M-HQP	8.90	2.06	●	
DA	0900M-HQP	9.00	2.19	●	SS10-DRA090M-○ SF12-DRA090M-○
	0910M-HQP	9.10	2.21	●	
	0920M-HQP	9.20	2.22	●	
	0930M-HQP	9.30	2.24	●	
	0940M-HQP	9.40	2.26	●	
DA	0950M-HQP	9.50	2.27	●	SS10-DRA095M-○ SF12-DRA095M-○
	0960M-HQP	9.60	2.29	●	
	0970M-HQP	9.70	2.31	●	
	0980M-HQP	9.80	2.32	●	
	0990M-HQP	9.90	2.34	●	
DA	1000M-HQP	10.00	2.35	●	SS12-DRA100M-○ SF16-DRA100M-○
	1010M-HQP	10.10	2.36	●	
	1020M-HQP	10.20	2.38	●	
	1030M-HQP	10.30	2.40	●	
	1040M-HQP	10.40	2.41	●	
DA	1050M-HQP	10.50	2.43	●	SS12-DRA105M-○ SF16-DRA105M-○
	1060M-HQP	10.60	2.44	●	
	1070M-HQP	10.70	2.46	●	
	1080M-HQP	10.80	2.47	●	
	1090M-HQP	10.90	2.49	●	
DA	1100M-HQP	11.00	2.65	●	SS12-DRA110M-○ SF16-DRA110M-○
	1110M-HQP	11.10	2.67	●	
	1120M-HQP	11.20	2.68	●	
	1130M-HQP	11.30	2.70	●	
	1140M-HQP	11.40	2.72	●	
DA	1150M-HQP	11.50	2.73	●	SS12-DRA115M-○ SF16-DRA115M-○
	1160M-HQP	11.60	2.75	●	
	1170M-HQP	11.70	2.76	●	
	1180M-HQP	11.80	2.78	●	
	1190M-HQP	11.90	2.80	●	
DA	1200M-HQP	12.00	2.79	●	SS14-DRA120M-○ SF16-DRA120M-○
	1210M-HQP	12.10	2.81	●	
	1220M-HQP	12.20	2.82	●	
	1230M-HQP	12.30	2.84	●	
	1240M-HQP	12.40	2.86	●	
DA	1250M-HQP	12.50	2.87	●	SS14-DRA125M-○ SF16-DRA125M-○
	1260M-HQP	12.60	2.89	●	
	1270M-HQP	12.70	2.91	●	
	1280M-HQP	12.80	2.92	●	
	1290M-HQP	12.90	2.94	●	
DA	1300M-HQP	13.00	2.98	●	SS14-DRA130M-○ SF16-DRA130M-○
	1310M-HQP	13.10	2.99	●	
	1320M-HQP	13.20	3.01	●	
DA	1330M-HQP	13.30	3.02	●	SS14-DRA130M-○ SF16-DRA130M-○
	1340M-HQP	13.40	3.04	●	
DA	1350M-HQP	13.50	3.06	●	SS14-DRA135M-○ SF16-DRA135M-○
	1360M-HQP	13.60	3.07	●	
	1370M-HQP	13.70	3.09	●	
	1380M-HQP	13.80	3.10	●	
	1390M-HQP	13.90	3.12	●	
DA	1400M-HQP	14.00	3.11	●	SS16-DRA140M-○ SF16-DRA140M-○
	1410M-HQP	14.10	3.12	●	
	1420M-HQP	14.20	3.14	●	
	1430M-HQP	14.30	3.16	●	
	1440M-HQP	14.40	3.17	●	
DA	1450M-HQP	14.50	3.19	●	SS16-DRA145M-○ SF16-DRA145M-○
	1460M-HQP	14.60	3.21	●	
	1470M-HQP	14.70	3.22	●	
	1480M-HQP	14.80	3.24	●	
	1490M-HQP	14.90	3.25	●	
DA	1500M-HQP	15.00	3.33	●	SS16-DRA150M-○ SF20-DRA150M-○
	1510M-HQP	15.10	3.35	●	
	1520M-HQP	15.20	3.36	●	
	1530M-HQP	15.30	3.38	●	
	1540M-HQP	15.40	3.39	●	
	1550M-HQP	15.50	3.41	●	
	1560M-HQP	15.60	3.42	●	
	1570M-HQP	15.70	3.44	●	
	1580M-HQP	15.80	3.46	●	
	1590M-HQP	15.90	3.47	●	
DA	1600M-HQP	16.00	3.55	●	SS18-DRA160M-○ SF20-DRA160M-○
	1610M-HQP	16.10	3.57	●	
	1620M-HQP	16.20	3.58	●	
	1630M-HQP	16.30	3.60	●	
	1640M-HQP	16.40	3.62	●	
	1650M-HQP	16.50	3.63	●	
	1660M-HQP	16.60	3.65	●	
	1670M-HQP	16.70	3.66	●	
	1680M-HQP	16.80	3.68	●	
	1690M-HQP	16.90	3.69	●	
DA	1700M-HQP	17.00	3.73	●	SS18-DRA170M-○ SF20-DRA170M-○
	1710M-HQP	17.10	3.75	●	
	1720M-HQP	17.20	3.77	●	
	1730M-HQP	17.30	3.78	●	
	1740M-HQP	17.40	3.80	●	
	1750M-HQP	17.50	3.81	●	
	1760M-HQP	17.60	3.83	●	
	1770M-HQP	17.70	3.84	●	
	1780M-HQP	17.80	3.86	●	
	1790M-HQP	17.90	3.88	●	
DA	1800M-HQP	18.00	3.97	●	SS20-DRA180M-○ SF25-DRA180M-○
	1810M-HQP	18.10	3.98	●	
	1820M-HQP	18.20	4.00	●	
	1830M-HQP	18.30	4.02	●	
	1840M-HQP	18.40	4.03	●	
	1850M-HQP	18.50	4.05	●	
	1860M-HQP	18.60	4.06	●	
	1870M-HQP	18.70	4.08	●	
	1880M-HQP	18.80	4.09	●	
	1890M-HQP	18.90	4.11	●	
DA	1900M-HQP	19.00	4.20	●	SS20-DRA190M-○ SF25-DRA190M-○
	1910M-HQP	19.10	4.22	●	
	1920M-HQP	19.20	4.23	●	
	1930M-HQP	19.30	4.25	●	
	1940M-HQP	19.40	4.26	●	
	1950M-HQP	19.50	4.28	●	
	1960M-HQP	19.60	4.29	●	
	1970M-HQP	19.70	4.31	●	
	1980M-HQP	19.80	4.33	●	
	1990M-HQP	19.90	4.34	●	

● : Std. Item

DA inserts are sold in 1 piece boxes

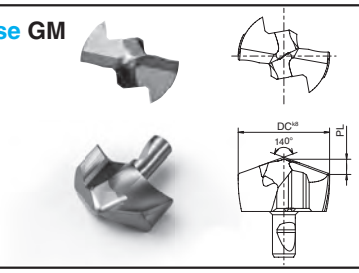
Inserts for MagicDrill DRA

Description Identification System (Insert)

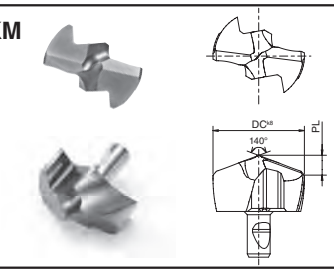


Applicable Inserts

General Purpose GM



Cast Iron KM



k8 tolerance

DC	k8 (mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Description	Dimension (mm) DC	PL	MEGACOAT NANO PR1535	PR1525	Applicable Toolholders K12~K21
DA 0794M-GM	7.94	1.34	●	●	SS10-DRA080M-○ SF12-DRA080M-○
0794M-KM		1.82		●	
DA 0800M-GM	8.00	1.35	●	●	
0800M-KM		1.85		●	
DA 0810M-GM	8.10	1.37	●	●	
0810M-KM		1.89		●	
DA 0820M-GM	8.20	1.38	●	●	
0820M-KM		1.93		●	
DA 0830M-GM	8.30	1.40	●	●	
0830M-KM		1.98		●	
DA 0840M-GM	8.40	1.42	●	●	
0840M-KM		2.02		●	
DA 0850M-GM	8.50	1.44	●	●	SS10-DRA085M-○ SF12-DRA085M-○
0850M-KM		2.06		●	
DA 0860M-GM	8.60	1.46	●	●	
0860M-KM		2.10		●	
DA 0870M-GM	8.70	1.48	●	●	
0870M-KM		2.14		●	
DA 0880M-GM	8.80	1.49	●	●	
0880M-KM		2.19		●	
DA 0890M-GM	8.90	1.51	●	●	
0890M-KM		2.23		●	
DA 0900M-GM	9.00	1.52	●	●	SS10-DRA090M-○ SF12-DRA090M-○
0900M-KM		2.02		●	
DA 0910M-GM	9.10	1.54	●	●	
0910M-KM		2.06		●	
DA 0920M-GM	9.20	1.56	●	●	
0920M-KM		2.11		●	
DA 0930M-GM	9.30	1.58	●	●	
0930M-KM		2.15		●	
DA 0940M-GM	9.40	1.59	●	●	
0940M-KM		2.19		●	
DA 0950M-GM	9.50	1.61	●	●	SS10-DRA095M-○ SF12-DRA095M-○
0950M-KM		2.23		●	
DA 0960M-GM	9.60	1.63	●	●	
0960M-KM		2.27		●	
DA 0970M-GM	9.70	1.65	●	●	
0970M-KM		2.32		●	
DA 0980M-GM	9.80	1.67	●	●	
0980M-KM		2.36		●	
DA 0990M-GM	9.90	1.68	●	●	
0990M-KM		2.40		●	

Description	Dimension (mm) DC	PL	MEGACOAT NANO PR1535	PR1525	Applicable Toolholders K12~K21
DA 1000M-GM	10.00	1.70	●	●	SS12-DRA100M-○ SF16-DRA100M-○
1000M-KM		2.20		●	
DA 1010M-GM	10.10	1.72	●	●	
1010M-KM		2.24		●	
DA 1020M-GM	10.20	1.74	●	●	
1020M-KM		2.28		●	
DA 1030M-GM	10.30	1.75	●	●	
1030M-KM		2.32		●	
DA 1040M-GM	10.40	1.77	●	●	
1040M-KM		2.37		●	
DA 1050M-GM	10.50	1.79	●	●	SS12-DRA105M-○ SF16-DRA105M-○
1050M-KM		2.41		●	
DA 1060M-GM	10.60	1.81	●	●	
1060M-KM		2.45		●	
DA 1070M-GM	10.70	1.83	●	●	
1070M-KM		2.49		●	
DA 1080M-GM	10.80	1.85	●	●	
1080M-KM		2.53		●	
DA 1090M-GM	10.90	1.86	●	●	
1090M-KM		2.57		●	
DA 1100M-GM	11.00	1.87	●	●	SS12-DRA110M-○ SF16-DRA110M-○
1100M-KM		2.50		●	
DA 1110M-GM	11.10	1.89	●	●	
1110M-KM		2.54		●	
DA 1120M-GM	11.20	1.91	●	●	
1120M-KM		2.59		●	
DA 1130M-GM	11.30	1.92	●	●	
1130M-KM		2.63		●	
DA 1140M-GM	11.40	1.94	●	●	
1140M-KM		2.67		●	
DA 1150M-GM	11.50	1.96	●	●	SS12-DRA115M-○ SF16-DRA115M-○
1150M-KM		2.71		●	
DA 1160M-GM	11.60	1.98	●	●	
1160M-KM		2.75		●	
DA 1170M-GM	11.70	2.00	●	●	
1170M-KM		2.80		●	
DA 1180M-GM	11.80	2.01	●	●	
1180M-KM		2.84		●	
DA 1190M-GM	11.90	2.03	●	●	
1190M-KM		2.88		●	

DA inserts are sold in 1 piece boxes

● : Std. Item

Description		Dimension (mm)		MEGACOAT NANO		Applicable Toolholders
		DC	PL	PR1535	PR1525	K12~K22
DA	1200M-GM	12.00	2.03	●	●	
	1200M-KM		2.68		●	
DA	1210M-GM	12.10	2.05	●	●	
	1210M-KM		2.72		●	
DA	1220M-GM	12.20	2.07	●	●	SS14-DRA120M-○
	1220M-KM		2.76		●	SF16-DRA120M-○
DA	1230M-GM	12.30	2.08	●	●	
	1230M-KM		2.80		●	
DA	1240M-GM	12.40	2.10	●	●	
	1240M-KM		2.85		●	
DA	1250M-GM	12.50	2.12	●	●	
	1250M-KM		2.89		●	
DA	1260M-GM	12.60	2.14	●	●	
	1260M-KM		2.93		●	
DA	1270M-GM	12.70	2.16	●	●	SS14-DRA125M-○
	1270M-KM		2.97		●	SF16-DRA125M-○
DA	1280M-GM	12.80	2.17	●	●	
	1280M-KM		3.01		●	
DA	1290M-GM	12.90	2.19	●	●	
	1290M-KM		3.06		●	
DA	1300M-GM	13.00	2.20	●	●	
	1300M-KM		2.83		●	
DA	1310M-GM	13.10	2.22	●	●	
	1310M-KM		2.87		●	
DA	1320M-GM	13.20	2.24	●	●	SS14-DRA130M-○
	1320M-KM		2.92		●	SF16-DRA130M-○
DA	1330M-GM	13.30	2.25	●	●	
	1330M-KM		2.96		●	
DA	1340M-GM	13.40	2.27	●	●	
	1340M-KM		3.00		●	
DA	1350M-GM	13.50	2.29	●	●	
	1350M-KM		3.04		●	
DA	1360M-GM	13.60	2.31	●	●	
	1360M-KM		3.08		●	
DA	1370M-GM	13.70	2.33	●	●	SS14-DRA135M-○
	1370M-KM		3.13		●	SF16-DRA135M-○
DA	1380M-GM	13.80	2.35	●	●	
	1380M-KM		3.17		●	
DA	1390M-GM	13.90	2.36	●	●	
	1390M-KM		3.21		●	
DA	1400M-GM	14.00	2.33	●	●	
	1400M-KM		3.04		●	
DA	1410M-GM	14.10	2.34	●	●	
	1410M-KM		3.09		●	
DA	1420M-GM	14.20	2.36	●	●	SS16-DRA140M-○
	1420M-KM		3.13		●	SF16-DRA140M-○
DA	1430M-GM	14.30	2.38	●	●	
	1430M-KM		3.17		●	
DA	1440M-GM	14.40	2.40	●	●	
	1440M-KM		3.21		●	
DA	1450M-GM	14.50	2.42	●	●	
	1450M-KM		3.25		●	
DA	1460M-GM	14.60	2.43	●	●	SS16-DRA145M-○
	1460M-KM		3.30		●	SF16-DRA145M-○
DA	1470M-GM	14.70	2.45	●	●	
	1470M-KM		3.34		●	

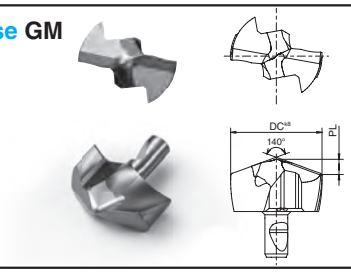
Description		Dimension (mm)		MEGACOAT NANO		Applicable Toolholders
		DC	PL	PR1535	PR1525	K12~K22
DA	1480M-GM	14.80	2.47	●	●	
	1480M-KM		3.38		●	SS16-DRA145M-○
DA	1490M-GM	14.90	2.49	●	●	SF16-DRA145M-○
	1490M-KM		3.42		●	
DA	1500M-GM	15.00	2.52	●	●	
	1500M-KM		3.24		●	
DA	1510M-GM	15.10	2.54	●	●	
	1510M-KM		3.28		●	
DA	1520M-GM	15.20	2.55	●	●	
	1520M-KM		3.33		●	
DA	1530M-GM	15.30	2.57	●	●	
	1530M-KM		3.37		●	
DA	1540M-GM	15.40	2.59	●	●	
	1540M-KM		3.41		●	SS16-DRA150M-○
DA	1550M-GM	15.50	2.61	●	●	SF20-DRA150M-○
	1550M-KM		3.45		●	
DA	1560M-GM	15.60	2.63	●	●	
	1560M-KM		3.49		●	
DA	1570M-GM	15.70	2.65	●	●	
	1570M-KM		3.54		●	
DA	1580M-GM	15.80	2.66	●	●	
	1580M-KM		3.58		●	
DA	1590M-GM	15.90	2.68	●	●	
	1590M-KM		3.62		●	
DA	1600M-GM	16.00	2.69	●	●	
	1600M-KM		3.43		●	
DA	1610M-GM	16.10	2.71	●	●	
	1610M-KM		3.47		●	
DA	1620M-GM	16.20	2.73	●	●	
	1620M-KM		3.51		●	
DA	1630M-GM	16.30	2.75	●	●	
	1630M-KM		3.55		●	
DA	1640M-GM	16.40	2.76	●	●	
	1640M-KM		3.60		●	SS18-DRA160M-○
DA	1650M-GM	16.50	2.78	●	●	SF20-DRA160M-○
	1650M-KM		3.64		●	
DA	1660M-GM	16.60	2.80	●	●	
	1660M-KM		3.68		●	
DA	1670M-GM	16.70	2.82	●	●	
	1670M-KM		3.72		●	
DA	1680M-GM	16.80	2.84	●	●	
	1680M-KM		3.76		●	
DA	1690M-GM	16.90	2.86	●	●	
	1690M-KM		3.81		●	
DA	1700M-GM	17.00	2.86	●	●	
	1700M-KM		3.61		●	
DA	1710M-GM	17.10	2.88	●	●	
	1710M-KM		3.65		●	
DA	1720M-GM	17.20	2.90	●	●	SS18-DRA170M-○
	1720M-KM		3.69		●	SF20-DRA170M-○
DA	1730M-GM	17.30	2.92	●	●	
	1730M-KM		3.74		●	
DA	1740M-GM	17.40	2.93	●	●	
	1740M-KM		3.78		●	

● : Std. Item

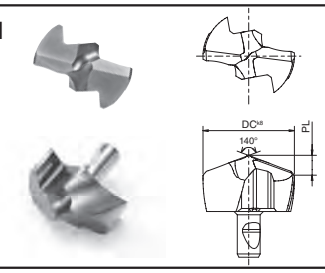
DA inserts are sold in 1 piece boxes

Applicable Inserts

General Purpose GM



Cast Iron KM



k8 tolerance

DC	k8 (mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.50	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Description	Dimension (mm) DC	PL	MEGACOAT NANO PR1535	PR1525	Applicable Toolholders ➡ K12~K22
DA 1750M-GM	17.50	2.95	●	●	SS18-DRA170M-○ SF20-DRA170M-○
1750M-KM		3.82		●	
DA 1760M-GM	17.60	2.97	●	●	
1760M-KM		3.86		●	
DA 1770M-GM	17.70	2.99	●	●	
1770M-KM		3.90		●	
DA 1780M-GM	17.80	3.01	●	●	
1780M-KM		3.95		●	
DA 1790M-GM	17.90	3.03	●	●	
1790M-KM		3.99		●	
DA 1800M-GM	18.00	3.04	●	●	SS20-DRA180M-○ SF25-DRA180M-○
1800M-KM		3.79		●	
DA 1810M-GM	18.10	3.06	●	●	
1810M-KM		3.83		●	
DA 1820M-GM	18.20	3.07	●	●	
1820M-KM		3.88		●	
DA 1830M-GM	18.30	3.09	●	●	
1830M-KM		3.92		●	
DA 1840M-GM	18.40	3.11	●	●	
1840M-KM		3.96		●	
DA 1850M-GM	18.50	3.13	●	●	
1850M-KM		4.00		●	
DA 1860M-GM	18.60	3.15	●	●	
1860M-KM		4.04		●	
DA 1870M-GM	18.70	3.17	●	●	
1870M-KM		4.08		●	
DA 1880M-GM	18.80	3.18	●	●	
1880M-KM		4.13		●	
DA 1890M-GM	18.90	3.20	●	●	
1890M-KM		4.17		●	
DA 1900M-GM	19.00	3.21	●	●	SS20-DRA190M-○ SF25-DRA190M-○
1900M-KM		3.97		●	
DA 1910M-GM	19.10	3.23	●	●	
1910M-KM		4.01		●	
DA 1920M-GM	19.20	3.25	●	●	
1920M-KM		4.05		●	
DA 1930M-GM	19.30	3.27	●	●	
1930M-KM		4.09		●	
DA 1940M-GM	19.40	3.29	●	●	
1940M-KM		4.14		●	
DA 1950M-GM	19.50	3.30	●	●	
1950M-KM		4.18		●	
DA 1960M-GM	19.60	3.32	●	●	
1960M-KM		4.22		●	
DA 1970M-GM	19.70	3.34	●	●	
1970M-KM		4.26		●	

Description	Dimension (mm) DC	PL	MEGACOAT NANO PR1535	PR1525	Applicable Toolholders ➡ K12~K22
DA 1980M-GM	19.80	3.36	●	●	SS20-DRA190M-○ SF25-DRA190M-○
1980M-KM		4.30		●	
DA 1990M-GM	19.90	3.38	●	●	
1990M-KM		4.35		●	
DA 2000M-GM	20.00	3.37	●	●	SS25-DRA200M-○ SF25-DRA200M-○
2000M-KM		4.20		●	
DA 2010M-GM	20.10	3.39	●	●	
2010M-KM		4.24		●	
DA 2020M-GM	20.20	3.41	●	●	
2020M-KM		4.28		●	
DA 2030M-GM	20.30	3.43	●	●	
2030M-KM		4.33		●	
DA 2040M-GM	20.40	3.45	●	●	
2040M-KM		4.37		●	
DA 2050M-GM	20.50	3.46	●	●	
2050M-KM		4.41		●	
DA 2060M-GM	20.60	3.48	●	●	
2060M-KM		4.45		●	
DA 2070M-GM	20.70	3.50	●	●	
2070M-KM		4.49		●	
DA 2080M-GM	20.80	3.52	●	●	
2080M-KM		4.54		●	
DA 2090M-GM	20.90	3.54	●	●	
2090M-KM		4.58		●	
DA 2100M-GM	21.00	3.54	●	●	SS25-DRA210M-○ SF25-DRA210M-○
2100M-KM		4.38		●	
DA 2150M-GM	21.50	3.63	●	●	
2150M-KM		4.59		●	
DA 2200M-GM	22.00	3.71	●	●	SS25-DRA220M-○ SF25-DRA220M-○
2200M-KM		4.55		●	
DA 2250M-GM	22.50	3.80	●	●	
2250M-KM		4.76		●	
DA 2300M-GM	23.00	3.87	●	●	SS25-DRA230M-○ SF25-DRA230M-○
2300M-KM		4.74		●	
DA 2350M-GM	23.50	3.96	●	●	
2350M-KM		4.94		●	
DA 2400M-GM	24.00	4.04	●	●	SS25-DRA240M-○ SF25-DRA240M-○
2400M-KM		4.91		●	
DA 2450M-GM	24.50	4.13	●	●	
2450M-KM		5.12		●	
DA 2500M-GM	25.00	4.20	●	●	SS32-DRA250M-○ SF25-DRA250M-○
2500M-KM		5.08		●	
DA 2550M-GM	25.50	4.29	●	●	
2550M-KM		5.29		●	

DA inserts are sold in 1 piece boxes

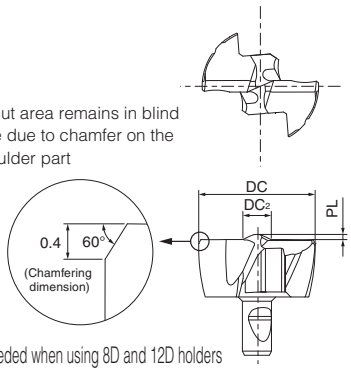
● : Std. Item

Applicable Inserts

FTP - Counterboring



Uncut area remains in blind hole due to chamfer on the shoulder part



*Applicable to 1.5D,3D,5D,8D and 12D holders, Prepared hole (0.5D) is needed when using 8D and 12D holders

k8 tolerance

DC	k8 (mm)
8.00 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.40	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Description	Dimension (mm)			MEGACOAT NANO		Applicable Toolholders
	DC	DC_2	PL	PR1535	PR1525	K12~K22
DA 0800M-FTP	8.00	2.90	0.40	●	●	SS10-DRA080M-○ SF12-DRA080M-○
0830M-FTP	8.30			●	●	
DA 0850M-FTP	8.50			●	●	SS10-DRA085M-○ SF12-DRA085M-○
0880M-FTP	8.80			●	●	
DA 0900M-FTP	9.00	3.00	0.43	●	●	SS10-DRA090M-○ SF12-DRA090M-○
0930M-FTP	9.30			●	●	
DA 0950M-FTP	9.50			●	●	SS10-DRA095M-○ SF12-DRA095M-○
DA 1000M-FTP	10.00	3.30	0.46	●	●	SS12-DRA100M-○ SF16-DRA100M-○
1030M-FTP	10.30			●	●	
DA 1050M-FTP	10.50			●	●	SS12-DRA105M-○ SF16-DRA105M-○
1080M-FTP	10.80			●	●	
DA 1100M-FTP	11.00	3.40	0.50	●	●	SS12-DRA110M-○ SF16-DRA110M-○
DA 1150M-FTP	11.50			●	●	SS12-DRA115M-○ SF16-DRA115M-○
DA 1200M-FTP	12.00	3.70	0.53	●	●	SS14-DRA120M-○ SF16-DRA120M-○
DA 1250M-FTP	12.50			●	●	SS14-DRA125M-○ SF16-DRA125M-○
1270M-FTP	12.70			●	●	
DA 1300M-FTP	13.00	3.90	0.56	●	●	SS14-DRA130M-○ SF16-DRA130M-○
DA 1350M-FTP	13.50			●	●	SS14-DRA135M-○ SF16-DRA135M-○
DA 1400M-FTP	14.00	4.20	0.60	●	●	SS16-DRA140M-○ SF16-DRA140M-○
DA 1450M-FTP	14.50			●	●	SS16-DRA145M-○ SF16-DRA145M-○
DA 1500M-FTP	15.00	4.40	0.65	●	●	SS16-DRA150M-○ SF20-DRA150M-○

Description	Dimension (mm)			MEGACOAT NANO		Applicable Toolholders
	DC	DC_2	PL	PR1535	PR1525	K12~K22
DA 1550M-FTP	15.50	4.40	0.65	●	●	SS16-DRA150M-○ SF20-DRA150M-○
DA 1600M-FTP	16.00	4.60	0.70	●	●	SS18-DRA160M-○ SF20-DRA160M-○
1650M-FTP	16.50			●	●	
DA 1700M-FTP	17.00	5.00	0.75	●	●	SS18-DRA170M-○ SF20-DRA170M-○
1750M-FTP	17.50			●	●	
DA 1800M-FTP	18.00	5.00	0.80	●	●	SS20-DRA180M-○ SF25-DRA180M-○
1850M-FTP	18.50			●	●	
DA 1900M-FTP	19.00	5.30	0.85	●	●	SS20-DRA190M-○ SF25-DRA190M-○
1950M-FTP	19.50			●	●	
DA 2000M-FTP	20.00	5.70	0.90	●	●	SS25-DRA200M-○ SF25-DRA200M-○
2050M-FTP	20.50			●	●	
DA 2100M-FTP	21.00	6.00	0.95	●	●	SS25-DRA210M-○ SF25-DRA210M-○
2150M-FTP	21.50			●	●	
DA 2200M-FTP	22.00	6.40	1.00	●	●	SS25-DRA220M-○ SF25-DRA220M-○
2250M-FTP	22.50			●	●	
DA 2300M-FTP	23.00	6.60	1.05	●	●	SS25-DRA230M-○ SF25-DRA230M-○
2350M-FTP	23.50			●	●	
DA 2400M-FTP	24.00	6.80	1.10	●	●	SS25-DRA240M-○ SF25-DRA240M-○
2450M-FTP	24.50			●	●	
DA 2500M-FTP	25.00	7.00	1.20	●	●	SS32-DRA250M-○ SF25-DRA250M-○
2540M-FTP	25.40			●	●	

● : Std. Item

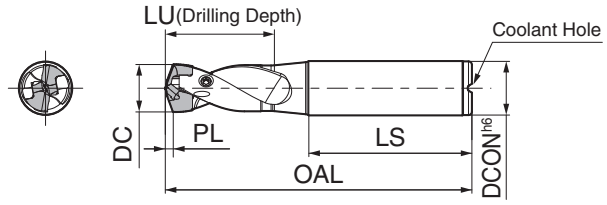
DA inserts are sold in 1 piece boxes

Description Identification System (Toolholder)

□□○○ - DRA ○○○ M - ○

Shank Type	Shank Dia.(mm)	Minimum Insert Dia.	Metric	Drilling Depth
SS : Straight Shank SF : Flanged Shank				1.5(LU≒1.5 x DC) 3 (LU≒3 x DC) 5 (LU≒5 x DC) 8 (LU≒8 x DC) 12(LU≒12 x DC)

SS-DRA (Drilling Depth : 1.5 x DC)



1.5D

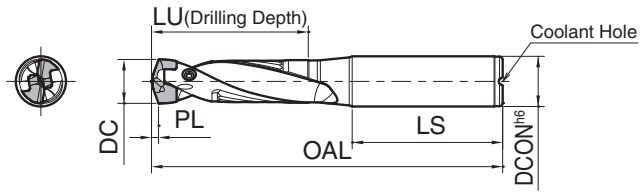
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts		Applicable Inserts K7~K11	Applicable Chamfering Holder and Insert Description K16	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench		Holder	Insert
			min.	max.									
SS10-	DRA080M-1.5	●	7.94	8.49	10	66.2	12.8	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...	S20-CH10-DRA	CT12T3-45DA
	DRA085M-1.5	●	8.50	8.99		67.5	13.5				DA0850M-...~DA0890M-...		
	DRA090M-1.5	●	9.00	9.49		68.7	14.3				DA0900M-...~DA0940M-...		
	DRA095M-1.5	●	9.50	9.99		70.0	15.0				DA0950M-...~DA0990M-...		
SS12-	DRA100M-1.5	●	10.00	10.49	12	76.2	15.8	45	HS-2534TRP		DA1000M-...~DA1040M-...	S32-CH12-DRA	
	DRA105M-1.5	●	10.50	10.99		77.5	16.5				DA1050M-...~DA1090M-...		
	DRA110M-1.5	●	11.00	11.49		79.7	17.3				DA1100M-...~DA1140M-...		
	DRA115M-1.5	●	11.50	11.99		81.0	18.0				DA1150M-...~DA1190M-...		
SS14-	DRA120M-1.5	●	12.00	12.49	14	82.2	18.8				DA1200M-...~DA1240M-...	S32-CH14-DRA	
	DRA125M-1.5	●	12.50	12.99		83.5	19.5				DA1250M-...~DA1290M-...		
	DRA130M-1.5	●	13.00	13.49		84.7	20.3				DA1300M-...~DA1340M-...		
	DRA135M-1.5	●	13.50	13.99		86.0	21.0				DA1350M-...~DA1390M-...		
SS16-	DRA140M-1.5	●	14.00	14.49	16	90.2	21.8	48	HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16-DRA	
	DRA145M-1.5	●	14.50	14.99		91.5	22.5				DA1450M-...~DA1490M-...		
	DRA150M-1.5	●	15.00	15.99		95.0	24.0				DA1500M-...~DA1590M-...		
SS18-	DRA160M-1.5	●	16.00	16.99	18	98.5	25.5				DA1600M-...~DA1690M-...	S32-CH18-DRA	
	DRA170M-1.5	●	17.00	17.99		101.0	27.0				DA1700M-...~DA1790M-...		
SS20-	DRA180M-1.5	●	18.00	18.99	20	106.5	28.5	50	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...	S32-CH20-DRA	
	DRA190M-1.5	●	19.00	19.99		109.0	30.0				DA1900M-...~DA1990M-...		
SS25-	DRA200M-1.5	●	20.00	20.99	25	117.5	31.5	56			DA2000M-...~DA2090M-...	-	-
	DRA210M-1.5	●	21.00	21.99		120.0	33.0				DA2100M-...~DA2150M-...		
	DRA220M-1.5	●	22.00	22.99		123.5	34.5				DA2200M-...~DA2250M-...		
	DRA230M-1.5	●	23.00	23.99		126.0	36.0				DA2300M-...~DA2350M-...		
	DRA240M-1.5	●	24.00	24.99		128.5	37.5				DA2400M-...~DA2450M-...		
SS32-	DRA250M-1.5	●	25.00	25.50	32	135.0	39.0	60			DA2500M-...~DA2550M-...		

● : Std. Item

SS-DRA (Drilling Depth : 3 x DC)



3D

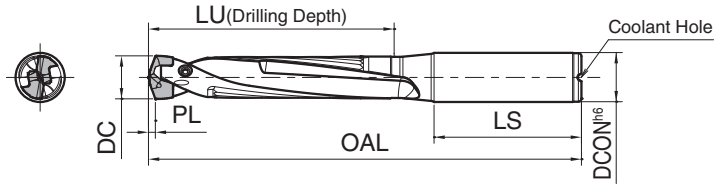
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts		Applicable Inserts K7~K11	Applicable Chamfering Holder and Insert Description K16	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench		Holder	Insert
			min.	max.									
SS10-	DRA080M-3	●	7.94	8.49	10	79	25.5	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...	S20-CH10-DRA	CT12T3-45DA
	DRA085M-3	●	8.50	8.99		81	27.0				DA0850M-...~DA0890M-...		
	DRA090M-3	●	9.00	9.49		83	28.5				DA0900M-...~DA0940M-...		
	DRA095M-3	●	9.50	9.99		85	30.0				DA0950M-...~DA0990M-...		
SS12-	DRA100M-3	●	10.00	10.49	12	92	31.5	45	HS-2534TRP		DA1000M-...~DA1040M-...	S32-CH12-DRA	
	DRA105M-3	●	10.50	10.99		94	33.0				DA1050M-...~DA1090M-...		
	DRA110M-3	●	11.00	11.49		97	34.5				DA1100M-...~DA1140M-...		
	DRA115M-3	●	11.50	11.99		99	36.0				DA1150M-...~DA1190M-...		
SS14-	DRA120M-3	●	12.00	12.49	14	101	37.5				DA1200M-...~DA1240M-...	S32-CH14-DRA	
	DRA125M-3	●	12.50	12.99		103	39.0				DA1250M-...~DA1290M-...		
	DRA130M-3	●	13.00	13.49		105	40.5				DA1300M-...~DA1340M-...		
	DRA135M-3	●	13.50	13.99		107	42.0				DA1350M-...~DA1390M-...		
SS16-	DRA140M-3	●	14.00	14.49	16	112	43.5	48	HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16-DRA	
	DRA145M-3	●	14.50	14.99		114	45.0				DA1450M-...~DA1490M-...		
	DRA150M-3	●	15.00	15.99		119	48.0				DA1500M-...~DA1590M-...		
SS18-	DRA160M-3	●	16.00	16.99	18	124	51.0				DA1600M-...~DA1690M-...	S32-CH18-DRA	
	DRA170M-3	●	17.00	17.99		128	54.0				DA1700M-...~DA1790M-...		
SS20-	DRA180M-3	●	18.00	18.99	20	135	57.0	50			DA1800M-...~DA1890M-...	S32-CH20-DRA	
	DRA190M-3	●	19.00	19.99		139	60.0				DA1900M-...~DA1990M-...		
SS25-	DRA200M-3	●	20.00	20.99	25	149	63.0	56	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...	-	-
	DRA210M-3	●	21.00	21.99		153	66.0				DA2100M-...~DA2150M-...		
	DRA220M-3	●	22.00	22.99		158	69.0				DA2200M-...~DA2250M-...		
	DRA230M-3	●	23.00	23.99		162	72.0				DA2300M-...~DA2350M-...		
	DRA240M-3	●	24.00	24.99		166	75.0				DA2400M-...~DA2450M-...		
SS32-	DRA250M-3	●	25.00	25.50	32	174	78.0	60			DA2500M-...~DA2550M-...		

● : Std. Item

SS-DRA (Drilling Depth : 5 x DC)



5D

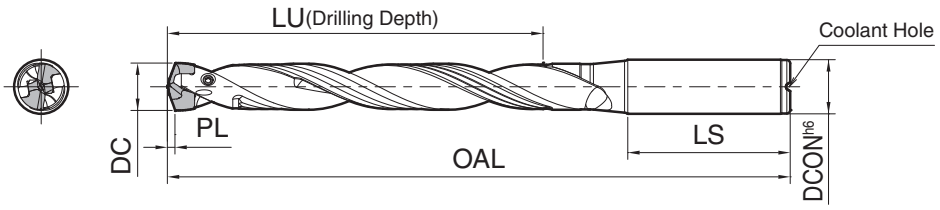
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts		Applicable Inserts K7~K11	Applicable Chamfering Holder and Insert Description K16	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench		Holder	Insert
			min.	max.									
SS10-	DRA080M-5	●	7.94	8.49	10	96	42.5	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...	S20-CH10-DRA	CT12T3-45DA
	DRA085M-5	●	8.50	8.99		99	45.0				DA0850M-...~DA0890M-...		
	DRA090M-5	●	9.00	9.49		102	47.5				DA0900M-...~DA0940M-...		
	DRA095M-5	●	9.50	9.99		105	50.0				DA0950M-...~DA0990M-...		
SS12-	DRA100M-5	●	10.00	10.49	12	113	52.5	45	HS-2534TRP		DA1000M-...~DA1040M-...	S32-CH12-DRA	
	DRA105M-5	●	10.50	10.99		116	55.0				DA1050M-...~DA1090M-...		
	DRA110M-5	●	11.00	11.49		120	57.5				DA1100M-...~DA1140M-...		
	DRA115M-5	●	11.50	11.99		123	60.0				DA1150M-...~DA1190M-...		
SS14-	DRA120M-5	●	12.00	12.49	14	126	62.5				DA1200M-...~DA1240M-...	S32-CH14-DRA	
	DRA125M-5	●	12.50	12.99		129	65.0				DA1250M-...~DA1290M-...		
	DRA130M-5	●	13.00	13.49		132	67.5				DA1300M-...~DA1340M-...		
	DRA135M-5	●	13.50	13.99		135	70.0				DA1350M-...~DA1390M-...		
SS16-	DRA140M-5	●	14.00	14.49	16	141	72.5	48	HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16-DRA	
	DRA145M-5	●	14.50	14.99		144	75.0				DA1450M-...~DA1490M-...		
	DRA150M-5	●	15.00	15.99		151	80.0				DA1500M-...~DA1590M-...		
SS18-	DRA160M-5	●	16.00	16.99	18	158	85.0				DA1600M-...~DA1690M-...	S32-CH18-DRA	
	DRA170M-5	●	17.00	17.99		164	90.0				DA1700M-...~DA1790M-...		
SS20-	DRA180M-5	●	18.00	18.99	20	173	95.0	50	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...	S32-CH20-DRA	
	DRA190M-5	●	19.00	19.99		179	100.0				DA1900M-...~DA1990M-...		
SS25-	DRA200M-5	●	20.00	20.99	25	191	105.0	56			DA2000M-...~DA2090M-...	-	-
	DRA210M-5	●	21.00	21.99		197	110.0				DA2100M-...~DA2150M-...		
	DRA220M-5	●	22.00	22.99		204	115.0				DA2200M-...~DA2250M-...		
	DRA230M-5	●	23.00	23.99		210	120.0				DA2300M-...~DA2350M-...		
	DRA240M-5	●	24.00	24.99		216	125.0				DA2400M-...~DA2450M-...		
SS32-	DRA250M-5	●	25.00	25.50	32	226	130.0	60			DA2500M-...~DA2550M-...		

● : Std. Item

SS-DRA (Drilling Depth : 8 x DC)



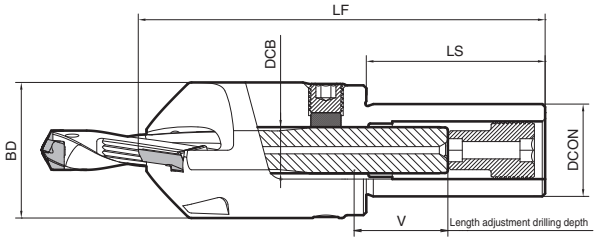
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts		Applicable Inserts K7~K11	Applicable Chamfering Holder and Insert Description K16	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench		Holder	Insert
			min.	max.									
SS10-	DRA080M-8	●	7.94	8.49	10	121	68.0	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...	S20-CH10-DRA	CT12T3-45DA
	DRA085M-8	●	8.50	8.99		126	72.0				DA0850M-...~DA0890M-...		
	DRA090M-8	●	9.00	9.49		130	76.0				DA0900M-...~DA0940M-...		
	DRA095M-8	●	9.50	9.99		135	80.0				DA0950M-...~DA0990M-...		
SS12-	DRA100M-8	●	10.00	10.49	12	144	84.0	45	HS-2534TRP		DA1000M-...~DA1040M-...	S32-CH12-DRA	
	DRA105M-8	●	10.50	10.99		149	88.0				DA1050M-...~DA1090M-...		
	DRA110M-8	●	11.00	11.49		154	92.0				DA1100M-...~DA1140M-...		
	DRA115M-8	●	11.50	11.99		159	96.0				DA1150M-...~DA1190M-...		
SS14-	DRA120M-8	●	12.00	12.49	14	163	100.0				DA1200M-...~DA1240M-...	S32-CH14-DRA	
	DRA125M-8	●	12.50	12.99		168	104.0				DA1250M-...~DA1290M-...		
	DRA130M-8	●	13.00	13.49		172	108.0				DA1300M-...~DA1340M-...		
	DRA135M-8	●	13.50	13.99		177	112.0				DA1350M-...~DA1390M-...		
SS16-	DRA140M-8	●	14.00	14.49	16	184	116.0	48	HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16-DRA	
	DRA145M-8	●	14.50	14.99		189	120.0				DA1450M-...~DA1490M-...		
	DRA150M-8	●	15.00	15.99		199	128.0				DA1500M-...~DA1590M-...		
SS18-	DRA160M-8	●	16.00	16.99	18	209	136.0				DA1600M-...~DA1690M-...	S32-CH18-DRA	
	DRA170M-8	●	17.00	17.99		218	144.0				DA1700M-...~DA1790M-...		
SS20-	DRA180M-8	●	18.00	18.99	20	230	152.0	50			DA1800M-...~DA1890M-...	S32-CH20-DRA	
	DRA190M-8	●	19.00	19.99		239	160.0				DA1900M-...~DA1990M-...		
SS25-	DRA200M-8	●	20.00	20.99	25	254	168.0	56	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...	-	-
	DRA210M-8	●	21.00	21.99		263	176.0				DA2100M-...~DA2150M-...		
	DRA220M-8	●	22.00	22.99		273	184.0				DA2200M-...~DA2250M-...		
	DRA230M-8	●	23.00	23.99		282	192.0				DA2300M-...~DA2350M-...		
	DRA240M-8	●	24.00	24.99		291	200.0				DA2400M-...~DA2450M-...		
SS32-	DRA250M-8	●	25.00	25.50	32	304	208.0	60			DA2500M-...~DA2550M-...		

● : Std. Item

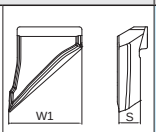
Chamfering Attachment



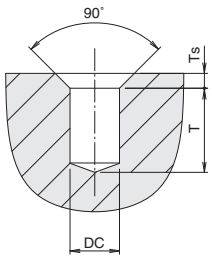
Holder

Description	Stock	Applicable Drill Shank Dia. DCB	Dimension (mm)					Applicable Inserts
			DCON	BD	LF	LS	V(Max.)	
S20-CH10-DRA	●	10	20	39	110	52	18	CT12T3-45DA
S32-CH12-DRA	●	12	32	43	130	62	24	
S32-CH14-DRA	●	14	32	45	130	62	24	
S32-CH16-DRA	●	16	32	47	141	62	24	
S32-CH18-DRA	●	18	32	49	145	62	24	
S32-CH20-DRA	●	20	32	53	150	62	24.5	

Applicable Inserts

Insert		Description	MEGACOAT NANO	Dimension (mm)	
			PR1535	W1	S
		**CT12T3-45DA**	●	13.54	3.97

Drilling Depth and Chamfering Dimension



Drill Dia. (mm) DC		Drilling Depth (mm)						Chamfering dimension (mm)		Applicable Chamfering Holder
		T(3D Drill)		T(5D Drill)		T(8D Drill)				
min.	max.	min.	max.	min.	max.	min.	max.	Ts	Ts max.	
7.94	8.49	12.5	20	18	36	43	60	2.5	8	**S20-CH10-DRA**
8.50	8.99	12.5	21.5	21.5	38.5	48	64			
9.00	9.49	12.5	23	24	41	52	68			
9.50	9.99	12.5	24.5	27.5	43.5	57.5	72.5			
10.00	10.49	15.5	26	22	46	52	76	4	8	**S32-CH12-DRA**
10.50	10.99	16	27.5	24.5	48.5	56	80			
11.00	11.49	16.5	29	27	51	60	84			
11.50	11.99	17.5	30.5	29.5	53.5	64	88			
12.00	12.49	18	32	32	56	68	92	4	8	**S32-CH14-DRA**
12.50	12.99	19	34	35	59	72.5	96.5			
13.00	13.49	19.5	35.5	37.5	61.5	76	100			
13.50	13.99	20	36.5	39.5	63.5	80	104			
14.00	14.49	21	38.5	42.5	66.5	84.5	108.5	4	8	**S32-CH16-DRA**
14.50	14.99	21.5	40	45	69	88.5	112.5			
15.00	15.99	22.5	41.5	47.5	71.5	92.5	116.5			
16.00	16.99	24	44.5	52.5	76.5	100.5	124.5	4	8	**S32-CH18-DRA**
17.00	17.99	25.5	47.5	57.5	81.5	108.5	132.5			
18.00	18.99	27.5	51	64	87	121	141	4	8	**S32-CH20-DRA**
19.00	19.99	29.5	54	69	92	129	149			

Ts : Maximum chamfer depth with recommended cutting conditions for DRA
Ts max. : Adjusting cutting conditions, such as reducing feed to 50% and/or lower cutting speed, is required.

● : Std. Item

Inserts are sold in 10 piece boxes

Spare Parts

Chamfering Holder	Adjustment Screw		For Fixing Drills					For Mounting Inserts		
			Clamp	Clamp Screw			Plunge Screw	Clamp	Clamp Screw	Wrench
Description		Hexagon hole two side widths			Hexagon hole two side widths	Tightening Torque (N·m)				
S20-CH10-DRA	AJ-12X22	6	CP-CH10	HS8X8	4	12	BNP6	C09N	W6X18N	DTM-15
S32-CH12-DRA			CP-CH12			15				
S32-CH14-DRA	AJ-20X30	8	CP-CH14	HS10X10	5	20				
S32-CH16-DRA			CP-CH16	HS12X10	6	30				
S32-CH18-DRA	AJ-22X35	10	CP-CH18			30				
S32-CH20-DRA			CP-CH20	HS16X10	8	45				

Method to use DRA chamfering attachment

1. Mount DRA drill into the chamfering attachment.



fig. 1 Install the DRA

2. Install an insert and tighten temporarily with clearance between the cutting edge and DRA body.

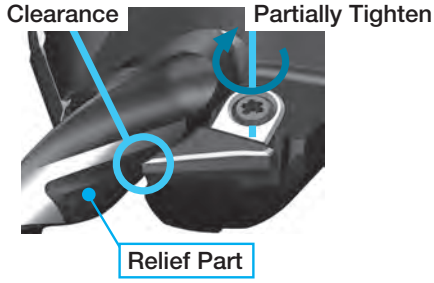


fig. 2 Install Inserts

3. Adjust drilling depth by turning adjustment screw with hexagon wrench

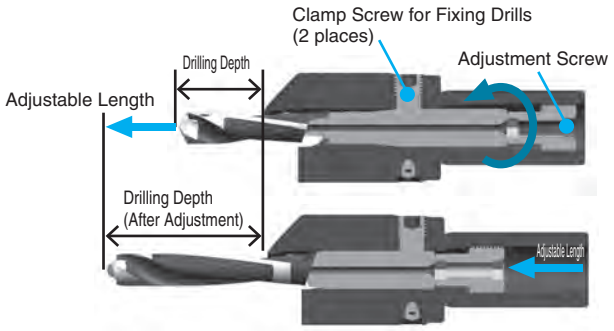


fig. 3 Adjustment of Drilling Depth

4. Align the flute edge and black relief part of the drill to the position shown in Fig.4 by rotating the DRA drill.

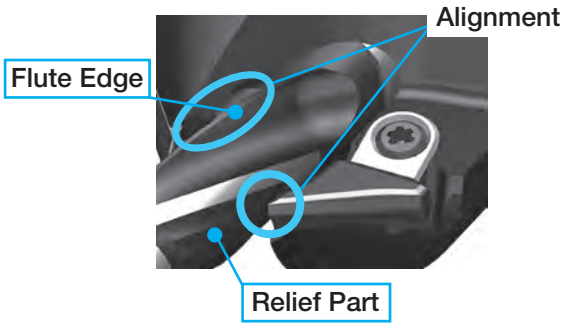


fig. 4 DRA Alignment

5. Fasten the two clamp screws for DRA (See table 1. for recommended torque)

Table 1 Recommended Torque

Chamfering Attachment	Clamp Screw	
	Recommended Torque (N·m)	Hexagon hole two side widths (mm)
S20-CH10-DRA	12	4
S32-CH12-DRA	15	
S32-CH14-DRA	20	5
S32-CH16-DRA	30	6
S32-CH18-DRA	30	
S32-CH20-DRA	45	8

6. Tighten the inserts while lightly pressing the edge of insert against the relief part. (Recommended Torque 3.5N·m)

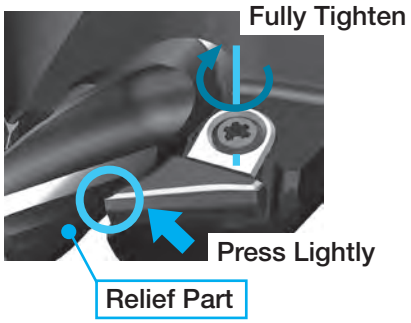
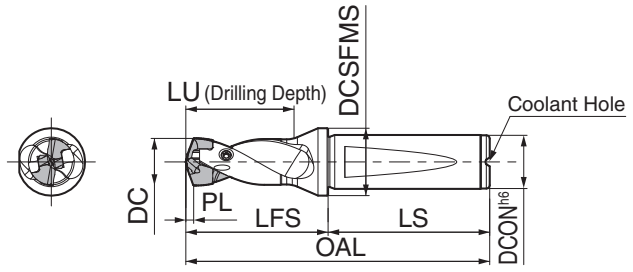


fig. 5 Fully Tighten

Cautions

- Chamfering attachment is dedicated for Straight Shank SS-DRA. It cannot be used for Flanged Shank SF-DRA.
- Chamfering requires two chamfering inserts. Using one insert is not recommended.
- Only fully remove clamp screws when replacing them.
- Clamps and clamp screws for mounting inserts need to be replaced regularly
- Screw locking adhesive is applied to adjustment screw. The effect will eventually wear off if the screws are used for a long time. Regular replacement is recommended.
- Please do not operate the plunge screws.

SF-DRA (Drilling Depth : 1.5 x DC)



1.5D

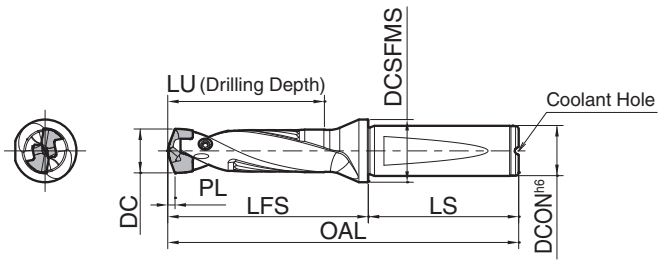
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)								Spare Parts		Applicable Inserts K7~K11
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-1.5	●	7.94	8.49	12	71.2	26.2	12.8	45	16	HS-2524TRP	FTP-5	DA0794M-…~DA0840M-…
	DRA085M-1.5	●	8.50	8.99		72.5	27.5	13.5					DA0850M-…~DA0890M-…
	DRA090M-1.5	●	9.00	9.49		73.7	28.7	14.3					DA0900M-…~DA0940M-…
	DRA095M-1.5	●	9.50	9.99		75.0	30.0	15.0					DA0950M-…~DA0990M-…
SF16-	DRA100M-1.5	●	10.00	10.49	16	79.2	31.2	15.8	48	20	HS-2534TRP		DA1000M-…~DA1040M-…
	DRA105M-1.5	●	10.50	10.99		80.5	32.5	16.5					DA1050M-…~DA1090M-…
	DRA110M-1.5	●	11.00	11.49		82.7	34.7	17.3					DA1100M-…~DA1140M-…
	DRA115M-1.5	●	11.50	11.99		84.0	36.0	18.0					DA1150M-…~DA1190M-…
	DRA120M-1.5	●	12.00	12.49		85.2	37.2	18.8					DA1200M-…~DA1240M-…
	DRA125M-1.5	●	12.50	12.99		86.5	38.5	19.5					DA1250M-…~DA1290M-…
	DRA130M-1.5	●	13.00	13.49		87.7	39.7	20.3					DA1300M-…~DA1340M-…
	DRA135M-1.5	●	13.50	13.99		89.0	41.0	21.0					DA1350M-…~DA1390M-…
	DRA140M-1.5	●	14.00	14.49		90.2	42.2	21.8			HS-3048TRP	DTP-6	DA1400M-…~DA1440M-…
	DRA145M-1.5	●	14.50	14.99		91.5	43.5	22.5					DA1450M-…~DA1490M-…
SF20-	DRA150M-1.5	●	15.00	15.99	20	97.0	47.0	24.0	50	25			DA1500M-…~DA1590M-…
	DRA160M-1.5	●	16.00	16.99		100.5	50.5	25.5					DA1600M-…~DA1690M-…
	DRA170M-1.5	●	17.00	17.99		103.0	53.0	27.0					DA1700M-…~DA1790M-…
SF25-	DRA180M-1.5	●	18.00	18.99	25	112.5	56.5	28.5	56	32	HS-4067TRP	DTP-7	DA1800M-…~DA1890M-…
	DRA190M-1.5	●	19.00	19.99		115.0	59.0	30.0					DA1900M-…~DA1990M-…
	DRA200M-1.5	●	20.00	20.99		117.5	61.5	31.5					DA2000M-…~DA2090M-…
	DRA210M-1.5	●	21.00	21.99		120.0	64.0	33.0					DA2100M-…~DA2150M-…
	DRA220M-1.5	●	22.00	22.99		123.5	67.5	34.5					DA2200M-…~DA2250M-…
	DRA230M-1.5	●	23.00	23.99		126.0	70.0	36.0					DA2300M-…~DA2350M-…
	DRA240M-1.5	●	24.00	24.99		128.5	72.5	37.5					DA2400M-…~DA2450M-…
	DRA250M-1.5	●	25.00	25.50		131.0	75.0	39.0					DA2500M-…~DA2550M-…

● : Std. Item

SF-DRA (Drilling Depth : 3 x DC)



3D

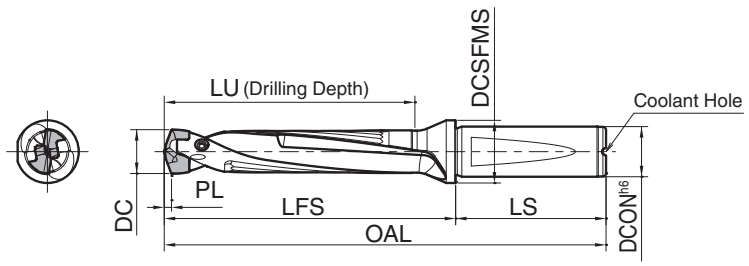
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)							Spare Parts		Applicable Inserts K7~K11
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-3	●	7.94	8.49	12	84	39	25.5	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	DRA085M-3	●	8.50	8.99		86	41	27.0					DA0850M-...~DA0890M-...
	DRA090M-3	●	9.00	9.49		88	43	28.5					DA0900M-...~DA0940M-...
	DRA095M-3	●	9.50	9.99		90	45	30.0					DA0950M-...~DA0990M-...
SF16-	DRA100M-3	●	10.00	10.49	16	95	47	31.5	48	20	HS-2534TRP		DA1000M-...~DA1040M-...
	DRA105M-3	●	10.50	10.99		97	49	33.0					DA1050M-...~DA1090M-...
	DRA110M-3	●	11.00	11.49		100	52	34.5					DA1100M-...~DA1140M-...
	DRA115M-3	●	11.50	11.99		102	54	36.0					DA1150M-...~DA1190M-...
	DRA120M-3	●	12.00	12.49		104	56	37.5					DA1200M-...~DA1240M-...
	DRA125M-3	●	12.50	12.99		106	58	39.0					DA1250M-...~DA1290M-...
	DRA130M-3	●	13.00	13.49		108	60	40.5					DA1300M-...~DA1340M-...
	DRA135M-3	●	13.50	13.99		110	62	42.0					DA1350M-...~DA1390M-...
	DRA140M-3	●	14.00	14.49		112	64	43.5					DA1400M-...~DA1440M-...
	DRA145M-3	●	14.50	14.99		114	66	45.0					DA1450M-...~DA1490M-...
SF20-	DRA150M-3	●	15.00	15.99	20	121	71	48.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	DRA160M-3	●	16.00	16.99		126	76	51.0					DA1600M-...~DA1690M-...
	DRA170M-3	●	17.00	17.99		130	80	54.0					DA1700M-...~DA1790M-...
SF25-	DRA180M-3	●	18.00	18.99	25	141	85	57.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	DRA190M-3	●	19.00	19.99		145	89	60.0					DA1900M-...~DA1990M-...
	DRA200M-3	●	20.00	20.99		149	93	63.0					DA2000M-...~DA2090M-...
	DRA210M-3	●	21.00	21.99		153	97	66.0					DA2100M-...~DA2150M-...
	DRA220M-3	●	22.00	22.99		158	102	69.0					DA2200M-...~DA2250M-...
	DRA230M-3	●	23.00	23.99		162	106	72.0					DA2300M-...~DA2350M-...
	DRA240M-3	●	24.00	24.99		166	110	75.0					DA2400M-...~DA2450M-...
	DRA250M-3	●	25.00	25.50		170	114	78.0					DA2500M-...~DA2550M-...

● : Std. Item

SF-DRA (Drilling Depth : 5 x DC)



5D

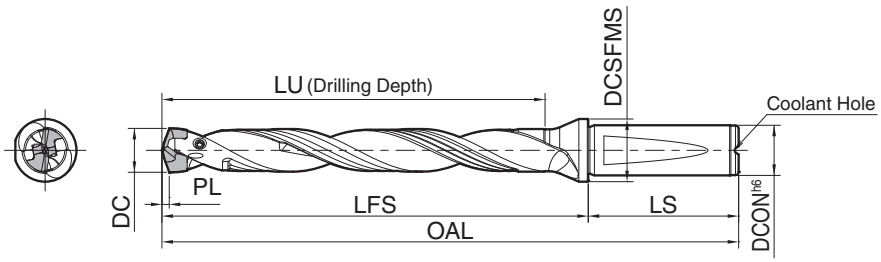
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)							Spare Parts		Applicable Inserts K7~K11
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-5	●	7.94	8.49	12	101	56	42.5	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	DRA085M-5	●	8.50	8.99		104	59	45.0					DA0850M-...~DA0890M-...
	DRA090M-5	●	9.00	9.49		107	62	47.5					DA0900M-...~DA0940M-...
	DRA095M-5	●	9.50	9.99		110	65	50.0					DA0950M-...~DA0990M-...
SF16-	DRA100M-5	●	10.00	10.49	16	116	68	52.5	48	20	HS-2534TRP		DA1000M-...~DA1040M-...
	DRA105M-5	●	10.50	10.99		119	71	55.0					DA1050M-...~DA1090M-...
	DRA110M-5	●	11.00	11.49		123	75	57.5					DA1100M-...~DA1140M-...
	DRA115M-5	●	11.50	11.99		126	78	60.0					DA1150M-...~DA1190M-...
	DRA120M-5	●	12.00	12.49		129	81	62.5					DA1200M-...~DA1240M-...
	DRA125M-5	●	12.50	12.99		132	84	65.0					DA1250M-...~DA1290M-...
	DRA130M-5	●	13.00	13.49		135	87	67.5					DA1300M-...~DA1340M-...
	DRA135M-5	●	13.50	13.99		138	90	70.0					DA1350M-...~DA1390M-...
	DRA140M-5	●	14.00	14.49		141	93	72.5			HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...
	DRA145M-5	●	14.50	14.99		144	96	75.0					DA1450M-...~DA1490M-...
SF20-	DRA150M-5	●	15.00	15.99	20	153	103	80.0	50	25			DA1500M-...~DA1590M-...
	DRA160M-5	●	16.00	16.99		160	110	85.0					DA1600M-...~DA1690M-...
	DRA170M-5	●	17.00	17.99		166	116	90.0					DA1700M-...~DA1790M-...
SF25-	DRA180M-5	●	18.00	18.99	25	179	123	95.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	DRA190M-5	●	19.00	19.99		185	129	100.0					DA1900M-...~DA1990M-...
	DRA200M-5	●	20.00	20.99		191	135	105.0					DA2000M-...~DA2090M-...
	DRA210M-5	●	21.00	21.99		197	141	110.0					DA2100M-...~DA2150M-...
	DRA220M-5	●	22.00	22.99		204	148	115.0					DA2200M-...~DA2250M-...
	DRA230M-5	●	23.00	23.99		210	154	120.0					DA2300M-...~DA2350M-...
	DRA240M-5	●	24.00	24.99		216	160	125.0					DA2400M-...~DA2450M-...
	DRA250M-5	●	25.00	25.50		222	166	130.0					DA2500M-...~DA2550M-...

● : Std. Item

SF-DRA (Drilling Depth : 8 x DC)



8D

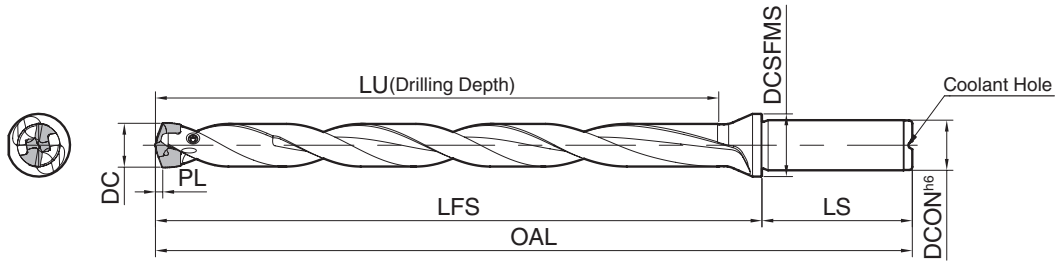
· For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)							Spare Parts		Applicable Inserts K7~K11
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-8	●	7.94	8.49	12	126	81	68.0	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	DRA085M-8	●	8.50	8.99		131	86	72.0					DA0850M-...~DA0890M-...
	DRA090M-8	●	9.00	9.49		135	90	76.0					DA0900M-...~DA0940M-...
	DRA095M-8	●	9.50	9.99		140	95	80.0					DA0950M-...~DA0990M-...
SF16-	DRA100M-8	●	10.00	10.49	16	147	99	84.0	48	20	HS-2534TRP		DA1000M-...~DA1040M-...
	DRA105M-8	●	10.50	10.99		152	104	88.0					DA1050M-...~DA1090M-...
	DRA110M-8	●	11.00	11.49		157	109	92.0					DA1100M-...~DA1140M-...
	DRA115M-8	●	11.50	11.99		162	114	96.0					DA1150M-...~DA1190M-...
	DRA120M-8	●	12.00	12.49		166	118	100.0					DA1200M-...~DA1240M-...
	DRA125M-8	●	12.50	12.99		171	123	104.0					DA1250M-...~DA1290M-...
	DRA130M-8	●	13.00	13.49		175	127	108.0					DA1300M-...~DA1340M-...
	DRA135M-8	●	13.50	13.99		180	132	112.0					DA1350M-...~DA1390M-...
	DRA140M-8	●	14.00	14.49		184	136	116.0			HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...
	DRA145M-8	●	14.50	14.99		189	141	120.0					DA1450M-...~DA1490M-...
SF20-	DRA150M-8	●	15.00	15.99	20	201	151	128.0	50	25			DA1500M-...~DA1590M-...
	DRA160M-8	●	16.00	16.99		211	161	136.0					DA1600M-...~DA1690M-...
	DRA170M-8	●	17.00	17.99		220	170	144.0					DA1700M-...~DA1790M-...
SF25-	DRA180M-8	●	18.00	18.99	25	236	180	152.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	DRA190M-8	●	19.00	19.99		245	189	160.0					DA1900M-...~DA1990M-...
	DRA200M-8	●	20.00	20.99		254	198	168.0					DA2000M-...~DA2090M-...
	DRA210M-8	●	21.00	21.99		263	207	176.0					DA2100M-...~DA2150M-...
	DRA220M-8	●	22.00	22.99		273	217	184.0					DA2200M-...~DA2250M-...
	DRA230M-8	●	23.00	23.99		282	226	192.0					DA2300M-...~DA2350M-...
	DRA240M-8	●	24.00	24.99		291	235	200.0					DA2400M-...~DA2450M-...
	DRA250M-8	●	25.00	25.50		300	244	208.0					DA2500M-...~DA2550M-...

● : Std. Item

SF-DRA (Drilling Depth : 12 x DC) NEW



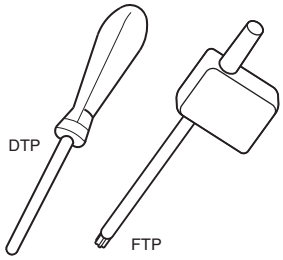
· For PL indicates distance from drill point to corner edge K7,K9~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)							Spare Parts		Applicable Inserts K7,K9~K11
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
			min.	max.									
SF16-	DRA120M-12	●	12.00	12.49	16	216	168	150.0	48	20	HS-2534TRP	FTP-5	DA1200M-...~DA1240M-...
	DRA125M-12	●	12.50	12.99		223	175	156.0					DA1250M-...~DA1290M-...
	DRA130M-12	●	13.00	13.49		229	181	162.0					DA1300M-...~DA1340M-...
	DRA135M-12	●	13.50	13.99		236	188	168.0					DA1350M-...~DA1390M-...
	DRA140M-12	●	14.00	14.49		242	194	174.0			HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...
	DRA145M-12	●	14.50	14.99		249	201	180.0					DA1450M-...~DA1490M-...
SF20-	DRA150M-12	●	15.00	15.99	20	265	215	192.0	50	25			DA1500M-...~DA1590M-...
	DRA160M-12	●	16.00	16.99		279	229	204.0					DA1600M-...~DA1690M-...
	DRA170M-12	●	17.00	17.99		292	242	216.0					DA1700M-...~DA1790M-...
SF25-	DRA180M-12	●	18.00	18.99	25	312	256	228.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	DRA190M-12	●	19.00	19.99		325	269	240.0					DA1900M-...~DA1990M-...
	DRA200M-12	●	20.00	20.99		338	282	252.0					DA2000M-...~DA2090M-...
	DRA210M-12	●	21.00	21.99		351	295	264.0					DA2100M-...~DA2150M-...
	DRA220M-12	●	22.00	22.99		365	309	276.0					DA2200M-...~DA2250M-...
	DRA230M-12	●	23.00	23.99		378	322	288.0					DA2300M-...~DA2350M-...
	DRA240M-12	●	24.00	24.99		391	335	300.0					DA2400M-...~DA2450M-...
	DRA250M-12	●	25.00	25.50		404	348	312.0					DA2500M-...~DA2550M-...

Spare Parts

Clamp Screw	Description
	HS-2524TRP
	HS-2534TRP
	HS-3048TRP
	HS-4067TRP

Wrench	Description	Tightening Torque (N·m)
	FTP-5	0.5
	DTP-6	0.8
	DTP-7	1.2

● : Std. Item

Recommended Cutting Conditions

High Precision Insert for Steel **HQP**

	Workpiece Material	Recommended Insert Grades / Cutting Speed (m/min)	n (min^{-1})	Drill Dia. DC (mm)				Remarks
		PR1525	f (mm/rev)	**ø8**	**ø11**	**ø14**	**ø19**	
High Precision Insert for Steel HQP	Low Carbon Steel	80 - 180	n (min^{-1})	3,180 - 7,160	2,310 - 5,210	1,810 - 4,090	1,410 - 3,180	Coolant
			f (mm/rev)	0.12 - 0.24	0.12 - 0.28	0.16 - 0.32	0.16 - 0.36	
	Carbon Steel	80 - 150	n (min^{-1})	3,180 - 7,160	2,310 - 5,210	1,810 - 4,090	1,410 - 3,180	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.28	0.16 - 0.32	0.16 - 0.36	
	Alloy Steel	70 - 120	n (min^{-1})	2,790 - 4,780	2,030 - 3,470	1,590 - 2,730	1,240 - 2,120	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.28	0.16 - 0.32	0.16 - 0.36	
	Mold Steel	50 - 90	n (min^{-1})	1,990 - 3,580	1,450 - 2,600	1,140 - 2,050	880 - 1,590	
			f (mm/rev)	0.08 - 0.17	0.08 - 0.2	0.11 - 0.23	0.11 - 0.26	

Caution : Recommended cutting conditions above is for 1.5D/3D type. As drilling depth increases (1.5D/3D→5D→8D→12D), feed rates need to be set lower than the recommended values.
Recommended feed rate : 1.5D/3D type=100%, 5D type=80% or less, 8D/12D type=70% or less

General Purpose **GM** / Cast Iron **KM**

	Workpiece Material	Recommended Insert Grades / Cutting Speed (m/min)		n (min^{-1})	Drill Dia. DC (mm)						Remarks
		PR1535	**PR1525**	f (mm/rev)	**ø8**	**ø11**	**ø14**	**ø18**	**ø22**	**ø25**	
General Purpose GM	Low Carbon Steel	★ 100 - 180	☆ 100 - 180	n (min^{-1})	3,980 - 7,160	2,890 - 5,210	2,270 - 4,090	1,770 - 3,180	1,450 - 2,600	1,270 - 2,290	Coolant
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
	Carbon Steel	★ 100 - 150	☆ 100 - 150	n (min^{-1})	3,980 - 5,970	2,890 - 4,340	2,270 - 3,410	1,770 - 2,650	1,450 - 2,170	1,270 - 1,910	
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
	Alloy Steel	★ 70 - 120	☆ 70 - 120	n (min^{-1})	2,790 - 4,780	2,030 - 3,470	1,590 - 2,730	1,240 - 2,120	1,010 - 1,740	890 - 1,530	
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
	Mold Steel	★ 50 - 90	☆ 50 - 90	n (min^{-1})	1,990 - 3,580	1,450 - 2,600	1,140 - 2,050	880 - 1,590	720 - 1,300	640 - 1,150	
				f (mm/rev)	0.08 - 0.17	0.08 - 0.22	0.11 - 0.25	0.11 - 0.28	0.14 - 0.32	0.14 - 0.32	
	Stainless Steel	★ 40 - 70	☆ 40 - 70	n (min^{-1})	1,590 - 2,790	1,160 - 2,030	910 - 1,590	710 - 1,240	580 - 1,010	510 - 890	
				f (mm/rev)	0.1 - 0.24	0.1 - 0.24	0.12 - 0.3	0.15 - 0.3	0.15 - 0.3	0.15 - 0.35	
					*Feed Rate 0.15 mm/rev or less is recommended until drilling depth reaches 0.5 x DC						
	Gray Cast Iron	☆ 90 - 170	★ 90 - 170	n (min^{-1})	3,580 - 6,760	2,600 - 4,920	2,050 - 3,870	1,590 - 3,010	1,300 - 2,460	1,150 - 2,170	
				f (mm/rev)	0.14 - 0.29	0.14 - 0.37	0.19 - 0.43	0.19 - 0.45	0.24 - 0.45	0.24 - 0.45	
	Nodular Cast Iron	☆ 40 - 120	★ 40 - 120	n (min^{-1})	1,590 - 4,780	1,160 - 3,470	910 - 2,730	710 - 2,120	580 - 1,740	510 - 1,530	
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
Cast Iron KM	Gray Cast Iron	-	90 - 170	n (min^{-1})	3,580 - 6,760	2,600 - 4,920	2,050 - 3,870	1,590 - 3,010	1,300 - 2,460	1,150 - 2,170	
				f (mm/rev)	0.17 - 0.35	0.19 - 0.42	0.23 - 0.53	0.25 - 0.60	0.32 - 0.60	0.32 - 0.60	
	Nodular Cast Iron	-	40 - 120	n (min^{-1})	1,590 - 4,780	1,160 - 3,470	910 - 2,730	710 - 2,120	580 - 1,740	510 - 1,530	
				f (mm/rev)	0.12 - 0.24	0.17 - 0.36	0.21 - 0.48	0.24 - 0.60	0.27 - 0.60	0.27 - 0.60	

*Recommended cutting conditions above is for 1.5D/3D type. As drilling depth increases (1.5D/3D→5D→8D→12D), cutting speed and feed rates need to be set lower than the recommended values.
Recommended feed rate : 1.5/3D type=100%, 5D type=80% or less
Recommended cutting speed and feed rate: 8D type=80% or less, 12D type=70% or less

★ : 1st Recommendation
☆ : 2nd Recommendation

Counterboring **FTP**

	Workpiece Material	Recommended Insert Grades / Cutting Speed (m/min)		n (min^{-1})	Drill Dia.DC (mm)						Remarks
		PR1535	**PR1525**	f (mm/rev)	**ø8**	**ø11**	**ø14**	**ø18**	**ø22**	**ø25**	
Counterboring FTP	Low Carbon Steel	★ 80 - 150	☆ 80 - 150	n (min^{-1})	3,150 - 6,000	2,300 - 4,350	1,800 - 3,400	1,400 - 2,650	1,150 - 2,200	1,000 - 1,900	Coolant
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.20 - 0.45	0.20 - 0.45	
	Carbon Steel	★ 80 - 120	☆ 80 - 120	n (min^{-1})	3,150 - 4,750	2,300 - 3,450	1,800 - 2,700	1,400 - 2,100	1,150 - 1,750	1,000 - 1,500	
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.20 - 0.45	0.20 - 0.45	
	Alloy Steel	★ 70 - 120	☆ 70 - 120	n (min^{-1})	2,800 - 4,750	2,000 - 3,450	1,600 - 2,700	1,250 - 2,100	1,000 - 1,750	900 - 1,500	
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.20 - 0.40	0.20 - 0.45	
	Mold Steel	★ 40 - 70	☆ 40 - 70	n (min^{-1})	1,600 - 2,800	1,150 - 2,000	900 - 1,600	700 - 1,250	600 - 1,000	500 - 900	
				f (mm/rev)	0.08 - 0.17	0.08 - 0.22	0.11 - 0.25	0.11 - 0.28	0.14 - 0.30	0.14 - 0.32	
	Stainless Steel	★ 40 - 70	☆ 40 - 70	n (min^{-1})	1,600 - 2,800	1,150 - 2,000	900 - 1,600	700 - 1,250	600 - 1,000	500 - 900	
				f (mm/rev)	0.10 - 0.20	0.10 - 0.20	0.10 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.28	
					*Feed Rate 0.15 mm/rev or less is recommended until drilling depth reaches 0.5 x DC						
	Gray Cast Iron	☆ 70 - 140	★ 70 - 140	n (min^{-1})	2,800 - 5,600	2,000 - 4,050	1,600 - 3,200	1,250 - 2,500	1,000 - 2,000	900 - 1,800	
				f (mm/rev)	0.14 - 0.29	0.14 - 0.37	0.19 - 0.43	0.19 - 0.45	0.24 - 0.45	0.24 - 0.45	
	Nodular Cast Iron	☆ 40 - 100	★ 40 - 100	n (min^{-1})	1,600 - 4,000	1,150 - 2,900	900 - 2,750	700 - 1,750	600 - 1,450	500 - 1,250	
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.2 - 0.45	0.2 - 0.45	

*The recommended cutting conditions are for drilling on plain surface.
The conditions for drilling on slant hole shows the depth from the top of workpiece.
Set the feed rate 50% or under when inclination angle is 30 or under. Set the feed rate 30% or under when inclination angle is over 30°.
Traversing is not recommended.
Applicable to 1.5D,3D,5D,8D and 12D holders. Prepared hole (0.5xDC) is needed when using 8D/12D holder.
Recommended feed rate : 1.5/3D type=100%, 5D type=80% or less
Recommended cutting speed and feed rate: 8D type=80% or less, 12D type=70% or less

★ : 1st Recommendation
☆ : 2nd Recommendation

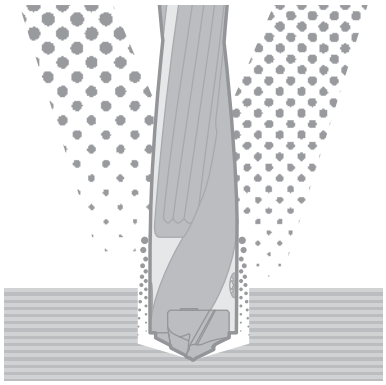
Coolant * Dry machining is not recommended.

1st Recommendation

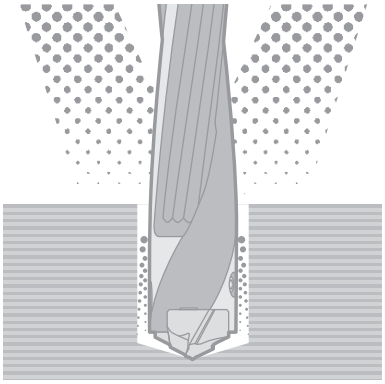
Internal coolant

Internal and external coolant is recommended

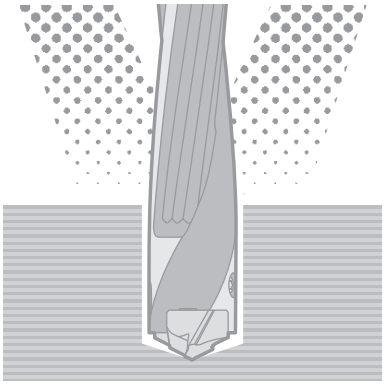
Drilling Depth Less than 1DC



Stainless Steel, high feed rate



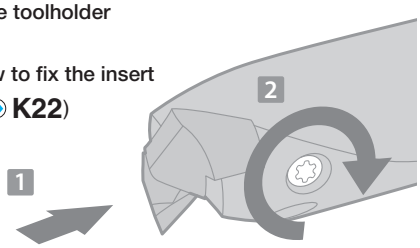
In case of external coolant



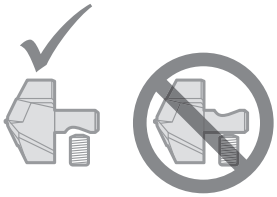
Lathe : 3DC or less
Vertical M/C : 1.5DC or less

How to attach inserts

1 Install insert onto the toolholder in the right direction
2 Tighten clamp screw to fix the insert (Tightening Torque ➡ **K22**)



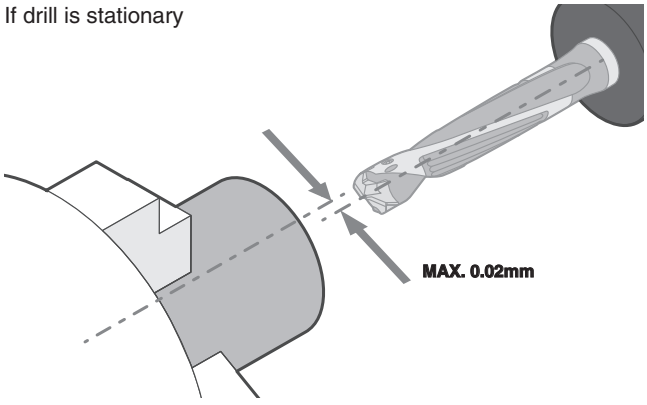
Be careful of the insert direction



* 1 Remove dust on insert pocket using air blow for every replacement.
* 2 Make sure that the locating surfaces of the insert closely contacts the toolholder.

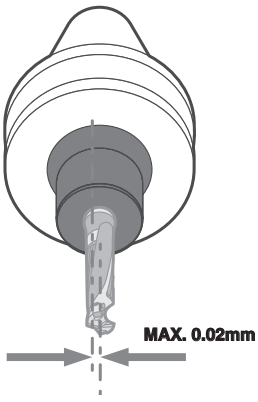
Core Deviation

If drill is stationary



This can be used with a boring sleeve and collet chuck, please be sure to set deviation amount 0.02mm or under between workpiece and drill.

If drill is rotating



Make sure to use arbor that is not deformed.
Center of arbor deviation must be within 0.02mm.

Cautions for installation on Machining Center

For installation of MagicDrill DRA

1st Choice

Hydro Chuck, Power Chuck, Collet Chuck, etc.

Hydro Chuck

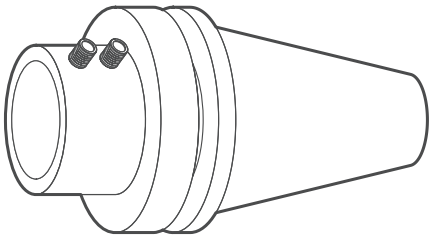
Power Chuck

Collet Chuck

Install MagicDrill DRA to the chucks

2nd Choice

Side lock arbor



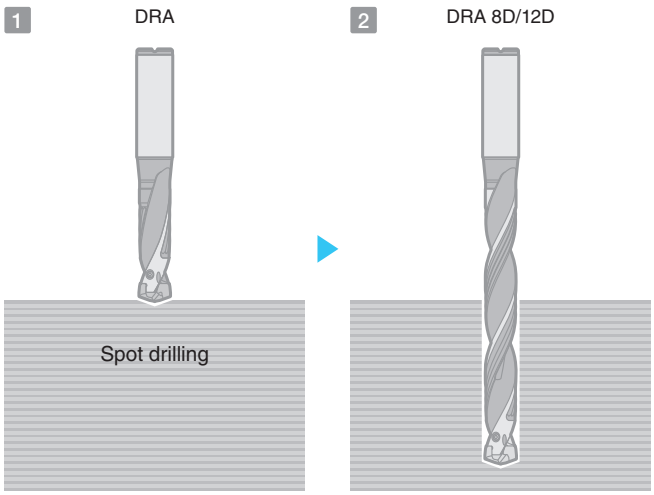
Example of side lock arbor

Cautions for machining with 8D/12D holder

Recommended machining

1 Make a center spot using DRA 1.5D/3D/5D type.
(Center spot should be at least half of cutting diameter)

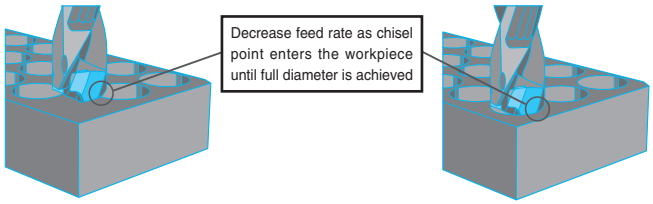
2 Then drill the hole using DRA (8D/12D type).



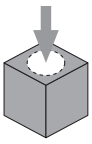
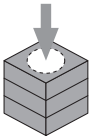
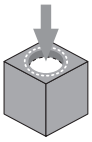
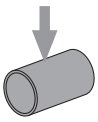
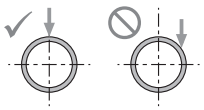
Precautions for KM Chipbreaker

Machining on Casting Surface

Decrease feed to 0.15 mm/rev until full drill diameter has entered the workpiece

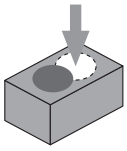


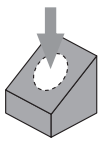
Applicable workpieces

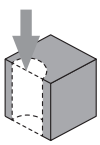
Applications	Shape of Workpiece	Caution for machining
Plain Surface		1. When machining stainless steel, for hole depths of up to 0.5DC, keep feed rate at 0.15mm/rev or less. 2. Internal coolant is recommended for smooth chip removal. For stainless steel, the combination of internal and external coolant is recommended.
Stacked Plates		1. Fix stacked plates securely to ensure they do not slip while machining.
Concave Surface		1. When machining concave holes, set the feed rate at half of recommended feed or less for continuous hole machining. 2. Utilize a step feeding if chips are not broken short at the inlet.
Pipe Material		1. Hole machining above the centerline of the pipe is possible. 2. Do not machine on curved surface areas.  Center portion machining *Curved surface portion machining

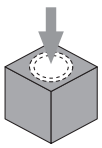
* Machining Possible with FTP and 1.5D toolholder

Not Recommended workpieces

Applications	Shape of Workpiece
*Hole Expansion	

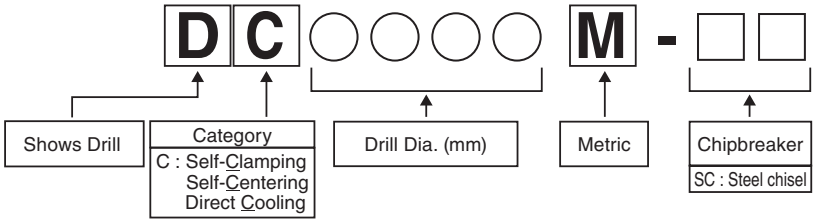
Applications	Shape of Workpiece
*Slant Surface	

Applications	Shape of Workpiece
Half Cylindrical	

Applications	Shape of Workpiece
*Cored Hole	

* Machining Possible with FTP and 1.5D toolholder

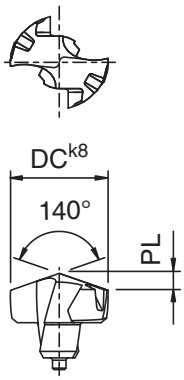
Description Identification System (Insert)



Insert Grades PR0315

PR0315 is tough super micro grain carbide grade with TiAlN coating, with excellent wear resistance and fracture resistance. It enables stable machining of carbon steel, alloy steel and cast iron.

Insert	Description		Dimension (mm) DC	Dimension (mm) PL	PVD Coated Carbide PR0315	Applicable Toolholders K29~K31, K34~K36
	DC	0794M-SC	7.94	1.37	●	SS10-DRC080M-○ SF12-DRC080M-○
		0800M-SC	8.00	1.38	●	
		0810M-SC	8.10	1.40	●	
		0820M-SC	8.20	1.42	●	
		0830M-SC	8.30	1.43	●	
		0840M-SC	8.40	1.45	●	
	DC	0850M-SC	8.50	1.47	●	SS10-DRC085M-○ SF12-DRC085M-○
		0860M-SC	8.60	1.48	●	
		0870M-SC	8.70	1.50	●	
		0880M-SC	8.80	1.52	●	
		0890M-SC	8.90	1.54	●	
	DC	0900M-SC	9.00	1.55	●	SS10-DRC090M-○ SF12-DRC090M-○
		0910M-SC	9.10	1.57	●	
		0920M-SC	9.20	1.59	●	
		0930M-SC	9.30	1.61	●	
		0940M-SC	9.40	1.62	●	
	DC	0950M-SC	9.50	1.64	●	SS10-DRC095M-○ SF12-DRC095M-○
		0960M-SC	9.60	1.66	●	
		0970M-SC	9.70	1.67	●	
		0980M-SC	9.80	1.69	●	
		0990M-SC	9.90	1.71	●	
	DC	1000M-SC	10.00	1.72	●	SS12-DRC100M-○ SF16-DRC100M-○
		1010M-SC	10.10	1.74	●	
		1020M-SC	10.20	1.76	●	
		1030M-SC	10.30	1.78	●	
		1040M-SC	10.40	1.80	●	
	DC	1050M-SC	10.50	1.81	●	SS12-DRC105M-○ SF16-DRC105M-○
		1060M-SC	10.60	1.83	●	
		1070M-SC	10.70	1.85	●	
		1080M-SC	10.80	1.86	●	
		1090M-SC	10.90	1.88	●	
	DC	1100M-SC	11.00	1.90	●	SS12-DRC110M-○ SF16-DRC110M-○
		1110M-SC	11.10	1.91	●	
		1120M-SC	11.20	1.93	●	
		1130M-SC	11.30	1.95	●	
		1140M-SC	11.40	1.97	●	
	DC	1150M-SC	11.50	1.98	●	SS12-DRC115M-○ SF16-DRC115M-○
		1160M-SC	11.60	2.00	●	
		1170M-SC	11.70	2.02	●	
		1180M-SC	11.80	2.04	●	
		1190M-SC	11.90	2.06	●	
	DC	1200M-SC	12.00	2.07	●	SS14-DRC120M-○ SF16-DRC120M-○
		1210M-SC	12.10	2.09	●	
		1220M-SC	12.20	2.11	●	
		1230M-SC	12.30	2.12	●	
		1240M-SC	12.40	2.14	●	



k8 tolerance

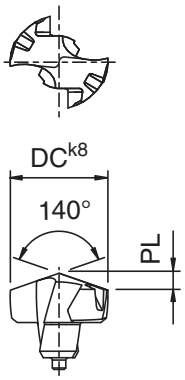
DC	k8(mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.99	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

● : Std. Item

DC inserts are sold in 1 piece boxes





k8 tolerance

DC	k8(mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.99	+0.033 0

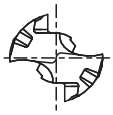
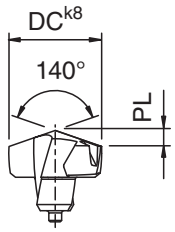
k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Insert	Description	Dimension (mm) DC	Dimension (mm) PL	PVD Coated Carbide PR0315	Applicable Toolholders (K29~K31, K34~K36)
DC	1250M-SC	12.50	2.16	●	SS14-DRC125M-○ SF16-DRC125M-○
	1260M-SC	12.60	2.17	●	
	1270M-SC	12.70	2.19	●	
	1280M-SC	12.80	2.21	●	
	1290M-SC	12.90	2.23	●	
DC	1300M-SC	13.00	2.24	●	SS14-DRC130M-○ SF16-DRC130M-○
	1310M-SC	13.10	2.26	●	
	1320M-SC	13.20	2.28	●	
	1330M-SC	13.30	2.30	●	
	1340M-SC	13.40	2.31	●	
DC	1350M-SC	13.50	2.33	●	SS14-DRC135M-○ SF16-DRC135M-○
	1360M-SC	13.60	2.35	●	
	1370M-SC	13.70	2.36	●	
	1380M-SC	13.80	2.38	●	
	1390M-SC	13.90	2.40	●	
DC	1400M-SC	14.00	2.41	●	SS16-DRC140M-○ SF16-DRC140M-○
	1410M-SC	14.10	2.43	●	
	1420M-SC	14.20	2.45	●	
	1430M-SC	14.30	2.47	●	
	1440M-SC	14.40	2.49	●	
DC	1450M-SC	14.50	2.50	●	SS16-DRC145M-○ SF16-DRC145M-○
	1460M-SC	14.60	2.52	●	
	1470M-SC	14.70	2.54	●	
	1480M-SC	14.80	2.55	●	
	1490M-SC	14.90	2.57	●	
DC	1500M-SC	15.00	2.59	●	SS16-DRC150M-○ SF20-DRC150M-○
	1510M-SC	15.10	2.60	●	
	1520M-SC	15.20	2.62	●	
	1530M-SC	15.30	2.64	●	
	1540M-SC	15.40	2.66	●	
	1550M-SC	15.50	2.68	●	
	1560M-SC	15.60	2.70	●	
	1570M-SC	15.70	2.71	●	
	1580M-SC	15.80	2.73	●	
DC	1600M-SC	16.00	2.76	●	SS18-DRC160M-○ SF20-DRC160M-○
	1610M-SC	16.10	2.78	●	
	1620M-SC	16.20	2.80	●	
	1630M-SC	16.30	2.81	●	
	1640M-SC	16.40	2.83	●	
	1650M-SC	16.50	2.85	●	
	1660M-SC	16.60	2.87	●	
	1670M-SC	16.70	2.89	●	
	1680M-SC	16.80	2.90	●	
	1690M-SC	16.90	2.92	●	
DC	1700M-SC	17.00	2.93	●	SS18-DRC170M-○ SF20-DRC170M-○
	1710M-SC	17.10	2.95	●	
	1720M-SC	17.20	2.97	●	
	1730M-SC	17.30	2.99	●	
	1740M-SC	17.40	3.00	●	
	1750M-SC	17.50	3.02	●	
	1760M-SC	17.60	3.04	●	
	1770M-SC	17.70	3.06	●	
	1780M-SC	17.80	3.08	●	
	1790M-SC	17.90	3.09	●	
DC	1800M-SC	18.00	3.10	●	SS20-DRC180M-○ SF25-DRC180M-○
	1810M-SC	18.10	3.12	●	
	1820M-SC	18.20	3.14	●	
	1830M-SC	18.30	3.16	●	
	1840M-SC	18.40	3.18	●	
	1850M-SC	18.50	3.19	●	
	1860M-SC	18.60	3.21	●	
	1870M-SC	18.70	3.23	●	
	1880M-SC	18.80	3.25	●	
	1890M-SC	18.90	3.27	●	

● : Std. Item

DC inserts are sold in 1 piece boxes

Inserts for MagicDrill DRC

Insert		Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholders
				DC	PL	PR0315	K29~K31, K34~K36
	 	DC	1900M-SC	19.00	3.28	●	SS20-DRC190M-○ SF25-DRC190M-○
			1910M-SC	19.10	3.29	●	
			1920M-SC	19.20	3.31	●	
			1930M-SC	19.30	3.33	●	
			1940M-SC	19.40	3.35	●	
			1950M-SC	19.50	3.37	●	
			1960M-SC	19.60	3.39	●	
			1970M-SC	19.70	3.40	●	
			1980M-SC	19.80	3.42	●	
			1990M-SC	19.90	3.44	●	
		DC	2000M-SC	20.00	3.45	●	SS25-DRC200M-○ SF25-DRC200M-○
			2010M-SC	20.10	3.47	●	
			2020M-SC	20.20	3.48	●	
			2030M-SC	20.30	3.50	●	
			2040M-SC	20.40	3.52	●	
			2050M-SC	20.50	3.54	●	
			2060M-SC	20.60	3.56	●	
			2070M-SC	20.70	3.58	●	
			2080M-SC	20.80	3.59	●	
			2090M-SC	20.90	3.61	●	
			2099M-SC	20.99	3.63	●	
		DC	2100M-SC	21.00	3.62	●	SS25-DRC210M-○ SF25-DRC210M-○
			2150M-SC	21.50	3.71	●	
			2200M-SC	22.00	3.79	●	SS25-DRC220M-○ SF25-DRC220M-○
			2250M-SC	22.50	3.88	●	
			2300M-SC	23.00	3.97	●	SS25-DRC230M-○ SF25-DRC230M-○
			2350M-SC	23.50	4.06	●	
			2400M-SC	24.00	4.14	●	SS25-DRC240M-○ SF25-DRC240M-○
			2450M-SC	24.50	4.23	●	
			2500M-SC	25.00	4.31	●	SS32-DRC250M-○ SF25-DRC250M-○
			2550M-SC	25.50	4.40	●	
			2599M-SC	25.99	4.49	●	

k8 tolerance

DC	k8(mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.99	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Q&A

Q-1 Is re-grinding available?

A-1 We don't recommend it. Grinding of edge nose chisel is not possible.

Q-2 How large would the machining hole be to the insert diameter (DC)?

A-2 The machining hole with SCM435, comparing to the insert diameter (DC), will be about +0.020~+0.040mm.

DC inserts are sold in 1 piece boxes

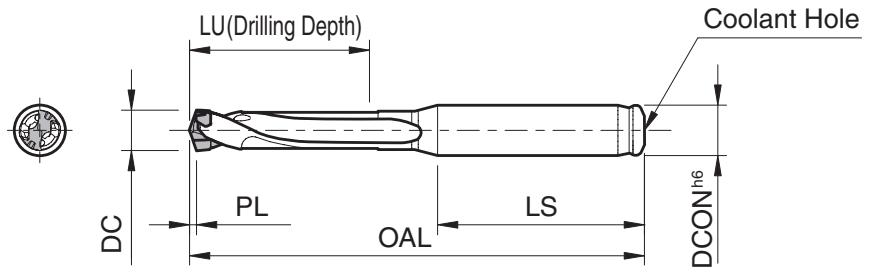
● : Std. Item

Description Identification System (Toolholder)

□□○○ - DRC ○○○ M - ○

Shank Type	Shank Dia.(mm)	Shows Drill	Category	Minimum Insert Dia.	Metric	Drilling Depth
SS : Straight Shank SF : Flanged Shank			C : Self-Clamping Self-Centering Direct Cooling			3(LU≒3xDC) 5(LU≒5xDC) 8(LU≒8xDC)

SS-DRC (Drilling Depth : 3 x DC)



· For PL indicates distance from drill point to corner edge K26~K28

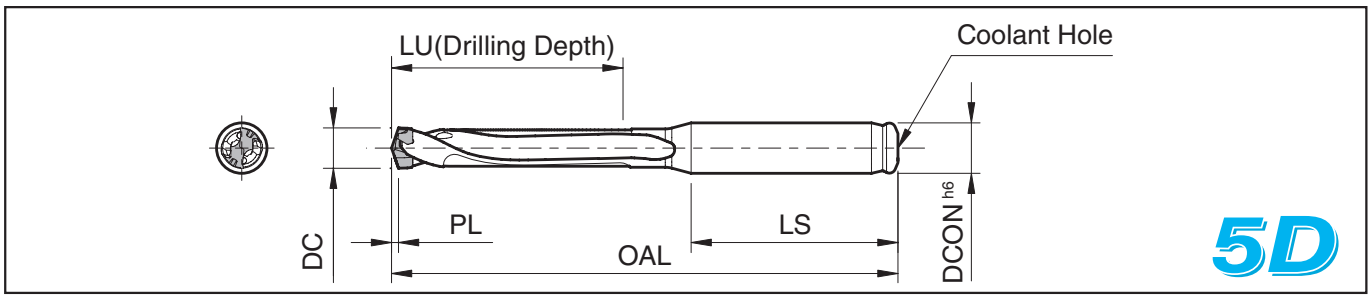
Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts	Applicable Inserts K26~K28	Applicable Chamfering Holder and Insert Description	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Wrench K37		Holder	Insert
			min.	max.								
SS10-	DRC080M-3	●	7.94	8.49	10	79	25.5	40	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-3	●	8.50	8.99		81	27.0			DC0850M-SC~DC0890M-SC		
	DRC090M-3	●	9.00	9.49		83	28.5			DC0900M-SC~DC0940M-SC		
	DRC095M-3	●	9.50	9.99		85	30.0			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-3	●	10.00	10.49	12	92	31.5	45	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-3	●	10.50	10.99		94	33.0			DC1050M-SC~DC1090M-SC		
	DRC110M-3	●	11.00	11.49		96	34.5			DC1100M-SC~DC1140M-SC		
	DRC115M-3	●	11.50	11.99		98	36.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-3	●	12.00	12.49	14	101	37.5		* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-3	●	12.50	12.99		103	39.0			DC1250M-SC~DC1290M-SC		
	DRC130M-3	●	13.00	13.49		105	40.5			DC1300M-SC~DC1340M-SC		
	DRC135M-3	●	13.50	13.99		107	42.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-3	●	14.00	14.49	16	112	43.5	48	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-3	●	14.50	14.99		114	45.0			DC1450M-SC~DC1490M-SC		
	DRC150M-3	●	15.00	15.99		118	48.0			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-3	●	16.00	16.99	18	122	51.0			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-3	●	17.00	17.99		127	54.0			DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-3	●	18.00	18.99	20	133	57.0	50	WDRC17	DC1800M-SC~DC1890M-SC	-	-
	DRC190M-3	●	19.00	19.99		137	60.0			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-3	●	20.00	20.99	25	147	63.0	56		DC2000M-SC~DC2099M-SC		
	DRC210M-3	●	21.00	21.99		151	66.0			DC2100M-SC~DC2150M-SC		
	DRC220M-3	●	22.00	22.99		156	69.0			DC2200M-SC~DC2250M-SC		
	DRC230M-3	●	23.00	23.99		160	72.0			DC2300M-SC~DC2350M-SC		
	DRC240M-3	●	24.00	24.99		164	75.0			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-3	●	25.00	25.99	32	172	78.0	60		DC2500M-SC~DC2599M-SC		

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

SS-DRC (Drilling Depth : 5 x DC)



· For PL indicates distance from drill point to corner edge K26~K28

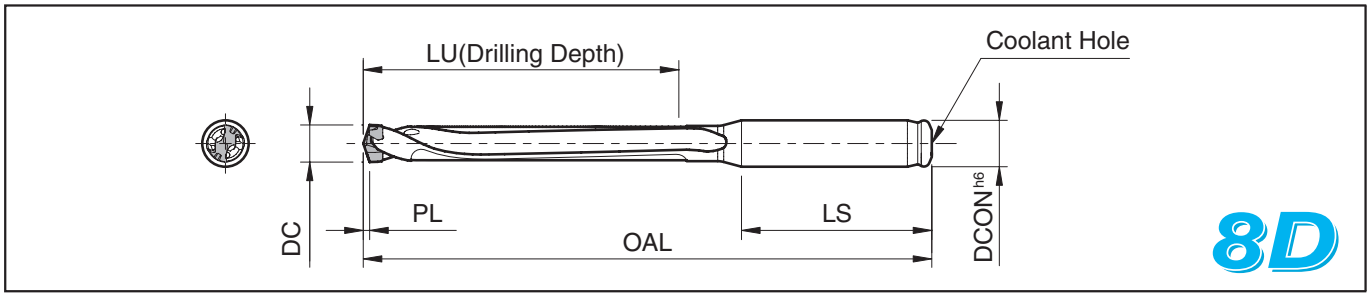
Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts	Applicable Inserts K26~K28	Applicable Chamfering Holder and Insert Description	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Wrench K37		Holder	Insert
			min.	max.								
SS10-	DRC080M-5	●	7.94	8.49	10	97	42.5	40	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-5	●	8.50	8.99		100	45.0			DC0850M-SC~DC0890M-SC		
	DRC090M-5	●	9.00	9.49		103	47.5			DC0900M-SC~DC0940M-SC		
	DRC095M-5	●	9.50	9.99		107	50.0			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-5	●	10.00	10.49	12	115	52.5	45	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-5	●	10.50	10.99		118	55.0			DC1050M-SC~DC1090M-SC		
	DRC110M-5	●	11.00	11.49		121	57.5			DC1100M-SC~DC1140M-SC		
	DRC115M-5	●	11.50	11.99		124	60.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-5	●	12.00	12.49	14	127	62.5		* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-5	●	12.50	12.99		130	65.0			DC1250M-SC~DC1290M-SC		
	DRC130M-5	●	13.00	13.49		133	67.5			DC1300M-SC~DC1340M-SC		
	DRC135M-5	●	13.50	13.99		137	70.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-5	●	14.00	14.49	16	143	72.5	48	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-5	●	14.50	14.99		146	75.0			DC1450M-SC~DC1490M-SC		
	DRC150M-5	●	15.00	15.99		152	80.0			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-5	●	16.00	16.99	18	158	85.0			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-5	●	17.00	17.99		165	90.0		WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-5	●	18.00	18.99	20	173	95.0	50		DC1800M-SC~DC1890M-SC	-	-
	DRC190M-5	●	19.00	19.99		179	100.0			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-5	●	20.00	20.99	25	191	105.0	56		DC2000M-SC~DC2099M-SC		
	DRC210M-5	●	21.00	21.99		198	110.0			DC2100M-SC~DC2150M-SC		
	DRC220M-5	●	22.00	22.99		204	115.0			DC2200M-SC~DC2250M-SC		
	DRC230M-5	●	23.00	23.99		210	120.0			DC2300M-SC~DC2350M-SC		
	DRC240M-5	●	24.00	24.99		216	125.0			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-5	●	25.00	25.99	32	227	130.0	60		DC2500M-SC~DC2599M-SC		

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

SS-DRC (Drilling Depth : 8 x DC)



· For PL indicates distance from drill point to corner edge K26~K28

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts	Applicable Inserts K26~K28	Applicable Chamfering Holder and Insert Description	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Wrench K37		Holder	Insert
			min.	max.								
SS10-	DRC080M-8	●	7.94	8.49	10	122.5	68	40	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-8	●	8.50	8.99		127.0	72			DC0850M-SC~DC0890M-SC		
	DRC090M-8	●	9.00	9.49		131.5	76			DC0900M-SC~DC0940M-SC		
	DRC095M-8	●	9.50	9.99		137.0	80			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-8	●	10.00	10.49	12	146.5	84	45	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-8	●	10.50	10.99		151.0	88			DC1050M-SC~DC1090M-SC		
	DRC110M-8	●	11.00	11.49		155.5	92			DC1100M-SC~DC1140M-SC		
	DRC115M-8	●	11.50	11.99		160.0	96			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-8	●	12.00	12.49	14	164.5	100		* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-8	●	12.50	12.99		169.0	104			DC1250M-SC~DC1290M-SC		
	DRC130M-8	●	13.00	13.49		173.5	108			DC1300M-SC~DC1340M-SC		
	DRC135M-8	●	13.50	13.99		179.0	112			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-8	●	14.00	14.49	16	186.5	116	48	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-8	●	14.50	14.99		191.0	120			DC1450M-SC~DC1490M-SC		
	DRC150M-8	●	15.00	15.99		200.0	128			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-8	●	16.00	16.99	18	209.0	136			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-8	●	17.00	17.99		219.0	144		WDRC17	DC1700M-SC~DC1790M-SC	-	-
SS20-	DRC180M-8	●	18.00	18.99	20	230.0	152	50		DC1800M-SC~DC1890M-SC		
	DRC190M-8	●	19.00	19.99		239.0	160			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-8	●	20.00	20.99	25	254.0	168	56		DC2000M-SC~DC2099M-SC		
	DRC210M-8	●	21.00	21.99		264.0	176			DC2100M-SC~DC2150M-SC		
	DRC220M-8	●	22.00	22.99		273.0	184			DC2200M-SC~DC2250M-SC		
	DRC230M-8	●	23.00	23.99		282.0	192			DC2300M-SC~DC2350M-SC		
	DRC240M-8	●	24.00	24.99		291.0	200			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-8	●	25.00	25.99	32	305.0	208	60		DC2500M-SC~DC2599M-SC		

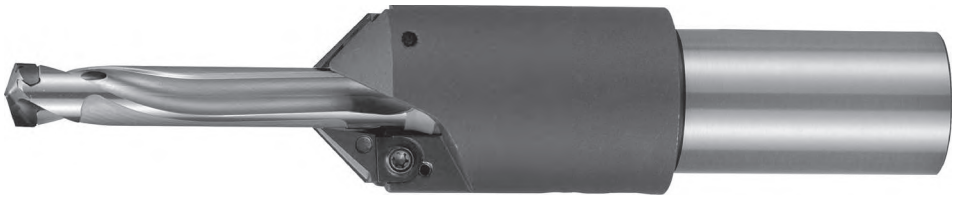
* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

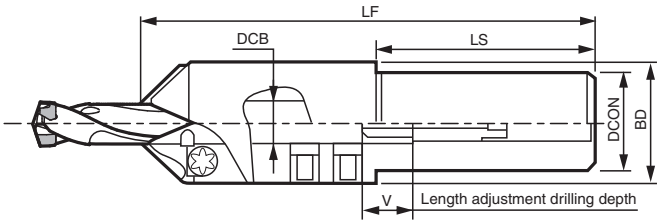
Chamfering Attachment

Drilling and chamfering simultaneously

By using the chamfering attachment, the SS-DRC can drill and chamfer simultaneously.



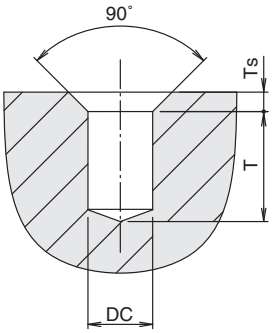
Holder



Description	Stock	Applicable Drill Shank Dia. DCB	Dimension (mm)					Applicable Inserts
			DCON	BD	LF	LS	V	
S20-CH10	●	10	20	29	122	52	17	CT08T2-45A
S32-CH12	●	12	32	38	133	62	21	CT12T3-45A
S32-CH14	●	14		40	137		16	
S32-CH16	●	16		42	141		19	
S32-CH18	●	18		47	144		15	

Note) Chamfering attachment is dedicated for Straight Shank SS-DRC.
It cannot be used for Flanged Shank SF-DRC.

Drilling Depth and Chamfering Dimension

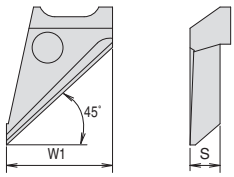


Drill Dia. (mm) DC		Drilling Depth (mm)						Chamfering dimension (mm) Ts		Applicable Chamfering Holder
		T (3D Drill)		T (5D Drill)		T (8D Drill)				
min.	max.	min.	max.	min.	max.	min.	max.	Ts 100	Ts max.	
7.94	8.49	11	19	21	37	47	63	2.5	5.0	**S20-CH10**
8.50	8.99	12	21	24	40	51	67			
9.00	9.49	12	23	27	43	56	72			
9.50	9.99	13	25	31	47	61	77			
10.00	10.49	13	26	28	49	60	81	3.5	7.0	**S32-CH12**
10.50	10.99	14	28	31	52	64	85			
11.00	11.49	14	30	34	55	69	90			
11.50	11.99	15	32	37	58	73	94			
12.00	12.49	15	30	41	56	79	94	4.0	8.0	**S32-CH14**
12.50	12.99	17	32	44	59	83	96			
13.00	13.49	19	34	47	62	88	103			
13.50	13.99	21	36	51	66	93	108			
14.00	14.49	19	37	50	68	94	112	4.0	8.0	**S32-CH16**
14.50	14.99	21	39	53	71	98	116			
15.00	15.99	25	43	59	77	107	125			
16.00	16.99	30	44	66	80	117	131	4.0	8.0	**S32-CH18**
17.00	17.99	35	49	73	87	127	141			

Ts 100 : Max. chamfering dimension at the full feed.
Ts max. : Max. chamfering dimension at a 50% feed reduction.
(Max. chamfering dimension of machining possible without step feeding)

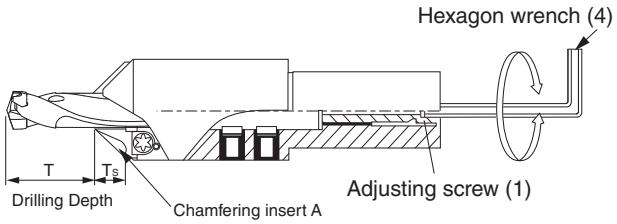
● : Std. Item

Applicable Inserts

Insert		Description	Dimension (mm)		PVD Coated Carbide	Applicable Chamfering Holder
			W1	S	PR0315	
		**CT08T2-45A**	8	2.83	●	**S20-CH10**
		CT12T3-45A	12	3.98	●	**S32-CH12** ~ **S32-CH18**

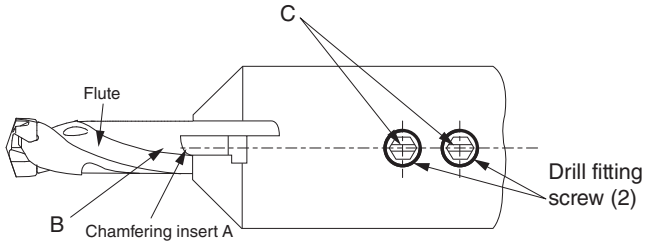
Method to use DRC chamfering attachment

I. Adjustment of Drilling Depth



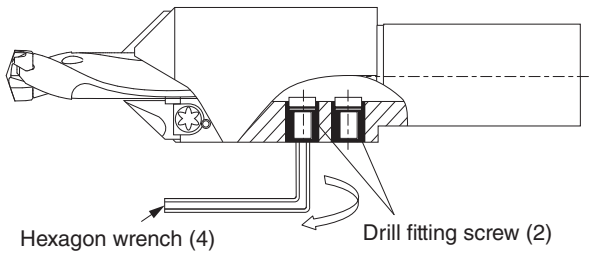
Insert drill into chamfering holder.
Next, temporarily attach the chamfering insert A.
Turn the adjusting screw (1) with the hexagon wrench (4) to set the drilling depth T.

II. Drill location check



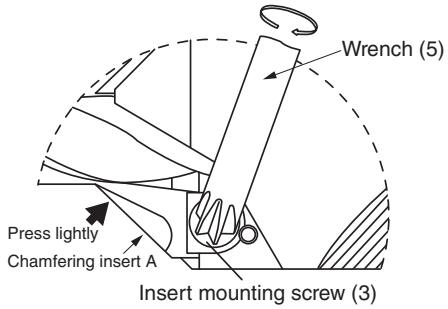
Rotate the drill so that the lower end of the chamfering insert A is aligned with the body clearance B of the drill.
Set it so that slot C and the drill fitting screws (2) are lined up as shown in the figure above.

III. Fix the drill



Tighten the drill fitting screws (2) with the hexagon wrench (4).
(When using a torque wrench, please refer to the table below)

IV. Installation of the chamfering insert



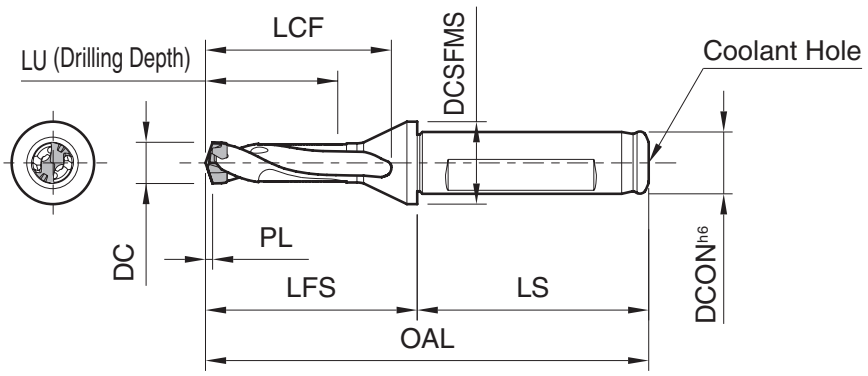
Press the chamfering insert A lightly into the drill and tighten the insert mounting screw (3) with wrench (5).

Chamfering Holder	Tightening Torque [N·m]	Adjusting screw (1)	Drill fitting screw (2)	Insert mounting screw (3)	Hexagon wrench (4)	Wrench (5)
S20-CH10	10	AJ-6×38	FS-10	MT-3	LW-3	DT-9
S32-CH12	15	AJ-8×44-9.5	FS-12	MT-4	LW-4	DT-15
S32-CH14	20	AJ-10×46	FS-14		LW-5	
S32-CH16	30		FS-16			
S32-CH18	45		FS-18			

● : Std. Item

Inserts are sold in 10 piece boxes

SF-DRC (Drilling Depth : 3 x DC)



3D

· For PL indicates distance from drill point to corner edge K26~K28

Toolholder Dimensions

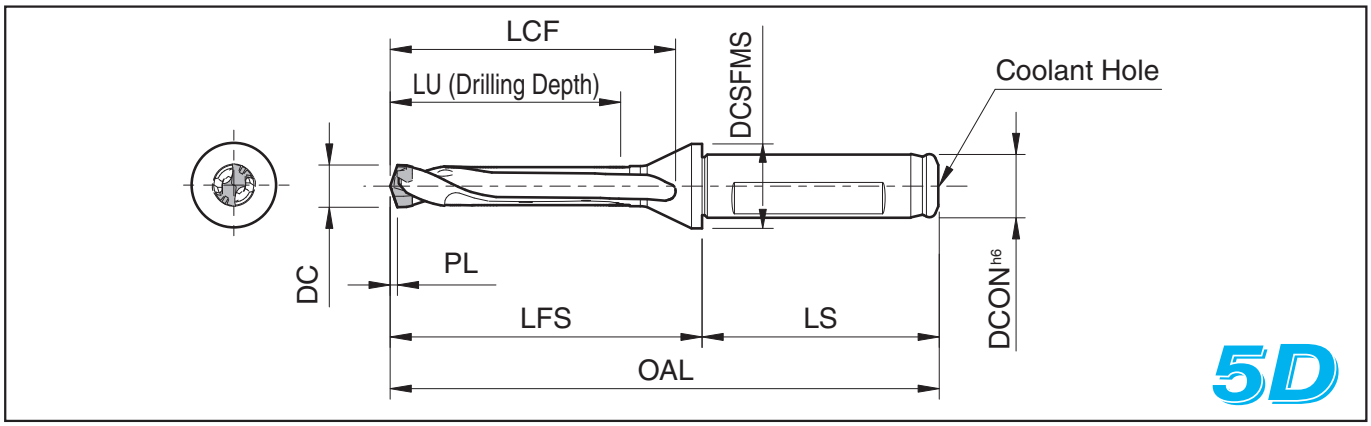
Description		Stock	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench
			min.	max.								
SF12-	DRC080M-3	●	7.94	8.49	12	86	41	35	26	45	16	WDRC17 * (Included wrench : WDRC8)
	DRC085M-3	●	8.50	8.99		88	43	37	27			
	DRC090M-3	●	9.00	9.49		90	45	39	29			
	DRC095M-3	●	9.50	9.99		92	47	41	30			
SF16-	DRC100M-3	●	10.00	10.49	16	97	49	43	32	48	20	WDRC17 * (Included wrench : WDRC10)
	DRC105M-3	●	10.50	10.99		99	51	45	33			
	DRC110M-3	●	11.00	11.49		101	53	47	35			
	DRC115M-3	●	11.50	11.99		103	55	49	36			
	DRC120M-3	●	12.00	12.49		106	58	52	38			WDRC17 * (Included wrench : WDRC12)
	DRC125M-3	●	12.50	12.99		108	60	54	39			
	DRC130M-3	●	13.00	13.49		110	62	56	41			
	DRC135M-3	●	13.50	13.99		112	64	58	42			
	DRC140M-3	●	14.00	14.49		114	66	60	44			WDRC17 * (Included wrench : WDRC14)
	DRC145M-3	●	14.50	14.99		116	68	62	45			
SF20-	DRC150M-3	●	15.00	15.99	20	122	72	66	48	50	25	
	DRC160M-3	●	16.00	16.99		126	76	70	51			
	DRC170M-3	●	17.00	17.99		131	81	75	54			WDRC17
SF25-	DRC180M-3	●	18.00	18.99	25	141	85	79	57	56	32	
	DRC190M-3	●	19.00	19.99		145	89	83	60			
	DRC200M-3	●	20.00	20.99		149	93	87	63			
	DRC210M-3	●	21.00	21.99		153	97	91	66			
	DRC220M-3	●	22.00	22.99		158	102	96	69			
	DRC230M-3	●	23.00	23.99		162	106	100	72			
	DRC240M-3	●	24.00	24.99		166	110	104	75			
	DRC250M-3	●	25.00	25.99		170	114	108	78			

Applicable Inserts
K26~K28
DC0794M-SC~DC0840M-SC
DC0850M-SC~DC0890M-SC
DC0900M-SC~DC0940M-SC
DC0950M-SC~DC0990M-SC
DC1000M-SC~DC1040M-SC
DC1050M-SC~DC1090M-SC
DC1100M-SC~DC1140M-SC
DC1150M-SC~DC1190M-SC
DC1200M-SC~DC1240M-SC
DC1250M-SC~DC1290M-SC
DC1300M-SC~DC1340M-SC
DC1350M-SC~DC1390M-SC
DC1400M-SC~DC1440M-SC
DC1450M-SC~DC1490M-SC
DC1500M-SC~DC1580M-SC
DC1600M-SC~DC1690M-SC
DC1700M-SC~DC1790M-SC
DC1800M-SC~DC1890M-SC
DC1900M-SC~DC1990M-SC
DC2000M-SC~DC2099M-SC
DC2100M-SC~DC2150M-SC
DC2200M-SC~DC2250M-SC
DC2300M-SC~DC2350M-SC
DC2400M-SC~DC2450M-SC
DC2500M-SC~DC2599M-SC

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

SF-DRC (Drilling Depth : 5 x DC)



· For PL indicates distance from drill point to corner edge K26~K28

Toolholder Dimensions

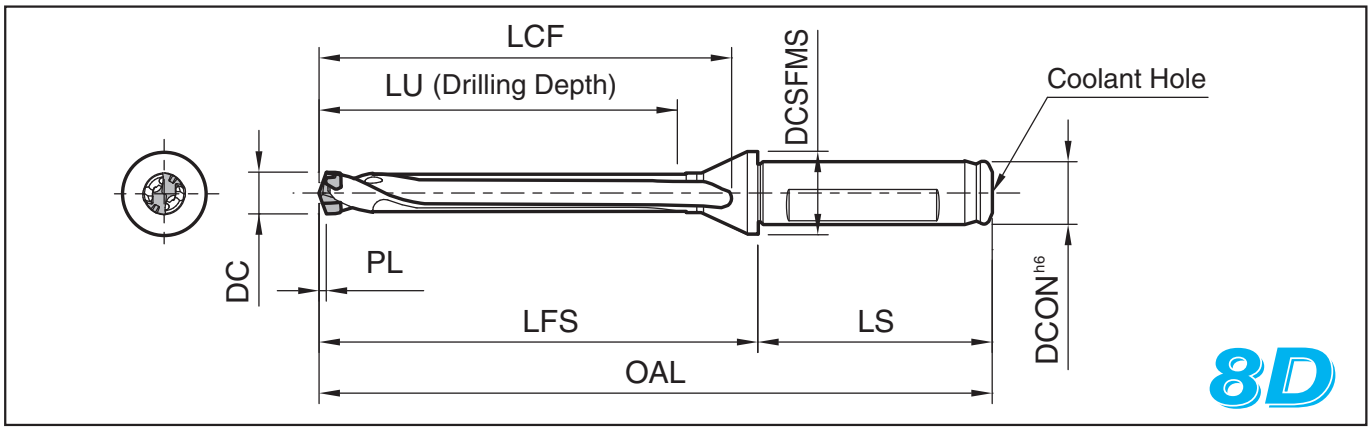
Description		Stock	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench
			min.	max.								
SF12-	DRC080M-5	●	7.94	8.49	12	104	59	53	43	45	16	* WDRC17 (Included wrench : WDRC8)
	DRC085M-5	●	8.50	8.99		107	62	56	45			
	DRC090M-5	●	9.00	9.49		110	65	59	48			
	DRC095M-5	●	9.50	9.99		114	69	63	50			
SF16-	DRC100M-5	●	10.00	10.49	16	120	72	66	53	48	20	* WDRC17 (Included wrench : WDRC10)
	DRC105M-5	●	10.50	10.99		123	75	69	55			
	DRC110M-5	●	11.00	11.49		126	78	72	58			
	DRC115M-5	●	11.50	11.99		129	81	75	60			
	DRC120M-5	●	12.00	12.49		132	84	78	63			* WDRC17 (Included wrench : WDRC12)
	DRC125M-5	●	12.50	12.99		135	87	81	65			
	DRC130M-5	●	13.00	13.49		138	90	84	68			
	DRC135M-5	●	13.50	13.99		142	94	88	70			
	DRC140M-5	●	14.00	14.49		145	97	91	73			* WDRC17 (Included wrench : WDRC14)
	DRC145M-5	●	14.50	14.99		148	100	94	75			
SF20-	DRC150M-5	●	15.00	15.99	20	156	106	100	80	50	25	
	DRC160M-5	●	16.00	16.99		162	112	106	85			
	DRC170M-5	●	17.00	17.99		169	119	113	90			WDRC17
SF25-	DRC180M-5	●	18.00	18.99	25	181	125	119	95	56	32	
	DRC190M-5	●	19.00	19.99		187	131	125	100			
	DRC200M-5	●	20.00	20.99		193	137	131	105			
	DRC210M-5	●	21.00	21.99		200	144	138	110			
	DRC220M-5	●	22.00	22.99		206	150	144	115			
	DRC230M-5	●	23.00	23.99		212	156	150	120			
	DRC240M-5	●	24.00	24.99		218	162	156	125			
	DRC250M-5	●	25.00	25.99		225	169	163	130			

Applicable Inserts
K26~K28
DC0794M-SC~DC0840M-SC
DC0850M-SC~DC0890M-SC
DC0900M-SC~DC0940M-SC
DC0950M-SC~DC0990M-SC
DC1000M-SC~DC1040M-SC
DC1050M-SC~DC1090M-SC
DC1100M-SC~DC1140M-SC
DC1150M-SC~DC1190M-SC
DC1200M-SC~DC1240M-SC
DC1250M-SC~DC1290M-SC
DC1300M-SC~DC1340M-SC
DC1350M-SC~DC1390M-SC
DC1400M-SC~DC1440M-SC
DC1450M-SC~DC1490M-SC
DC1500M-SC~DC1580M-SC
DC1600M-SC~DC1690M-SC
DC1700M-SC~DC1790M-SC
DC1800M-SC~DC1890M-SC
DC1900M-SC~DC1990M-SC
DC2000M-SC~DC2099M-SC
DC2100M-SC~DC2150M-SC
DC2200M-SC~DC2250M-SC
DC2300M-SC~DC2350M-SC
DC2400M-SC~DC2450M-SC
DC2500M-SC~DC2599M-SC

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

SF-DRC (Drilling Depth : 8 x DC)



· For PL indicates distance from drill point to corner edge K26~K28

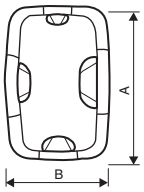
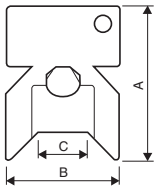
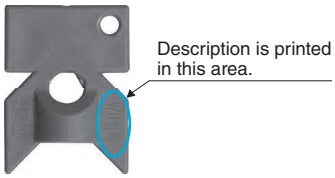
Toolholder Dimensions

Description		Stock	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench K37	K26~K28
			min.	max.									
SF12-	DRC080M-8	●	7.94	8.49	12	129	84	79	68	45	16	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC
	DRC085M-8	●	8.50	8.99		134	89	83	72				DC0850M-SC~DC0890M-SC
	DRC090M-8	●	9.00	9.49		138	93	88	76				DC0900M-SC~DC0940M-SC
	DRC095M-8	●	9.50	9.99		144	99	93	80				DC0950M-SC~DC0990M-SC
SF16-	DRC100M-8	●	10.00	10.49	16	151	103	97	84	48	20	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC
	DRC105M-8	●	10.50	10.99		156	108	102	88				DC1050M-SC~DC1090M-SC
	DRC110M-8	●	11.00	11.49		160	112	107	92				DC1100M-SC~DC1140M-SC
	DRC115M-8	●	11.50	11.99		165	117	111	96				DC1150M-SC~DC1190M-SC
	DRC120M-8	●	12.00	12.49		169	121	116	100			* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC
	DRC125M-8	●	12.50	12.99		174	126	120	104				DC1250M-SC~DC1290M-SC
	DRC130M-8	●	13.00	13.49		178	130	124	108				DC1300M-SC~DC1340M-SC
	DRC135M-8	●	13.50	13.99		184	136	130	112				DC1350M-SC~DC1390M-SC
	DRC140M-8	●	14.00	14.49		188	140	134	116			* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC
	DRC145M-8	●	14.50	14.99		193	145	139	120				DC1450M-SC~DC1490M-SC
SF20-	DRC150M-8	●	15.00	15.99	20	204	154	148	128	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-8	●	16.00	16.99		213	163	157	136				DC1600M-SC~DC1690M-SC
	DRC170M-8	●	17.00	17.99		223	173	167	144			WDRC17	DC1700M-SC~DC1790M-SC
SF25-	DRC180M-8	●	18.00	18.99	25	238	182	176	152	56	32		DC1800M-SC~DC1890M-SC
	DRC190M-8	●	19.00	19.99		247	191	185	160				DC1900M-SC~DC1990M-SC
	DRC200M-8	●	20.00	20.99		256	200	194	168				DC2000M-SC~DC2099M-SC
	DRC210M-8	●	21.00	21.99		266	210	204	176				DC2100M-SC~DC2150M-SC
	DRC220M-8	●	22.00	22.99		275	219	213	184				DC2200M-SC~DC2250M-SC
	DRC230M-8	●	23.00	23.99		284	228	222	192				DC2300M-SC~DC2350M-SC
	DRC240M-8	●	24.00	24.99		293	237	231	200				DC2400M-SC~DC2450M-SC
	DRC250M-8	●	25.00	25.99		303	247	241	208				DC2500M-SC~DC2599M-SC

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

Wrench

Shape		Description	Dimension (mm) A	B	C	Remarks
		**WDRC17**	77	52	-	· WDRC17(Multiple type wrench) has four insert entry points. If using an insert ranging from DC1700M-SC to DC2099M-SC, use the entry point printed as "ø17.00~ø20.99". · WDRC17 can be used instead of WDRC8~14 wrench.
		**WDRC8**	43	33	ø10.2	 Description is printed in this area.
		WDRC10			ø12.2	
		WDRC12			ø14.2	
		WDRC14			ø17.2	

Method to change MagicDrill DRC inserts

How to attach inserts



(1) Fix drill holder on arbor. For insert exchange, fix arbor on the machine or set on toolpresetter.
(2) Use compressed air to remove dust.



(3) Install insert onto holder.
(Use gloves to protect your hand from any danger.)



(4) Turn lightly in a clockwise direction.
(Use gloves to protect your hand from any danger.)



(5) Align the wrench properly with the insert.



(6) Make sure the wrench is aligned with the wrench slots on the insert.



(Improper alignment shown)



Slot for wrench



(7) Turn the wrench in a slow counterclockwise direction.
(8) Completed.

How to detach inserts



(1) Use compressed air to remove dust.
(2) Align the wrench properly with the insert.



(3) Make sure the wrench is aligned with the wrench slots on the insert.



(4) Turn the wrench in a counterclockwise direction.



(5) Once lock is released, insert can be turned by fingers.
(Use gloves to protect your hand from any danger.)



(6) Remove insert.
(Use gloves to protect your hand from any danger.)

Recommended Cutting Conditions

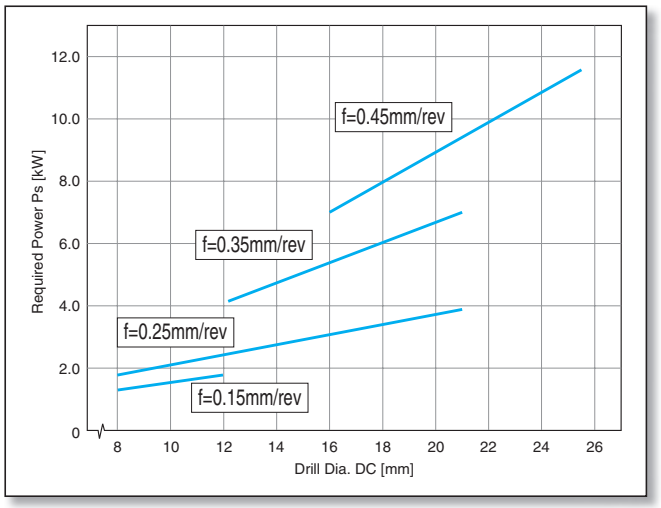
Workpiece Material		Hardness (HB)	Cutting Conditions		Drill Dia. DC (mm)								Remarks
			Cutting Speed Vc (m/min)	n (min^{-1}) / f (mm/rev)	ø8	ø10	ø12	ø14	ø16	ø18	ø20	ø25	
Low Carbon Steel	SS400 S10C~S25C	125	120 - 180	n (min^{-1})	4,780 - 7,170	3,820 - 5,730	3,180 - 4,780	2,730 - 4,090	2,390 - 3,580	2,120 - 3,180	1,910 - 2,870	1,530 - 2,290	Coolant (See Page**K39**)
				f (mm/rev)	0.11 - 0.20	0.13 - 0.24	0.14 - 0.28	0.17 - 0.32	0.19 - 0.35	0.23 - 0.38	0.25 - 0.41	0.30 - 0.50	
Carbon Steel	S30C~S58C (Annealed)	190	100 - 150	n (min^{-1})	3,980 - 5,970	3,180 - 4,780	2,650 - 3,980	2,270 - 3,410	1,990 - 2,990	1,770 - 2,650	1,590 - 2,390	1,270 - 1,910	
				f (mm/rev)	0.13 - 0.24	0.15 - 0.29	0.17 - 0.33	0.19 - 0.36	0.22 - 0.41	0.25 - 0.46	0.28 - 0.48	0.32 - 0.60	
	S30C~S58C (Heat treated)	250	80 - 120	n (min^{-1})	3,180 - 4,780	2,550 - 3,820	2,120 - 3,180	1,820 - 2,730	1,590 - 2,390	1,420 - 2,120	1,270 - 1,910	1,020 - 1,530	
				f (mm/rev)	0.13 - 0.21	0.15 - 0.25	0.18 - 0.31	0.21 - 0.39	0.23 - 0.45	0.25 - 0.53	0.28 - 0.61	0.38 - 0.64	
		300	50 - 75	n (min^{-1})	1,990 - 2,990	1,590 - 2,390	1,330 - 1,990	1,140 - 1,710	1,000 - 1,490	880 - 1,330	800 - 1,190	640 - 960	
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.28	0.21 - 0.32	0.23 - 0.35	0.25 - 0.41	0.28 - 0.41	0.32 - 0.45	
Alloy Steel	(Annealed)	180	70 - 95	n (min^{-1})	2,790 - 3,780	2,230 - 3,030	1,860 - 2,520	1,590 - 2,160	1,390 - 1,890	1,240 - 1,680	1,110 - 1,510	890 - 1,210	
				f (mm/rev)	0.15 - 0.28	0.16 - 0.35	0.21 - 0.37	0.23 - 0.46	0.25 - 0.46	0.25 - 0.51	0.30 - 0.51	0.35 - 0.60	
	(Heat treated)	275	70 - 95	n (min^{-1})	2,790 - 3,780	2,230 - 3,030	1,860 - 2,520	1,590 - 2,160	1,390 - 1,890	1,240 - 1,680	1,110 - 1,510	890 - 1,210	
				f (mm/rev)	0.11 - 0.21	0.14 - 0.25	0.19 - 0.30	0.21 - 0.33	0.23 - 0.37	0.28 - 0.43	0.28 - 0.46	0.32 - 0.58	
		300	60 - 90	n (min^{-1})	2,390 - 3,580	1,910 - 2,870	1,590 - 2,390	1,360 - 2,050	1,190 - 1,790	1,060 - 1,590	960 - 1,430	760 - 1,150	
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.26	0.18 - 0.31	0.21 - 0.33	0.23 - 0.36	0.25 - 0.38	0.30 - 0.50	
		350	50 - 75	n (min^{-1})	1,990 - 2,990	1,590 - 2,390	1,330 - 1,990	1,140 - 1,710	1,000 - 1,490	880 - 1,330	800 - 1,190	640 - 960	
				f (mm/rev)	0.11 - 0.20	0.12 - 0.23	0.16 - 0.25	0.17 - 0.29	0.18 - 0.32	0.20 - 0.36	0.23 - 0.38	0.28 - 0.50	
Stainless Steel	SUS304 SUS316	220	60 - 80	n (min^{-1})	2,390 - 3,180	1,910 - 2,550	1,590 - 2,120	1,360 - 1,820	1,190 - 1,590	1,060 - 1,420	960 - 1,270	760 - 1,020	
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.26	0.18 - 0.31	0.21 - 0.33	0.23 - 0.36	0.25 - 0.38	0.28 - 0.42	
	SUS630	300	50 - 70	n (min^{-1})	1,990 - 2,790	1,590 - 2,230	1,330 - 1,860	1,140 - 1,590	1,000 - 1,390	880 - 1,240	800 - 1,110	640 - 890	
				f (mm/rev)	0.11 - 0.20	0.12 - 0.23	0.16 - 0.25	0.17 - 0.29	0.18 - 0.32	0.20 - 0.36	0.23 - 0.38	0.25 - 0.40	
Gray Cast Iron	FC150~FC200	180	120 - 170	n (min^{-1})	4,780 - 6,770	3,820 - 5,410	3,180 - 4,510	2,730 - 3,870	2,390 - 3,380	2,120 - 3,010	1,910 - 2,710	1,530 - 2,170	
				f (mm/rev)	0.17 - 0.32	0.20 - 0.37	0.23 - 0.43	0.27 - 0.48	0.30 - 0.55	0.33 - 0.61	0.33 - 0.61	0.40 - 0.74	
	FC250~FC350	260	90 - 120	n (min^{-1})	3,580 - 4,780	2,870 - 3,820	2,390 - 3,180	2,050 - 2,730	1,790 - 2,390	1,590 - 2,120	1,430 - 1,910	1,150 - 1,530	
				f (mm/rev)	0.14 - 0.25	0.16 - 0.31	0.19 - 0.35	0.23 - 0.42	0.26 - 0.47	0.28 - 0.53	0.30 - 0.58	0.36 - 0.70	
Nodular Cast Iron	FCD400~FCD500	160	60 - 90	n (min^{-1})	2,390 - 3,580	1,910 - 2,870	1,590 - 2,390	1,360 - 2,050	1,190 - 1,790	1,060 - 1,590	960 - 1,430	760 - 1,150	
				f (mm/rev)	0.14 - 0.25	0.16 - 0.30	0.19 - 0.35	0.22 - 0.40	0.24 - 0.45	0.28 - 0.51	0.28 - 0.56	0.34 - 0.67	
	FCD600~FCD800	250	40 - 65	n (min^{-1})	1,590 - 2,590	1,270 - 2,070	1,060 - 1,730	910 - 1,480	800 - 1,290	710 - 1,150	640 - 1,040	510 - 830	
				f (mm/rev)	0.10 - 0.19	0.12 - 0.22	0.14 - 0.25	0.16 - 0.31	0.19 - 0.35	0.23 - 0.51	0.25 - 0.53	0.30 - 0.60	

As drilling depth increases (3D→5D→8D), feed rates should be reduced.

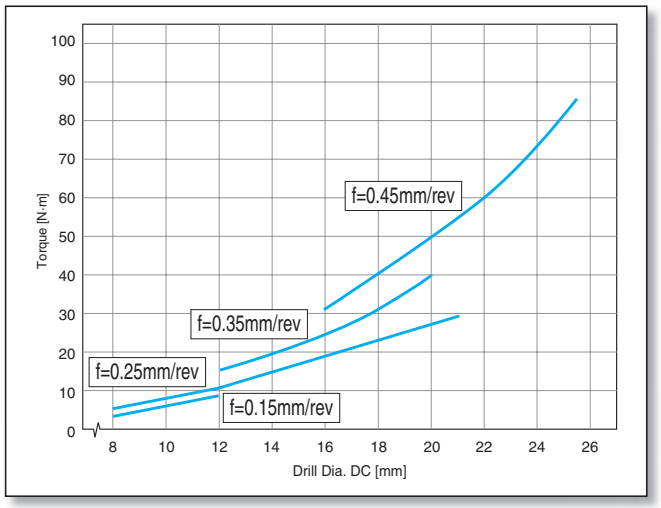
Reference charts

<Cutting Conditions> : Workpiece Material Heat treated steel (Hardness 240HB) Vc=80m/min, Wet

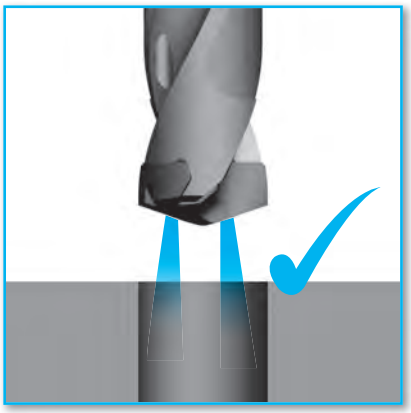
Required Power



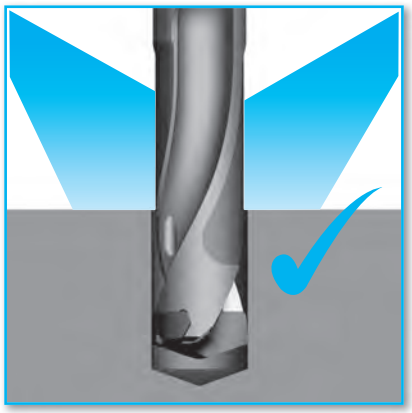
Torque



Coolant



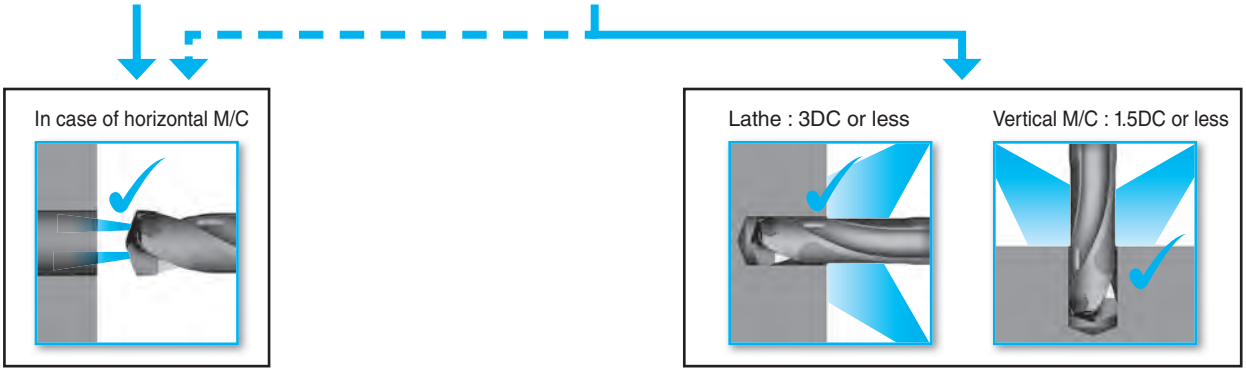
1) Internal coolant is recommended.



2) In case of using external coolant system



3) Dry machining is not recommended.

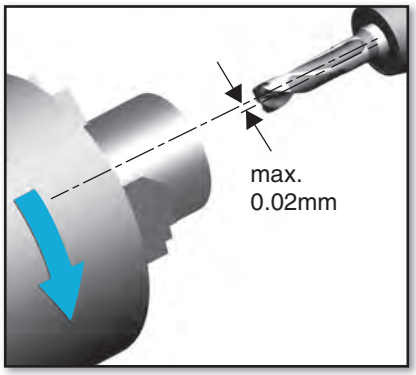


Internal coolant is recommended for horizontal machining center because external coolant may not sufficiently be applied to inside because the tool is revolving.

Precautions for use

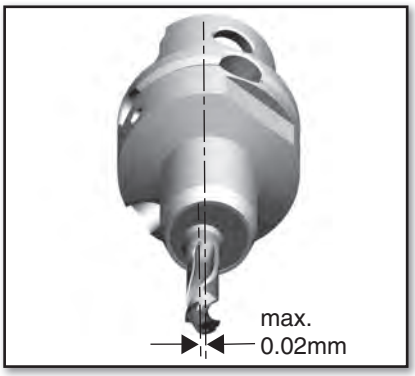
Core Deviation

1) If drill is stationary



This can be used with a boring sleeve (screw clamp) and collet chuck, please be sure to set deviation amount within 0.02mm between workpiece and drill.

2) If drill is rotating



Make sure to use arbor that is not deformed.
Center of arbor deviation must be within 0.02mm.

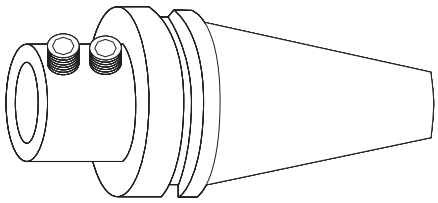
Cautions for installation on Machining Center

For installation of MagicDrill DRC,
1st Choice Hydro Chuck, Power Chuck, Collet Chuck, etc.
2nd Choice Side lock arbor

Hydro Chuck
Power Chuck
Collet Chuck

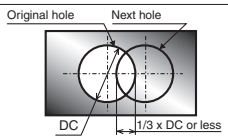
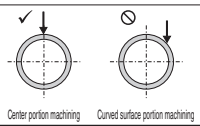
1st Choice

Install MagicDrill DRC to the chucks

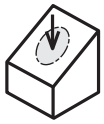
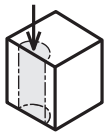


Example of side lock arbor
2nd Choice

Applicable workpieces

Applications	Shape of Workpiece	Caution for machining
Plain Surface		1. Due to good chip control, step machining is not necessary for Low Carbon Steel. 2. When machining SUS304, for hole depths of more than 2.5D, utilize the step machining process. 3. In order to have smooth chip removal, we recommend internal coolant.
Stacked Plates		1. Fix stacked plates securely to ensure so that they do not slip while machining.
Hole Expansion		1. If the overlap amount is 1/3 x DC or less, machining is possible. 
Concave Surface		1. When machining concave holes, set the feed rates at half or less than continuous hole machining.
Pipe Material		1. Hole machining above the centerline of the pipe is possible. 2. Do not machine on curved surface areas. 

Not Recommended workpieces

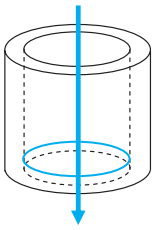
Applications	Shape of Workpiece
Slant Surface	
Half Cylindrical	
Cored Hole	

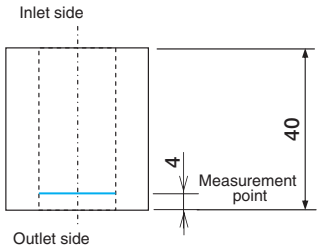
Comparison of Machining Precision

Cutting Condition and Measurement Point

<Cutting Conditions>

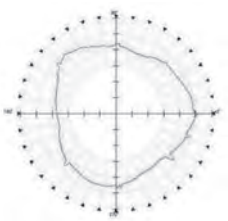
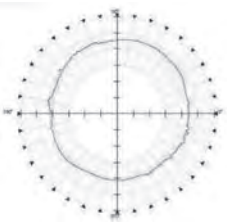
Workpiece Material	S45C
Vc	100m/min
f	0.2mm/rev, 0.3mm/rev
Drilling Depth H	Through hole (40mm)
Coolant	Wet (Internal coolant)
Tool	ø14-3D type
Machine	M/C





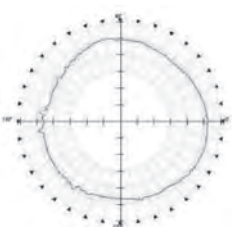
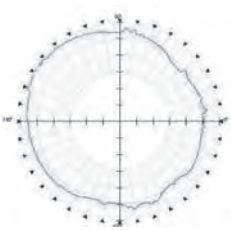
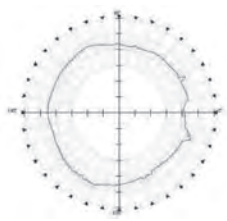
Roundness

1) Roundness (f=0.2mm/rev)

Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness : 5.5μm	Roundness : 22.5μm	Roundness : 6.4μm	Roundness : 9.8μm	Roundness : 5.2μm

(Internal evaluation)

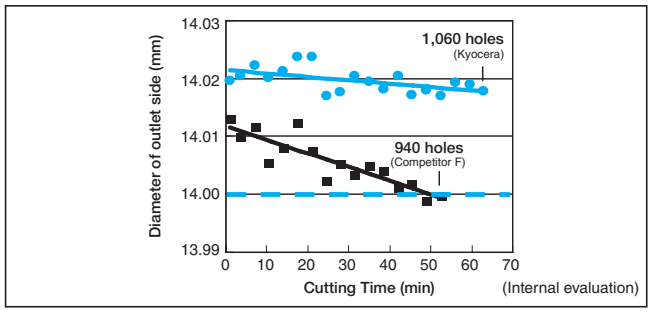
2) Roundness (f=0.3mm/rev)

Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness : 10.7μm	Roundness : 15.2μm	Roundness : 12.0μm	Roundness : 11.8μm	Roundness : 12.3μm

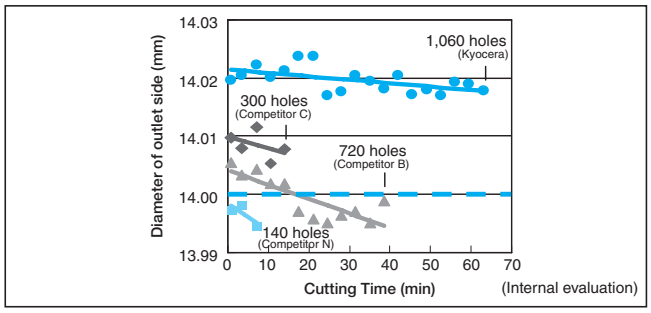
(Internal evaluation)

Comparison of Hole Dia. (f=0.3mm/rev)

1) Comparison with indexable drill



2) Comparison with carbide solid drill



Q&A

Q-3 Drilling deep hole machining using DRC (8D type), dimension variation of diameters has occurred at inlet and far (outlet) side possibly due to deflection. Is there any countermeasure?

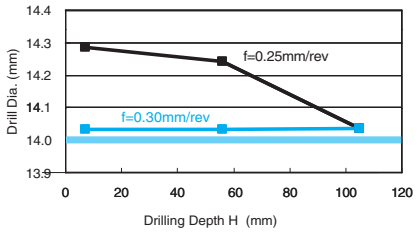
A-3 There are some countermeasures as follows to prevent deflection (to improve bite of drill).

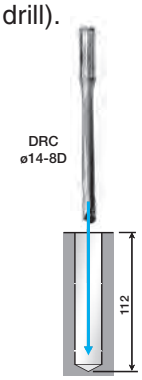
Countermeasures 1

● Increasing the feed rate

Increasing the feed rate may keep the processing diameters constant.
(Estimated rate: Current rate + 0.03 ~ 0.05 mm/rev)

<Cutting Conditions>
S55C Vc=80m/min H=112mm
f=0.25mm/rev → 0.30mm/rev
Wet (Internal coolant)
SS16-DRC140M-8
DC1400M-SC (PR0315)





If increasing the feed rate is not possible because rigidity of machine or clamp is weak.

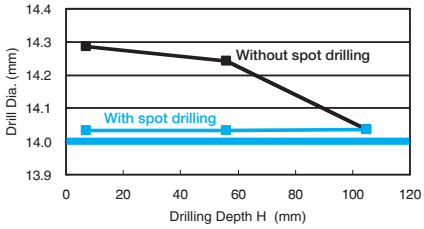
Countermeasures 2

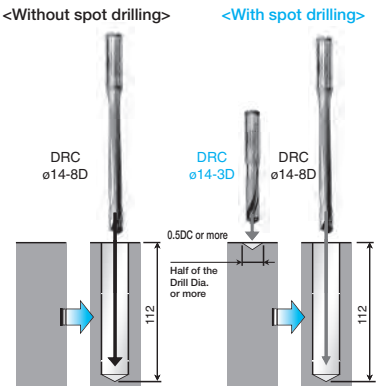
● Make a center spot

1) Make a center spot using the DRC drill or a commercially available center drill which has a vertex angle of about 140˚.
(If the center drill can be modified, make its vertex angle larger than 140˚)

2) Then drill the hole using the DRC drill (8D type).

<Cutting Conditions>
S55C Vc=80m/min
f=0.25mm/rev H=112mm
Wet (Internal coolant)
SS16-DRC140M-3
SS16-DRC140M-8
DC1400M-SC (PR0315)

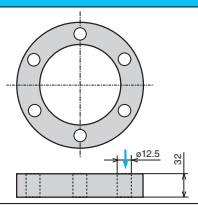




Case Studies

S50C

- Flange
- Vc=97m/min (n=2,490min^{-1})
- H=32mm
- f=0.3mm/rev
  (Vf=747mm/min)
- Wet (Internal coolant)
- DC1250M-SC (PR0315)



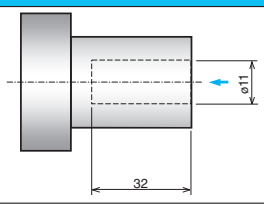
SS14-DRC120M-3	3,000 holes / insert
Competitor A	1,800 holes / drill

Compared to competitor's drill A, MagicDrill DRC has reduced burr and reduced 10% of the power required or more. Tool life has also improved greatly.

(User Evaluation)

SCM440

- Housing
- Vc=83m/min (n=2,400min^{-1})
- H=32mm
- f=0.24mm/rev
  (Vf=576mm/min)
- Wet (Internal coolant)
- DC1100M-SC (PR0315)



SS12-DRC110M-3	2,400 holes / insert
Competitor B	2,000 holes / drill

Compared to competitor's solid drill B, MagicDrill DRC has greatly reduced preparation time with its easy insert replacement feature. Also, the costs of spare tools for re-grinding has been reduced, and tool life has improved.

(User Evaluation)

High Efficiency Indexable Insert Drill

MagicDrill DRV

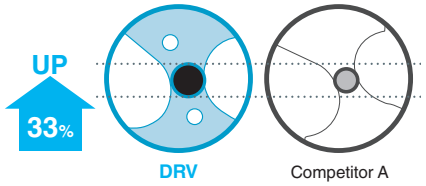
Economical Inserts with 4 Cutting Edges. Excellent Chip Evacuation with 6D Maximum Deep-Hole Drilling

High Speed and Highly Efficient Drilling Available with the Combination of a CVD Outer Insert and PVD Inner Insert

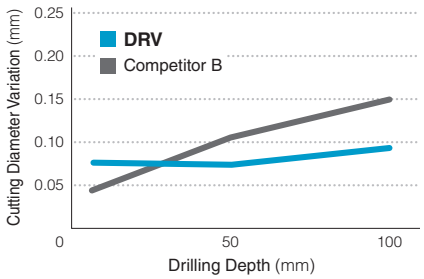
1 Excellent Drilling Precision with Less Variation in Cutting Diameter Up to 6D Drilling Capabilities with a Low Cutting Force Design

Optimal Web Thickness Reduces Chattering with a Low Cutting Force Design

Web Thickness Comparison (Internal evaluation)

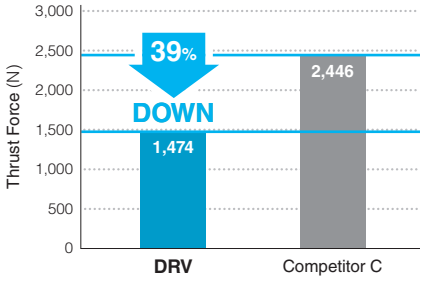


Comparison of Cutting Diameter Variation (Internal evaluation)



Cutting Conditions : Vc = 150 m/min, f = 0.06 mm/rev
Drill Dia. ø20(5D), Wet Workpiece Material : S50C

Cutting Force Comparison (Internal evaluation)



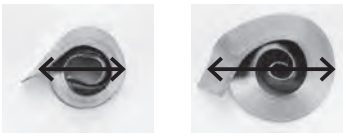
Cutting Conditions : Vc = 200 m/min, f = 0.12 mm/rev
Drill Dia. ø20(3D), Wet Workpiece Material : S50C

2 Unique Insert Design to Control Chip Flow

Outer edge **Smooth Chip Evacuation with Compact Chips**



Chip Shape Comparison of Outer Insert Cutting Edge (Internal evaluation)



DRV:10mm Competitor D:12mm

16% Diameter of Chips

Cutting Conditions : Vc = 150 m/min, f = 0.06 mm/rev, Drill Dia. ø20(3D), Wet
Workpiece Material : S50C

Inner edge **Excellent Chip Evacuation as well as Less Wear Resistance with Reduced Chips Weight**



Weight per Unit of Length for Chips Generated by the Inner Edge (Internal evaluation)

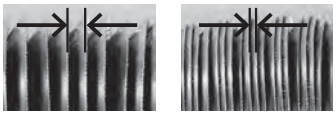
DRV
80mg/mm



Competitor E
151mg/mm



Pitch Comparison of Chips Generated by the Inner Edge (Internal evaluation)

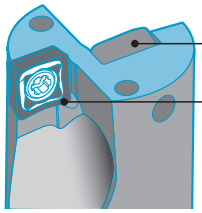


DRV : 1.2mm Competitor E : 0.5mm

47% Weight of Chips

Cutting Conditions : Vc = 250 m/min, f = 0.08 mm/rev, Drill Dia. ø20(5D), Wet Workpiece Material : SUS304

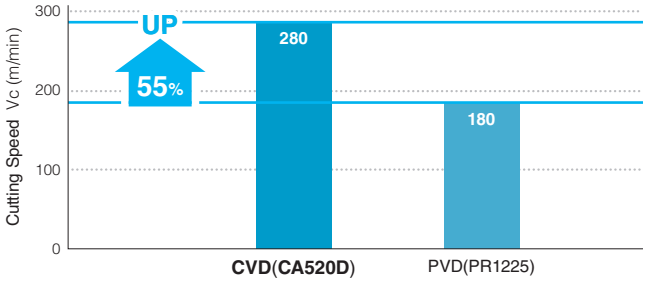
3 CVD Insert on the Outer Edge for Highly Efficient Drilling



New Grades Developed for Drilling

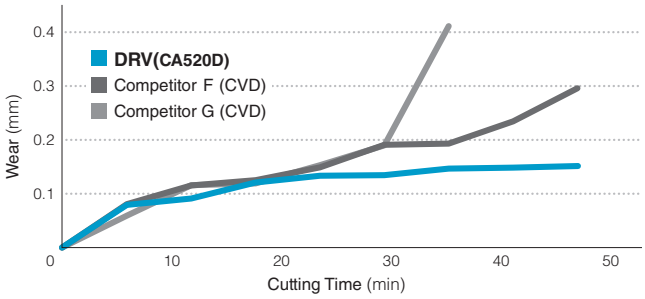
High Speed and Highly Efficient Machining Available with the Combination of CVD (Outer Edge) and PVD (Inner Edge) Inserts

Recommended Cutting Speed (Maximum Value)



Drill Dia. ø20(3D) Workpiece Material : S50C

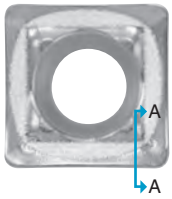
Wear Resistance Comparison (Internal evaluation)



Cutting Conditions : Vc = 200 m/min, f = 0.12 mm/rev, Drill Dia. ø20(3D) , Wet
Workpiece Material : SCM440H

4 Economical Inserts with 4 Cutting Edges
4 Types of Chipbreakers for Various Machining Applications

General Purpose GM Chipbreaker



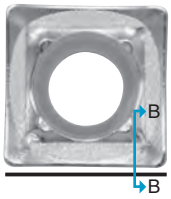
Chipbreaker for Steel Machining
Stable Deep-hole Machining with Low Cutting Force



A-A Section

Edge Shape Optimized for Various Machining Applications

Tough Edge GH Chipbreaker



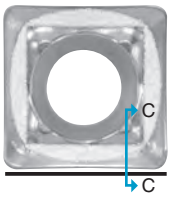
1st Recommendation for Machining Cast Iron
Good for Continuous Steel Machining
Reduced Breakages Common in Through-hole Machining



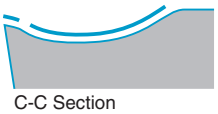
B-B Section

Negative Land with Strong Edge

For Stainless Steel Machining SM Chipbreaker



Stable Chip Control when Machining
Gummy Stainless Steel
Reduces Chip Clogging in the Holder Body



C-C Section

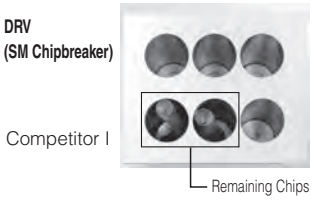
Sharp Cutting and Large Rake Angle

Chip Control Comparison (Internal evaluation)



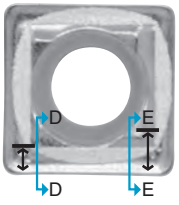
Cutting Conditions : Vc = 100 m/min, f = 0.1 mm/rev
Drill Dia. ø20(3D), Drilling Depth 60 mm
Wet Workpiece Material : SUS304

Comparison of Remaining Chips (Internal evaluation)

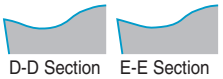


Cutting Conditions : Vc = 150 m/min, f = 0.08 mm/rev
Drill Dia. ø25(5D), Drilling Depth 98 mm
Wet Workpiece Material : SUS304

For Machining Soft Steel XM Chipbreaker



Stable Chip Control of Outer Cutting Edge



D-D Section E-E Section

Excellent Chip Control with the Changing Width of the Chipbreaker

Chip Control Comparison (Internal evaluation)



Cutting Conditions : Vc = 200 m/min, f = 0.12 mm/rev
Drill Dia. ø16(3D), Drilling Depth 48 mm
Wet Workpiece Material : SS400

Chipbreaker Selection Chart ➡K44

Applicable Inserts (Outer edge)

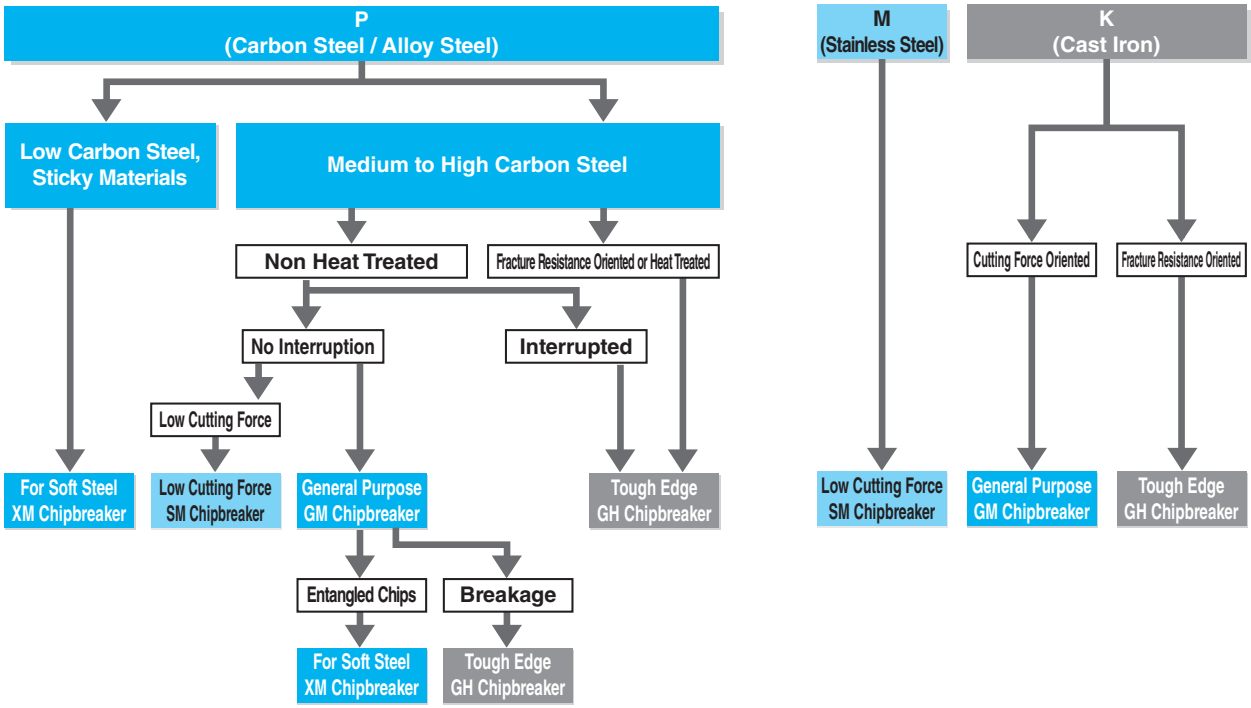
Classification of usage
★:High Speed and Highly Efficient Drilling
☆:Stable Machining Oriented

P	Carbon Steel / Alloy Steel	☆	★	
	Mold Steel	☆	★	
M	Stainless Steel	☆	★	
K	Cast Iron	☆		★

Insert	Applications	Description	Dimension (mm) IC W1/L	S	D1	RE	Angle AN	MEGACOAT PR1225	CVD Coated Carbide CA520D	CA415D	MEGACOAT NANO PR1535
LCMT / SCMT General Purpose	Outer edge	LCMT 030203-GM-E	4.40/5.54	2.0	2.3	0.3	7°	●	●	●	
		SCMT 040205-GM-E	4.80	2.2	2.4			●	●	●	
		050205-GM-E	5.25	2.6	2.4			●	●	●	
		060205-GM-E	6.40	2.8	2.9	0.5		●	●	●	
		070305-GM-E	7.65	3.2	3.5			●	●	●	
		090405-GM-E	9.10	4.1	4.0			●	●	●	
		110406-GM-E	11.00	4.5	4.6	0.6		●	●	●	
		NEW 140508-GM-E	13.80	5.0	5.7	0.8		●	●	●	
		170608-GM-E	16.80	6.58	6.9			●	●	●	
LCMT / SCMT Tough Edge	NEW	LCMT 030203-GH-E	4.40/5.54	2.0	2.3	0.3	7°	●	●	●	
		SCMT 040205-GH-E	4.80	2.2	2.4			●	●	●	
		050205-GH-E	5.25	2.6	2.4			●	●	●	
		060205-GH-E	6.40	2.8	2.9	0.5		●	●	●	
		070305-GH-E	7.65	3.2	3.5			●	●	●	
		090405-GH-E	9.10	4.1	4.0			●	●	●	
		110406-GH-E	11.00	4.5	4.6	0.6		●	●	●	
		NEW 140508-GH-E	13.80	5.0	5.7	0.8		●	●	●	
		170608-GH-E	16.80	6.58	6.9			●	●	●	
For Soft Steel Machining		SCMT 040205-XM-E	4.80	2.2	2.4		7°	●	●		
		050205-XM-E	5.25	2.6	2.4			●	●		
		060205-XM-E	6.40	2.8	2.9	0.5		●	●		
		070305-XM-E	7.65	3.2	3.5			●	●		
		090405-XM-E	9.10	4.1	4.0			●	●		
		110406-XM-E	11.00	4.5	4.6	0.6		●	●		
		NEW 140508-XM-E	13.80	5.0	5.7	0.8		●	●		
		170608-XM-E	16.80	6.58	6.9			●	●		
LCMT / SCMT For Stainless Steel Machining		LCMT 030203-SM-E	4.40/5.54	2.0	2.3	0.3	7°	●	●		
		SCMT 040205-SM-E	4.80	2.2	2.4			●	●		
		050205-SM-E	5.25	2.6	2.4			●	●		
		060205-SM-E	6.40	2.8	2.9	0.5		●	●		
		070305-SM-E	7.65	3.2	3.5			●	●		
		090405-SM-E	9.10	4.1	4.0			●	●		
		110406-SM-E	11.00	4.5	4.6	0.6		●	●		
		NEW 140508-SM-E	13.80	5.0	5.7	0.8		●	●		
		170608-SM-E	16.80	6.58	6.9			●	●		

* LCMT03*** is 2-edge insert

Chipbreaker Selection Chart



● : Std. Item

Applicable Inserts (Inner edge)

Classification of usage ★:High Speed and Highly Efficient Drilling						
P	Carbon Steel / Alloy Steel					★
	Mold Steel					★
M	Stainless Steel					★
K	Cast Iron					★

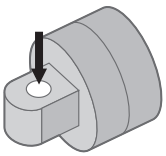
Insert	Applications	Description	Dimension (mm) IC W1/L	S	D1	RE	Angle AN	MEGACOAT PR1225	CVD Coated Carbide CA520D	CA415D	MEGACOAT NANO PR1535
LCMT / SCMT General Purpose	Inner edge	LCMT 030205-GM-I	4.16/5.37	2.0	2.3	0.5	7°				●
		SCMT 040209-GM-I	5.00	2.2	2.4	0.9					●
		050210-GM-I	5.70	2.6	2.4	1.0					●
		060210-GM-I	6.90	2.8	2.9						●
		070310-GM-I	8.20	3.2	3.5						●
		090410-GM-I	9.80	4.1	4.0						●
		110410-GM-I	11.90	4.5	4.6						●
		NEW 140510-GM-I	14.90	5.0	5.7						●
		170610-GM-I	17.90	6.58	6.9						●
LCMT / SCMT Tough Edge	NEW Inner edge	LCMT 030205-GH-I	4.16/5.37	2.0	2.3	0.5	7°				●
		SCMT 040209-GH-I	5.00	2.2	2.4	0.9					●
		050210-GH-I	5.70	2.6	2.4	1.0					●
		060210-GH-I	6.90	2.8	2.9						●
		070310-GH-I	8.20	3.2	3.5						●
		090410-GH-I	9.80	4.1	4.0						●
		110410-GH-I	11.90	4.5	4.6						●
		NEW 140510-GH-I	14.90	5.0	5.7						●
		170610-GH-I	17.90	6.58	6.9						●
For Soft Steel Machining	Inner edge	SCMT 040209-XM-I	5.00	2.2	2.4	0.9	7°				●
		050210-XM-I	5.70	2.6	2.4	1.0					●
		060210-XM-I	6.90	2.8	2.9						●
		070310-XM-I	8.20	3.2	3.5						●
		090410-XM-I	9.80	4.1	4.0						●
		110410-XM-I	11.90	4.5	4.6						●
		NEW 140510-XM-I	14.90	5.0	5.7						●
		170610-XM-I	17.90	6.58	6.9						●
LCMT / SCMT For Stainless Steel Machining	Inner edge	LCMT 030205-SM-I	4.16/5.37	2.0	2.3	0.5	7°				●
		SCMT 040209-SM-I	5.00	2.2	2.4	0.9					●
		050210-SM-I	5.70	2.6	2.4	1.0					●
		060210-SM-I	6.90	2.8	2.9						●
		070310-SM-I	8.20	3.2	3.5						●
		090410-SM-I	9.80	4.1	4.0						●
		110410-SM-I	11.90	4.5	4.6						●
		NEW 140510-SM-I	14.90	5.0	5.7						●
		170610-SM-I	17.90	6.58	6.9						●

* LCMT03*** is 2-edge insert

Case Studies

Housing SCM420

Vc = 125 m/min (n = 1,660 min^{-1})
f = 0.08 mm/rev (Vf = 133 mm/min)
Drilling Depth 45 mm
Wet (External coolant)
S25-DRV240M-4-07
SCMT070310GM-I PR1535
SCMT070305GM-E PR1225



Cutting Time

DRV (ø24-4D) 16 sec

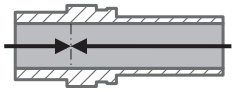
50% or more Cutting Time

Competitor K (ø24-4D) 35 sec

Chattering and chip biting occurred in low rigidity workpiece of Competitor K. Speed was reduced to Vc = 60 m/min.
DRV finely divided chips for stable machining at Vc = 125 m/min.
(User Evaluation)

Nipple S20CF

Vc = 230 m/min (n = 3,330 min^{-1})
f = 0.13 mm/rev (Vf = 433 mm/min)
Drilling Depth 60 mm (4D)
30 mm (2D)
Wet (Internal coolant)
S25-DRV220M-4-06 (4D)
S25-DRV220M-2-06 (2D)
SCMT060210-GM-I PR1535
SCMT060205-GM-E PR1225



Cutting Time

DRV (ø22-4D/2D) 12 sec

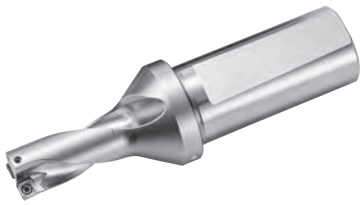
40% Cutting Time

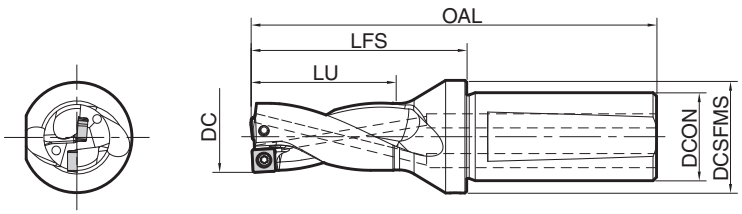
Competitor L (ø22-4D/2D) 20 sec

Chattering and deflection occurred with Competitor L. DRV showed stable machining and a shorter cutting time even when the cutting conditions were increased to 1.6 times or more.
(User Evaluation)

● : Std. Item

DRV (Drilling Depth : 2 x DC)





Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts: K44 (Outer edge) K45 (Inner edge)
S20-	DRV120M-2-03	●	2	12	82	39	24	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
	DRV125M-2-03	●		12.5	83	40	25			+0.20			
	DRV130M-2-03	●		13	84	41	26			+0.15			
	DRV135M-2-03	●		13.5	85	42	27			+0.10			
	DRV140M-2-04	●	2	14	92	49	28	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
	DRV145M-2-04	●		14.5	93	50	29			+0.35			
	DRV150M-2-04	●		15	94	51	30			+0.30			
	DRV155M-2-04	●		15.5	95	52	31			+0.25			
S25-	DRV160M-2-05	●	2	16	110	56	32	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
	DRV165M-2-05	●		16.5	111	57	33			+0.35			
	DRV170M-2-05	●		17	112	58	34			+0.30			
	DRV175M-2-05	●		17.5	113	59	35			+0.25			
	DRV180M-2-05	●		18	114	60	36			+0.20			
	DRV185M-2-05	●		18.5	115	61	37			+0.15			
	DRV190M-2-06	●	2	19	113	59	38	25	32	+0.65	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
	DRV195M-2-06	●		19.5	114	60	39			+0.60			
	DRV200M-2-06	●		20	115	61	40			+0.55			
	DRV205M-2-06	●		20.5	116	62	41			+0.50			
	DRV210M-2-06	●		21	117	63	42			+0.45			
	DRV215M-2-06	●		21.5	118	64	43			+0.35			
	DRV220M-2-06	●		22	119	65	44			+0.30			
	DRV225M-2-07	●	2	22.5	120	66	45	25	32	+0.90	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
	DRV230M-2-07	●		23	121	67	46			+0.80			
	DRV235M-2-07	●		23.5	122	68	47			+0.75			
	DRV240M-2-07	●		24	123	69	48			+0.70			
	DRV245M-2-07	●		24.5	124	70	49			+0.65			
	DRV250M-2-07	●		25	125	71	50			+0.60			
	DRV255M-2-07	●		25.5	126	72	51			+0.50			
	DRV260M-2-07	●		26	127	73	52			+0.45			
S32-	DRV270M-2-09	●	2	27	136	77	54	32	41	+1.05	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
	DRV280M-2-09	●		28	138	79	56			+0.95			
	DRV290M-2-09	●		29	140	81	58			+0.85			
	DRV300M-2-09	●		30	142	83	60			+0.75			
	DRV310M-2-09	●		31	144	85	62			+0.60			
	DRV320M-2-09	●		32	146	87	64			+0.50			
S40-	DRV330M-2-11	●	2	33	161	92	66	40	49	+1.25	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I
	DRV340M-2-11	●		34	163	94	68			+1.15			
	DRV350M-2-11	●		35	165	96	70			+1.00			
	DRV360M-2-11	●		36	167	98	72			+0.90			
	DRV370M-2-11	●		37	169	100	74			+0.80			
	DRV380M-2-11	●		38	171	102	76			+0.65			
	DRV390M-2-11	●		39	173	104	78			+0.55			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

● : Std. Item

Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts
S40-	DRV400M-2-14	●	2	40	181	112	80	40	49	+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
NEW	DRV410M-2-14	●		41	183	114	82			+1.60			
	DRV420M-2-14	●		42	185	116	84			+1.50			
	DRV430M-2-14	●		43	187	118	86			+1.40			
	DRV440M-2-14	●		44	189	120	88			+1.30			
	DRV450M-2-14	●		45	191	122	90			+1.15			
	DRV460M-2-14	●		46	193	124	92		54	+1.05			
	DRV470M-2-14	●		47	195	126	94			+0.95			
	DRV480M-2-14	●		48	197	128	96			+0.80			
	DRV490M-2-14	●		49	199	130	98			+0.70			
	DRV500M-2-17	●	2	50	198	129	100	40	59	+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	DRV510M-2-17	●		51	200	131	102			+1.95			
	DRV520M-2-17	●		52	202	133	104			+1.85			
	DRV530M-2-17	●		53	204	135	106			+1.75			
	DRV540M-2-17	●		54	206	137	108			+1.65			
	DRV550M-2-17	●		55	208	139	110			+1.50			
	DRV560M-2-17	●		56	210	141	112			+1.40			
	DRV570M-2-17	●		57	212	143	114		64	+1.30			
	DRV580M-2-17	●		58	214	145	116			+1.15			
	DRV590M-2-17	●		59	216	147	118			+1.05			
	DRV600M-2-17	●		60	218	149	120			+0.95			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

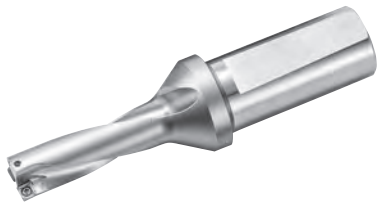
· Hole Dia. Tolerance (2D type)

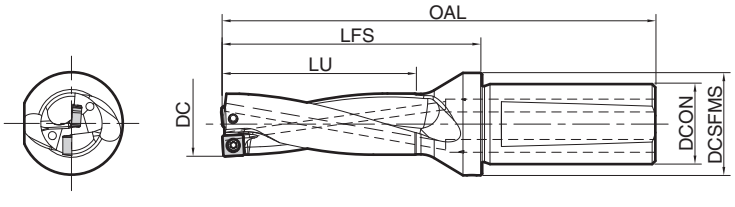
DC	Hole Dia. Tolerance (mm)
ø12 - ø60	+0.30 0

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRV (Drilling Depth : 3 x DC)





3D

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts (K44 Outer edge / K45 Inner edge)
S20- DRV120M-3-03	●	2	12	94	51	36	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
DRV125M-3-03	●		12.5	96	53	37.5			+0.20			
DRV130M-3-03	●		13	97	54	39			+0.15			
DRV135M-3-03	●		13.5	99	56	40.5			+0.10			
DRV140M-3-04	●	2	14	106	63	42	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
DRV145M-3-04	●		14.5	108	65	43.5			+0.35			
DRV150M-3-04	●		15	109	66	45			+0.30			
DRV155M-3-04	●		15.5	111	68	46.5			+0.25			
S25- DRV160M-3-05	●	2	16	126	72	48	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
DRV165M-3-05	●		16.5	127	73	49.5			+0.35			
DRV170M-3-05	●		17	129	75	51			+0.30			
DRV175M-3-05	●		17.5	130	76	52.5			+0.25			
DRV180M-3-05	●		18	132	78	54			+0.20			
DRV185M-3-05	●		18.5	133	79	55.5			+0.15			
DRV190M-3-06	●	2	19	132	78	57	25	32	+0.65	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
DRV195M-3-06	●		19.5	134	80	58.5			+0.60			
DRV200M-3-06	●		20	135	81	60			+0.55			
DRV205M-3-06	●		20.5	137	83	61.5			+0.50			
DRV210M-3-06	●		21	138	84	63			+0.45			
DRV215M-3-06	●		21.5	140	86	64.5			+0.35			
DRV220M-3-06	●		22	141	87	66			+0.30			
DRV225M-3-07	●	2	22.5	142	88	67.5	25	32	+0.90	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
DRV230M-3-07	●		23	144	90	69			+0.80			
DRV235M-3-07	●		23.5	145	91	70.5			+0.75			
DRV240M-3-07	●		24	147	93	72			+0.70			
DRV245M-3-07	●		24.5	148	94	73.5			+0.65			
DRV250M-3-07	●		25	150	96	75			+0.60			
DRV255M-3-07	●		25.5	151	97	76.5			+0.50			
DRV260M-3-07	●		26	153	99	78			+0.45			
S32- DRV265M-3-09	●	2	26.5	161	102	79.5	32	41	+1.15	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
DRV270M-3-09	●		27	163	104	81			+1.05			
DRV275M-3-09	●		27.5	164	105	82.5			+1.00			
DRV280M-3-09	●		28	166	107	84			+0.95			
DRV285M-3-09	●		28.5	167	108	85.5			+0.90			
DRV290M-3-09	●		29	169	110	87			+0.85			
DRV295M-3-09	●		29.5	170	111	88.5			+0.80			
DRV300M-3-09	●		30	172	113	90			+0.75			
DRV305M-3-09	●		30.5	173	114	91.5			+0.65			
DRV310M-3-09	●		31	175	116	93			+0.60			
DRV315M-3-09	●		31.5	176	117	94.5			+0.55			
DRV320M-3-09	●		32	178	119	96			+0.50			
S40- DRV330M-3-11	●	2	33	194	125	99	40	49	+1.25	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I
DRV340M-3-11	●		34	197	128	102			+1.15			
DRV350M-3-11	●		35	200	131	105			+1.00			
DRV360M-3-11	●		36	203	134	108			+0.90			
DRV370M-3-11	●		37	206	137	111			+0.80			
DRV380M-3-11	●		38	209	140	114			+0.65			
DRV390M-3-11	●		39	212	143	117			+0.55			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

● : Std. Item

Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts: K44 (Outer edge) K45 (Inner edge)
S40-	DRV400M-3-14	●	2	40	221	152	120	40	49	+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
NEW	DRV410M-3-14	●		41	224	155	123			+1.60			
	DRV420M-3-14	●		42	227	158	126			+1.50			
	DRV430M-3-14	●		43	230	161	129			+1.40			
	DRV440M-3-14	●		44	233	164	132			+1.30			
	DRV450M-3-14	●		45	236	167	135			+1.15			
	DRV460M-3-14	●		46	239	170	138		54	+1.05			
	DRV470M-3-14	●		47	242	173	141			+0.95			
	DRV480M-3-14	●		48	245	176	144			+0.80			
	DRV490M-3-14	●		49	248	179	147			+0.70			
	DRV500M-3-17	●	2	50	248	179	150	40	59	+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	DRV510M-3-17	●		51	251	182	153			+1.95			
	DRV520M-3-17	●		52	254	185	156			+1.85			
	DRV530M-3-17	●		53	257	188	159			+1.75			
	DRV540M-3-17	●		54	260	191	162			+1.65			
	DRV550M-3-17	●		55	263	194	165			+1.50			
	DRV560M-3-17	●		56	266	197	168			+1.40			
	DRV570M-3-17	●		57	269	200	171		64	+1.30			
	DRV580M-3-17	●		58	272	203	174			+1.15			
	DRV590M-3-17	●		59	275	206	177			+1.05			
	DRV600M-3-17	●		60	278	209	180			+0.95			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

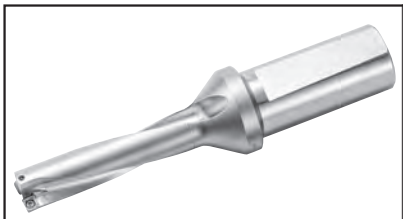
· Hole Dia. Tolerance (3D type)

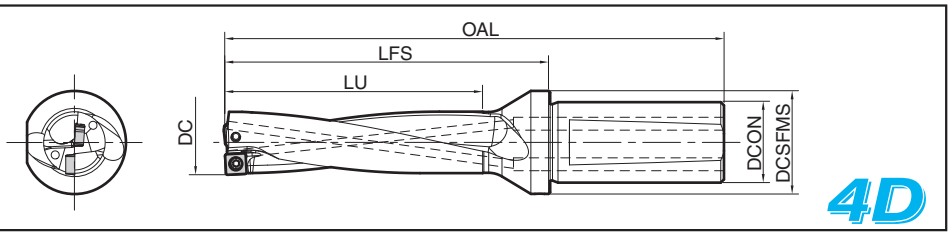
DC	Hole Dia. Tolerance (mm)
ø12 - ø60	+0.30 0

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRV (Drilling Depth : 4 x DC)





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts: K44 (Outer edge) K45 (Inner edge)
S20- DRV120M-4-03	●	2	12	106	63	48	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
DRV125M-4-03	●		12.5	108	65	50			+0.20			
DRV130M-4-03	●		13	110	67	52			+0.15			
DRV135M-4-03	●		13.5	112	69	54			+0.10			
DRV140M-4-04	●	2	14	120	77	56	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
DRV145M-4-04	●		14.5	122	79	58			+0.35			
DRV150M-4-04	●		15	124	81	60			+0.30			
DRV155M-4-04	●		15.5	126	83	62			+0.25			
S25- DRV160M-4-05	●	2	16	142	88	64	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
DRV165M-4-05	●		16.5	144	90	66			+0.35			
DRV170M-4-05	●		17	146	92	68			+0.30			
DRV175M-4-05	●		17.5	148	94	70			+0.25			
DRV180M-4-05	●		18	150	96	72			+0.20			
DRV185M-4-05	●		18.5	152	98	74			+0.15			
DRV190M-4-06	●	2	19	151	97	76	25	32	+0.65	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
DRV195M-4-06	●		19.5	153	99	78			+0.60			
DRV200M-4-06	●		20	155	101	80			+0.55			
DRV205M-4-06	●		20.5	157	103	82			+0.50			
DRV210M-4-06	●		21	159	105	84			+0.45			
DRV215M-4-06	●		21.5	161	107	86			+0.35			
DRV220M-4-06	●		22	163	109	88			+0.30			
DRV225M-4-07	●	2	22.5	165	111	90	25	32	+0.90	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
DRV230M-4-07	●		23	167	113	92			+0.80			
DRV235M-4-07	●		23.5	169	115	94			+0.75			
DRV240M-4-07	●		24	171	117	96			+0.70			
DRV245M-4-07	●		24.5	173	119	98			+0.65			
DRV250M-4-07	●		25	175	121	100			+0.60			
DRV255M-4-07	●		25.5	177	123	102			+0.50			
DRV260M-4-07	●		26	179	125	104			+0.45			
S32- DRV270M-4-09	●	2	27	190	131	108	32	41	+1.05	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
DRV280M-4-09	●		28	194	135	112			+0.95			
DRV290M-4-09	●		29	198	139	116			+0.85			
DRV300M-4-09	●		30	202	143	120			+0.75			
DRV310M-4-09	●		31	206	147	124			+0.60			
DRV320M-4-09	●		32	210	151	128			+0.50			
S40- DRV330M-4-11	●	2	33	227	158	132	40	49	+1.25	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I
DRV340M-4-11	●		34	231	162	136			+1.15			
DRV350M-4-11	●		35	235	166	140			+1.00			
DRV360M-4-11	●		36	239	170	144			+0.90			
DRV370M-4-11	●		37	243	174	148			+0.80			
DRV380M-4-11	●		38	247	178	152			+0.65			
DRV390M-4-11	●		39	251	182	156			+0.55			

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

● : Std. Item

Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts: K44 (Outer edge) K45 (Inner edge)
S40-	DRV400M-4-14	●	2	40	261	192	160	40	49	+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
NEW	DRV410M-4-14	●		41	265	196	164			+1.60			
	DRV420M-4-14	●		42	269	200	168			+1.50			
	DRV430M-4-14	●		43	273	204	172			+1.40			
	DRV440M-4-14	●		44	277	208	176			+1.30			
	DRV450M-4-14	●		45	281	212	180			+1.15			
	DRV460M-4-14	●		46	285	216	184		54	+1.05			
	DRV470M-4-14	●		47	289	220	188			+0.95			
S50-	DRV480M-4-14	●		48	293	224	192	50	59	+0.80			
NEW	DRV490M-4-14	●		49	297	228	196			+0.70			
S50-	DRV500M-4-17	●	2	50	298	229	200	50	59	+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
NEW	DRV510M-4-17	●		51	302	233	204			+1.95			
	DRV520M-4-17	●		52	306	237	208			+1.85			
	DRV530M-4-17	●		53	310	241	212			+1.75			
	DRV540M-4-17	●		54	314	245	216			+1.65			
	DRV550M-4-17	●		55	318	249	220			+1.50			
	DRV560M-4-17	●		56	322	253	224			+1.40			
	DRV570M-4-17	●		57	326	257	228		64	+1.30			
	DRV580M-4-17	●		58	330	261	232			+1.15			
	DRV590M-4-17	●		59	334	265	236			+1.05			
	DRV600M-4-17	●		60	338	269	240			+0.95			

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

· Hole Dia. Tolerance (4D type)

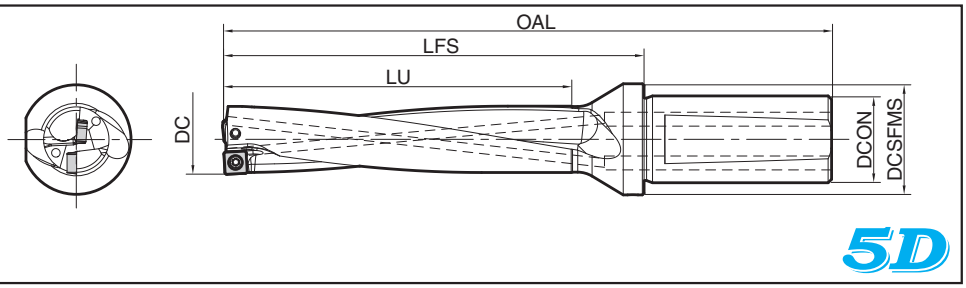
DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.35 0
ø40 - ø60	+0.40 0

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRV(Drilling Depth : 5 x DC)





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts (K44 Outer edge / K45 Inner edge)
S20- DRV120M-5-03	●	2	12	118	75	60	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E
DRV130M-5-03	●		13	123	80	65			+0.15			Inner edge LCMT030205-□□-I
DRV140M-5-04	●	2	14	134	91	70	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E
DRV150M-5-04	●		15	139	96	75			+0.30			Inner edge SCMT040209-□□-I
S25- DRV160M-5-05	●	2	16	158	104	80	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E
DRV170M-5-05	●		17	163	109	85			+0.30			Inner edge SCMT050210-□□-I
DRV180M-5-05	●		18	168	114	90			+0.20			
DRV190M-5-06	●	2	19	170	116	95	25	32	+0.65	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E
DRV200M-5-06	●		20	175	121	100			+0.55			Inner edge SCMT060210-□□-I
DRV210M-5-06	●		21	180	126	105			+0.45			
DRV220M-5-06	●		22	185	131	110			+0.30			
DRV230M-5-07	●	2	23	190	136	115	25	32	+0.80	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E
DRV240M-5-07	●		24	195	141	120			+0.70			Inner edge SCMT070310-□□-I
DRV250M-5-07	●		25	200	146	125			+0.60			
DRV260M-5-07	●		26	205	151	130			+0.45			
S32- DRV270M-5-09	●	2	27	217	158	135	32	41	+1.05	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E
DRV280M-5-09	●		28	222	163	140			+0.95			Inner edge SCMT090410-□□-I
DRV290M-5-09	●		29	227	168	145			+0.85			
DRV300M-5-09	●		30	232	173	150			+0.75			
DRV310M-5-09	●		31	237	178	155			+0.60			
DRV320M-5-09	●		32	242	183	160			+0.50			
S40- DRV330M-5-11	●	2	33	260	191	165	40	49	+1.25	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E
DRV340M-5-11	●		34	265	196	170			+1.15			Inner edge SCMT110410-□□-I
DRV350M-5-11	●		35	270	201	175			+1.00			
DRV360M-5-11	●		36	275	206	180			+0.90			
DRV370M-5-11	●		37	280	211	185			+0.80			
DRV380M-5-11	●		38	285	216	190			+0.65			
DRV390M-5-11	●		39	290	221	195			+0.55			

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions **K58**
Trouble shooting **K64**

● : Std. Item

Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts: K44 (Outer edge) K45 (Inner edge)
S40-	DRV400M-5-14	●	2	40	301	232	200	40	49	+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
NEW	DRV410M-5-14	●		41	306	237	205			+1.60			
	DRV420M-5-14	●		42	311	242	210			+1.50			
	DRV430M-5-14	●		43	316	247	215			+1.40			
	DRV440M-5-14	●		44	321	252	220			+1.30			
	DRV450M-5-14	●		45	326	257	225			+1.15			
	DRV460M-5-14	●		46	331	262	230		54	+1.05			
	DRV470M-5-14	●		47	336	267	235			+0.95			
S50-	DRV480M-5-14	●		48	341	272	240	50	59	+0.80			
NEW	DRV490M-5-14	●		49	346	277	245			+0.70			
S50-	DRV500M-5-17	●	2	50	348	279	250	50	59	+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
NEW	DRV510M-5-17	●		51	353	284	255			+1.95			
	DRV520M-5-17	●		52	358	289	260			+1.85			
	DRV530M-5-17	●		53	363	294	265			+1.75			
	DRV540M-5-17	●		54	368	299	270			+1.65			
	DRV550M-5-17	●		55	373	304	275			+1.50			
	DRV560M-5-17	●		56	378	309	280			+1.40			
	DRV570M-5-17	●		57	383	314	285		64	+1.30			
	DRV580M-5-17	●		58	388	319	290			+1.15			
	DRV590M-5-17	●		59	393	324	295			+1.05			
	DRV600M-5-17	●		60	398	329	300			+0.95			

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

· Hole Dia. Tolerance (5D type)

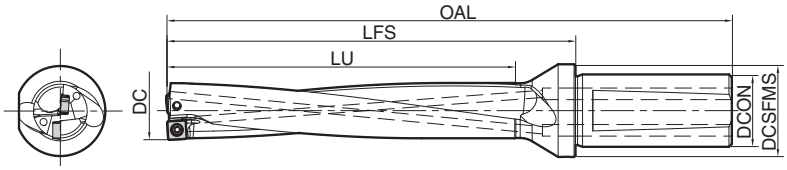
DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.35 0
ø40 - ø60	+0.40 0

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRV(Drilling Depth : 6 x DC)





Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts: K44 (Outer edge) K45 (Inner edge)
S20-	DRV120M-6-03	●	2	12	130	87	72	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E
	DRV130M-6-03	●		13	136	93	78			+0.15			Inner edge LCMT030205-□□-I
	DRV140M-6-04	●	2	14	148	105	84	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E
	DRV150M-6-04	●		15	154	111	90			+0.30			Inner edge SCMT040209-□□-I
S25-	DRV160M-6-05	●	2	16	174	120	96	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E
	DRV170M-6-05	●		17	180	126	102			+0.30			Inner edge SCMT050210-□□-I
	DRV180M-6-05	●		18	186	132	108			+0.20			
	DRV190M-6-06	●	2	19	189	135	114	25	32	+0.65	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E
	DRV200M-6-06	●		20	195	141	120			+0.55			Inner edge SCMT060210-□□-I
	DRV210M-6-06	●		21	201	147	126			+0.45			
	DRV220M-6-06	●		22	207	153	132			+0.30			
	DRV230M-6-07	●	2	23	213	159	138	25	32	+0.80	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E
	DRV240M-6-07	●		24	219	165	144			+0.70			Inner edge SCMT070310-□□-I
	DRV250M-6-07	●		25	225	171	150			+0.60			
	DRV260M-6-07	●		26	231	177	156			+0.45			
S32-	DRV270M-6-09	●	2	27	244	185	162	32	41	+1.05	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E
	DRV280M-6-09	●		28	250	191	168			+0.95			Inner edge SCMT090410-□□-I
	DRV290M-6-09	●		29	256	197	174			+0.85			
	DRV300M-6-09	●		30	262	203	180			+0.75			
	DRV310M-6-09	●		31	268	209	186			+0.60			
	DRV320M-6-09	●		32	274	215	192			+0.50			
S40-	DRV330M-6-11	●	2	33	293	224	198	40	49	+1.25	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E
	DRV340M-6-11	●		34	299	230	204			+1.15			Inner edge SCMT110410-□□-I
	DRV350M-6-11	●		35	305	236	210			+1.00			
	DRV360M-6-11	●		36	311	242	216			+0.90			
	DRV370M-6-11	●		37	317	248	222			+0.80			
	DRV380M-6-11	●		38	323	254	228			+0.65			
	DRV390M-6-11	●		39	329	260	234			+0.55			
S40-	DRV400M-6-14	●	2	40	341	272	240	40	49	+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E
NEW	DRV410M-6-14	●		41	347	278	246			+1.60			Inner edge SCMT140510-□□-I
	DRV420M-6-14	●		42	353	284	252			+1.50			
	DRV430M-6-14	●		43	359	290	258			+1.40			
	DRV440M-6-14	●		44	365	296	264			+1.30			
	DRV450M-6-14	●		45	371	302	270			+1.15			
S50-	DRV500M-6-17	●	2	50	398	329	300	50	59	+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E
NEW	DRV550M-6-17	●		55	428	359	330			+1.50			Inner edge SCMT170610-□□-I
	DRV600M-6-17	●		60	458	389	360		64	+0.95			

· When offset drilling, reduce feed rate to 0.04mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

· Hole Dia. Tolerance (6D type)

DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.45 0
ø40 - ø60	+0.50 0

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

Insert Grade Selection Guide

Select CVD for the outer edge when performing high speed and high efficiency drilling.Drilling for high efficiency, abrasion resistance and long tool life.
Select PVD for the outer edge for stable drilling and a better surface finish.
PVD is recommended for the outer edge when chattering occurs or drilling with lathe is not available, even if cutting conditions are increased.

High Speed and Highly Efficient Drilling

Outer edge : CVD (CA520D/CA415D)



Inner edge : PVD (PR1535)



Stable Machining Oriented(1st Recommendation for Lathe Machining)

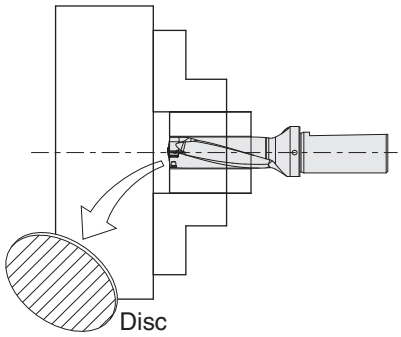
Outer edge : PVD (PR1225)



Inner edge : PVD (PR1535)



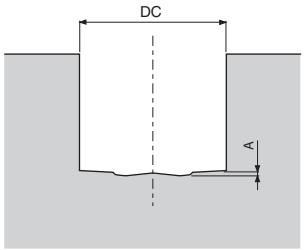
Caution



When drilling through the workpiece, a disk may be ejected.
Proper machine guarding is necessary to prevent injury.

DRV Hole Bottom Shape (mm)

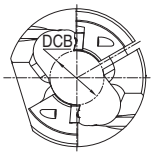
Insert Size	DC	A	Insert Size	DC	A	Insert Size	DC	A	Insert Size	DC	A
03	12.0	0.70	06	19.0	1.2	09	26.5	1.2	14	40.0	1.9
	12.5			19.5			27.0			41.0	
	13.0			20.0			27.5	1.3		42.0	2.0
	13.5			20.5	1.3		28.0			43.0	
04	14.0	1.0		21.0			28.5			44.0	
	14.5			21.5			29.0			45.0	2.1
	15.0			22.0			29.5	1.4		46.0	
	15.5		07	22.5	1.2		30.0			47.0	
05	16.0	1.1		23.0			30.5			48.0	2.2
	16.5			23.5			31.0			49.0	
	17.0			24.0			31.5	1.5	17	50.0	2.0
	17.5			24.5	1.3		32.0			51.0	2.1
	18.0	1.2		25.0		11	33.0	1.5		52.0	
	18.5			25.5			34.0			53.0	
				26.0			35.0			54.0	2.2
							36.0	1.6		55.0	
							37.0			56.0	
							38.0			57.0	2.3
							39.0	1.7		58.0	
										59.0	2.4
										60.0	

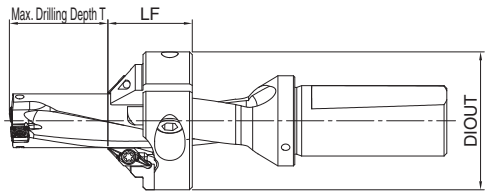


Common for 2D, 3D, 4D, 5D, 6D type
* Above is numeric guideline. (Varies within ±0.1mm depending on workpiece materials and cutting conditions)

Chamfering Attachment



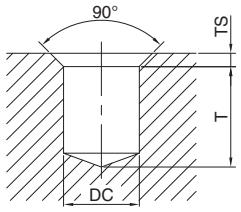




Toolholder Dimensions

Description	Stock	Applicable Drills	Dimension (mm)			Applicable Inserts	Spare Parts			
			DIOUT	DCB	LF		Clamp Screw	Wrench	Clamp Bolt	Wrench
DRV-CH17	●	S25-DRV165M-◯-05 S25-DRV170M-◯-05	47	16.2	30	CH0503-45	SB-3080TR	FT-10	HH6X18	LW-5
DRV-CH18	●	S25-DRV175M-◯-05 S25-DRV180M-◯-05	47	17.2	30					
DRV-CH19	●	S25-DRV185M-◯-05 S25-DRV190M-◯-06	49	18.2	30					
DRV-CH20	●	S25-DRV195M-◯-06 S25-DRV200M-◯-06	49	19.2	30					
DRV-CH21	●	S25-DRV205M-◯-06 S25-DRV210M-◯-06	49	20.2	30					
DRV-CH22	●	S25-DRV215M-◯-06 S25-DRV220M-◯-06	49	21.2	30					
DRV-CH23	●	S25-DRV225M-◯-07 S25-DRV230M-◯-07	51	22.2	30					
DRV-CH24	●	S25-DRV235M-◯-07 S25-DRV240M-◯-07	51	23.2	30					
DRV-CH25	●	S25-DRV245M-◯-07 S25-DRV250M-◯-07	53	24.2	30					
DRV-CH26	●	S25-DRV255M-◯-07 S25-DRV260M-◯-07	53	25.2	30					
DRV-CH27	●	S32-DRV265M-◯-09 S32-DRV270M-◯-09	64	26	35				HH8X20	LW-6

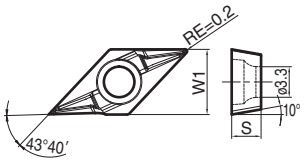
Max. Drilling Depth and Chamfering Dimension



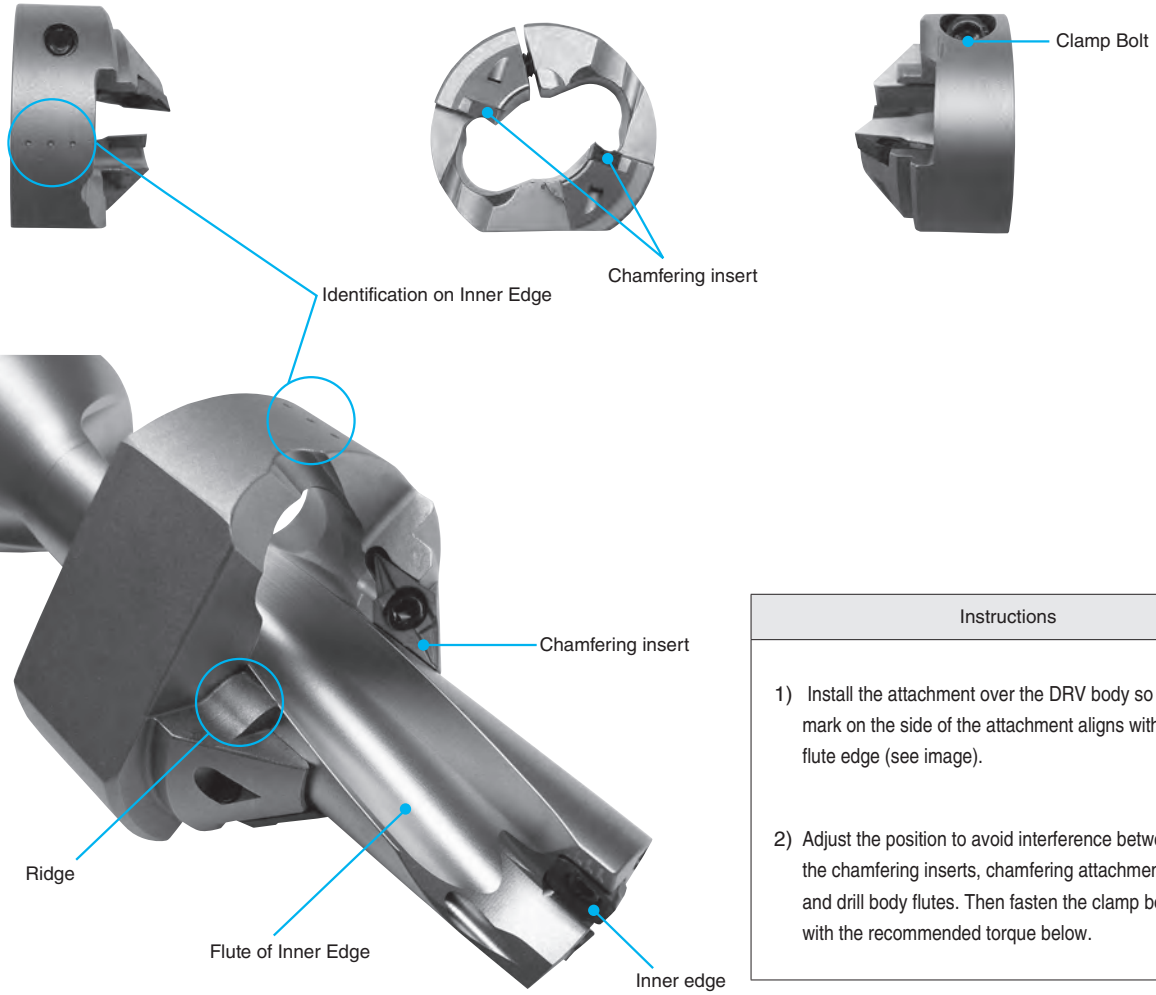
Drill Dia. (mm)	Max. Drilling Depth T (mm)					Max. Chamfering Dimension (mm)	Applicable Chamfering Attachment
DC	2D Drill	3D Drill	4D Drill	5D Drill	6D Drill	Ts	
16.5	0.5	17	33.5	-	-	2.5	DRV-CH17
17	1.5	18.5	35.5	52.5	69.5		
17.5	2.5	20	37.5	-	-		DRV-CH18
18	3.5	21.5	39.5	57.5	75.5		
18.5	4.5	23	41.5	-	-		DRV-CH19
19	5.5	24.5	43.5	62.5	81.5		
19.5	6.5	26	45.5	-	-		DRV-CH20
20	7.5	27.5	47.5	67.5	87.5		
20.5	8.5	29	49.5	-	-		DRV-CH21
21	9.5	30.5	51.5	72.5	93.5		
21.5	10.5	32	53.5	-	-		DRV-CH22
22	11.5	33.5	55.5	77.5	99.5		
22.5	12.5	35	57.5	-	-		DRV-CH23
23	13.5	36.5	59.5	82.5	105.5		
23.5	14.5	38	61.5	-	-		DRV-CH24
24	15.5	39.5	63.5	87.5	111.5		
24.5	16.5	41	65.5	-	-		DRV-CH25
25	17.5	42.5	67.5	92.5	117.5		
25.5	18.5	44	69.5	-	-		DRV-CH26
26	19.5	45.5	71.5	97.5	123.5		
26.5	-	47	-	-	-		DRV-CH27
27	16.5	43.5	75.5	97.5	124.5		

● : Std. Item

Applicable Inserts

Insert		Description	Dimension (mm)		MEGACOAT NANO	Applicable Chamfering Attachment
			W1	S	**PR1535**	
		**CH0503-45**	7.05	3.18	●	DRV-CH○○

How to Install Chamfering Attachment



Instructions
1) Install the attachment over the DRV body so that "···" mark on the side of the attachment aligns with the inside flute edge (see image).
2) Adjust the position to avoid interference between the chamfering inserts, chamfering attachment ridges, and drill body flutes. Then fasten the clamp bolt with the recommended torque below.

Recommended Tightening Torque

Chamfering Attachment Description	Tightening Torque (N·m)	Clamp Bolt	Wrench
DRV-CH17~CH26	10	HH6X18	LW-5
DRV-CH27	14	HH8X20	LW-6

DRV Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grades(Cutting Speed Vc: m/min)										Drill Dia. DC (mm)	Drill type							
	PVD Coated Carbide				CVD Coated Carbide							2D , 3D				4D			
	PR1225				CA520D				CA415D			f (mm/rev)							
	GM	GH	XM	SM	GM	GH	XM	SM	GM	GH		GM	GH	XM	SM	GM	GH	XM	SM
Low Carbon Steel	-	-	★ 120-200	☆ 120-200	-	-	★ 150-280	☆ 150-280	-	-	ø12-ø13.5	-	-	-	0.04-0.06	-	-	-	0.04-0.06
											ø14-ø15.5	-	-	0.04-0.09	0.04-0.07	-	-	0.04-0.08	0.04-0.07
											ø16-ø18.5	-	-	0.04-0.10	0.04-0.08	-	-	0.04-0.08	0.04-0.08
											ø19-ø22	-	-	0.04-0.12	0.04-0.08	-	-	0.04-0.10	0.04-0.08
											ø22.5-ø26	-	-	0.04-0.14	0.06-0.10	-	-	0.04-0.12	0.05-0.10
											ø26.5-ø32	-	-	0.06-0.14	0.06-0.10	-	-	0.04-0.12	0.05-0.10
											ø33-ø39	-	-	0.06-0.14	0.06-0.10	-	-	0.06-0.12	0.05-0.10
											ø40-ø60	-	-	0.06-0.16	0.08-0.12	-	-	0.06-0.16	0.05-0.10
Carbon Steel	★ 100-180	☆ 100-180	☆ 100-180	☆ 100-180	★ 150-280	☆ 150-280	☆ 150-280	☆ 150-280	-	-	ø12-ø13.5	0.04-0.14	0.04-0.14	-	0.04-0.10	0.04-0.10	0.04-0.10	-	0.04-0.08
											ø14-ø15.5	0.04-0.14	0.04-0.14	0.04-0.10	0.04-0.10	0.04-0.10	0.04-0.10	0.04-0.08	0.04-0.08
											ø16-ø18.5	0.06-0.16	0.06-0.16	0.06-0.12	0.06-0.12	0.05-0.12	0.05-0.12	0.04-0.10	0.05-0.10
											ø19-ø26	0.08-0.20	0.08-0.20	0.06-0.14	0.06-0.14	0.07-0.16	0.07-0.16	0.04-0.12	0.05-0.12
											ø26.5-ø32	0.08-0.20	0.08-0.20	0.06-0.14	0.06-0.14	0.07-0.16	0.07-0.16	0.04-0.12	0.05-0.12
											ø33-ø39	0.08-0.20	0.08-0.20	0.06-0.16	0.06-0.14	0.07-0.16	0.07-0.16	0.06-0.14	0.05-0.12
											ø40-ø60	0.08-0.20	0.08-0.20	0.06-0.18	0.06-0.14	0.07-0.16	0.07-0.16	0.06-0.16	0.05-0.12
Alloy Steel	★ 100-160	☆ 100-160	☆ 100-160	-	★ 140-220	☆ 140-220	☆ 140-220	-	-	-	ø12-ø13.5	0.04-0.12	0.04-0.12	-	-	0.04-0.10	0.04-0.10	-	-
											ø14-ø15.5	0.04-0.14	0.04-0.14	-	-	0.04-0.10	0.04-0.10	-	-
											ø16-ø18.5	0.06-0.16	0.06-0.16	-	-	0.05-0.12	0.05-0.12	-	-
											ø19-ø26	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-
											ø26.5-ø32	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-
											ø33-ø39	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-
											ø40-ø60	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-
Mold Steel	☆ 80-150	★ 80-150	-	-	☆ 130-210	★ 130-210	-	-	-	-	ø12-ø13.5	0.04-0.08	0.04-0.08	-	-	0.04-0.07	0.04-0.07	-	-
											ø14-ø15.5	0.04-0.08	0.04-0.08	-	-	0.04-0.07	0.04-0.07	-	-
											ø16-ø18.5	0.06-0.12	0.06-0.12	-	-	0.05-0.10	0.05-0.10	-	-
											ø19-ø26	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
											ø26.5-ø32	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
											ø33-ø39	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
											ø40-ø60	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
Stainless Steel (Austenitic related)	-	-	-	★ 70-140	-	-	-	★ 140-200	-	-	ø12-ø13.5	-	-	-	0.04-0.10	-	-	-	0.04-0.08
											ø14-ø15.5	-	-	-	0.04-0.10	-	-	-	0.04-0.08
											ø16-ø18.5	-	-	-	0.06-0.12	-	-	-	0.05-0.11
											ø19-ø26	-	-	-	0.06-0.14	-	-	-	0.06-0.12
											ø26.5-ø32	-	-	-	0.06-0.14	-	-	-	0.06-0.12
											ø33-ø39	-	-	-	0.06-0.14	-	-	-	0.06-0.12
											ø40-ø60	-	-	-	0.06-0.14	-	-	-	0.06-0.12
Gray Cast Iron	☆ 100-150	★ 100-150	-	-	-	-	-	-	☆ 150-220	★ 150-220	ø12-ø13.5	0.08-0.14	0.08-0.14	-	-	0.06-0.10	0.06-0.10	-	-
											ø14-ø15.5	0.08-0.14	0.08-0.14	-	-	0.06-0.12	0.06-0.12	-	-
											ø16-ø18.5	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-
											ø19-ø26	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
											ø26.5-ø32	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
											ø33-ø39	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
											ø40-ø60	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
Nodular Cast Iron	☆ 80-120	★ 80-120	-	-	-	-	-	-	☆ 120-180	★ 120-180	ø12-ø13.5	0.08-0.12	0.08-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø14-ø15.5	0.08-0.12	0.08-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø16-ø18.5	0.08-0.16	0.08-0.16	-	-	0.08-0.14	0.08-0.14	-	-
											ø19-ø26	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-
											ø26.5-ø32	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-
											ø33-ø39	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-
											ø40-ø60	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-

· Internal Coolant is Recommended

★ : 1st Recommendation ☆ : 2nd Recommendation

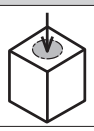
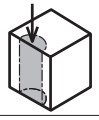
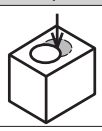
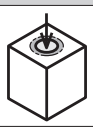
DRV Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grades(Cutting Speed Vc: m/min)										Drill Dia. DC (mm)	Drill type							
	PVD Coated Carbide				CVD Coated Carbide							5D				6D			
	PR1225				CA520D				CA415D			f (mm/rev)							
	GM	GH	XM	SM	GM	GH	XM	SM	GM	GH		GM	GH	XM	SM	GM	GH	XM	SM
Low Carbon Steel	-	-	★ 120-200	☆ 120-200	-	-	★ 150-280	☆ 150-280	-	-	ø12-ø13.5	-	-	-	0.03-0.05	-	-	-	0.03-0.05
											ø14-ø15.5	-	-	0.04-0.07	0.04-0.06	-	-	0.04-0.06	0.04-0.06
											ø16-ø18.5	-	-	0.04-0.08	0.04-0.06	-	-	0.04-0.06	0.04-0.06
											ø19-ø22	-	-	0.04-0.10	0.04-0.07	-	-	0.04-0.07	0.04-0.07
											ø22.5-ø26	-	-	0.04-0.12	0.04-0.08	-	-	0.04-0.08	0.04-0.07
											ø26.5-ø32	-	-	0.04-0.12	0.04-0.08	-	-	0.04-0.08	0.04-0.07
											ø33-ø39	-	-	0.05-0.12	0.04-0.10	-	-	0.04-0.09	0.04-0.08
											ø40-ø60	-	-	0.06-0.14	0.04-0.10	-	-	0.06-0.12	0.04-0.08
Carbon Steel	★ 100-180	☆ 100-180	☆ 100-180	☆ 100-180	★ 150-280	☆ 150-280	☆ 150-280	☆ 150-280	-	-	ø12-ø13.5	0.04-0.08	0.04-0.08	-	0.04-0.07	0.03-0.05	0.03-0.05	-	0.03-0.05
											ø14-ø15.5	0.04-0.08	0.04-0.08	0.04-0.07	0.04-0.07	0.04-0.06	0.04-0.06	0.04-0.06	0.04-0.06
											ø16-ø18.5	0.05-0.10	0.05-0.10	0.05-0.08	0.05-0.08	0.05-0.08	0.05-0.08	0.05-0.07	0.05-0.07
											ø19-ø26	0.06-0.12	0.06-0.12	0.05-0.10	0.05-0.10	0.06-0.10	0.06-0.10	0.05-0.08	0.05-0.08
											ø26.5-ø32	0.06-0.12	0.06-0.12	0.05-0.12	0.05-0.10	0.06-0.10	0.06-0.10	0.05-0.08	0.05-0.08
											ø33-ø39	0.06-0.12	0.06-0.12	0.05-0.12	0.05-0.10	0.06-0.10	0.06-0.10	0.05-0.08	0.05-0.08
											ø40-ø60	0.06-0.12	0.06-0.12	0.06-0.12	0.05-0.10	0.06-0.10	0.06-0.10	0.06-0.10	0.05-0.08
Alloy Steel	★ 100-160	☆ 100-160	☆ 100-160	-	★ 140-220	☆ 140-220	☆ 140-220	-	-	-	ø12-ø13.5	0.04-0.08	0.04-0.08	-	-	0.03-0.05	0.03-0.05	-	-
											ø14-ø15.5	0.04-0.08	0.04-0.08	-	-	0.04-0.06	0.04-0.06	-	-
											ø16-ø18.5	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-
											ø19-ø26	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø26.5-ø32	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø33-ø39	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø40-ø60	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
Mold Steel	☆ 80-150	★ 80-150	-	-	☆ 130-210	★ 130-210	-	-	-	-	ø12-ø13.5	0.04-0.06	0.04-0.06	-	-	0.03-0.05	0.03-0.05	-	-
											ø14-ø15.5	0.04-0.06	0.04-0.06	-	-	0.04-0.05	0.04-0.05	-	-
											ø16-ø18.5	0.04-0.08	0.04-0.08	-	-	0.04-0.06	0.04-0.06	-	-
											ø19-ø26	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-
											ø26.5-ø32	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-
											ø33-ø39	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-
											ø40-ø60	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-
Stainless Steel (Austenitic related)	-	-	-	★ 70-140	-	-	-	★ 140-200	-	-	ø12-ø13.5	-	-	-	0.04-0.08	-	-	-	0.03-0.05
											ø14-ø15.5	-	-	-	0.04-0.08	-	-	-	0.04-0.06
											ø16-ø18.5	-	-	-	0.04-0.10	-	-	-	0.04-0.09
											ø19-ø26	-	-	-	0.06-0.12	-	-	-	0.06-0.10
											ø26.5-ø32	-	-	-	0.06-0.12	-	-	-	0.06-0.10
											ø33-ø39	-	-	-	0.06-0.12	-	-	-	0.06-0.10
											ø40-ø60	-	-	-	0.06-0.12	-	-	-	0.06-0.10
Gray Cast Iron	☆ 100-150	★ 100-150	-	-	-	-	-	-	☆ 150-220	★ 150-220	ø12-ø13.5	0.04-0.10	0.04-0.10	-	-	0.04-0.08	0.04-0.08	-	-
											ø14-ø15.5	0.04-0.10	0.04-0.10	-	-	0.04-0.08	0.04-0.08	-	-
											ø16-ø18.5	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø19-ø26	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-
											ø26.5-ø32	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-
											ø33-ø39	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-
											ø40-ø60	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-
Nodular Cast Iron	☆ 80-120	★ 80-120	-	-	-	-	-	-	☆ 120-180	★ 120-180	ø12-ø13.5	0.04-0.08	0.04-0.08	-	-	0.03-0.05	0.03-0.05	-	-
											ø14-ø15.5	0.04-0.08	0.04-0.08	-	-	0.04-0.06	0.04-0.06	-	-
											ø16-ø18.5	0.06-0.10	0.06-0.10	-	-	0.06-0.08	0.06-0.08	-	-
											ø19-ø26	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø26.5-ø32	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø33-ø39	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-
											ø40-ø60	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-

· Internal Coolant is Recommended

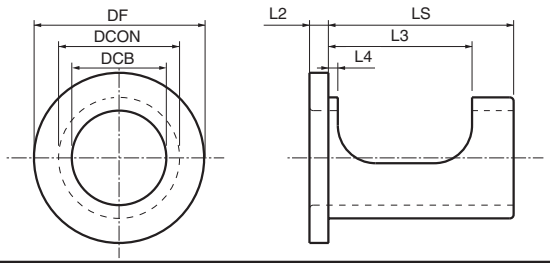
★ : 1st Recommendation ☆ : 2nd Recommendation

Cutting Conditions by Application

Applications	Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Cored Hole	Concave Surface	Stacked Plates
Shape of Workpiece							
Cutting Speed Vc (m/min)	See recommended cutting conditions above.	120 (PVD insert is recommended for outer edge.)					Not Available
f (mm/rev)	See recommended cutting conditions above.	Half of the above recommended conditions is recommended.				Concave Surface : Half of the above recommended conditions is recommended. Continuous Part : See recommended cutting conditions above.	Not Available
Coolant (Internal coolant)	Yes						Not Available

SHE



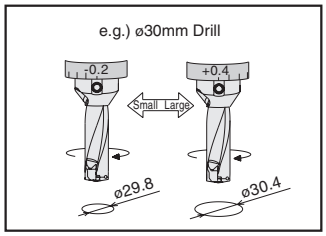


Sleeve Dimensions

Description	Stock	Dimension (mm)							* Drill Dia. Adjustable Range	Center Height Adjustable Range
		DCB	DCON	DF	LS	L2	L3	L4		
SHE 2025-43	●	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
2532-48	●	25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
3240-53	●	32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
4050-63	●	40	50	74	63	6	49	3.0	+0.6~-0.2	+0.2~-0.2

· Diameter Adjustment Range adjusts the drill diameter.
· SHE type is for MagicDrill **DRV / DRZ / DRX**. It is not suitable for MagicDrill **DRS**, because large correction amount is required.

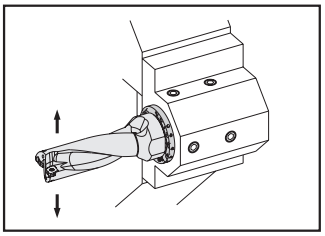
1. Diameter Adjustment ~For Machining Center~



● Diameter Adjustment Range (mm)

Shank Dia.	Adjustment Range
ø20	+0.4~-0.2
ø25	
ø32	
ø40	+0.6~-0.2

2. Center Height Adjustment ~Fewer problems owing to height adjustment for lathes~



● Center Height Adjustment Range (mm)

Shank Dia.	Adjustment Range
ø20	+0.2~-0.15
ø25	
ø32	
ø40	+0.3~-0.2

● : Std. Item

◆ How to Use the Adjustable Sleeve

1. Hole Diameter Adjustment when Drilling

(1) Adjust the scale at the flange periphery of the sleeve to the reference mark (DRV/DRX) or the center of coolant plug (DRZ). (Fig. 1)
(2) When making the hole diameter larger, rotate the sleeve in (+) direction and to make it smaller, rotate the sleeve in (-) direction.
(3) When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
(4) Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window.
The upper screw should be tightened slightly so that the sleeve will not be damaged.

Caution :
· Not applicable for Collet Chuck type Arbor.
· Scale on the sleeve is the reference value. Check the actual hole diameter after adjusting.

DRV (DRX)

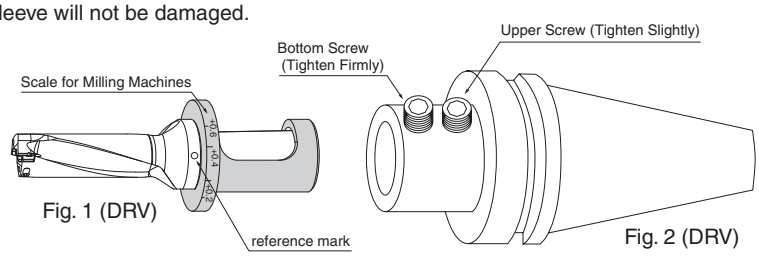


Fig. 1 (DRV)

Fig. 2 (DRV)

DRZ

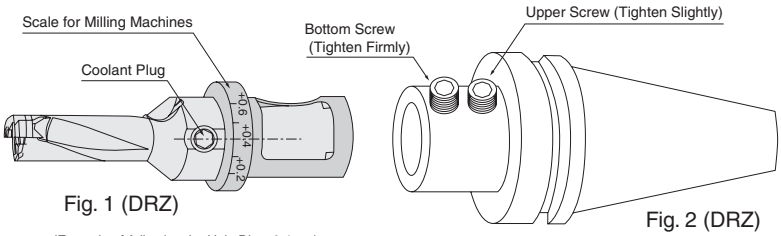


Fig. 1 (DRZ)

Fig. 2 (DRZ)

(Example of Adjusting the Hole Dia. +0.4mm)

2. Center-Height Adjustment for Lathes

Most Lathe problem occur due to Center Height Deviation.
The Center Height is appropriate if a core approximately 0.5mm diameter remains at the center of the end face. (Fig. 3)
Center-height adjustment is necessary for the case as follows :

◆ No core remains or ◆ Core diameter is more than 1mm

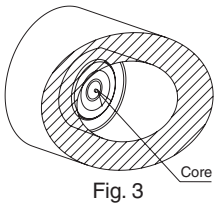


Fig. 3

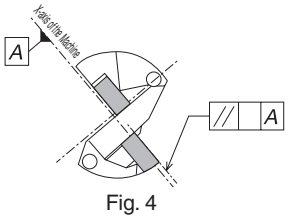


Fig. 4

(1) Align the drill with the outer insert face parallel to the X-axis of the tool turret. (Fig. 4)
(2) Adjust the scale at the flange periphery of the sleeve to the reference mark (DRV/DRX) or the center of coolant plug (DRZ).
(3) When no core remains, rotate the sleeve to (+) direction to make the core larger, and when the core diameter is 1mm or more, rotate the sleeve to (-) direction to make the core smaller.
(4) When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
(5) After Completing the adjustment, firmly tighten on the drill directly through the sleeve's window.

Note : Depending on amount of the center height adjustment, the hole diameter may change. It is recommended that the hole diameter is checked after the center height adjustment.

Lathe Installation

(1) The top face of the outer insert should be parallel to the X-axis to allow for offset cutting.(Drill diameter can be changed by moving X-axis.)
(2) It is recommended to set the outer insert as shown in Fig. 1 with the outer insert facing the operator. (Fig. 1)
(It is also possible to use it by setting it in 180˚ reverse position)
If the lathe has two turrets, when installing the drill into the lower turret, the outer insert should be set to face the operator.
(It is also possible to use it by setting at 180˚ reverse position)

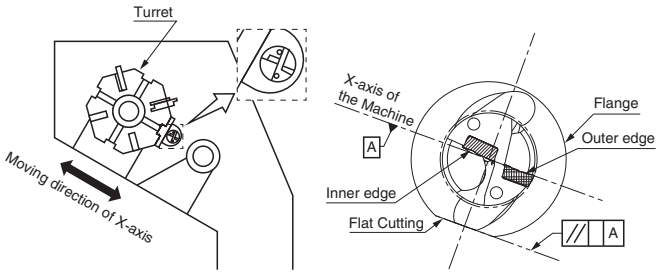


Fig. 1 Installed into the Lathe

Drill Diameter Adjustment

1. Drill Diameter Adjustment

(1) Drill diameter is adjusted by moving X-axis.
The moving direction of the X-axis depends on the position of the toolholder.
(2) In case of making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig. 2, Fig. 3)
For making the hole diameter smaller, slide the tool along the X-axis in the opposite direction.
(This movement of the axis is called “Offset”)
However, be sure not to make the hole diameter smaller than the drill diameter by 0.2mm or more. Otherwise, the toolholder will interfere with the drilled hole. (Fig. 4)
e.g.) In case of using ø20 drill, the hole diameter must not be smaller than 19.8mm.

2. Offset Limit of the Drill Diameter

For the maximum limit of the drill diameter, refer to “Max. Offset (Radial)” in the Toolholder Dimensions table.
(The figure in the table shows how much it is possible the offset the drill in the radial direction.)
When using ø20 drill, for example, it is possible to make a hole up to ø21.1 since "Max. Offset (Radial)" is +0.55mm.

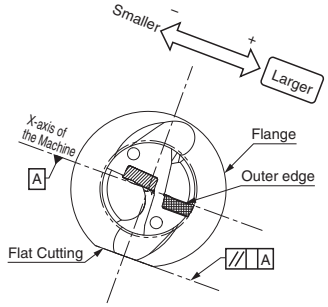


Fig. 2 Outer insert Facing Up

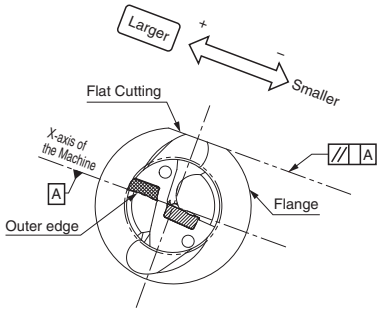


Fig. 3 Outer insert Facing Down

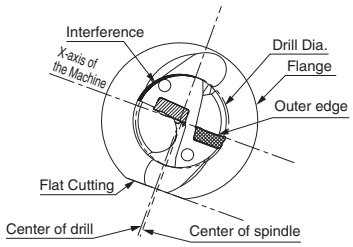


Fig. 4 Excessive offset (For Smaller Hole Diameter)

Center Height Adjustment

1. Center Height of the Inner Insert

When installing inner insert as shown in Fig. 1, it will be set around 0.05mm below the Center of Spindle. (Fig. 5)
This is the normal position of the center height and the drill is designed to be handled in this condition.
However, in case that the turret of the lathe is out of the center of Spindle, sometimes the inner insert may be set above the center, or excessively below the center.
For stable drilling, it is essential to check the Center Height carefully.

2. How to Check the Center Height

For checking the center height of the inner insert, see the core which remains at the center of the end face of the drilled hole. (Fig. 6)
If the center height is in the normal position, a core about 0.5mm in diameter, will remain after machining.
Adjustment of center height is required if a large core diameter of 1 mm or more remains.
* The drilled hole for verification purposes needs to be machined at approximately 10 mm in depth and at a feed rate of 0.1 mm/rev or lower.

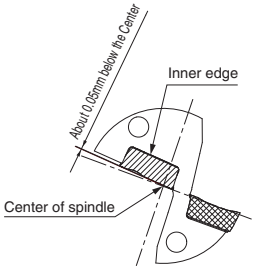


Fig. 5 Front View of the Drill

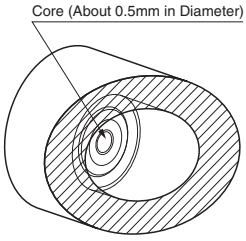


Fig. 6 Center Core

3. Center Height Adjustment

a) When there are no remaining cores and insert breakage near the center of the drill.

This happens when the inner insert is set above the center height. (Fig. 7)

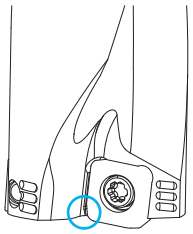


Fig. 7 Insert breakage near the center of the drill

[How to Adjust]

(1) Install the drill rotated 180˚.
Most problems will be solved by this method. (Fig. 8)

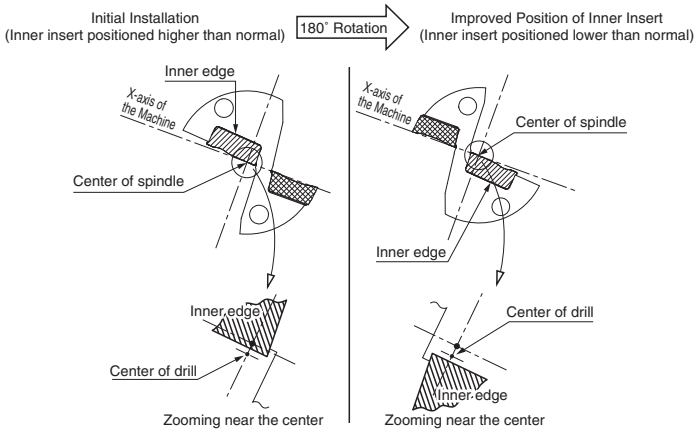


Fig. 8

[How to Adjust]

(2) If the core diameter becomes too large after the above adjustment, install the drill by rotating 90˚ counter-clockwise as shown in Fig. 9 (outer insert is positioned lower) and adjust the center height by moving the tool in the X-axis direction.
(However, this will make it impossible to adjust the cutting diameter.)
Caution : In case of installing the drill in the reverse direction (outer insert is positioned above), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.
The best solution is to readjust the center position of the turret itself.

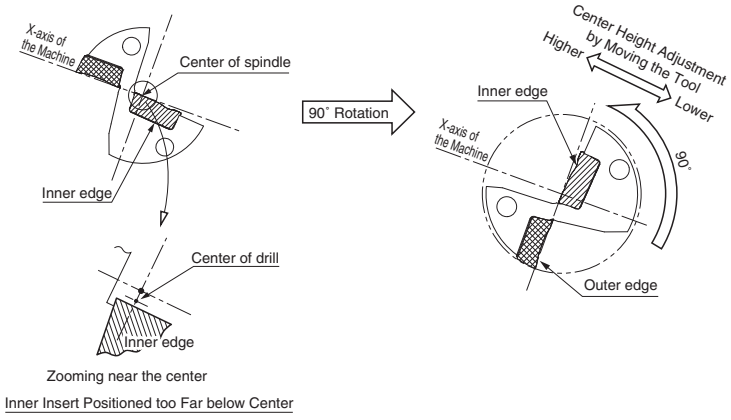


Fig. 9

b) Core with excessively large diameter (More than 1mm)

This occurs when the inner insert is excessively below the center.
This condition causes poor chip evacuation and an adjustment is required.

[How to Adjust]

Install the drill rotating 90˚ as shown in Fig. 10. (outer insert is positioned on the upper side) and adjust the center height by moving tool in the X-axis direction.
(However, this will make it impossible to adjust the cutting diameter.)
Caution : In case of installing the drill in the opposite direction (outer insert is positioned lower), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.
The best solution is to readjust the center position of the turret itself.

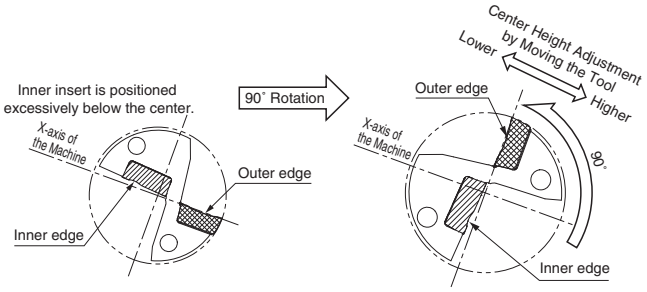
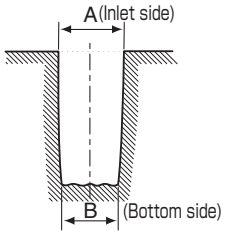
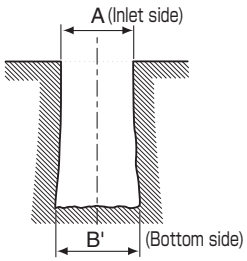


Fig. 10

Trouble shooting (DRV / DRS / DRZ / DRX)

Trouble condition	Condition		Cause	Countermeasures
Hole diameter becomes smaller (at hole bottom)		There is no problem for inlet, however gradually hole diameter is getting smaller at the bottom. A>B	Chip jam (External or Internal edge chip stuck)	Change the cutting conditions · Increase the cutting speed · Lower the feed rate ➡ See page, K58, K59, K66, K77, K90 for "Recommended Cutting Conditions".
Hole diameter becomes larger (at hole bottom)		There is no problem for inlet, however gradually hole diameter is getting larger at the bottom. A<B'	Internal edge chip jam.	Change the cutting conditions · Increase the cutting speed · Lower the feed rate ➡ See page, K58, K59, K66, K77, K90 for "Recommended Cutting Conditions". · Check the core height ➡ **K62~K63 (DRV)** ➡ **K78~K79 (DRZ/DRX)**
Hole diameter is small (from the hole inlet)		Hole diameter is small from inlet. (At turning moment)	Inappropriate adjustment of hole diameter.	In case of using lathe machine, use X-axis and adjustment hole diameter. ➡ **K62 (DRV)** ➡ **K78 (DRZ/DRX)**
			No core at internal edge. (No core remains)	Adjust the center height. ➡ **K62~K63 (DRV)** ➡ **K78~K79 (DRZ/DRX)**

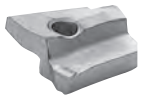
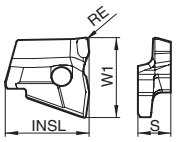
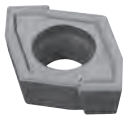
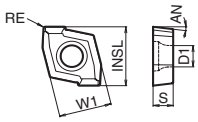
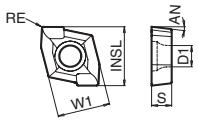
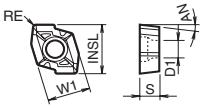
Indication of tool life of MagicDrill (DRV / DRS / DRZ / DRX)

How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	• When an insert is new, The toolholder is slightly bent to the side during drilling. (therefore, the drill diameter is slightly bigger during drilling.) Once drilling is finished, the toolholder will return back to normal size. No tool marks will appear on the finished surface. (This depends on workpiece and cutting condition. Slight tool mark might appear if cutting force on external dia. is too low.) • When an insert is at the end of its tool life, Gradually the external corner part gets worn out, the toolholder dose not bend slightly outwards, it starts to bend inwards. After the drilling is finished, the toolholder returns to the normal position. When taking off a toolholder under this condition the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking hole diameter	When hole diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause.
Checking the surface on the outlet side	If insert wear progresses, the burrs of penetrated hole entrance becomes bigger. This is a clear indication that the tool must be exchanged.
Variation of drilling noise	DRV / DRZ / DRX : Light drilling noise at the beginning turns to brady noise which contains vibration noise. DRS : Light drilling noise at the beginning turns to whir noise. Although, it is difficult to recognize DRV / DRZ / DRX type's smaller drill diameter or DRS type's variation of drilling noise because of main motor noise or coolant discharge noise.
Variation of vibration	As the end of tool life is getting closer, there is more vibration and the drilling noise changes. However, when drilling smaller diameters these factors are difficult to detect.

Applicable Inserts (for DRS / DRZ)

Applicable Inserts
(for DRS / DRZ)

Classification of usage							Applicable Toolholders See Page
● : 1st Choice ○ : 2nd Choice (Steel; non heat treated)	P	Carbon Steel / Alloy Steel	●	○			
		Mold Steel	●				
	M	Stainless Steel	○	●			
	K	Cast Iron			●		
	N	Non-ferrous Metals				●	

Insert	Description		Dimension (mm)					Angle	MEGACOAT			Carbide	Applicable Toolholders See Page
			INSL	S	D1	W1	RE	AN	PR1230	PR1225	PR1210	KW10	
 	DS	100	9.0	3.5	-	8.8	0.2	-	●		●		K66
		105	9.7	3.7		9.3			●		●		
		110	10.0	3.9		9.8			●		●		
		115	10.3	4.1		10.2			●		●		
		120	10.9	4.3		10.8	0.25		●		●		
 	ZCMT	050203	5.9	2.38	2.3	5.0	0.3	7°	●	●	●	●	K68 ~ K75
		06T204	7.0	2.80	2.5	6.0	0.4		●	●	●	●	
		080304	9.7	3.18	2.9	8.2			●	●	●	●	
		10T304	12.0	3.97	4.4	10.4			●	●	●	●	
		12T306	14.3	3.97	5.6	12.8	0.6		●	●	●	●	
		150408	17.8	4.76	5.6	15.8	0.8		●	●	●	●	
		200608	22.8	6.35	6.5	20.3			●			●	
 Low Cutting Force For Deeper Drilling	ZCMT	050203SP	5.9	2.38	2.3	5.0	0.3	7°	●	●		●	
		06T204SP	7.0	2.80	2.5	6.0	0.4		●	●		●	
		080304SP	9.7	3.18	2.9	8.2			●	●		●	
		10T304SP	12.0	3.97	4.4	10.4			●	●		●	
		12T304SP	14.3	3.97	5.6	12.8			●	●		●	
		150406SP	17.8	4.76	5.6	15.8	0.6		●	●		●	
 For Stainless Steel	ZCMT	050203SU	5.9	2.38	2.3	5.0	0.3	7°	●	●			
		06T204SU	7.0	2.80	2.5	6.0	0.4		●	●			

* Features of SP Chipbreaker··· 1. Less cutting force with large rake angle
2. Suitable for chip control of sticky materials such as stainless steel or soft steel.
3. Larger size inserts have smaller corner-R(RE) than standard chipbreaker type and can reduce burrs.

Suitable Chipbreaker (ZCMT)

Workpiece Material	Insert Size	ZCMT05									ZCMT06									ZCMT08					
	Chipbreaker	Standard			SP			SU			Standard			SP			SU			Standard			SP		
	Drilling Depth	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D
Low Carbon Steel		☆	☆	-	★	★	★	-	-	-	☆	☆	-	★	★	★	☆	☆	☆	☆	☆	-	★	★	★
Carbon Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★
Alloy Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★
Mold Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★
Stainless Steel		☆	☆	-	★	★	★	☆	☆	-	-	-	-	☆	☆	☆	★	★	★	☆	☆	-	★	★	★
Cast Iron		★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆
Aluminum Alloys		☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★
Brass		★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆
Titanium Alloys		☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★

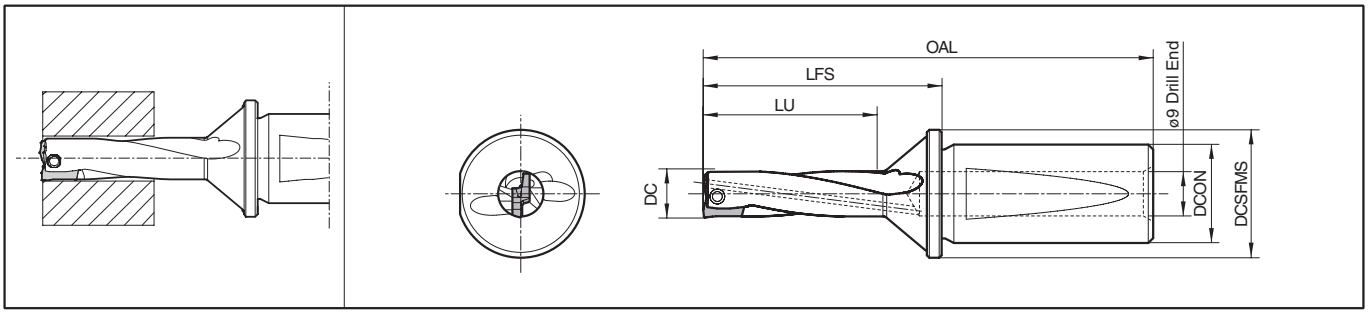
Workpiece Material	Insert Size	ZCMT10								ZCMT12								ZCMT15								ZCMT20		
	Chipbreaker	Standard				SP				Standard				SP				Standard				SP				Standard		
	Drilling Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D
Low Carbon Steel		☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	★	★	★
Carbon Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★
Alloy Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★
Mold Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★
Stainless Steel		☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	★	★	★
Cast Iron		★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★
Aluminum Alloys		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★	★
Brass		★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★
Titanium Alloys		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★	★

· Standard chipbreakers (without symbol) may function better when interrupted drilling.
· When drilling aluminum alloys, chips become long and difficult to be discharged at the depth over 2D.
· 5D type is the same as 4D type.

★ : 1st Choice ☆: 2nd Choice

● : Std. Item

DRS



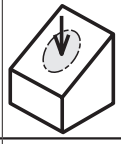
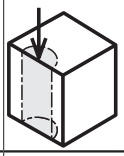
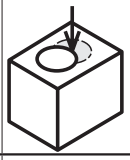
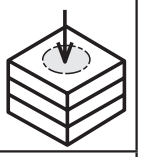
Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Wrench	Applicable Inserts ➡ K65
S20	-DRS10035	▲	1	10.0	92	49	35.0	20	26	+0.2	SB-2080TR	FT-6	-	DS100
	-DRS10336	▲	1	10.3	92	49	36.0			+0.1				
	-DRS10537	▲	1	10.5	93	50	37.0			+0.2				DS105
	-DRS11038	▲	1	11.0	96	53	38.5			+0.2	SB-2290TR			DS110
	-DRS11540	▲	1	11.5	97	54	40.5			+0.2				DS115
	-DRS12042	▲	1	12.0	99	56	42.0			+0.4	SB-25100TR	-	DT-7	DS120
	-DRS12544	▲	1	12.5	101	58	44.0			+0.2				

Trouble shooting ➡ K64

Cutting Conditions by Application

[Workpiece Material : S50C]

Applications		Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole	Stacked Plates
Shape of Workpiece								
DRS	Vc (m/min)	80	80	Not recommended	Not recommended	80	Not recommended	Not Available
DRS	f (mm/rev)	0.08	0.04	Not recommended	Not recommended	Concave Surface 0.04 Continuous Part 0.08	Not recommended	Not Available
Coolant (Internal)		Yes	Yes	-	-	Yes	-	-

In case of using external coolant system, chip evacuation will be bad. Therefore ap should be measured within 1.5 times (1.5 x DC) of drill diameter (DC).

DRS Recommended Cutting Conditions (Coolant)

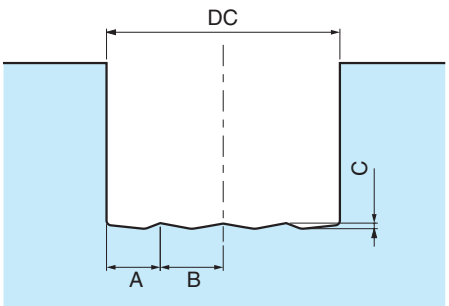
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT PR1230	PR1210	f (mm/rev)
Low Carbon Steel	★ 80~100	-	0.06
Carbon Steel	★ 80~100	-	0.08~0.1
Alloy Steel	★ 80	-	0.04~0.06
Mold Steel	★ 80	-	0.04~0.06
Stainless Steel (Austenitic related)	★ 70~80	-	0.05~0.06
Gray Cast Iron	-	★ 80~100	0.08~0.1

★ : 1st Recommendation ☆ : 2nd Recommendation

1. Apply a sufficient amount of coolant.
2. If cutting speed is decreased too much from above condition, chip evacuation performance will deteriorate.
   If the feed rate is increased too much from above condition, inner edge chip evacuation will deteriorate.
   If the feed rate is decreased too much from above condition, outer edge chip evacuation will deteriorate.
3. If chips are too long when low carbon steel drilling, increased the cutting speed to 120~150m/min.
   If this does not solve the problem, try step feeding.
   [How to step feeding] (1) Cut 1~2mm (2) Return 0.1mm (3) Repeat (1) and (2)

DRS Hole Bottom Shape (mm)

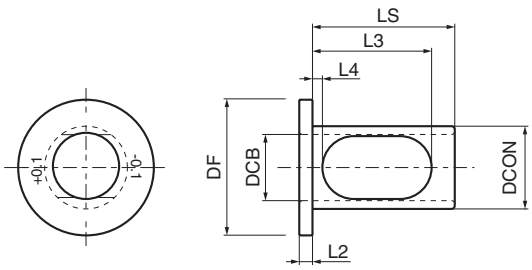
DC	A	B	C
10.0	2.2	2.80	0.2
10.3	2.3	2.85	0.2
10.5	2.3	2.95	0.2
11.0	2.4	3.10	0.2
11.5	2.5	3.25	0.2
12.0	2.8	3.20	0.3
12.5	2.9	3.35	0.4



▲ : To be replaced by a new product

SHEM





Sleeve Dimensions

Description	Stock	Dimension (mm)							* Drill Dia. Adjustable Range
		DCB	DCON	DF	LS	L2	L3	L4	
SHEM 2025-43	●	20	25	41	43	4	36	3.0	+0.1, -0.1
2032-43	●		32	49		6		2.5	+0.1, -0.1

* Diameter Adjustment Range adjusts the drill diameter.

How to Use the Adjustable Sleeve

· SHEM is designed for only MagicDrill Mini (DRS)
· SHEM is for drill diameter adjustment only. (up to +0.1mm or -0.1mm)
SHEM is not for center height adjustment like conventional adjustable sleeve (SHE)
· Apply SHEM when adjusting the hole diameter for pre-drilling before threading.

(1) Set the outer edge horizontally with 90˚ to making line on the sleeve. (Fig. 1)
(2) When making the hole diameter larger, align the +0.1 mark on the sleeve with the flat on the drill shank.
To adjust to smaller diameter, align the -0.1 mark on the sleeve with the flat on the drill shank. (Fig. 1)
(3) Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window.
The upper screw should be tightened slightly so that the sleeve will not be damaged. (Fig. 2)

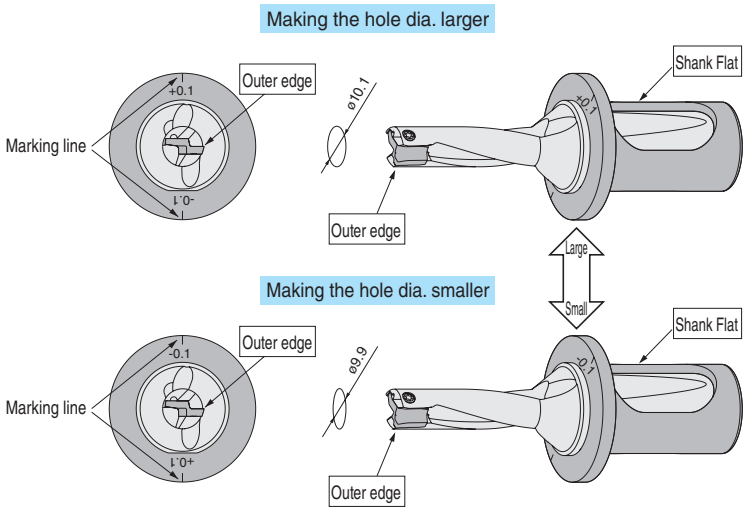


Fig. 1 Diameter Adjustment Method (e.g.) ø10 Drill

Caution : Not applicable for Collet Chuck type Arbor.

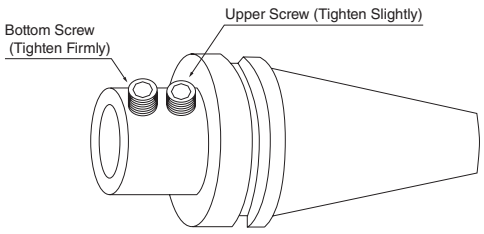
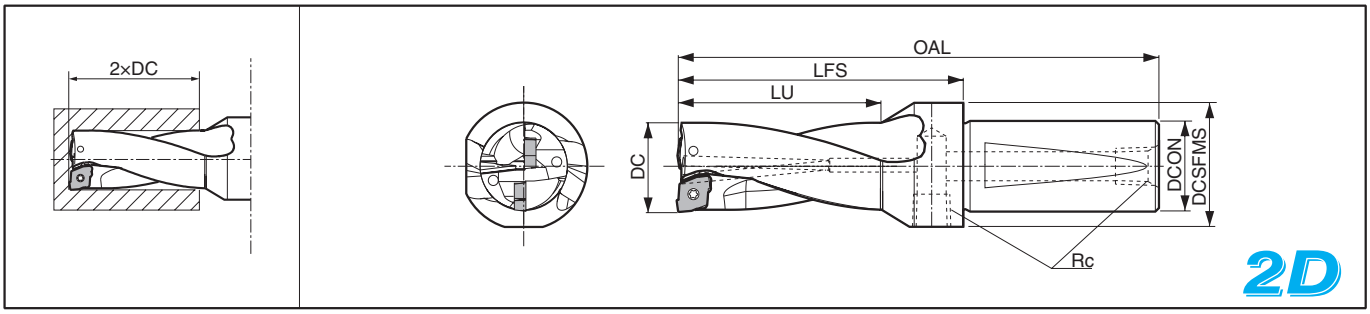


Fig. 2

● : Std. Item

DRZ (Drilling Depth : 2 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts (K65)
S20 -DRZ1326-05	●	2	13	95	52	26	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135270-05	●		13.5	95	52	27				+0.5				
-DRZ1428-05	●		14	98	55	28				+0.5				
-DRZ145290-05	●		14.5	98	55	29				+0.5				
-DRZ1530-05	●		15	100	57	30				+0.5				
-DRZ155310-05	●		15.5	100	57	31				+0.5				
S25 -DRZ1632-06	●	2	16	115	61	32	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165330-06	●		16.5	115	61	33				+0.9				
-DRZ1734-06	●		17	116	62	34				+0.8				
-DRZ175350-06	●		17.5	116	62	35				+0.7				
-DRZ1836-06	●		18	118	64	36				+0.6				
-DRZ185370-06	●		18.5	118	64	37				+0.6				
-DRZ1938-06	●		19	120	66	38				+0.5				
-DRZ195390-06	●		19.5	120	66	39				+0.5				
-DRZ2040-06	●		20	123	69	40				+0.5				
-DRZ205410-06	●		20.5	125	71	41				+0.3				
-DRZ2142-06	●		21	125	71	42				+0.2				
-DRZ215430-08	●	2	21.5	128	74	43	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2244-08	●		22	128	74	44				+1.6				
-DRZ225450-08	●		22.5	128	74	45				+1.4				
-DRZ2346-08	●		23	130	76	46				+1.3				
-DRZ235470-08	●		23.5	130	76	47				+1.2				
-DRZ2448-08	●		24	131	77	48		35		+1.1				
-DRZ245490-08	●		24.5	131	77	49				+0.9				
-DRZ2550-08	●		25	133	79	50				+0.8				
-DRZ255510-08	●		25.5	133	79	51				+0.7				
-DRZ2652-08	●		26	135	81	52				+0.6				
-DRZ265530-08	●		26.5	135	81	53				+0.5				
S32 -DRZ2754-10	●	2	27	149	90	54	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ275550-10	●		27.5	149	90	55				+2.3				
-DRZ2856-10	●		28	151	92	56				+2.2				
-DRZ285570-10	●		28.5	151	92	57				+2.1				
-DRZ2958-10	●		29	153	94	58				+2.0				
-DRZ295590-10	●		29.5	153	94	59				+1.8				
-DRZ3060-10	●		30	154	95	60		45		+1.7				
-DRZ305610-10	●		30.5	154	95	61				+1.5				
-DRZ3162-10	●		31	155	96	62				+1.5				
-DRZ315630-10	●		31.5	155	96	63				+1.3				
-DRZ3264-10	●		32	158	99	64				+1.2				
-DRZ325650-10	●		32.5	158	99	65				+1.0				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions **K77**
Trouble shooting **K64**

● : Std. Item

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ➡ K65
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc		Clamp Screw	Wrench	Plug	
S40 -DRZ3366-12	●	2	33	173	104	66	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ3468-12	●		34	176	107	68				+2.7				
-DRZ3570-12	●		35	177	108	70				+2.4				
-DRZ3672-12	●		36	180	111	72				+2.2				
-DRZ3774-12	●		37	181	112	74				+1.9				
-DRZ3876-12	●		38	183	114	76				+1.7				
-DRZ3978-12	●		39	185	116	78				+1.4				
-DRZ4080-12	●		40	185	116	80				+1.2				
-DRZ4182-15	●	2	41	186	117	82	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ4284-15	●		42	188	119	84				+3.7				
-DRZ4386-15	●		43	190	121	86				+3.5				
-DRZ4488-15	●		44	192	123	88				+3.2				
-DRZ4590-15	●		45	192	123	90				+3.0				
-DRZ4692-15	●		46	198	129	92		60		+2.7				
-DRZ4794-15	●		47	201	132	94				+2.5				
-DRZ4896-15	●		48	203	134	96				+2.2				
-DRZ4998-15	●		49	204	135	98				+2.0				
-DRZ50100-15	●		50	204	135	100				+1.7				
-DRZ51102-15	●		51	205	136	102				+1.2				
-DRZ52104-15	●		52	205	136	104				+1.0				
-DRZ53106-15	●		53	208	139	106				+0.7				
-DRZ54108-20	●	2	54	214	145	108	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608
-DRZ55110-20	●		55	215	146	110				+4.7				
-DRZ56112-20	●		56	217	148	112				+4.4				
-DRZ57114-20	●		57	219	150	114				+4.1				
-DRZ58116-20	●		58	221	152	116				+3.8				
-DRZ59118-20	●		59	223	154	118				+3.5				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K77
Trouble shooting ➡ K64

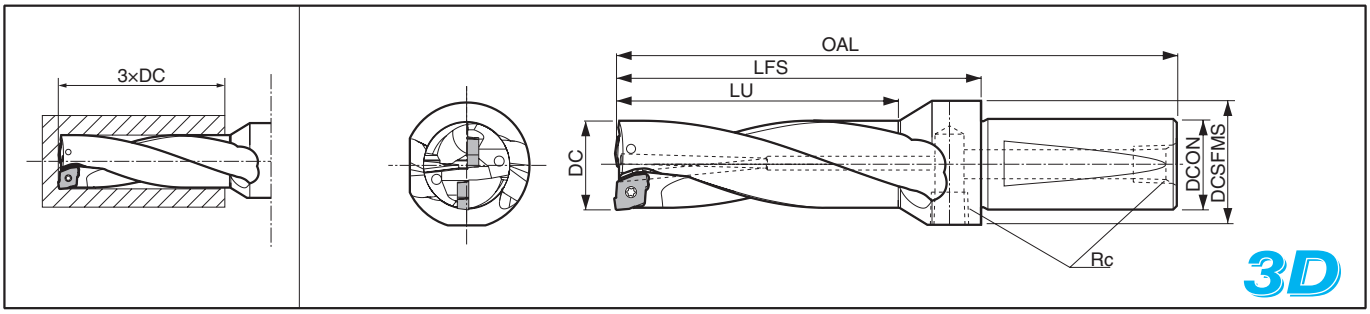
· Hole Dia. Tolerance (2D type)

DC	Hole Dia. Tolerance (mm)
ø13~ø26.5	+0.20 -0.10
ø27~ø40	+0.25 -0.15
ø41~ø59	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRZ (Drilling Depth : 3 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K65
S20 -DRZ1339-05	●	2	13	108	65	39	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135405-05	●		13.5	108	65	40.5				+0.5				
-DRZ1442-05	●		14	112	69	42				+0.5				
-DRZ145435-05	●		14.5	112	69	43.5				+0.5				
-DRZ1545-05	●		15	115	72	45				+0.5				
-DRZ155465-05	●		15.5	115	72	46.5				+0.5				
S25 -DRZ1648-06	●	2	16	131	77	48	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165495-06	●		16.5	131	77	49.5				+0.9				
-DRZ1751-06	●		17	133	79	51				+0.8				
-DRZ175525-06	●		17.5	133	79	52.5				+0.7				
-DRZ1854-06	●		18	136	82	54				+0.6				
-DRZ185555-06	●		18.5	136	82	55.5				+0.6				
-DRZ1957-06	●		19	139	85	57				+0.5				
-DRZ195585-06	●		19.5	139	85	58.5				+0.5				
-DRZ2060-06	●		20	143	89	60				+0.5				
-DRZ205615-06	●		20.5	146	92	61.5				+0.3				
-DRZ2163-06	●		21	146	92	63				+0.2				
-DRZ215645-08	●	2	21.5	147	93	64.5	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2266-08	●		22	147	93	66				+1.6				
-DRZ225675-08	●		22.5	147	93	67.5				+1.4				
-DRZ2369-08	●		23	150	96	69				+1.3				
-DRZ235705-08	●		23.5	150	96	70.5				+1.2				
-DRZ2472-08	●		24	152	98	72		35		+1.1				
-DRZ245735-08	●		24.5	152	98	73.5				+0.9				
-DRZ2575-08	●		25	155	101	75				+0.8				
-DRZ255765-08	●		25.5	155	101	76.5				+0.7				
-DRZ2678-08	●		26	158	104	78				+0.6				
-DRZ265795-08	●		26.5	158	104	79.5				+0.5				
S32 -DRZ2781-10	●	2	27	173	114	81	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ275825-10	●		27.5	173	114	82.5				+2.3				
-DRZ2884-10	●		28	176	117	84				+2.2				
-DRZ285855-10	●		28.5	176	117	85.5				+2.1				
-DRZ2987-10	●		29	179	120	87				+2.0				
-DRZ295885-10	●		29.5	179	120	88.5				+1.8				
-DRZ3090-10	●		30	181	122	90		45		+1.7				
-DRZ305915-10	●		30.5	181	122	91.5				+1.5				
-DRZ3193-10	●		31	183	124	93				+1.5				
-DRZ315945-10	●		31.5	183	124	94.5				+1.3				
-DRZ3296-10	●		32	187	128	96				+1.2				
-DRZ325975-10	●		32.5	187	128	97.5				+1.0				
-DRZ3399-12	●	2	33	193	134	99	32	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●		34	197	138	102				+2.7				
-DRZ35105-12	●		35	199	140	105				+2.4				
-DRZ36108-12	●		36	203	144	108				+2.2				
-DRZ37111-12	●		37	205	146	111				+1.9				
-DRZ38114-12	●		38	208	149	114				+1.7				
-DRZ39117-12	●		39	211	152	117				+1.4				
-DRZ40120-12	●		40	212	153	120				+1.2				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K77**
Trouble shooting ➡ **K64**

● : Std. Item

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K65
S40 -DRZ3399-12	●	2	33	203	134	99	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●		34	207	138	102				+2.7				
-DRZ35105-12	●		35	209	140	105				+2.4				
-DRZ36108-12	●		36	213	144	108				+2.2				
-DRZ37111-12	●		37	215	146	111				+1.9				
-DRZ38114-12	●		38	218	149	114				+1.7				
-DRZ39117-12	●		39	221	152	117				+1.4				
-DRZ40120-12	●		40	222	153	120				+1.2				
-DRZ41123-15	●	2	41	224	155	123	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42126-15	●		42	227	158	126				+3.7				
-DRZ43129-15	●		43	230	161	129				+3.5				
-DRZ44132-15	●		44	233	164	132				+3.2				
-DRZ45135-15	●		45	234	165	135				+3.0				
-DRZ46138-15	●		46	241	172	138		60		+2.7				
-DRZ47141-15	●		47	245	176	141				+2.5				
-DRZ48144-15	●		48	248	179	144				+2.2				
-DRZ49147-15	●		49	250	181	147				+2.0				
-DRZ50150-15	●		50	251	182	150				+1.7				
-DRZ51153-15	●		51	254	185	153				+1.2				
-DRZ52156-15	●		52	257	188	156				+1.0				
-DRZ53159-15	●		53	260	191	159				+0.7				
-DRZ54162-20	●	2	54	266	197	162	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608
-DRZ55165-20	●		55	269	200	165				+4.7				
-DRZ56168-20	●		56	272	203	168				+4.4				
-DRZ57171-20	●		57	275	206	171				+4.1				
-DRZ58174-20	●		58	278	209	174				+3.8				
-DRZ59177-20	●		59	281	212	177				+3.5				

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K77**
Trouble shooting ➡ **K64**

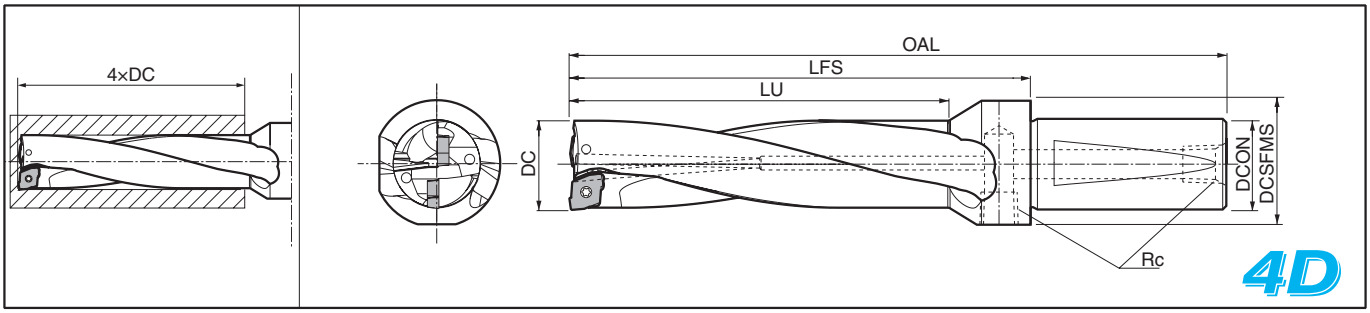
· Hole Dia. Tolerance (3D type)

DC	Hole Dia. Tolerance (mm)
ø13~ø26.5	+0.20 -0.10
ø27~ø40	+0.25 -0.15
ø41~ø59	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRZ (Drilling Depth : 4 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K65
S20 -DRZ1352-05	●	2	13	121	78	52	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135540-05	●		13.5	121	78	54				+0.5				
-DRZ1456-05	●		14	126	83	56				+0.5				
-DRZ145580-05	●		14.5	126	83	58				+0.5				
-DRZ1560-05	●		15	130	87	60				+0.5				
-DRZ155620-05	●		15.5	130	87	62				+0.5				
S25 -DRZ1664-06	●	2	16	147	93	64	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165660-06	●		16.5	147	93	66				+0.9				
-DRZ1768-06	●		17	149	95	68				+0.8				
-DRZ175700-06	●		17.5	149	95	70				+0.7				
-DRZ1872-06	●		18	153	99	72				+0.6				
-DRZ185740-06	●		18.5	153	99	74				+0.6				
-DRZ1976-06	●		19	157	103	76				+0.5				
-DRZ195780-06	●		19.5	157	103	78				+0.5				
-DRZ2080-06	●		20	156	102	80				+0.5				
-DRZ205820-06	●		20.5	161	107	82				+0.3				
-DRZ2184-06	●		21	161	107	84				+0.2				
-DRZ215860-08	●	2	21.5	169	115	86	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2288-08	●		22	169	115	88				+1.6				
-DRZ225900-08	●		22.5	169	115	90				+1.4				
-DRZ2392-08	●		23	173	119	92				+1.3				
-DRZ235940-08	●		23.5	173	119	94				+1.2				
-DRZ2496-08	●		24	176	122	96		35		+1.1				
-DRZ245980-08	●		24.5	176	122	98				+0.9				
-DRZ25100-08	●		25	180	126	100				+0.8				
-DRZ2551020-08	●		25.5	180	126	102				+0.7				
-DRZ26104-08	●		26	184	130	104				+0.6				
-DRZ2651060-08	●		26.5	184	130	106				+0.5				
S32 -DRZ27108-10	●	2	27	200	141	108	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ2751100-10	●		27.5	200	141	110				+2.3				
-DRZ28112-10	●		28	204	145	112				+2.2				
-DRZ2851140-10	●		28.5	204	145	114				+2.1				
-DRZ29116-10	●		29	208	149	116				+2.0				
-DRZ2951180-10	●		29.5	208	149	118				+1.8				
-DRZ30120-10	●		30	211	152	120		45		+1.7				
-DRZ3051220-10	●		30.5	211	152	122				+1.5				
-DRZ31124-10	●		31	214	155	124				+1.5				
-DRZ3151260-10	●		31.5	214	155	126				+1.3				
-DRZ32128-10	●		32	219	160	128				+1.2				
-DRZ3251300-10	●		32.5	219	160	130				+1.0				
-DRZ33132-12	●	2	33	226	167	132	32	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34136-12	●		34	231	172	136				+2.7				
-DRZ35140-12	●		35	234	175	140				+2.4				
-DRZ36144-12	●		36	239	180	144				+2.2				
-DRZ37148-12	●		37	242	183	148				+1.9				
-DRZ38152-12	●		38	246	187	152				+1.7				
-DRZ39156-12	●		39	250	191	156				+1.4				
-DRZ40160-12	●		40	252	193	160				+1.2				

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K77
Trouble shooting ➡ K64

● : Std. Item

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc		Clamp Screw	Wrench	Plug	
S40 -DRZ33132-12	●	2	33	236	167	132	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34136-12	●		34	241	172	136				+2.7				
-DRZ35140-12	●		35	244	175	140				+2.4				
-DRZ36144-12	●		36	249	180	144				+2.2				
-DRZ37148-12	●		37	252	183	148				+1.9				
-DRZ38152-12	●		38	256	187	152				+1.7				
-DRZ39156-12	●		39	260	191	156				+1.4				
-DRZ40160-12	●		40	262	193	160				+1.2				
-DRZ41164-15	●	2	41	265	196	164	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42168-15	●		42	269	200	168				+3.7				
-DRZ43172-15	●		43	273	204	172				+3.5				
-DRZ44176-15	●		44	277	208	176				+3.2				
-DRZ45180-15	●		45	279	210	180				+3.0				
-DRZ46184-15	●		46	287	218	184		60		+2.7				
-DRZ47188-15	●		47	292	223	188				+2.5				
-DRZ48192-15	●		48	296	227	192				+2.2				
-DRZ49196-15	●		49	300	231	196				+2.0				
-DRZ50200-15	●		50	301	232	200				+1.7				

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions **K77**
Trouble shooting **K64**

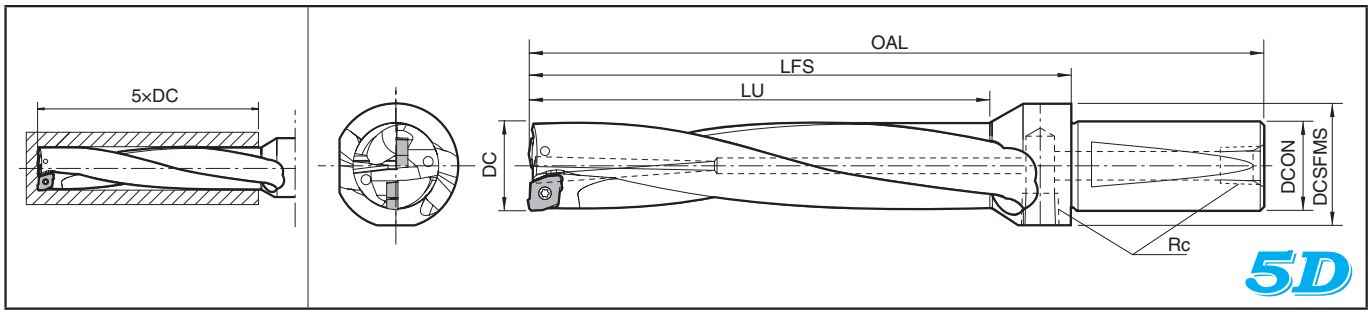
· Hole Dia. Tolerance (4D type)

DC	Hole Dia. Tolerance (mm)
ø13~ø26.5	+0.25 -0.10
ø27~ø40	+0.30 -0.15
ø41~ø50	+0.35 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRZ (Drilling Depth : 5 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K65
S32 -DRZ27135-10	●	2	27	227	168	135	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ28140-10	●		28	232	173	140				+2.2				
-DRZ29145-10	●		29	237	178	145				+2.0				
-DRZ30150-10	●		30	241	182	150		45		+1.7				
-DRZ31155-10	●		31	245	186	155				+1.5				
-DRZ32160-10	●		32	251	192	160				+1.2				
S40 -DRZ33165-12	●	2	33	269	200	165	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34170-12	●		34	275	206	170				+2.7				
-DRZ35175-12	●		35	279	210	175				+2.4				
-DRZ36180-12	●		36	285	216	180				+2.2				
-DRZ37185-12	●		37	289	220	185				+1.9				
-DRZ38190-12	●		38	294	225	190				+1.7				
-DRZ39195-12	●		39	299	230	195				+1.4				
-DRZ40200-12	●		40	302	233	200				+1.2				
-DRZ41205-15	●	2	41	306	237	205	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42210-15	●		42	311	242	210				+3.7				
-DRZ43215-15	●		43	316	247	215				+3.5				
-DRZ44220-15	●		44	321	252	220				+3.2				
-DRZ45225-15	●		45	324	255	225				+3.0				
-DRZ46230-15	●		46	333	264	230		60		+2.7				
-DRZ47235-15	●		47	339	270	235				+2.5				
-DRZ48240-15	●		48	344	275	240				+2.2				
-DRZ49245-15	●		49	349	280	245				+2.0				
-DRZ50250-15	●		50	351	282	250				+1.7				

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K77**
Trouble shooting ➡ **K64**

· Hole Dia. Tolerance (5D type)

DC	Hole Dia. Tolerance (mm)
ø27~ø40	+0.35 -0.15
ø41~ø50	+0.40 -0.20

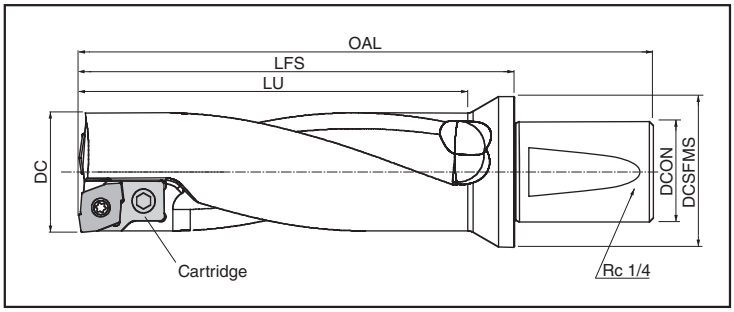
* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

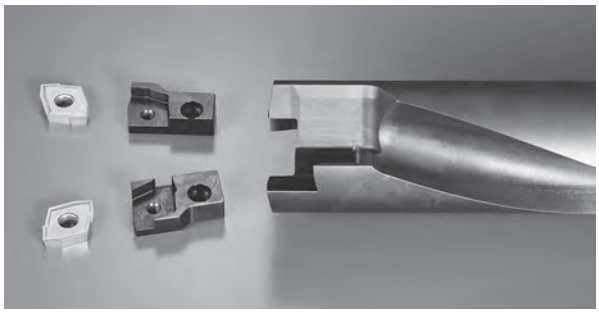
● : Std. Item

MagicDrill for Large Dia. (ø60 or over)

● MagicDrill for large diameters (ø60 or over) are available as Custom Orders.
(Ask your regional sales staff for details such as drill dia. / shank type, etc.)

DRZ-CR (Cartridge type)





Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Cartridge For outer edge	Cartridge For inner edge	Clamp Screw	Wrench	Applicable Inserts ➡ K65
S50	-DRZ60180-20CR	MTO	2	60	286	217	195	50	75	+3.0	DR20CR-OUT (1pc)	DR20CR-IN (1pc)	SB-60120TR	DT-25	ZCMT200608
	-DRZ65195-20CR	MTO	2	65	296	227	206			+1.5					
	-DRZ70210-20CR	MTO	2	70	308	239	220			+0.2					
	-DRZ75225-12CR	MTO	4	75	330	261	225	50	80	Offset N.A.	DR12CR-OUT (2pcs)	DR12CR-IN (2pcs)	SB-5085TR	DT-20	ZCMT12T306 ZCMT12T304SP
	-DRZ80240-12CR	MTO	4	80	340	271	240								

· Clamp screws for cartridges are included in toolholders : HH6X12 for **DR20CR** and HH4X12 for **DR12CR**.

Recommended Cutting Conditions ➡ K77

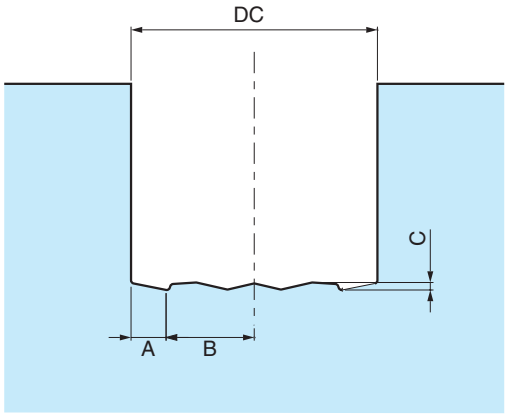
MTO : Made to order

DRZ Hole Bottom Shape (Common for 2 x DC, 3 x DC, 4 x DC, 5 x DC) (mm)

DC	A	B	C
13.0	2.1	4.4	0.4
13.5		4.7	
14.0		4.9	
14.5		5.2	0.5
15.0		5.4	
15.5		5.7	
16.0	2.7	5.3	0.6
16.5		5.6	
17.0		5.8	
17.5		6.1	
18.0		6.3	
18.5		6.6	0.7
19.0		6.8	
19.5		7.1	
20.0		7.3	
20.5		7.6	
21.0		7.8	0.8

DC	A	B	C
21.5	3.1	7.7	0.6
22.0		7.9	
22.5		8.2	
23.0		8.4	
23.5		8.7	0.7
24.0		8.9	
24.5		9.2	
25.0		9.4	
25.5		9.7	
26.0		9.9	
26.5		10.2	
27.0	4.0	9.5	0.7
27.5		9.8	
28.0		10.0	
28.5		10.3	
29.0		10.5	
29.5		10.8	0.8
30.0		11.0	
30.5		11.3	
31.0		11.5	
31.5		11.8	
32.0		12.0	
32.5		12.3	

DC	A	B	C
33.0	5.7	10.8	0.8
34.0		11.3	
35.0		11.8	
36.0		12.3	
37.0		12.8	
38.0		13.3	0.9
39.0		13.8	
40.0		14.3	
41.0	6.5	14.0	1.0
42.0		14.5	
43.0		15.0	
44.0		15.5	
45.0		16.0	
46.0		16.5	
47.0		17.0	1.1
48.0		17.5	
49.0		18.0	
50.0		18.5	
51.0		19.0	
52.0		19.5	
53.0		20.0	
54.0	8.5	18.5	1.2
55.0		19.0	
56.0		19.5	
57.0		20.0	
58.0		20.5	
59.0		21.0	



* Above is numeric guideline.
(Varies within ±0.1mm depending on workpiece materials and cutting conditions)

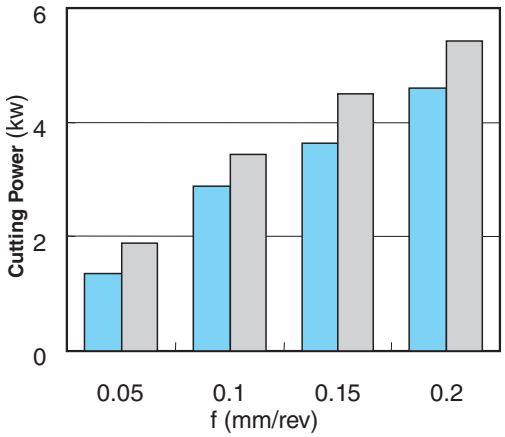
Cutting Power

ø20 Cutting Power Comparison



Vc=100m/min, (n=1,600min^{-1})
ø20 Indexable Drill
SCM415 Wet (Internal coolant)

Comparison of Cutting Power



Case Studies

MagicDrill Dia.		ø16	ø27		ø50	
Machine		Competitor A	Competitor B		Competitor C	Competitor D
Machine Power		AC 5.5/7.5 kW	AC 5.5/7.5 kW		AC 5.5/7.5 kW	AC 7.5/11 kW
Cutting Conditions	Vc (mm/min)	150	130	150	120	110	157
	f (mm/rev)	0.06	0.13		0.1	0.08	0.12
Workpiece Material		SS400	SCM435		SCM415	SS400	
Required Power (Load Meter Values)		60%	80%	95%	100%	60%	100%
Remarks		-	-		With conventional drill, limited up to ø40	-	

Recommended Cutting Conditions

DRZ Recommended Cutting Conditions (Coolant)

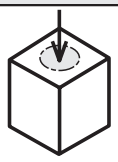
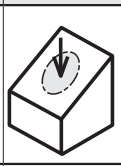
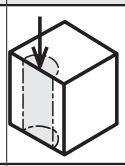
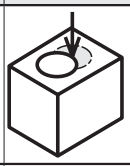
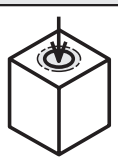
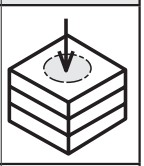
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT PR1230 Standard SP SU	MEGACOAT PR1225 Standard SP SU	Carbide PR1210 Standard	Carbide KW10 Standard SP	Drill Dia. DC (mm)	Drill type (Drilling Depth) 2D f (mm/rev)	3D	4D	5D
Low Carbon Steel	★ 120~220	☆ 120~220	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
					ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
					ø50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Carbon Steel	★ 100~160	☆ 100~160	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
					ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
					ø50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Alloy Steel	★ 80~140	☆ 80~140	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
					ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
					ø50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Mold Steel	★ 70~130	☆ 70~130	-	-	ø13~ø15.5	0.04~0.08	0.04~0.08	0.03~0.07	-
					ø16~ø26.5	0.08~0.12	0.06~0.10	0.06~0.08	-
					ø27~ø50	0.08~0.15	0.06~0.12	0.06~0.10	0.04~0.07
					ø50~	0.08~0.15	0.06~0.12	0.06~0.10	-
Stainless Steel (Austenitic related)	☆ 60~120	★ 60~120	-	-	ø13~ø15.5	0.04~0.08	0.04~0.08	0.03~0.06	-
					ø16~ø26.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø27~ø50	0.06~0.10	0.06~0.12	0.04~0.10	0.04~0.07
					ø50~	0.06~0.12	0.06~0.12	0.04~0.10	-
Gray Cast Iron	-	-	★ 100~150	☆ 100~120	ø13~ø15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
					ø16~ø26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
					ø27~ø50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
					ø50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Nodular Cast Iron	-	-	★ 80~120	☆ 80~100	ø13~ø15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
					ø16~ø26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
					ø27~ø50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
					ø50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Non-ferrous Metals	-	-	-	★ 200_600	ø13~ø15.5	0.06~0.12	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.18	0.08~0.15	0.06~0.15	-
					ø27~ø50	0.08~0.20	0.08~0.18	0.06~0.15	0.05~0.10
					ø50~	0.08~0.20	0.08~0.18	0.06~0.15	-
Titanium Alloys	-	-	-	★ 40~70	ø13~ø15.5	0.05~0.06	0.05~0.06	0.05~0.06	-
					ø16~ø26.5	0.05~0.07	0.05~0.07	0.05~0.07	-
					ø27~ø50	0.06~0.08	0.06~0.08	0.06~0.08	0.04~0.05
					ø50~	0.06~0.08	0.06~0.08	0.06~0.08	-

· Apply a sufficient amount of coolant.

★ : 1st Recommendation ☆ : 2nd Recommendation

Cutting Conditions by Application

[Workpiece Material : S50C]

Applications		Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole	Stacked Plates
Shape of Workpiece								
DRZ	Cutting Speed Vc (m/min)	120	120	120	120	120	120	Not Available
DRZ	f (mm/rev)	0.1	0.05	0.05	0.05	Concave Surface 0.05 / Continuous Part 0.1	*0.05	Not Available
Coolant (Internal)		Yes	Yes	Yes	Yes	Yes	Yes	Not Available

* Cutting width (Torus-shaped part) when drilling cored hole. (Same as when using a Boring Bar).

Drill type	2D ~ 3D	4D ~ 5D
Cutting width (Torus-shaped part)	0.1 x DC or less	Not recommended

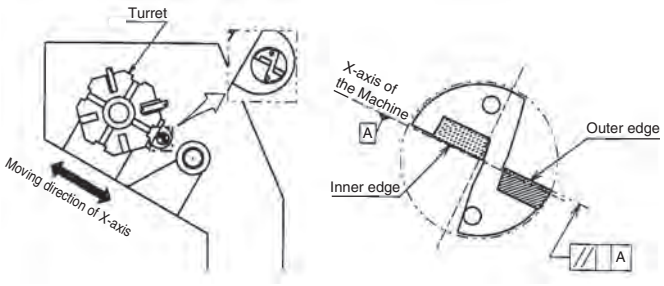
e.g.) In case of drilling using DRZ3090-10 (3 x DC)
(1) For milling, pre-drilled hole should be cut ø24 (ø30 - 0.1 x 30 x 2) or bigger
(2) For turning, ap should be set ap = 3mm (0.1 x 30) or under

Max. Depth for Drilling with External Coolant

In case of using external coolant system, chip evacuation will be bad.Therefore ap should be measured within 1.5 times (1.5 x DC) of drill diameter (DC).

Lathe Installation

(1) The top face of the outer insert should be parallel to the X-axis to allow for offset machining.
Drill diameter can be changed by moving X-axis.
(2) It is recommended to set the outer insert as shown in Fig. 1 with the outer insert facing the operator.
(It is also possible to use it by setting it in 180˚ reverse position)
If the lathe has two turrets, when installing the drill into the lower turret, the outer insert should be set to face the operator.
(It is also possible to use it by setting at 180˚ reverse position)



(Fig. 1) Installed to the Lathe

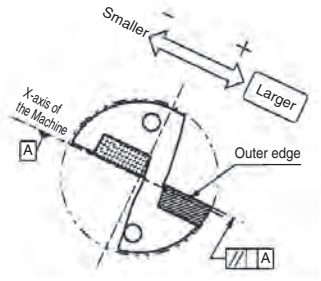
Drill Diameter Adjustment

1. Drill Diameter Adjustment

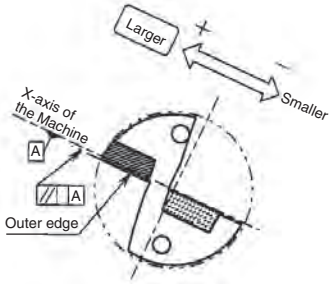
(1) Drill diameter is adjusted by moving X-axis.
The moving direction of the X-axis depends on the position of the toolholder.
(2) In case of making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig. 2, Fig. 3)
For making the hole diameter smaller, slide the tool along the X-axis in the opposite direction.
(This movement of the axis is called “Offset”)
However, be sure not to make the hole diameter smaller than the drill diameter by 0.2mm or more. Otherwise, the toolholder will interfere with the drilled hole. (Fig. 4)
e.g.) In case of using ø20 drill, the hole diameter must not be smaller than 19.8mm.

2. Offset Limit of the Drill Diameter

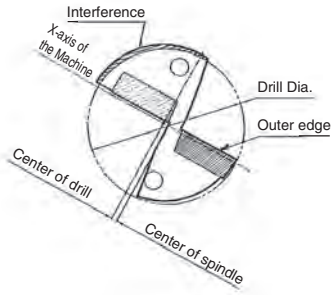
For the maximum limit of the drill diameter, refer to “Max. Offset (Radial)” in the Toolholder Dimensions table.
(The figure in the table shows how much it is possible the offset the drill in the radial direction.)
e.g.) In case of using ø20 drill, it is possible to make a hole up to ø21 since “Max. Offset (Radial)” is +0.5mm.



(Fig. 2) Outer insert Facing Up



(Fig. 3) Outer insert Facing Down

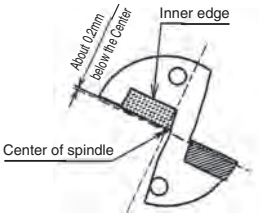


(Fig. 4) Excessive offset (For Smaller Hole Diameter)

Center Height Adjustment

1. Center Height of the Inner Insert

When installing inner insert as shown in Fig. 1, it will be set around 0.2mm below the Center of Spindle. (Fig. 5)
This is the normal position of the center height and the drill is designed to be handled in this condition.
However, in case that the turret of the lathe is out of the center of Spindle, sometimes the inner insert may be set above the center, or excessively below the center.
For stable drilling, it is essential to check the Center Height carefully.

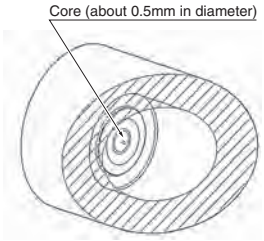


(Fig. 5) Front View of the Drill

2. How to Check the Center Height

For checking the center height of the inner insert, see the core which remains at the center of the end face of the drilled hole. (Fig. 6)
If the center height is in the normal position,
a core about 0.5mm in diameter, will remain after machining.
In the following cases, it is necessary to adjust the Center Height.
· No core remains
· Core diameter is more than 1mm

* The drilled hole for verification purposes needs to be machined at approximately 10 mm in depth and at a feed rate of 0.1 mm/rev or lower.

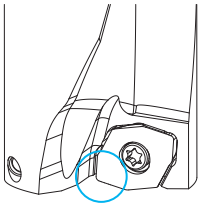


(Fig. 6) Center Core

3. Center Height Adjustment

a) No core remains / Core with Excessively Small Diameter

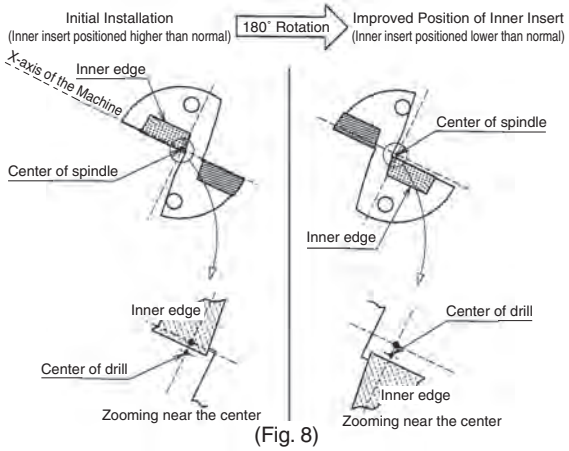
This happens when the Inner Insert is set above the Center Height.
In this case, adjustment is necessary since insert breakage will be probable at the center of the drill. (Fig. 7)



(Fig. 7) Insert breakage near the center of the drill

[How to Adjust]

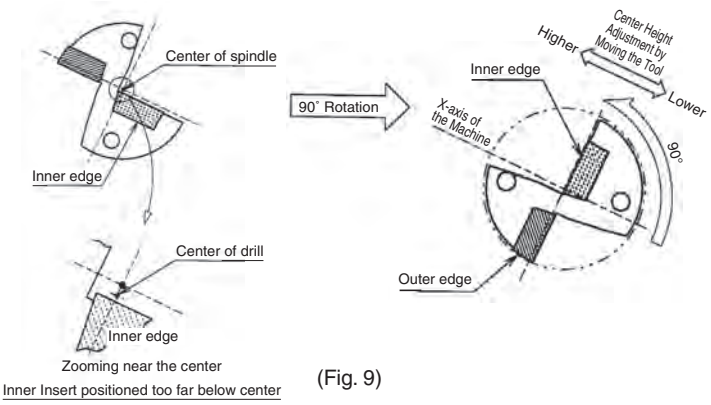
(1) Install the drill rotated 180˚.
Most problems will be solved by this method. (Fig. 8)



(Fig. 8)

[How to Adjust]

(2) If the core diameter becomes too large after the above adjustment, install the drill by rotating 90˚ counter-clockwise as shown in Fig. 9 (outer insert is positioned lower) and adjust the center height by moving the tool in the X-axis direction.(However, this makes it impossible to adjust the drill diameter)
Caution : In case of installing the drill in the reverse direction (outer insert is positioned above), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.
The best solution is to readjust the center position of the turret itself.



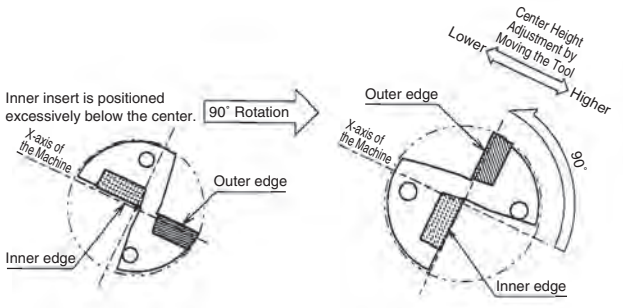
(Fig. 9)

b) Core with excessively large diameter (More than 1mm)

This occurs when the inner insert is excessively below the center.
This condition causes poor chip evacuation and an adjustment is required.

[How to Adjust]

Install the drill rotating 90˚ as shown in Fig. 10. (outer insert is positioned on the upper side) and adjust the center height by moving tool in the X-axis direction.
(However, this makes it impossible to adjust the drill diameter)
Caution : In case of installing the drill in the opposite direction (outer insert is positioned lower), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.
The best solution is to readjust the center position of the turret itself.

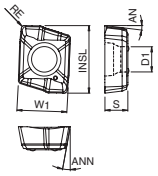
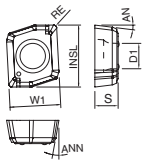
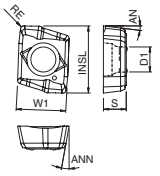
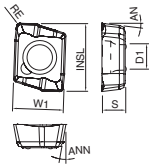
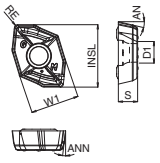
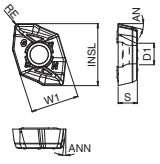
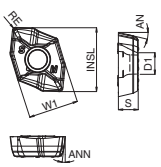


(Fig. 10)

Applicable Inserts
(for DRX)

Classification of usage
● : 1st Choice
○ : 2nd Choice
(Steel; non heat treated)

P	Carbon Steel / Alloy Steel	●	○			
	Mold Steel	●				
M	Stainless Steel	○	●			
K	Cast Iron			●		
N	Non-ferrous Metals				●	

Insert		Description	Dimension (mm)					Angle		MEGACOAT			Carbide	Applicable Toolholders See Page
			INSL	S	D1	W1	RE	AN	ANN	PR1230	PR1225	PR1210	GW15	
 For outer edge / General Purpose		**ZXMT 030203GM-E**	6.4	2.30	2.4	4.8	0.3	7°	10°	●		●		K82 K84 K86 K88
 For inner edge / General Purpose		**ZXMT 030203GM-I**	5.9	2.30	2.4	4.8	0.3	7°	10°	●	●	●	●	
 For outer edge / Tough Edge		**ZXMT 030203GH-E**	6.4	2.30	2.4	4.8	0.3	7°	10°	●				
 For outer edge / Low Cutting Force		**ZXMT 030203SM-E**	6.4	2.30	2.4	4.8	0.3	7°	10°		●		●	
 General Purpose		**ZXMT 040203GM**	6.2	2.60	2.4	5.1	0.3	13°	10°	●		●		K82 K83 K84 K85 K86 K87 K88
		05T203GM	7.3	2.76	2.5	5.5	0.3		7°	●		●		
		06T204GM	8.6	2.89	2.8	6.4	0.4			●		●		
		070305GM	10.2	3.24	3.0	8.0	0.5			●		●		
		09T306GM	12.2	4.03	3.6	9.6	0.6			●		●		
		11T306GM	14.5	4.06	4.6	11.6	0.6			●		●		
		140408GM	18.0	4.88	5.7	14.4	0.8			●		●		
		170608GM	22.1	6.58	6.8	17.7	0.8			●		●		
 Tough Edge		**ZXMT 040203GH**	6.2	2.60	2.4	5.1	0.3	13°	10°	●				
		05T203GH	7.3	2.76	2.5	5.5	0.3		7°	●				
		06T204GH	8.6	2.89	2.8	6.4	0.4			●				
		070305GH	10.2	3.24	3.0	8.0	0.5			●				
		09T306GH	12.2	4.03	3.6	9.6	0.6			●				
		11T306GH	14.5	4.06	4.6	11.6	0.6			●				
		140408GH	18.0	4.88	5.7	14.4	0.8			●				
		170608GH	22.1	6.58	6.8	17.7	0.8			●				
 Low Cutting Force / for Deeper Drilling		**ZXMT 040203SM**	6.2	2.60	2.4	5.1	0.3	13°	10°		●		●	
		05T203SM	7.3	2.76	2.5	5.5	0.3		7°		●		●	
		06T204SM	8.6	2.89	2.8	6.4	0.4				●		●	
		070305SM	10.2	3.24	3.0	8.0	0.5				●		●	
		09T306SM	12.2	4.03	3.6	9.6	0.6				●		●	
		11T306SM	14.5	4.06	4.6	11.6	0.6				●		●	
		140408SM	18.0	4.88	5.7	14.4	0.8				●		●	
		170608SM	22.1	6.58	6.8	17.7	0.8				●		●	

● : Std. Item

Suitable Chipbreaker (ZXMT)

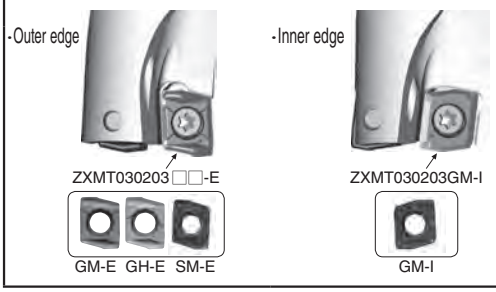
Workpiece Material	Insert Type	ZXMT											
	Chipbreaker	GM				GH				SM			
	Drilling Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D
Low Carbon Steel		☆	☆	☆	☆					★	★	★	★
Carbon Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Alloy Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Mold Steel		☆	☆	☆	☆	★	★	★	★				
Stainless Steel										★	★	★	★
Cast Iron		★	★	★	★								
Aluminum Alloys										★	★	★	★
Brass										★	★	★	★
Titanium Alloys										★	★	★	★

★ : 1st Choice ☆: 2nd Choice

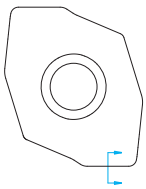
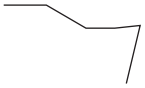
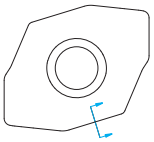
How to select ZXMT03

ZXMT03 (Drill Dia. : ø12~ø13)

1) For outer edge, please select "-E" insert from three different chipbreakers for each application.
2) For inner edge, please select "-I" insert (GM chipbreaker only).



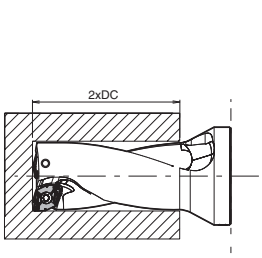
Features of the Chipbreaker

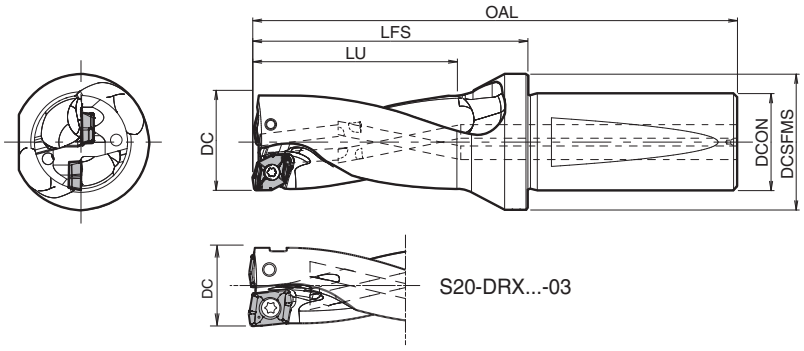
Chipbreaker			GM (General purpose)	GH (Tough Edge)	SM (Low Cutting Force / for Deeper Drilling)
Insert					
Features			1st. recommendation for carbon steel and alloy steel, 1st. recommendation for cast iron.	1st. recommendation for interrupted drilling and hard materials. Cutting edge strength oriented design.	Suitable for sticky materials such as stainless steel and low carbon steel.
			Good balance of sharp cutting and cutting edge strength	Middle to high feed rates of steel drilling, GM Chipbreaker alternative.	Low cutting force, prevents chattering. For low to medium feed rates of steel.
Outer edge side	 Wide chipbreaker	Chipbreaker Cross-section			
		Chips from Outer edge			
Inner edge side	 Flat chipbreaker	Chipbreaker Cross-section			
		Chips from Inner edge			
Workpiece Material			S50C	S50C	SUS304

Indication of tool life of MagicDrill

How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	· When an insert is new, the toolholder is slightly bent to the side during drilling (therefore, the drill diameter is slightly bigger during drilling). Once drilling is finished, the toolholder will return back to normal size.No tool marks will appear on the finished surface (This depends on workpiece and cutting condition. Slight tool mark might appear if cutting force on external dia. is too low.) · When an insert is at the end of its tool life, gradually the external corner part gets worn out. Also the toolholder does not bend slightly outwards, and it starts to bend inwards. After the drilling is finished, the toolholder returns to the normal position.When taking off a toolholder under this condition, the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking hole diameter	When hole diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause and it must be exchange.
Checking the surface on the outlet side	As the wear of the insert progresses, burrs at the through-hole outlet increase when exiting the hole. This is a clear indication that the tool needs to be replaced.
Variation of drilling noise	Light drilling noise at the beginning turns to brady noise which contains vibration noise.
Variation of vibration	As the end of tool life is getting closer, there is more vibration and the drilling noise changes. However, when drilling smaller diameters these factors are difficult to detect.

DRX (Drilling Depth : 2 x DC)





S20-DRX...-03

2D

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K80
S20 -DRX120M-2-03	▲	2	12	88	45	24	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-2-03	▲		12.5	89	46	25			+0.4			
-DRX130M-2-03	▲		13	90	47	26			+0.3			
-DRX135M-2-04	▲	2	13.5	91	48	27	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-2-04	▲		14	92	49	28			+0.4			
-DRX145M-2-04	▲		14.5	93	50	29			+0.3			
-DRX150M-2-04	▲		15	94	51	30			+0.2			
S25 -DRX155M-2-05	▲	2	15.5	109	55	31	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-2-05	▲		16	110	56	32			+0.7			
-DRX165M-2-05	▲		16.5	111	57	33			+0.5			
-DRX170M-2-05	▲		17	112	58	34			+0.4			
-DRX175M-2-05	▲		17.5	113	59	35			+0.3			
-DRX180M-2-05	▲		18	114	60	36			+0.2			
-DRX185M-2-06	▲	2	18.5	112	58	37	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-2-06	▲		19	113	59	38			+0.8			
-DRX195M-2-06	▲		19.5	114	60	39			+0.7			
-DRX200M-2-06	▲		20	115	61	40			+0.5			
-DRX205M-2-06	▲		20.5	116	62	41			+0.4			
-DRX210M-2-06	▲		21	117	63	42			+0.3			
-DRX215M-2-06	▲		21.5	118	64	43			+0.2			
-DRX220M-2-07	▲	2	22	119	65	44	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-2-07	▲		22.5	120	66	45			+1.0			
-DRX230M-2-07	▲		23	121	67	46			+0.9			
-DRX235M-2-07	▲		23.5	122	68	47			+0.8			
-DRX240M-2-07	▲		24	123	69	48			+0.7			
-DRX245M-2-07	▲		24.5	124	70	49			+0.5			
-DRX250M-2-07	▲		25	125	71	50			+0.4			
-DRX255M-2-07	▲		25.5	126	72	51			+0.3			
-DRX260M-2-07	▲		26	127	73	52			+0.2			
S32 -DRX270M-2-09	▲	2	27	136	77	54	32	41	+1.6	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX280M-2-09	▲		28	138	79	56			+1.3			
-DRX290M-2-09	▲		29	140	81	58			+1.1			
-DRX300M-2-09	▲		30	142	83	60		43	+0.8			
-DRX310M-2-09	▲		31	144	85	62			+0.6			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K90**
Trouble shooting ➡ **K64**

▲ : To be replaced by a new product

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K80
S40 -DRX320M-2-11	▲		32	169	100	64			+2.2			
-DRX330M-2-11	▲		33	171	102	66			+1.9			
-DRX340M-2-11	▲		34	173	104	68			+1.7			
-DRX350M-2-11	▲	2	35	175	106	70	40	54	+1.4	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX360M-2-11	▲		36	177	108	72			+1.2			
-DRX370M-2-11	▲		37	179	110	74			+0.9			
-DRX380M-2-11	▲		38	181	112	76			+0.7			
-DRX390M-2-14	▲		39	179	110	78			+2.8			
-DRX400M-2-14	▲		40	181	112	80		54	+2.5			
-DRX410M-2-14	▲		41	183	114	82			+2.3			
-DRX420M-2-14	▲		42	185	116	84			+2.0			
-DRX430M-2-14	▲	2	43	187	118	86	40		+1.8	SB-5090TR	DT-20	ZXMT140408□□
-DRX440M-2-14	▲		44	189	120	88			+1.5			
-DRX450M-2-14	▲		45	191	122	90		59	+1.3			
-DRX460M-2-14	▲		46	193	124	92			+1.0			
-DRX470M-2-14	▲		47	195	126	94			+0.8			
-DRX480M-2-17	▲		48	194	125	96			+3.8			
-DRX490M-2-17	▲		49	196	127	98			+3.5			
-DRX500M-2-17	▲		50	198	129	100		59	+3.3			
-DRX510M-2-17	▲		51	200	131	102			+3.0			
-DRX520M-2-17	▲		52	202	133	104			+2.8			
-DRX530M-2-17	▲		53	204	135	106			+2.5			
-DRX540M-2-17	▲	2	54	206	137	108	40		+2.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX550M-2-17	▲		55	208	139	110			+2.0			
-DRX560M-2-17	▲		56	210	141	112			+1.8			
-DRX570M-2-17	▲		57	212	143	114		64	+1.5			
-DRX580M-2-17	▲		58	214	145	116			+1.3			
-DRX590M-2-17	▲		59	216	147	118			+1.0			
-DRX600M-2-17	▲		60	218	149	120			+0.8			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K90**
Trouble shooting ➡ **K64**

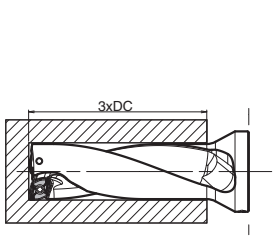
· Hole Dia. Tolerance (2D type)

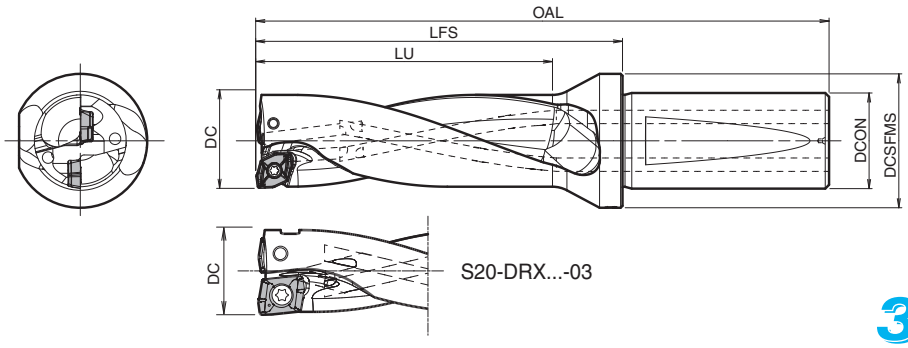
DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.20 -0.10
ø27~ø38	+0.25 -0.15
ø39~ø60	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

▲ : To be replaced by a new product

DRX (Drilling Depth : 3 x DC)





3D

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K80
S20 -DRX120M-3-03	▲	2	12	100	57	36	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-3-03	▲		12.5	102	59	37.5			+0.4			
-DRX130M-3-03	▲		13	103	60	39			+0.3			
-DRX135M-3-04	▲	2	13.5	105	62	40.5	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-3-04	▲		14	106	63	42			+0.4			
-DRX145M-3-04	▲		14.5	108	65	43.5			+0.3			
-DRX150M-3-04	▲		15	109	66	45			+0.2			
S25 -DRX155M-3-05	▲	2	15.5	124	70	46.5	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-3-05	▲		16	126	72	48			+0.7			
-DRX165M-3-05	▲		16.5	127	73	49.5			+0.5			
-DRX170M-3-05	▲		17	129	75	51			+0.4			
-DRX175M-3-05	▲		17.5	130	76	52.5			+0.3			
-DRX180M-3-05	▲		18	132	78	54			+0.2			
-DRX185M-3-06	▲	2	18.5	131	77	55.5	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-3-06	▲		19	132	78	57			+0.8			
-DRX195M-3-06	▲		19.5	134	80	58.5			+0.7			
-DRX200M-3-06	▲		20	135	81	60			+0.5			
-DRX205M-3-06	▲		20.5	137	83	61.5			+0.4			
-DRX210M-3-06	▲		21	138	84	63			+0.3			
-DRX215M-3-06	▲		21.5	140	86	64.5			+0.2			
-DRX220M-3-07	▲	2	22	141	87	66	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-3-07	▲		22.5	142	88	67.5			+1.0			
-DRX230M-3-07	▲		23	144	90	69			+0.9			
-DRX235M-3-07	▲		23.5	145	91	70.5			+0.8			
-DRX240M-3-07	▲		24	147	93	72			+0.7			
-DRX245M-3-07	▲		24.5	148	94	73.5			+0.5			
-DRX250M-3-07	▲		25	150	96	75			+0.4			
-DRX255M-3-07	▲		25.5	151	97	76.5			+0.3			
-DRX260M-3-07	▲		26	153	99	78			+0.2			
S32 -DRX265M-3-09	▲	2	26.5	161	102	79.5	32	41	+1.7	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX270M-3-09	▲		27	163	104	81			+1.6			
-DRX275M-3-09	▲		27.5	164	105	82.5			+1.5			
-DRX280M-3-09	▲		28	166	107	84			+1.3			
-DRX285M-3-09	▲		28.5	167	108	85.5			+1.2			
-DRX290M-3-09	▲		29	169	110	87			+1.1			
-DRX295M-3-09	▲		29.5	170	111	88.5		43	+1.1			
-DRX300M-3-09	▲		30	172	113	90			+0.8			
-DRX305M-3-09	▲		30.5	173	114	91.5			+0.7			
-DRX310M-3-09	▲		31	175	116	93			+0.6			
-DRX315M-3-09	▲		31.5	176	117	94.5			+0.5			
S40 -DRX320M-3-11	▲	2	32	201	132	96	40	54	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX330M-3-11	▲		33	204	135	99			+1.9			
-DRX340M-3-11	▲		34	207	138	102			+1.7			
-DRX350M-3-11	▲		35	210	141	105			+1.4			
-DRX360M-3-11	▲		36	213	144	108			+1.2			
-DRX370M-3-11	▲		37	216	147	111			+0.9			
-DRX380M-3-11	▲		38	219	150	114			+0.7			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K90
Trouble shooting ➡ K64

▲ : To be replaced by a new product

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts K80
S40 -DRX390M-3-14	▲		39	218	149	117			+2.8			
-DRX400M-3-14	▲		40	221	152	120		54	+2.5			
-DRX410M-3-14	▲		41	224	155	123			+2.3			
-DRX420M-3-14	▲		42	227	158	126			+2.0			
-DRX430M-3-14	▲	2	43	230	161	129	40		+1.8	SB-5090TR	DT-20	ZXMT140408 □□
-DRX440M-3-14	▲		44	233	164	132			+1.5			
-DRX450M-3-14	▲		45	236	167	135		59	+1.3			
-DRX460M-3-14	▲		46	239	170	138			+1.0			
-DRX470M-3-14	▲		47	242	173	141			+0.8			
-DRX480M-3-17	▲		48	242	173	144			+3.8			
-DRX490M-3-17	▲		49	245	176	147			+3.5			
-DRX500M-3-17	▲		50	248	179	150		59	+3.3			
-DRX510M-3-17	▲		51	251	182	153			+3.0			
-DRX520M-3-17	▲		52	254	185	156			+2.8			
-DRX530M-3-17	▲		53	257	188	159			+2.5			
-DRX540M-3-17	▲	2	54	260	191	162	40		+2.3	SB-60120TR	DT-25	ZXMT170608 □□
-DRX550M-3-17	▲		55	263	194	165			+2.0			
-DRX560M-3-17	▲		56	266	197	168			+1.8			
-DRX570M-3-17	▲		57	269	200	171		64	+1.5			
-DRX580M-3-17	▲		58	272	203	174			+1.3			
-DRX590M-3-17	▲		59	275	206	177			+1.0			
-DRX600M-3-17	▲		60	278	209	180			+0.8			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions **K90**
Trouble shooting **K64**

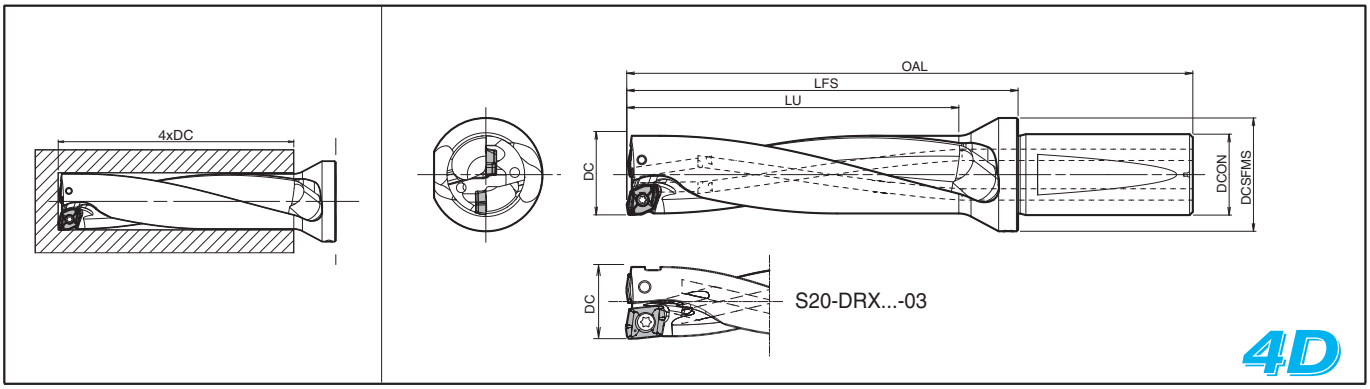
· Hole Dia. Tolerance (3D type)

DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.20 -0.10
ø26.5~ø38	+0.25 -0.15
ø39~ø60	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

▲ : To be replaced by a new product

DRX (Drilling Depth : 4 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K80
S20 -DRX120M-4-03	▲	2	12	112	69	48	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-4-03	▲		12.5	114	71	50			+0.4			
-DRX130M-4-03	▲		13	116	73	52			+0.3			
-DRX135M-4-04	▲	2	13.5	118	75	54	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-4-04	▲		14	120	77	56			+0.4			
-DRX145M-4-04	▲		14.5	122	79	58			+0.3			
-DRX150M-4-04	▲		15	124	81	60			+0.2			
S25 -DRX155M-4-05	▲	2	15.5	140	86	62	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-4-05	▲		16	142	88	64			+0.7			
-DRX165M-4-05	▲		16.5	144	90	66			+0.5			
-DRX170M-4-05	▲		17	146	92	68			+0.4			
-DRX175M-4-05	▲		17.5	148	94	70			+0.3			
-DRX180M-4-05	▲		18	150	96	72			+0.2			
-DRX185M-4-06	▲	2	18.5	149	95	74	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-4-06	▲		19	151	97	76			+0.8			
-DRX195M-4-06	▲		19.5	153	99	78			+0.7			
-DRX200M-4-06	▲		20	155	101	80			+0.5			
-DRX205M-4-06	▲		20.5	157	103	82			+0.4			
-DRX210M-4-06	▲		21	159	105	84			+0.3			
-DRX215M-4-06	▲		21.5	161	107	86			+0.2			
-DRX220M-4-07	▲	2	22	163	109	88	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-4-07	▲		22.5	165	111	90			+1.0			
-DRX230M-4-07	▲		23	167	113	92			+0.9			
-DRX235M-4-07	▲		23.5	169	115	94			+0.8			
-DRX240M-4-07	▲		24	171	117	96			+0.7			
-DRX245M-4-07	▲		24.5	173	119	98			+0.5			
-DRX250M-4-07	▲		25	175	121	100			+0.4			
-DRX255M-4-07	▲		25.5	177	123	102			+0.3			
-DRX260M-4-07	▲		26	179	125	104			+0.2			
S32 -DRX270M-4-09	▲	2	27	190	131	108	32	41	+1.6	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX280M-4-09	▲		28	194	135	112			+1.3			
-DRX290M-4-09	▲		29	198	139	116			+1.1			
-DRX300M-4-09	▲		30	202	143	120		43	+0.8			
-DRX310M-4-09	▲		31	206	147	124			+0.6			
S40 -DRX320M-4-11	▲	2	32	223	154	128	40	49	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX330M-4-11	▲		33	227	158	132			+1.9			
-DRX340M-4-11	▲		34	231	162	136			+1.7			
-DRX350M-4-11	▲		35	235	166	140			+1.4			
-DRX360M-4-11	▲		36	239	170	144			+1.2			
-DRX370M-4-11	▲		37	243	174	148			+0.9			
-DRX380M-4-11	▲		38	247	178	152			+0.7			

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K90**
Trouble shooting ➡ **K64**

▲ : To be replaced by a new product

Toolholder Dimensions

4D

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
S40 -DRX390M-4-14	▲		39	257	188	156			+2.8			
-DRX400M-4-14	▲		40	261	192	160		54	+2.5			
-DRX410M-4-14	▲		41	265	196	164			+2.3			
-DRX420M-4-14	▲		42	269	200	168			+2.0			
-DRX430M-4-14	▲	2	43	273	204	172	40		+1.8	SB-5090TR	DT-20	ZXMT140408□□
-DRX440M-4-14	▲		44	277	208	176			+1.5			
-DRX450M-4-14	▲		45	281	212	180		59	+1.3			
-DRX460M-4-14	▲		46	285	216	184			+1.0			
-DRX470M-4-14	▲		47	289	220	188			+0.8			
S50 -DRX480M-4-17	▲		48	290	221	192			+3.8			
-DRX490M-4-17	▲		49	294	225	196			+3.5			
-DRX500M-4-17	▲		50	298	229	200		59	+3.3			
-DRX510M-4-17	▲		51	302	233	204			+3.0			
-DRX520M-4-17	▲		52	306	237	208			+2.8			
-DRX530M-4-17	▲		53	310	241	212			+2.5			
-DRX540M-4-17	▲	2	54	314	245	216	50		+2.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX550M-4-17	▲		55	318	249	220			+2.0			
-DRX560M-4-17	▲		56	322	253	224			+1.8			
-DRX570M-4-17	▲		57	326	257	228		64	+1.5			
-DRX580M-4-17	▲		58	330	261	232			+1.3			
-DRX590M-4-17	▲		59	334	265	236			+1.0			
-DRX600M-4-17	▲		60	338	269	240			+0.8			

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions **K90**
Trouble shooting **K64**

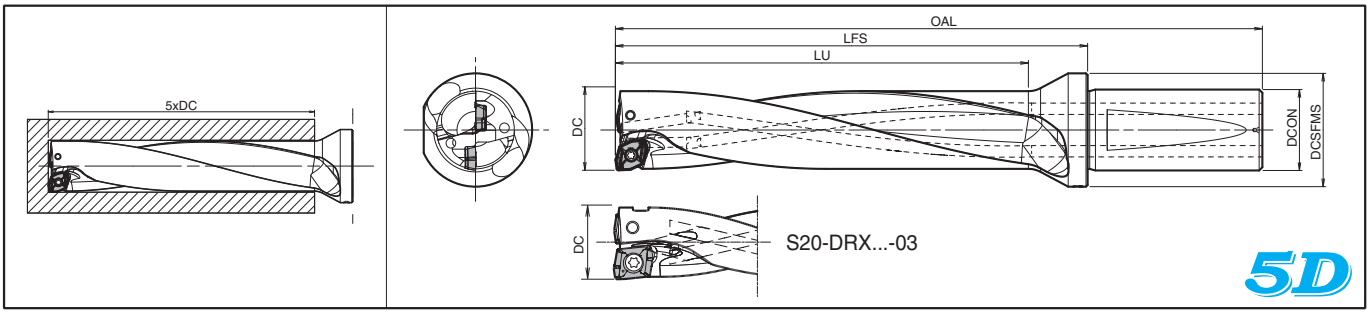
· Hole Dia. Tolerance (4D type)

DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.25 -0.10
ø27~ø38	+0.30 -0.15
ø39~ø60	+0.35 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

▲ : To be replaced by a new product

DRX (Drilling Depth : 5 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K80
S20 -DRX120M-5-03	▲	2	12	120	77	60	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX130M-5-03	▲		13	125	82	65			+0.3			
-DRX140M-5-04	▲	2	14	134	91	70	20	27	+0.4	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX150M-5-04	▲		15	139	96	75			+0.2			
S25 -DRX160M-5-05	▲		16	158	104	80			+0.7			
-DRX170M-5-05	▲	2	17	163	109	85	25	32	+0.4	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX180M-5-05	▲		18	168	114	90			+0.2			
-DRX190M-5-06	▲		19	170	116	95			+0.8			
-DRX200M-5-06	▲	2	20	175	121	100	25	32	+0.5	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX210M-5-06	▲		21	180	126	105			+0.3			
-DRX220M-5-07	▲		22	185	131	110			+1.2			
-DRX230M-5-07	▲		23	190	136	115			+0.9			
-DRX240M-5-07	▲	2	24	195	141	120	25	33	+0.7	SB-2570TR	DTM-8	ZXMT070305□□
-DRX250M-5-07	▲		25	200	146	125			+0.4			
-DRX260M-5-07	▲		26	205	151	130			+0.2			
S32 -DRX270M-5-09	▲		27	217	158	135			+1.6			
-DRX280M-5-09	▲		28	222	163	140		41	+1.3			
-DRX290M-5-09	▲	2	29	227	168	145	32		+1.1	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX300M-5-09	▲		30	232	173	150		43	+0.8			
-DRX310M-5-09	▲		31	237	178	155			+0.6			
S40 -DRX320M-5-11	▲		32	255	186	160			+2.2			
-DRX330M-5-11	▲		33	260	191	165			+1.9			
-DRX340M-5-11	▲		34	265	196	170			+1.7			
-DRX350M-5-11	▲	2	35	270	201	175		49	+1.4	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX360M-5-11	▲		36	275	206	180			+1.2			
-DRX370M-5-11	▲		37	280	211	185			+0.9			
-DRX380M-5-11	▲		38	285	216	190			+0.7			
-DRX390M-5-14	▲		39	296	227	195			+2.8			
-DRX400M-5-14	▲		40	301	232	200		54	+2.5			
-DRX410M-5-14	▲		41	306	237	205			+2.3			
-DRX420M-5-14	▲		42	311	242	210			+2.0			
-DRX430M-5-14	▲	2	43	316	247	215	40		+1.8	SB-5090TR	DT-20	ZXMT140408□□
-DRX440M-5-14	▲		44	321	252	220			+1.5			
-DRX450M-5-14	▲		45	326	257	225		59	+1.3			
-DRX460M-5-14	▲		46	331	262	230			+1.0			
-DRX470M-5-14	▲		47	336	267	235			+0.8			
S50 -DRX480M-5-17	▲		48	338	269	240			+3.8			
-DRX490M-5-17	▲		49	343	274	245			+3.5			
-DRX500M-5-17	▲		50	348	279	250		59	+3.3			
-DRX510M-5-17	▲		51	353	284	255			+3.0			
-DRX520M-5-17	▲		52	358	289	260			+2.8			
-DRX530M-5-17	▲		53	363	294	265			+2.5			
-DRX540M-5-17	▲	2	54	368	299	270	50		+2.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX550M-5-17	▲		55	373	304	275			+2.0			
-DRX560M-5-17	▲		56	378	309	280			+1.8			
-DRX570M-5-17	▲		57	383	314	285		64	+1.5			
-DRX580M-5-17	▲		58	388	319	290			+1.3			
-DRX590M-5-17	▲		59	393	324	295			+1.0			
-DRX600M-5-17	▲		60	398	329	300			+0.8			

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K90**
Trouble shooting ➡ **K64**

· Hole Dia. Tolerance (5D type)

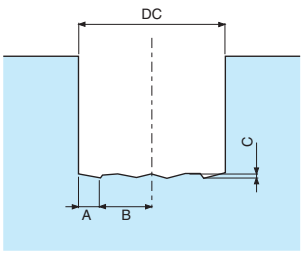
DC	Hole Dia. Tolerance (mm)	DC	Hole Dia. Tolerance (mm)	DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.30 -0.10	ø27~ø38	+0.35 -0.15	ø39~ø60	+0.40 -0.20

* The values shown in the left are only estimation. It may vary depending on machines / workpieces / clamping status / cutting conditions.

▲ : To be replaced by a new product

MagicDrill DRX Hole Bottom Shape (mm)

DC	A	B	C	DC	A	B	C	DC	A	B	C
12.0	1.8	4.2	0.5	24.5	3.2	9.1	0.8	39.0	5.8	13.7	1.5
12.5		4.5		25.0		9.3	0.9	40.0		14.2	
13.0		4.7		25.5		9.6		41.0		14.7	
13.5	2	4.8	0.5	26.0		9.8		42.0		15.2	
14.0		5.0		26.5	3.9	9.4	1.0	43.0		15.7	
14.5		5.3		27.0		9.6		44.0		16.2	
15.0		5.5		27.5		9.9		45.0		16.7	
15.5		5.8	0.6	28.0		10.1		46.0		17.2	
16.0		6.0		28.5		10.4		47.0		17.7	1.6
16.5		6.3		29.0		10.6		48.0	7.1	16.9	1.7
17.0		6.5		29.5		10.9		49.0		17.4	
17.5		6.8		30.0		11.1	1.1	50.0		17.9	
18.0		7.0	0.7	30.5		11.4		51.0		18.4	
18.5	2.4	6.9	0.7	31.0		11.6		52.0		18.9	
19.0		7.1		31.5		11.9	1.2	53.0		19.4	
19.5		7.4		32.0	4.7	11.3	1.1	54.0		19.9	
20.0		7.6		33.0		11.8		55.0		20.4	1.8
20.5		7.9		34.0		12.3		56.0		20.9	
21.0		8.1	0.8	35.0		12.8		57.0		21.4	1.9
21.5		8.4		36.0		13.3	1.2	58.0		21.9	2.0
22.0	3.2	7.8	0.8	37.0		13.8	1.3	59.0		22.4	
22.5		8.1		38.0		14.3		60.0		22.9	2.1
23.0		8.3									
23.5		8.6									
24.0		8.8									



Common for 2D, 3D, 4D, 5D
* Above is numeric guideline. (Varies within ±0.1mm depending on workpiece materials and cutting conditions)

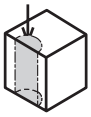
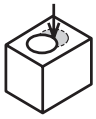
DRX Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT PR1230 GM GH	MEGACOAT PR1225 SM	MEGACOAT PR1210 GM	Carbide GW15 SM	Drill Dia. DC (mm)	Toolholder type 2D~3D f (mm/rev) GM	2D~3D GH	2D~3D SM	4D GM	4D GH	4D SM	5D GM	5D GH	5D SM
Low Carbon Steel	☆ 120-240	★ 120-240			ø12~ø15	0.06~0.10	0.06~0.10	0.04~0.10	0.05~0.08	0.05~0.08	0.04~0.08	0.04~0.07	0.04~0.07	0.04~0.08
					ø15.5~ø18	0.06~0.12	0.06~0.12	0.06~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08	0.05~0.08	0.04~0.09
					ø18.5~ø26	0.08~0.14	0.08~0.14	0.06~0.14	0.06~0.12	0.08~0.12	0.05~0.12	0.06~0.10	0.06~0.10	0.04~0.10
					ø26.5~ø60	0.08~0.14	0.08~0.14	0.06~0.14	0.06~0.12	0.08~0.12	0.05~0.12	0.06~0.10	0.06~0.10	0.04~0.10
Carbon Steel	★ 100-180	☆ 100-180			ø12~ø15	0.04~0.14	0.04~0.14	0.04~0.10	0.04~0.10	0.04~0.10	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					ø15.5~ø18	0.06~0.16	0.06~0.16	0.06~0.12	0.05~0.12	0.05~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					ø18.5~ø26	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
					ø26.5~ø60	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
Alloy Steel	★ 100-160	☆ 100-160			ø12~ø15	0.04~0.14	0.04~0.14	0.04~0.10	0.04~0.10	0.04~0.10	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					ø15.5~ø18	0.06~0.16	0.06~0.16	0.06~0.12	0.05~0.12	0.05~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					ø18.5~ø26	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
					ø26.5~ø60	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
Mold Steel	★ 80-150	☆ 80-150			ø12~ø15	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07	0.04~0.07	0.04~0.07	0.04~0.06	0.04~0.06	0.04~0.06
					ø15.5~ø18	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					ø18.5~ø26	0.08~0.15	0.08~0.15	0.06~0.12	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					ø26.5~ø60	0.08~0.15	0.08~0.15	0.06~0.12	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08
Stainless Steel (Austenitic related)	☆ 70-140	★ 70-140			ø12~ø15	0.06~0.10	0.06~0.10	0.04~0.10	0.05~0.08	0.05~0.08	0.04~0.08	0.04~0.07	0.04~0.08	0.04~0.08
					ø15.5~ø18	0.06~0.10	0.06~0.10	0.06~0.12	0.05~0.08	0.05~0.08	0.05~0.11	0.04~0.07	0.04~0.07	0.04~0.10
					ø18.5~ø26	0.08~0.12	0.08~0.12	0.06~0.14	0.07~0.10	0.07~0.10	0.06~0.12	0.07~0.10	0.07~0.10	0.06~0.12
					ø26.5~ø60	0.08~0.12	0.08~0.12	0.06~0.14	0.07~0.10	0.07~0.10	0.06~0.12	0.07~0.10	0.07~0.10	0.06~0.12
Gray Cast Iron			★ 100-150		ø12~ø15	0.08~0.14	-	-	0.06~0.12	-	-	0.04~0.10	-	-
					ø15.5~ø18	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
					ø18.5~ø26	0.08~0.20	-	-	0.08~0.18	-	-	0.06~0.14	-	-
					ø26.5~ø60	0.08~0.20	-	-	0.08~0.18	-	-	0.06~0.14	-	-
Nodular Cast Iron			★ 80-120		ø12~ø15	0.08~0.12	-	-	0.06~0.10	-	-	0.04~0.08	-	-
					ø15.5~ø18	0.08~0.16	-	-	0.08~0.14	-	-	0.06~0.10	-	-
					ø18.5~ø26	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
					ø26.5~ø60	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
Non-ferrous Metals				★ 200-600	ø12~ø15	-	-	0.06~0.12	-	-	0.05~0.10	-	-	0.04~0.08
					ø15.5~ø18	-	-	0.08~0.14	-	-	0.06~0.12	-	-	0.05~0.10
					ø18.5~ø26	-	-	0.08~0.16	-	-	0.06~0.14	-	-	0.05~0.12
					ø26.5~ø60	-	-	0.08~0.20	-	-	0.08~0.16	-	-	0.07~0.14
Titanium Alloys				★ 40-70	ø12~ø15	-	-	0.05~0.08	-	-	0.04~0.07	-	-	0.04~0.06
					ø15.5~ø18	-	-	0.05~0.08	-	-	0.04~0.07	-	-	0.04~0.06
					ø18.5~ø26	-	-	0.06~0.10	-	-	0.06~0.08	-	-	0.05~0.07
					ø26.5~ø60	-	-	0.06~0.10	-	-	0.06~0.08	-	-	0.05~0.07

· Apply a sufficient amount of coolant.

★ : 1st Recommendation ☆ : 2nd Recommendation

Cutting Conditions by Application

Applications		Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole*	Stacked Plates
Shape of Workpiece								
DRX	Cutting Speed Vc (m/min)	120	120	120	120	120	120	Not Available
DRX	f (mm/rev)	0.1	0.05	0.05	0.05	Concave Surface 0.05 Continuous Part 0.1	0.05	Not Available
Coolant (Internal)		Yes	Yes	Yes	Yes	Yes	Yes	Not Available

* Cutting width (Torus-shaped part) when drilling cored hole.

Drill type	2D~3D	4D	5D
Cutting width (Torus-shaped part)	0.1 x DC or less	Corner radius or less	Not recommended

Max. Depth for Drilling with External Coolant

In case of using external coolant system, chip evacuation will be bad.
Therefore ap should be measured within 1.5 times (1.5 x DC) of drill diameter (DC).

Large Diameter MagicDrill DRW



Features

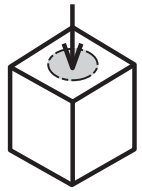
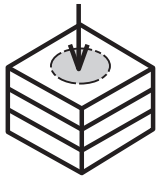
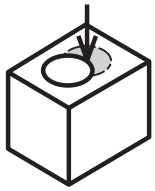
- Sharp cutting
- Enhanced chip evacuation
- Superior fracture resistance and long tool life with MEGACOAT NANO PR1535 grade



Applicable diameter : ø60~ø100
Drilling Depth : 1D, 2D, 3D
Use single type of insert.

● MagicDrill Series Application Map

Applicable workpiece

Plain Surface	Stacked Plates	Hole Expansion	Slant Surface
			

* Hole expansion : Overlap amount of through hole must be 0.2 x DC or less.
Expansion of blind holes is not possible because chips are built up in the next hole and will cause chip biting.

● Toolholder Identification System

S50	-	DRW	0600M	-	1	-	06
Straight Shank ø50		Type	Drill Dia. (mm) 0600M : ø60		Drilling Depth 1 : 1 X DC		Insert Size

DRW



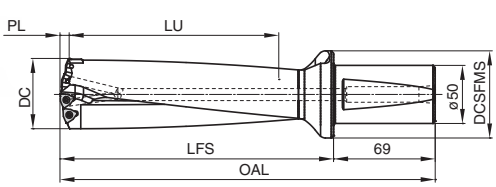
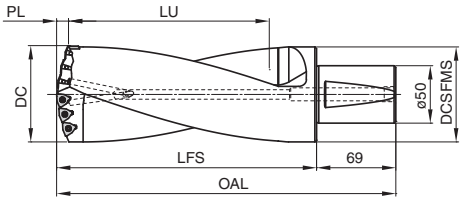


Fig. 1



DC=ø65~ø74 (4 inserts)
DC=ø75~ø100 (6 inserts)

Fig. 2

Toolholder Dimensions (Drilling Depth : 1 x DC) 1D

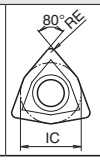
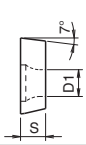
Description		Stock	No. of Inserts	Dimension (mm)						Drawing
				DC	OAL	LFS	LU	PL	DCSFMS	
S50-	DRW0600M-1-06	MTO	4	60	175	106	60	7.6	63	Fig. 1
	DRW0610M-1-06	MTO		61	176	107	61	7.7	63	
	DRW0620M-1-06	MTO		62	178	109	62	7.8	63	
	DRW0630M-1-06	MTO		63	179	110	63	7.9	63	
	DRW0640M-1-06	MTO		64	182	113	64	8.0	63	
	DRW0650M-1-06	MTO		65	184	115	65	8.2	63	Fig. 2
	DRW0660M-1-06	MTO		66	185	116	66	8.3	64	
	DRW0670M-1-06	MTO		67	187	118	67	8.4	65	
	DRW0680M-1-06	MTO		68	189	120	68	8.5	66	
	DRW0690M-1-06	MTO		69	190	121	69	8.6	67	
	DRW0700M-1-06	MTO		70	192	123	70	8.7	68	
	DRW0710M-1-06	MTO		71	193	124	71	8.8	69	
	DRW0720M-1-06	MTO		72	195	126	72	9.0	70	
	DRW0730M-1-06	MTO		73	198	129	73	9.1	71	
	DRW0740M-1-06	MTO		74	199	130	74	9.2	72	
S50-	DRW0750M-1-06	MTO	6	75	201	132	75	9.3	73	Fig. 2
	DRW0760M-1-06	MTO		76	203	134	76	9.4	74	
	DRW0770M-1-06	MTO		77	204	135	77	9.5	75	
	DRW0780M-1-06	MTO		78	206	137	78	9.7	76	
	DRW0790M-1-06	MTO		79	207	138	79	9.8	77	
	DRW0800M-1-06	MTO		80	207	138	80	9.9	78	
	DRW0810M-1-06	MTO		81	208	139	81	9.9	79	
	DRW0820M-1-06	MTO		82	210	141	82	9.9	80	
	DRW0830M-1-06	MTO		83	210	141	83	9.9	81	
	DRW0840M-1-06	MTO		84	210	141	84	9.9	82	
	DRW0850M-1-06	MTO		85	211	142	85	10.5	83	
	DRW0860M-1-06	MTO		86	213	144	86	10.5	84	
	DRW0870M-1-06	MTO		87	215	146	87	10.5	85	
	DRW0880M-1-06	MTO		88	216	147	88	10.5	86	
	DRW0890M-1-06	MTO		89	218	149	89	10.5	87	
	DRW0900M-1-06	MTO		90	219	150	90	11.0	88	
	DRW0910M-1-06	MTO		91	220	151	91	11.0	89	
	DRW0920M-1-06	MTO		92	222	153	92	11.0	90	
	DRW0930M-1-06	MTO		93	223	154	93	11.0	91	
	DRW0940M-1-06	MTO		94	225	156	94	11.0	92	
	DRW0950M-1-06	MTO		95	226	157	95	11.6	93	
	DRW0960M-1-06	MTO		96	228	159	96	11.6	94	
	DRW0970M-1-06	MTO		97	228	159	97	11.6	95	
	DRW0980M-1-06	MTO		98	230	161	98	11.6	96	
	DRW0990M-1-06	MTO		99	231	162	99	11.6	97	
	DRW1000M-1-06	MTO		100	232	163	100	12.2	98	

Toolholder Dimensions (Drilling Depth : 2 x DC) 2D

Description		Stock	No. of Inserts	Dimension (mm)						Drawing
				DC	OAL	LFS	LU	PL	DCSFMS	
S50-	DRW0600M-2-06	●	4	60	235	166	120	7.6	63	Fig. 1
	DRW0610M-2-06	MTO		61	237	168	122	7.7	63	
	DRW0620M-2-06	MTO		62	240	171	124	7.8	63	
	DRW0630M-2-06	MTO		63	242	173	126	7.9	63	
	DRW0640M-2-06	MTO		64	246	177	128	8.0	63	
	DRW0650M-2-06	●		65	249	180	130	8.2	63	Fig. 2
	DRW0660M-2-06	MTO		66	251	182	132	8.3	64	
	DRW0670M-2-06	MTO		67	254	185	134	8.4	65	
	DRW0680M-2-06	MTO		68	257	188	136	8.5	66	
	DRW0690M-2-06	MTO		69	259	190	138	8.6	67	
	DRW0700M-2-06	●		70	262	193	140	8.7	68	
	DRW0710M-2-06	MTO		71	264	195	142	8.8	69	
	DRW0720M-2-06	MTO		72	267	198	144	9.0	70	
	DRW0730M-2-06	MTO		73	271	202	146	9.1	71	
	DRW0740M-2-06	●		74	273	204	148	9.2	72	
S50-	DRW0750M-2-06	●	6	75	276	207	150	9.3	73	Fig. 2
	DRW0760M-2-06	MTO		76	279	210	152	9.4	74	
	DRW0770M-2-06	MTO		77	281	212	154	9.5	75	
	DRW0780M-2-06	MTO		78	284	215	156	9.7	76	
	DRW0790M-2-06	MTO		79	286	217	158	9.8	77	
	DRW0800M-2-06	●		80	287	218	160	9.9	78	
	DRW0810M-2-06	MTO		81	289	220	162	9.9	79	
	DRW0820M-2-06	MTO		82	292	223	164	9.9	80	
	DRW0830M-2-06	MTO		83	293	224	166	9.9	81	
	DRW0840M-2-06	MTO		84	294	225	168	9.9	82	
	DRW0850M-2-06	●		85	296	227	170	10.5	83	
	DRW0860M-2-06	MTO		86	299	230	172	10.5	84	
	DRW0870M-2-06	MTO		87	302	233	174	10.5	85	
	DRW0880M-2-06	MTO		88	304	235	176	10.5	86	
	DRW0890M-2-06	MTO		89	307	238	178	10.5	87	
	DRW0900M-2-06	●		90	309	240	180	11.0	88	
	DRW0910M-2-06	MTO		91	311	242	182	11.0	89	
	DRW0920M-2-06	MTO		92	314	245	184	11.0	90	
	DRW0930M-2-06	MTO		93	316	247	186	11.0	91	
	DRW0940M-2-06	●		94	319	250	188	11.0	92	
	DRW0950M-2-06	●		95	321	252	190	11.6	93	
	DRW0960M-2-06	MTO		96	324	255	192	11.6	94	
	DRW0970M-2-06	MTO		97	325	256	194	11.6	95	
	DRW0980M-2-06	MTO		98	328	259	196	11.6	96	
	DRW0990M-2-06	MTO		99	330	261	198	11.6	97	
	DRW1000M-2-06	●		100	332	263	200	12.2	98	

● : Std. Item
MTO : Made to order

Applicable Inserts

Insert			Description	Dimension (mm)				MEGACOAT	MEGACOAT NANO	CVD Coated Carbide	Applicable Toolholders
				IC	S	D1	RE	PR1230	PR1535	CA6535	
			WCMT06T308	9.525	3.97	3.7	0.8	●	●	●	S50-DRW…-06
			WCMT050308	7.94	3.18	3.2		●			(Custom-order toolholder)

* WCMT050308 is for custom-order (ø22 or larger).

Toolholder Dimensions (Drilling Depth : 3 x DC) 3D

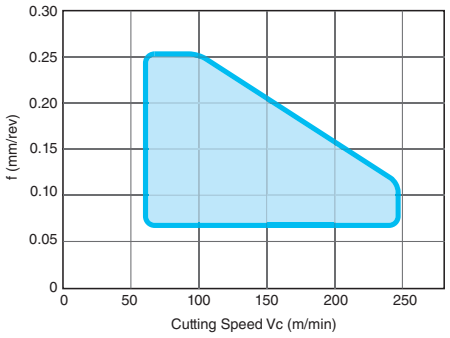
Description		Stock	No. of Inserts	Dimension (mm)						Drawing
				DC	OAL	LFS	LU	PL	DCSFMS	
S50-	DRW0600M-3-06	●	4	60	295	226	180	7.6	63	Fig. 1
	DRW0610M-3-06	MTO		61	298	229	183	7.7	63	
	DRW0620M-3-06	MTO		62	302	233	186	7.8	63	
	DRW0630M-3-06	MTO		63	305	236	189	7.9	63	
	DRW0640M-3-06	MTO		64	310	241	192	8.0	63	
	DRW0650M-3-06	●		65	314	245	195	8.2	63	Fig. 2
	DRW0660M-3-06	MTO		66	317	248	198	8.3	64	
	DRW0670M-3-06	MTO		67	321	252	201	8.4	65	
	DRW0680M-3-06	MTO		68	325	256	204	8.5	66	
	DRW0690M-3-06	MTO		69	328	259	207	8.6	67	
	DRW0700M-3-06	●		70	332	263	210	8.7	68	
	DRW0710M-3-06	MTO		71	335	266	213	8.9	69	
	DRW0720M-3-06	MTO		72	339	270	216	9.0	70	
	DRW0730M-3-06	MTO		73	344	275	219	9.1	71	
	DRW0740M-3-06	●		74	347	278	222	9.2	72	
S50-	DRW0750M-3-06	●	6	75	351	282	225	9.3	73	Fig. 2
	DRW0760M-3-06	MTO		76	355	286	228	9.4	74	
	DRW0770M-3-06	MTO		77	358	289	231	9.5	75	
	DRW0780M-3-06	MTO		78	362	293	234	9.7	76	
	DRW0790M-3-06	MTO		79	365	296	237	9.8	77	
	DRW0800M-3-06	●		80	367	298	240	9.9	78	
	DRW0810M-3-06	MTO		81	370	301	243	9.9	79	
	DRW0820M-3-06	MTO		82	374	305	246	9.9	80	
	DRW0830M-3-06	MTO		83	376	307	249	9.9	81	
	DRW0840M-3-06	MTO		84	378	309	252	9.9	82	
	DRW0850M-3-06	●		85	381	312	255	10.5	83	
	DRW0860M-3-06	MTO		86	385	316	258	10.5	84	
	DRW0870M-3-06	MTO		87	389	320	261	10.5	85	
	DRW0880M-3-06	MTO		88	392	323	264	10.5	86	
	DRW0890M-3-06	MTO		89	396	327	267	10.5	87	
	DRW0900M-3-06	●		90	399	330	270	11.0	88	
	DRW0910M-3-06	MTO		91	402	333	273	11.0	89	
	DRW0920M-3-06	MTO		92	406	337	276	11.0	90	
	DRW0930M-3-06	MTO		93	409	340	279	11.0	91	
	DRW0940M-3-06	●		94	413	344	282	11.0	92	
	DRW0950M-3-06	●		95	416	347	285	11.6	93	
	DRW0960M-3-06	MTO		96	420	351	288	11.6	94	
	DRW0970M-3-06	MTO		97	422	353	291	11.6	95	
	DRW0980M-3-06	MTO		98	426	357	294	11.6	96	
	DRW0990M-3-06	MTO		99	429	360	297	11.6	97	
	DRW1000M-3-06	●		100	432	363	300	12.2	98	

Recommended Cutting Conditions

Workpiece Material	Cutting Speed Vc (m/min)	f (mm/rev)
Carbon Steel	80~200	0.07~0.25
Alloy Steel	80~160	0.07~0.25
Mold Steel	70~150	0.06~0.20
Gray Cast Iron	100~240	0.07~0.30
Nodular Cast Iron	80~150	0.07~0.25

· Apply enough amount of coolant (internal supply).
· Feed rate should be calculated as single insert.

Application Map (Carbon Steel / Alloy Steel)



Spare Parts

Description	Clamp Screw	Wrench
		
S50-DRW…-06	SB-3592TR	DT-10

Hole Dia. Tolerance

DC	Hole Dia. Tolerance (mm)
ø60~ø100	0~+0.4

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

· Offset Drilling

Offset for DRW should be 0~+0.15 mm in radius
(0~+0.3 mm in diameter).
Do not set it to a negative value to make the diameter smaller.

● : Std. Item
MTO : Made to order

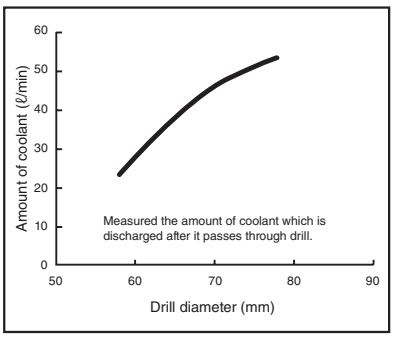
Inserts are sold in 10 piece boxes

Q&A

Q-1 Is it possible to use external coolant?

A-1 External coolant is not recommended because the amount of chips will be enormous.
Use internal coolant.
See the graph of "Drill diameter and coolant amount".

◆Drill diameter and coolant amount



Q-2 What level of spindle output is required?

A-2 Higher output is preferable.
What is important is enough torque rather than high spindle rate.
See the examples of required power as below.

Drill Dia.	Workpiece Material	Machine	Cutting Conditions	Spindle Power	*Required Power
ø75 (2D)	SCM415	M/C	Vc=130m/min (n=550min^{-1}) f=0.12mm/rev (Vf=66mm/min)	22kW	60%
ø85 (2D)	Alloy Steel	M/C	Vc=150m/min (n=560min^{-1}) f=0.1mm/rev (Vf=56mm/min)	30kW	85%
ø94 (2D)	S45C	NC lathe	Vc=120m/min (n=410min^{-1}) f=0.1mm/rev (Vf=41mm/min)	20kW	100%
ø94 (2D)	SUS304	NC lathe	Vc=80m/min (n=270min^{-1}) f=0.2mm/rev (Vf=54mm/min)	20kW	40%

* The required power was read on the load meter.

Q-3 The workpiece material is elastic and the chips are stretched and tangled. Is there any countermeasure?

A-3 When chips of elastic material are stretched and tangled, try "low rate + large feed", "high rate + small feed" or other settings.
Chips are usually stretched well between the inlet and 10mm inside, and not any more stretched further inside.
Therefore charging the condition of entrance only will also be effective.

· [Low cutting speed + Large feed]
  This setting makes the chips thicker so that they easily break off.
  e.g. Vc=80m/min, f=0.2~0.25mm/rev
· [High cutting speed + Small feed]
  This setting makes the chips thinner and uses centrifugal force to cut them off.
  e.g. Vc=200m/min, f=0.07~0.09mm/rev
· [Step machining at inlet]
  e.g. Inlet~10mm deep : 1mm step drilling
  e.g. 10mm deep or more : Vc=150m/min, f=0.15mm/rev (Continuous drilling)

Q-4 Chattering occurs. Is there any countermeasure?

A-4 Chattering usually occurs during chamfering and when the feed rate per revolution is not high enough.
Try changing the cutting conditions as follows.

· Increase the feed rate if it is small.
  If the feed rate is f=0.06mm/rev, for example, increase it to f=0.08~0.12mm/rev.
  Increasing the feed rate will improve chamfering and thus prevent chattering.

· If the cutting speed is too high, lower it to Vc=100~150m/min.

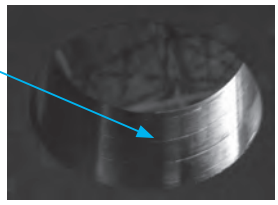
· If the chamfering point and pass-through point are not plain, or if the workpiece clamping rigidity is low, lower the feed rate to f=0.07~0.08mm/rev.

· If chattering occurs on the full contact surface (e.g. during step drilling), make adjustments by increasing the feed rate during chamfering or lowering the cutting speed.
  Once chattering occurs during chamfering, it will continue through drilling.

Q-5 Tool markings are made on the finished surface. Is there any countermeasure?

A-5 During processing, force of deflection is applied to the center of the drill.
If the drill is just pulled out from the position where processing is finished, tool markings will be made.
To prevent tool markings, perform offset before pulling out the drill.

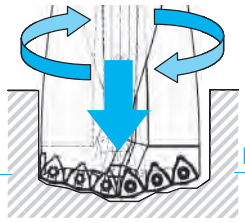
Tool marking



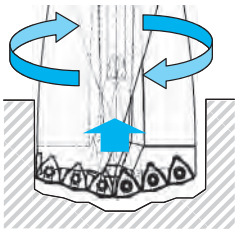
Example of tool marking

· How to prevent tool markings

(1) Drilling the hole (The spindle revolves)



(2) Turn back approximately 0.5 mm (The spindle revolves)

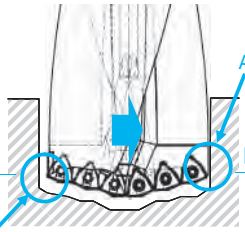




Chips are adhering to the bottom when drilling stops.

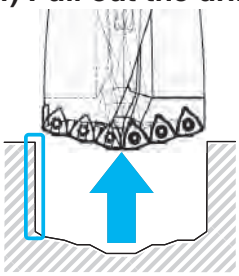
· Without turning back, chips remains adhering to the bottom.
· If offset (3) is performed without turning back, the bottom of drill contacts with the inner surface of hole.
· Turning back is necessary for blind holes but not for through holes.

(3) Stop revolution and perform offset (The spindle stops)



Make a clearance to prevent the tool from contacting when pulling out. (Approximately 0.1 ~ 0.2 mm)

(4) Pull out the drill



Example of drilling program

```
G90G54G0G43X0Y0Z100.0H10
S477M03
Z2.5M8
G01Z-80.0F48
Z-79.5M19   ← The spindle
X0.2Y0.2      stops at the
Z100.0M9      specified position
```

* The M code and X and Y moving directions are unique to the equipment.

Tool markings are not made (or are only slight even if made).

DRW custom-order item Applicable drill dia. : ø22~ø200



BT integral arbor type is also available.



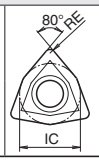
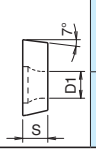
Max. ø200 is applicable.

<Standard item>



Straight Shank (1D~3D)

Applicable Inserts

Insert			Description	Dimension (mm)				MEGACOAT	MEGACOAT NANO	CVD Coated Carbide	Applicable Toolholders
				IC	S	D1	RE	PR1230	PR1535	CA6535	
			WCMT06T308	9.525	3.97	3.7	0.8	●	●	●	S50-DRW…-06
			WCMT050308	7.94	3.18	3.2		●			(Custom-order toolholder)

* WCMT050308 is for custom-order (ø22 or larger).

Fine Micro Drill

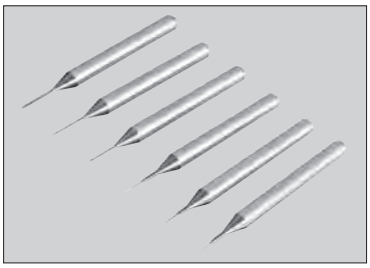
Features

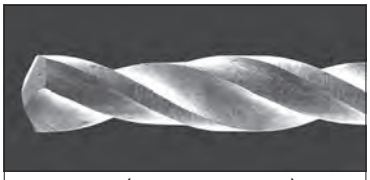
1. High-grade cutting edge is realized by Kyocera prominent minute grind technology

2. Enables stable cutting edge strength and fracture resistance with tough super micro-grain carbide

3. More high efficiency and long tool life drilling is possible due to high performance special thin coating (FS coat)

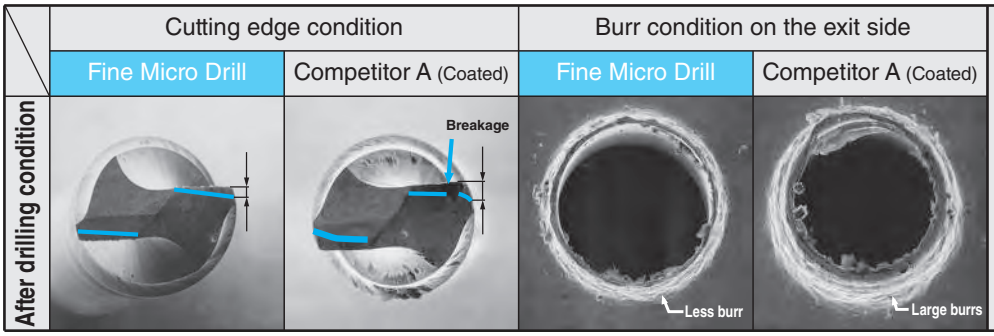
* FS coat is abbreviation of fine surface. FS coat have superior surface smoothness and low wear coefficient. With its high wear resistance, FS coat is effective to improve sharp cutting and superior chip evacuation





ø0.1(FDM-010M A)

Drilling quality



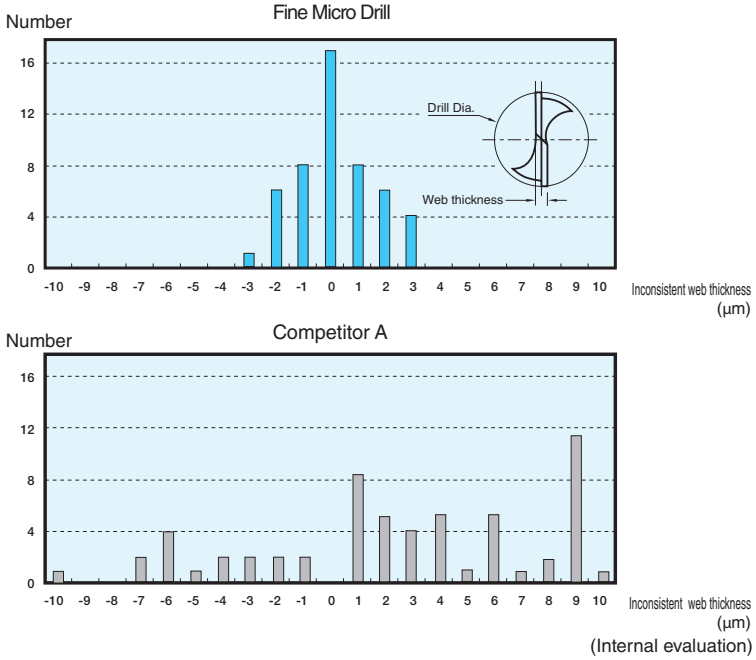
Cutting Conditions

Workpiece Material	: SUS304 (t=0.5mm)
Drill Dia.	: ø0.3mm FDM-030 (FSA)
Cutting Speed	: Vc=10m/min (n=10,600min^{-1})
Feed	: f =0.001mm/rev
Coolant	: Wet (Water soluble coolant)
Drilling Depth	: 0.5mm (Through hole)
Step feeding depth	: 0.025 mm/time
Number of holes	: 200 holes

(Internal evaluation)

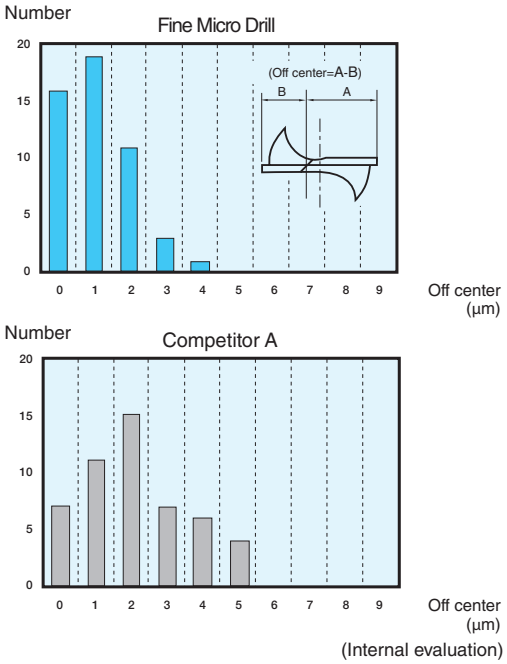
Comparison of cutting edge quality

Comparison of inconsistent web thickness
(Drill Dia. ø0.3)



(Internal evaluation)

Comparison of inconsistent cutting edge center
(Drill Dia. ø0.3)



(Internal evaluation)

FDM-M (Shank Dia. ø3, Coated)

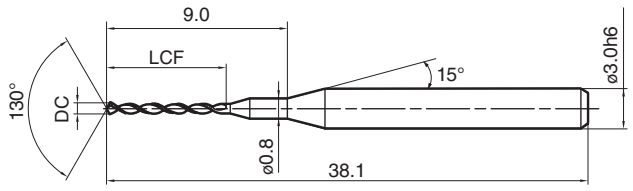


Fig. 1

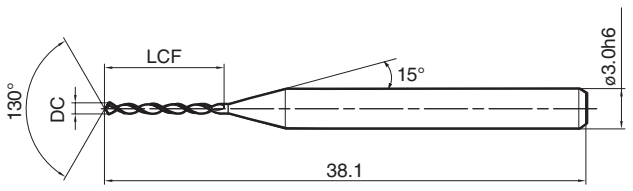


Fig. 2

Drill Dia. DC Tolerance
DC≦0.50(+0,-0.005)
DC>0.50(+0,-0.007)

Helix Angle 30°

Description	Dimension (mm)		Drawing	Grades
	Drill Dia.	Flute Length		Coated
	DC	LCF		FSA
FDM-010M(1)	0.10	1.3	Fig. 1	●
FDM-011M(1)	0.11			●
FDM-012M(1)	0.12	1.5		●
FDM-013M(1)	0.13			●
FDM-014M(1)	0.14	1.7		●
FDM-015M(1)	0.15			●
FDM-016M(1)	0.16	1.9		●
FDM-017M(1)	0.17			●
FDM-018M(1)	0.18	2.2		●
FDM-019M(1)	0.19			●
FDM-020M(1)	0.20	2.4		●
FDM-021M(1)	0.21			●
FDM-022M(1)	0.22	2.7		●
FDM-023M(1)	0.23			●
FDM-024M(1)	0.24	2.9		●
FDM-025M(1)	0.25			●
FDM-026M(1)	0.26	3.1		●
FDM-027M(1)	0.27			●
FDM-028M(1)	0.28	3.3		●
FDM-029M(1)	0.29			●
FDM-030M(1)	0.30	5.0		●
FDM-031M(1)	0.31			●

Description	Dimension (mm)		Drawing	Grades
	Drill Dia.	Flute Length		Coated
	DC	LCF		FSA
FDM-032M(1)	0.32	5.0	Fig. 1	●
FDM-033M(1)	0.33			●
FDM-034M(1)	0.34			●
FDM-035M(1)	0.35			●
FDM-036M(1)	0.36	6.0		●
FDM-037M(1)	0.37			●
FDM-038M(1)	0.38			●
FDM-039M(1)	0.39	6.0	Fig. 2	●
FDM-040M(1)	0.40	7.0		●
FDM-041M(1)	0.41			●
FDM-042M(1)	0.42			●
FDM-043M(1)	0.43			●
FDM-044M(1)	0.44			●
FDM-045M(1)	0.45			●
FDM-046M(1)	0.46			●
FDM-047M(1)	0.47			●
FDM-048M(1)	0.48			●
FDM-049M(1)	0.49			●
FDM-050M(1)	0.50			●
FDM-060M(1)	0.60			●
FDM-070M(1)	0.70	8.0		●
FDM-080M(1)	0.80	10.0		●

Identification System

FDM- ○○○ **M** **(1)** **FSA**

- ○○○ : Drill Dia.
- M : Shank Dia. 3.0mm
- (1) : 1 piece boxes
- FSA : Grades

● : Std. Item

The above description are sold in 1 piece boxes

Fine Micro Drill

FDM-M (Shank Dia. ø3, Uncoated)

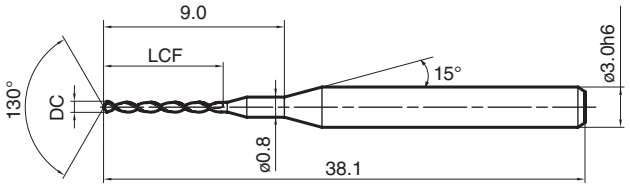


Fig. 1

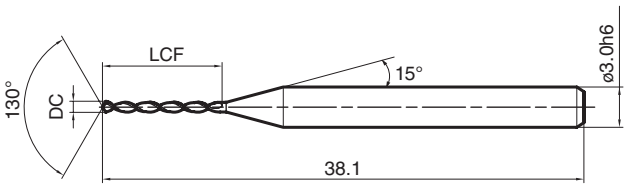


Fig. 2

Drill Dia. DC Tolerance
DC≦0.50(+0,-0.005)
DC>0.50(+0,-0.007)

Helix Angle 30°

Description	Dimension (mm)		Drawing	Grades
	Drill Dia.	Flute Length		Uncoated
	DC	LCF		A
FDM-010M(1)	0.10	1.3	Fig. 1	●
FDM-011M(1)	0.11			●
FDM-012M(1)	0.12	1.5		●
FDM-013M(1)	0.13			●
FDM-014M(1)	0.14	1.7		●
FDM-015M(1)	0.15			●
FDM-016M(1)	0.16	1.9		●
FDM-017M(1)	0.17			●
FDM-018M(1)	0.18	2.2		●
FDM-019M(1)	0.19			●
FDM-020M(1)	0.20	2.4		●
FDM-021M(1)	0.21			●
FDM-022M(1)	0.22	2.7		●
FDM-023M(1)	0.23			●
FDM-024M(1)	0.24	2.9		●
FDM-025M(1)	0.25			●
FDM-026M(1)	0.26	3.1		●
FDM-027M(1)	0.27			●
FDM-028M(1)	0.28	3.3		●
FDM-029M(1)	0.29			●
FDM-030M(1)	0.30	5.0		●
FDM-031M(1)	0.31			●

Description	Dimension (mm)		Drawing	Grades
	Drill Dia.	Flute Length		Uncoated
	DC	LCF		A
FDM-032M(1)	0.32	5.0	Fig. 1	●
FDM-033M(1)	0.33			●
FDM-034M(1)	0.34			●
FDM-035M(1)	0.35			●
FDM-036M(1)	0.36	6.0		●
FDM-037M(1)	0.37			●
FDM-038M(1)	0.38			●
FDM-039M(1)	0.39	6.0	Fig. 2	●
FDM-040M(1)	0.40	7.0		●
FDM-041M(1)	0.41			●
FDM-042M(1)	0.42			●
FDM-043M(1)	0.43			●
FDM-044M(1)	0.44			●
FDM-045M(1)	0.45			●
FDM-046M(1)	0.46			●
FDM-047M(1)	0.47			●
FDM-048M(1)	0.48			●
FDM-049M(1)	0.49			●
FDM-050M(1)	0.50			●
FDM-060M(1)	0.60			●
FDM-070M(1)	0.70	8.0		●
FDM-080M(1)	0.80	10.0		●

Identification System

FDM- ○○○ **M** **(1)** **A**

○○○ : Drill Dia.

M : Shank Dia. 3.0mm

(1) : 1 piece boxes

A : Grades

The above description are sold in 1 piece boxes

● : Std. Item

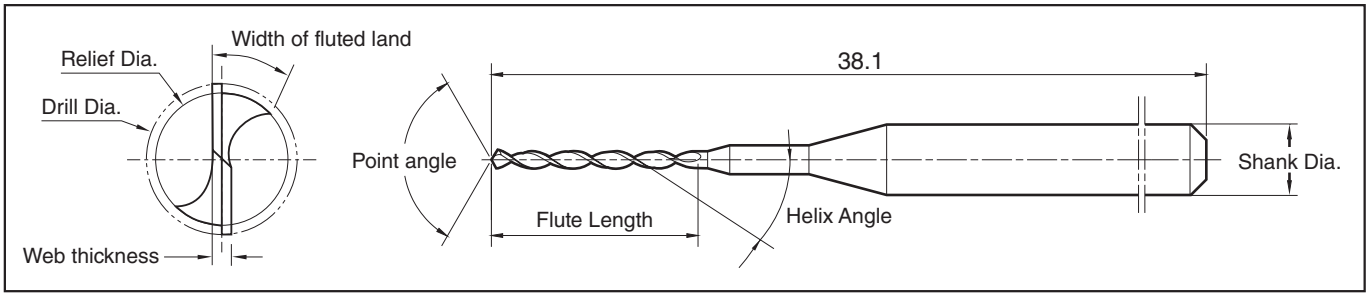
Recommended Cutting Conditions

Custom-order item

● Non stock size are also available

(1) Drill Dia.
(2) Drill Dia. tolerance
(3) Flute Length
(4) Shank Dia.
(5) Please inform us about FSA (coated) or A (uncoated) and so on

Small change such as changing only flute length is available in short read time.
Ask us for the change such as point angle, helix angle, and so on.



Recommended Cutting Conditions

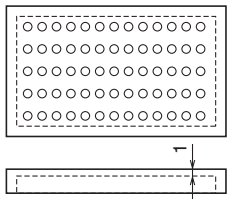
	Carbon Steel / Alloy Steel		Stainless Steel		Cast Iron		Aluminum / Copper	
Drill Dia. (mm)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
0.10~0.19	2~6	0.0005~0.002	2~6	0.0003~0.001	2~10	0.0005~0.003	4~15	0.0005~0.003
0.20~0.29	4~10	0.001~0.004	4~10	0.0005~0.002	5~15	0.001~0.005	10~20	0.001~0.005
0.30~0.50	6~15	0.002~0.010	6~10	0.001~0.005	10~20	0.004~0.015	15~30	0.004~0.015
0.60~0.80	8~24	0.004~0.015	8~15	0.002~0.007	10~30	0.005~0.020	20~45	0.005~0.020

Cautions
- The above is guide. It may change depending on hardness of workpiece and machine condition.
- Apply coolant. Water-insoluble cutting oil is recommended.
- Use high precision chuck and use as short overhang length as possible.
- When drilling depth is more than 3D, utilize the step machining process.
  Step depth is 10%~50% of drill diameter. When hole depth is deeper , shorten the step depth.

Case Studies

Free cutting prehardened steel

- Plate
- n=16,000min^{-1}
- H=1mm (Through hole)
- Vf=22mm/min
- Wet (Oil-base)
- FDM-010M (A) (ø0.10mm)



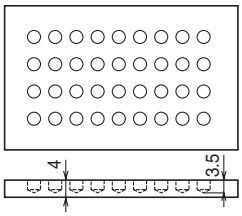
Fine Micro Drill	600 holes / pc
Competitor B (Coated)	200 holes / pc (Broken)

- Competitor B is broken at 200 holes / pc
- Regardless of uncoated(A), Fine micro drill achieved 3 times longer tool life compared with Competitor B

(User Evaluation)

SK3

- Gauge
- n=10,000min^{-1}
- H=3.5mm
- Vf=100mm/min
- Wet (Oil-base)
- FDM-036M (FSA) (ø0.36mm)



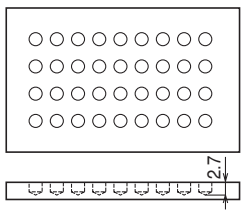
Fine Micro Drill	5,200 holes / pc
Competitor C (Coated)	4,000 holes / pc

- Fine micro drill achieved 30% longer tool life compared with Competitor C

(User Evaluation)

SUS316L

- Plate
- n=8,000min^{-1}
- H=2.7mm
- Vf=45mm/min
- Wet (Oil-base)
- XFDM-040 (FSA) (ø0.40mm)



Fine Micro Drill	2,400 holes / pc
Competitor D (Coated High-speed steel)	300 holes / pc

- Fine micro drill achieved 8 times longer tool life compared with Competitor D

(User Evaluation)



Solid Tools

Carbide Substrate

L

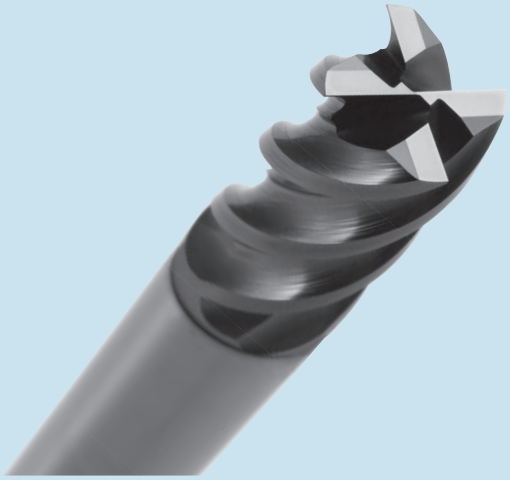
L1~L82

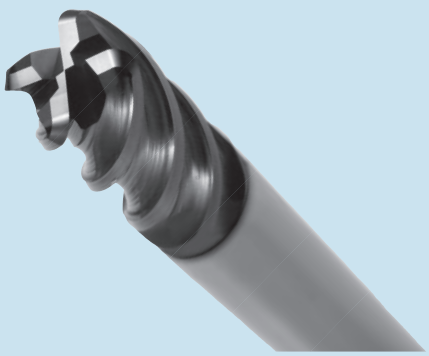
End Mills

Tool Selection Guide		**L2~L9**
Application and selection		L2
Solid End Mill Identification System / Icon Glossary		L4
Surface finish oriented		**L10~L15**
Square / For Automatic Lathes (Overall length 35mm / 45mm)	F Series	L10
High efficiency chip evacuation		**L16~L24**
High feed rate, High efficiency	4MFK/4MFR	L16
Difficult-to-cut materials, High efficiency	4TFK/4TFR	L20
Multi-functional, High efficiency	3ZFK	L22
Multi-purpose		**L25**
High efficiency, High feed rate with multi-edge	6/8PFK	L26~L27
Superalloy	4JER	**L28~L29**
Roughings		**L30~L33**
Special serrated edge, Difficult-to-cut materials	4/5/6RFH	L30
Serrated edge, Notched edge		L32
Ball-nose End Mills		**L34~L36**
Ball-noses	2SEB	L34
Hard Materials	H Series	**L37**
Special corner-R shaped (For High Feed Rate)	6PDRS	L38~L39
Aluminum & Non-ferrous Metals		**L40~L44**
High efficiency, High precision	3AFK	L40
Square (Varied interval flute design with wiper edge)	N Series	L44
Solid Tools for CFRP		**L45~L47**

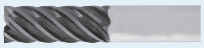
Drills

Drills		**L48~L62**
Flat Bottom Drill	2ZDK-HP	L48
Recommended Cutting Conditions		**L63~L82**





Application and selection

See Page	Applications	Description	Identification System	Features	Shape	Coating	No. of Flutes	Helix Angle	Outside Dia. DC (mm)	
L10~L11	Surface finish oriented	2FES S/M/L	1	2 flutes, Sharp corner edge		MEGACOAT	2	30°	ø0.2~ø16	
L12		2FEK S/M		2 flutes, Tough corner edge					ø3~ø16	
L13		4FESM		4 flutes, Sharp corner edge			4		ø1~ø16	
		4FEKM		4 flutes, Tough corner edge					ø3~ø16	
L14~L15		2/3/4 FESW		For Automatic Lathes (Overall length 35mm / 45mm)			2/3/4	35°	ø3~ø13	
L16~L19	High efficiency chip evacuation	4MFK	2	4 flutes High feed rate, High efficiency		MEGACOAT NANO	4	Variable Lead 42°, 44°	ø3~ø16	
		4MFR								
L20~L21		4TFK	2	4 flutes Difficult-to-cut materials, High efficiency		MEGACOAT NANO	4	Variable Lead 42°, 44°	ø3~ø20	
		4TFR								
L22~L23		3ZFK S/M	1	Multi-functional, High efficiency		MEGACOAT	3	40°	ø3~ø16	
L24		5DERM	1	5 flutes, Steel and Difficult-to-cut materials Varied interval flute design		AlTiN	5	38°	ø4~ø25	
L25	Multi-purpose	3UFSM	1	3 flutes, Multi-purpose		TiAlN	3	45°	ø1~ø20	
L26~L27	High efficiency, High feed rate with Multi-edge	6PFK	2	6/8 flutes,High efficiency, High feed rate, Finishing (Shouldering)		MEGACOAT NANO	6	Variable Lead 42°, 44°	ø6~ø25	
		8PFK					8			
L28~L29	Superalloy	4JER	2	4 flutes High efficiency, Stable machining		MEGACOAT HARD	4	Variable Lead 32°, 35°	ø6~ø20	
L30~L31	Roughing	4RFH	2	Special serrated edge, Difficult-to-cut materials with Coolant hole		MEGACOAT HARD	4	40°	ø6~ø20	
		5RFH					5			
		6RFH					6			
L32		3/4/5 RDSM	1	Serrated edge		TiAlN	3/4/5	20°	ø4~ø25	
		3/4/5 RDSL								
L33		4/6 RFSM	1	Notched edge			4/6	45°	ø6~ø25	
L34~L35	Ball-nose	2SEB	3	High efficiency Ball-nose End Mill with 2 flutes		MEGACOAT NANO	2	30°	ø2~ø16	
L36		3UEBS	1	Ball-nose End Mill with 3 flutes		TiAlN	3	30°	ø3~ø12	
		4YEBM	1	Ball-nose End Mill with 4 flutes		TiAlN	4	38°	ø5~ø20	
L37	Hard materials	4/5/6/7 HFSS	1	Multi-edge type Negative rake angle Hard Materials Finishing		MEGACOAT HARD	4/5/6/7	45°	ø1~ø12	
		4/5/6/7/8 HFSM					4/5/6/7/8		ø1~ø25	
L38~L39	Special corner-R shaped	6PDRS	1	6 flutes, High feed rate		AlTiN	6	20°	ø6~ø12	

Carbide Substrate

Substrate of all solid end mills is carbide.

Workpiece Material										Description	See Page
	Steel		Heat Treated Steel		Stainless Steel	Titanium Alloys	Heat-resistant Alloys	Cast Iron	Aluminum & Non-ferrous Metals		
	~30HRC P ~30HRC	~40HRC P 30~40HRC	~55HRC H ~55HRC	~68HRC H ~68HRC	M Stainless steel	S Titanium Alloy	S Heat-resistant Alloy	K Cast Iron	N Aluminum & Non Ferrous Material		
	●	○	○		●			○	○	2FES S/M/L	L10~L11
										2FEK S/M	L12
										4FESM	L13
										4FEKM	
										2/3/4 FESW	L14~L15
	●	○	○		○	○		○	○	4MFK	L16~L19
										4MFR	
	●	○			●	●	○	○		4TFK	L20~L21
										4TFR	
	●	○			●	○		○	○	3ZFK S/M	L22~L23
	●	●			●	●	●	○		5DERM	L24
	●	●	○		●	○		●	○	3UFSM	L25
	●	○	○		●	●		○	○	6PFK	L26~L27
										8PFK	
	●	○			○	○	●			4JER	L28~L29
	●	●			●	●	○	○		4RFH	L30~L31
										5RFH	
										6RFH	
	●	●			○			●		3/4/5 RDSM	L32
										3/4/5 RDSL	
	○	●	●	○	○	●	○	○		4/6 RFSM	L33
	●	●	●	○	○			○		2SEB	L34~L35
	●	●			○	○		●	○	3UEBS	L36
	●	○			●	●	○	○		4YEBM	
	●	●	●	●						4/5/6/7 HFSS	L37
										4/5/6/7/8 HFSM	
	●	●	●	●						6PDRS	L38~L39

● : 1st Choice ○ : 2nd Choice

Application and selection

See Page	Applications	Description	Identification System	Features	Shape	Coating	No. of Flutes	Helix Angle	Outside Dia. DC (mm)	
L40~L43	Aluminum & Non-ferrous metals	3AFK	2	High efficiency, High precision		-	3	45°	ø3~ø16	
L44		3NESM	1	Varied interval flute design with wiper edge		-	3	38°	ø3~ø20	
L47	CFRP	4FCX-KCD	2	NEW For CFRP Diamond Coating		Diamond	4	10°	ø8~ø12	

Solid End Mill Identification System

1

2 F E S M 020 - 060 - 04 XXXXXXXX
(1) (2) (3) (4) (5) (6) (7) (8) (9)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Length of cut	(6) Outside Dia.	(7) Length of cut	(8) Shank Dia.	(9) Others
2 3 4 5 6 7 8	F : Surface finish oriented U : Multi-purpose Z : Multi-functional, High efficiency Y/D : High efficiency (Difficult-to-cut materials) R : Roughing H : Hard materials N : Aluminum & Non-ferrous metals	D : 20-29° E : 30-39° F : 40-49° G : 50-59°	B : Ball-nose R : Radius S,K : Square C : With corner chamfering	S : Short M: Medium L : Long W: For Automatic Lathes	020 ↓ 2.0mm	060 ↓ 6.0mm	04 ↓ 4.0mm	Corner-R, C width etc. …

2

4 T F R 030 - 080 - R02
(1) (2) (3) (4) (5) (6) (7)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Outside Dia.	(6) Length of cut	(7) Others
3 4 5 6 8	M : High feed rate, High efficiency P : Shouldering, High feed rate, Finishing T : High efficiency (Difficult-to-cut materials) J : Superalloy A : Aluminum & Non-ferrous metals R : Roughing F : For CFRP	C : 10-19° E : 30-39° F : 40-49°	K : Tough corner edge R : Radius H : Radius (with Coolant Hole) X : Special	030 ↓ 3.0mm	080 ↓ 8.0mm	R02 : Corner-R 0.2mm 090 : Under Neck Length 9mm KCD : Diamond Coating

3

2 S E B 020 - 050 - R10
(1) (2) (3) (4) (5) (6) (7)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Outside Dia.	(6) Length of cut	(7) Radius of Ball-nose
2	S : High efficiency	E : 30-39°	B : Ball-nose	020 ↓ 2.0mm	050 ↓ 5.0mm	R10 ↓ R1.0mm

Carbide Substrate

Substrate of all solid end mills is carbide.

Workpiece Material										Description	See Page
	Steel		Heat Treated Steel		Stainless Steel	Titanium Alloys	Heat-resistant Alloys	Cast Iron	Aluminum & Non-ferrous Metals		
	~30HRC	~40HRC	~55HRC	~68HRC							
	P ~30HRC	P 30~40HRC	H ~55HRC	H ~68HRC	M Stainless steel	S Titanium Alloy	S Heat-resistant Alloy	K Cast Iron	N Aluminum & Non Ferrous Material		
									●	3AFK	L40~L43
									●	3NESM	L44
									●	4FCX-KCD	L47

● : 1st Choice ○ : 2nd Choice

Icon Glossary

Coating

- MEGACOAT NANO — MEGACOAT NANO
- MEGACOAT HARD — MEGACOAT HARD
- MEGACOAT — MEGACOAT
- TiAlN — TiAlN Coating
- AlTiN — AlTiN Coating
- Diamond — CVD Diamond Coating
- Uncoated — Uncoated

Corner Form

- Radius R — Radius
- Sharp — Sharp corner edge
- Land — With corner land
- C — With corner chamfering
- Honing R — Honed

Shank Dia. Tolerance

- h5 Shank Dia. — Shank Dia. Tolerance is h5.
- h6 Shank Dia. — Shank Dia. Tolerance is h6.

Corner Radius Tolerance

0 ~ -0.02 mm R — Corner Radius Tolerance is 0~-0.02mm.

Ball-nose radius Tolerance

0 ~ -0.02 mm R — The R tolerance of ball-nose end mill is 0~-0.02mm.

No. of Flutes

3 — 3 flutes design

Helix Angle

30° — Helix Angle 30°

Cutting edge shape

Cutting shape — Roughing

Introduction

Surface finish oriented

F Series

MEGACOAT is applied



(FES)

MEGACOAT and sharp cutting edge enable high precision finishing owing to excellent wear and heat resistance
Overall lengths 35mm and 45mm are available for automatic lathes

L10~L15

L10~L15

High efficiency, Excellent chip evacuation

L16~L24

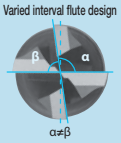
M Series

MEGACOAT NANO is applied



(4MFK)

Superior chattering resistance with Kyocera's unique varied interval flute design and variable lead
Achieves high rigidity and stable chip evacuation with new special flute design
Achieves high feed rate, high efficiency machining



L16

T Series

MEGACOAT NANO is applied



(4TFK)

High efficiency end mill for difficult-to-cut materials (stainless steel, titanium alloys and heat-resistant alloys)
Varied interval flute design / Variable Lead



L20

3ZFK

MEGACOAT is applied

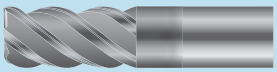


(3ZFKS)

Multi-functional, high efficiency end mill
Applicable to plunge milling, slotting and finishing with one end mill.
Smooth chip evacuation because sub-groove on gash breaks chips during plunge milling.

L22

D Series



(5DERM)

Varied interval flute design with 5 flutes
For high efficiency slotting and shouldering
Applicable to difficult-to-cut materials like stainless steel and heat resistant steel

L24

High efficiency , High feed rate

L26~L27

PFK

MEGACOAT NANO is applied



(6PFK)

High feed rate and high efficiency shouldering with multi-edge design (6 flutes /8 flutes)
Varied interval flute design and variable lead to minimize chattering

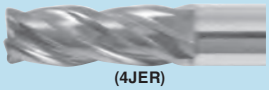
L26

Superalloy

L28~L29

J Series

MEGACOAT HARD is applied



(4JER)

High efficiency and stable machining for Heat Resistant Alloys such as Inconel®
Long tool life machining with MEGACOAT HARD for excellent heat resistance

L28

Roughing

R Series

MEGACOAT HARD is applied



(RFH)

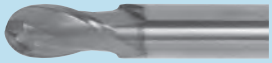
High efficiency machining of Difficult-to-cut material with multi-edge design and coolant hole
Deep slotting (ap = 2 x DC) for Stainless Steel and Titanium Alloy
Lineup of RDS with serrated edge and RFS with notched edge

L30~L33
L30

Ball-nose End Mill

S Series

MEGACOAT NANO is applied

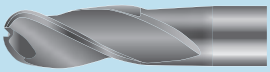


(2SEB)

High efficiency ball-nose end mill with 2 flutes
Sharp cutting with special nose geometry
Close tolerance edge diameter (R±0.005mm, ø16 excluded)
Stable chip evacuation by a large chip pocket design

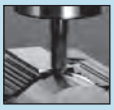
L34~L36
L34

U Series Y Series (UEB,YEB)



(3UEBS)

Boll-nose end mill with 3/4 flutes

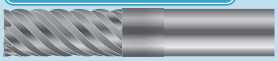


L36

Hard Materials

H Series

MEGACOAT HARD is applied

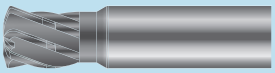


(HFS)

PVD coating "MEGACOAT HARD" for hard materials is applied
Large core diameter and negative rake angle improves edge strength
Helix angle is 45˚.High efficiency machining and long tool life with wide range of 4, 5, 6, 7 and 8 flutes types

L37~L39
L37

P Series (PDR)



(6PDRS)

High efficiency radius. Enables large cutting volume and high efficiency machining with special corner-R shaped
Ramping and arc cutting are possible

L38

Aluminum & Non-ferrous Metals

A Series

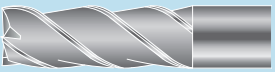


(3AFK)

High-efficiency and High-precision 3 flutes end mill
Sharp cutting edge and excellent anti-chattering performance
Delivers high stability in diverse machining situations

L40~L44
L40

N Series



(3NESM)

Good bottom surface finish with wiper edge on the end edge
Varied interval flute design prevents chattering and improves machining efficiency and surface finish quality of side wall of workpiece.

L44

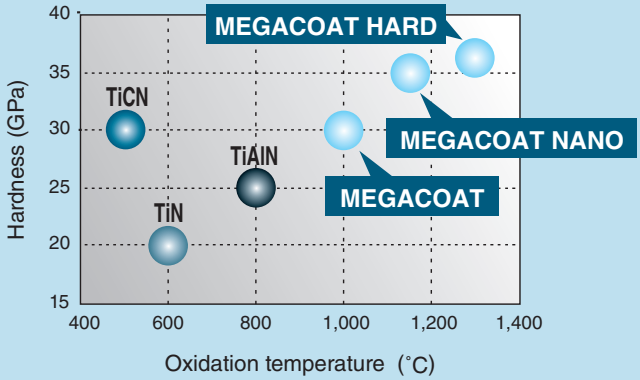
New PVD technology, MEGACOAT



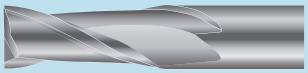
Superior wear and oxidation resistant MEGACOAT

MEGACOAT for Solid End Mill

1. For General Milling…
.....MEGACOAT
2. For High Efficiency Milling
.....MEGACOAT NANO
3. For Superalloy, Hard materials
.....MEGACOAT HARD



1. MEGACOAT for general milling



F Series
L10~L15

MEGACOAT extend tool life for roughing to finishing of various kinds of material with superior wear resistance and high oxidation resistance

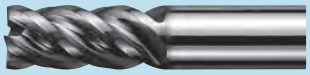


(Internal evaluation)

2. MEGACOAT NANO with special multilayer nano coating for high efficiency machining



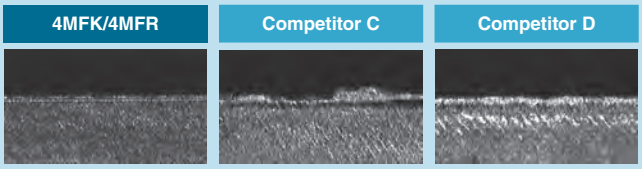
4MFK/4MFR



4TFK/4TFR

· Long Tool Life with "MEGACOAT NANO"
Doubled Wear Resistance compared to the Competitor's!

Edge Conditions after 140m Machining



[Cutting Conditions:n=6,000min^{-1},Vf=1,100mm/min,apxae=5.0x0.8mm, ø8, SCM440, Shouldering]

4MFK / 4MFR
L16

4TFK / 4TFR
L20

(Internal evaluation)

The special Multilayer Nano Coating realizes superior wear resistance due to high hardness and anti-chipping performance. Suitable for high feed rate machining

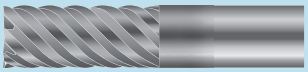
3. MEGACOAT HARD for machining of superalloy and hard materials



4JER



4/5/6RFH



(H Series)

4JER
L28

4/5/6RFH
L30

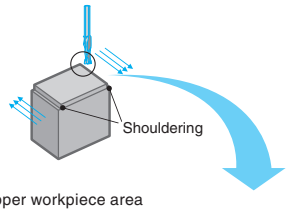
H Series
L37

The special multilayer coating provides high hardness and excellent oxidation resistance
Longer tool life and stability at machining of superalloys and hard materials

Case Studies

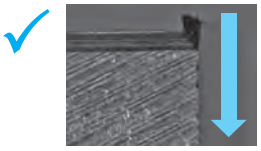
Block SUS304

Sharp Cutting Edge Reduced Burrs

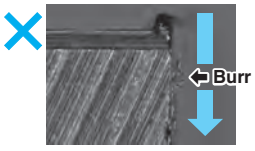


n = 2,230 min^{-1}
(Vc = 70 m/min)
Vf = 134 mm/min
(fz = 0.03 mm/t)
ap x ae = 5.0 x 1.0 mm

Upper workpiece area



2FESM100-220-10

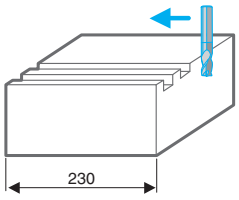


Competitor Coated Carbide **E**

(Internal evaluation)

Slotting of Titanium Alloy

Outside Dia. ø10 mm
Workpiece Material Ti-6Al-4V
Spindle Revolution 3ZFK : n = 1,700 min^{-1} (Vc = 54 m/min)
Spindle Revolution Competitor F : n = 1,300 min^{-1} (Vc = 40 m/min)
Feed Rate Vf = 460 mm/min (fz = 0.09 mm/t)
ap x ae = 2 x 10 mm
Wet



Depth of cut 2mm each up to 10mm

Number of slots

		Tool life
3ZFK	52 slots	1.4 times
Competitor F	35 slots	

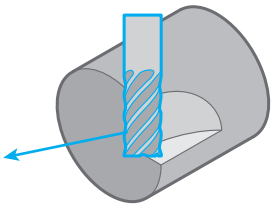
Better surface finish and longer tool life with 3ZFK

Compared to competitor's coated product, the 3ZFK has a 1.4 times longer tool life

3ZFK prevents burr formation due to sharp cutting edge (Internal evaluation)

Machine parts SCM440

n = 2,400 min^{-1}
(Vc = 150 m/min)
Vf = 1,710 mm/min
(fz = 0.12 mm/t)
ap x ae = 18 x 1.0 mm
Shouldering



Cycle time for a set of workpiece (setup time included)

		52% Cutting Time
6PFK 200-450	159 sec	
Conventional G	336 sec	

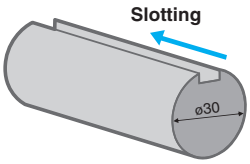
Cycle time greatly reduced compared with conventional End Mill G

No heavy wear after machining 100 workpieces and still possible to continue machining

(User Evaluation)

Automotive parts S45C

n = 3,500 min^{-1}
(Vc = 77 m/min)
Vf = 1,000 mm/min
(fz = 0.071 mm/t)
ap x ae = 5 x 7 mm, Wet



Number of workpiece

		Tool life	Productivity
4MFK070-160	255 pcs	5 times	6.6 times
Competitor H	50 pcs		

(Competitor H, Cutting Conditions)
ø7, 4 flutes n = 2,000 min^{-1} (Vc = 44 m/min)
Vf = 150 mm/min (fz = 0.019 mm/t), ap x ae = 5 x 7mm, Wet

Kyocera showed 5 times longer tool life than Competitor H

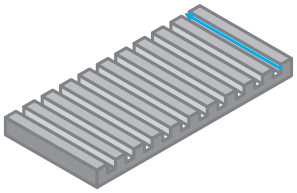
Kyocera showed 6.6 times productivity than Competitor H

No vibration occurred. Stable machining

(User Evaluation)

Plate SUS304

n = 1,590 min^{-1}
(Vc = 50 m/min)
Vf = 220 mm/min
(fz = 0.035 mm/t)
ap x ae = 4 ~ 10 x 10 mm, Wet



Number of workpiece

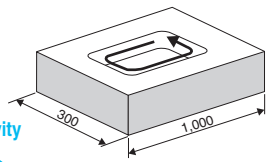
		Tool life
4TFK100-250	2 pcs	1.3 times longer
Competitor I (4 flutes)	1.5 pcs	

4TFK showed 1.3 times longer tool life than Competitor I

(User Evaluation)

Mold Heat Treated Steel (60HRC)

n=1,194min^{-1}
(Vc=60m/min)
Vf=400mm/min
(fz=0.056mm/t)
ap x ae=40 x 0.3mm
6HFSM160-420-16
(ø16, 6 flutes)



Tool life Double Productivity Double

6HFSM160-420-16	Amount of chip evacuation 4.8cc/min	Tool life : 10pcs
Competitor Coated Carbide J	Amount of chip evacuation	2.4cc/min Tool life : 5pcs

[Competitor Coated Carbide J]
ø16, 6 flutes
n=597min^{-1}
(Vc=30m/min)
Vf=200mm/min
(fz=0.056mm/t)
ap x ae=40 x 0.3mm

The cutting speed and table feed rate is doubled compared to competitor's coated carbide J. The cutting edge conditions was good and the tool life was also doubled.

(User Evaluation)

No. of Flutes : 2

2FESS, 2FESM, 2FESL

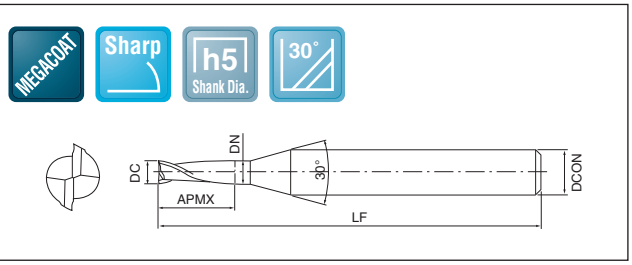


2

MEGACOAT is applied

Recommended Workpiece Materials ★ 1st Choice





2FESS (Short)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	DCON	LF	ZEFP
2FESS010-015-04	●	1.0	0 -0.015	1.5	1.1	4	45	2
2FESS015-023-04	●	1.5	0 -0.015	2.3	1.6	4	45	2
2FESS020-030-04	●	2.0	0 -0.015	3.0	2.1	4	45	2
2FESS025-037-04	●	2.5	0 -0.015	3.7	2.6	4	45	2
2FESS030-045-06	●	3.0	0 -0.015	4.5	3.2	6	50	2
2FESS035-052-06	●	3.5	0 -0.015	5.2	3.7	6	50	2
2FESS040-060-06	●	4.0	0 -0.015	6.0	4.2	6	50	2
2FESS045-067-06	●	4.5	0 -0.015	6.7	4.7	6	50	2
2FESS050-075-06	●	5.0	0 -0.015	7.5	5.2	6	50	2
2FESS055-082-06	●	5.5	0 -0.015	8.2	5.7	6	50	2
2FESS060-090-06	●	6.0	0 -0.020	9.0	-	6	50	2
2FESS070-105-08	●	7.0	0 -0.020	10.5	7.2	8	60	2
2FESS080-120-08	●	8.0	-0.005 -0.025	12.0	-	8	60	2
2FESS090-135-10	●	9.0	-0.005 -0.025	13.5	9.2	10	70	2
2FESS100-150-10	●	10.0	-0.005 -0.025	15.0	-	10	70	2
2FESS120-180-12	●	12.0	-0.010 -0.030	18.0	-	12	75	2
2FESS140-210-16	●	14.0	-0.010 -0.030	21.0	14.2	16	75	2
2FESS150-230-16	●	15.0	-0.010 -0.030	23.0	15.2	16	90	2
2FESS160-240-16	●	16.0	-0.010 -0.030	24.0	-	16	90	2

2FESM (Medium)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	DCON	LF	ZEFP
2FESM002-004-04	●	0.2	0 -0.015	0.4	0.22	4	45	2
2FESM003-006-04	●	0.3	0 -0.015	0.6	0.32	4	45	2
2FESM004-008-04	●	0.4	0 -0.015	0.8	0.42	4	45	2
2FESM005-010-04	●	0.5	0 -0.015	1.0	0.53	4	45	2
2FESM006-012-04	●	0.6	0 -0.015	1.2	0.63	4	45	2
2FESM007-014-04	●	0.7	0 -0.015	1.4	0.74	4	45	2
2FESM008-016-04	●	0.8	0 -0.015	1.6	0.84	4	45	2
2FESM009-020-04	●	0.9	0 -0.015	2.0	0.95	4	45	2
2FESM010-025-04	●	1.0	0 -0.015	2.5	1.1	4	45	2
2FESM011-025-04	●	1.1	0 -0.015	2.5	1.2	4	45	2
2FESM012-040-04	●	1.2	0 -0.015	4.0	1.3	4	45	2
2FESM013-040-04	●	1.3	0 -0.015	4.0	1.4	4	45	2
2FESM014-040-04	●	1.4	0 -0.015	4.0	1.5	4	45	2
2FESM015-040-04	●	1.5	0 -0.015	4.0	1.6	4	45	2
2FESM016-050-04	●	1.6	0 -0.015	5.0	1.7	4	45	2
2FESM017-050-04	●	1.7	0 -0.015	5.0	1.8	4	45	2
2FESM018-050-04	●	1.8	0 -0.015	5.0	1.9	4	45	2
2FESM019-050-04	●	1.9	0 -0.015	5.0	2.0	4	45	2
2FESM020-060-04	●	2.0	0 -0.015	6.0	2.1	4	45	2
2FESM021-060-04	●	2.1	0 -0.015	6.0	2.2	4	45	2
2FESM022-060-04	●	2.2	0 -0.015	6.0	2.3	4	45	2
2FESM023-060-04	●	2.3	0 -0.015	6.0	2.4	4	45	2
2FESM024-080-04	●	2.4	0 -0.015	8.0	2.5	4	45	2
2FESM025-080-04	●	2.5	0 -0.015	8.0	2.6	4	45	2
2FESM026-080-04	●	2.6	0 -0.015	8.0	2.7	4	45	2
2FESM027-080-04	●	2.7	0 -0.015	8.0	2.8	4	45	2
2FESM028-080-04	●	2.8	0 -0.015	8.0	2.9	4	45	2
2FESM029-080-04	●	2.9	0 -0.015	8.0	3.1	4	45	2
2FESM030-100-06	●	3.0	0 -0.015	10.0	3.2	6	50	2
2FESM031-100-06	●	3.1	0 -0.015	10.0	3.3	6	50	2
2FESM032-100-06	●	3.2	0 -0.015	10.0	3.4	6	50	2
2FESM033-100-06	●	3.3	0 -0.015	10.0	3.5	6	50	2

Recommended Cutting Conditions ➔ L63

● : Std. Item

2FESM (Medium)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	DCON	LF	ZEFP
2FESM034-100-06	●	3.4	0 -0.015	10.0	3.6	6	50	2
2FESM035-100-06	●	3.5	0 -0.015	10.0	3.7	6	50	2
2FESM036-100-06	●	3.6	0 -0.015	10.0	3.8	6	50	2
2FESM037-100-06	●	3.7	0 -0.015	10.0	3.9	6	50	2
2FESM038-110-06	●	3.8	0 -0.015	11.0	4.0	6	50	2
2FESM039-110-06	●	3.9	0 -0.015	11.0	4.1	6	50	2
2FESM040-110-06	●	4.0	0 -0.015	11.0	4.2	6	50	2
2FESM041-110-06	●	4.1	0 -0.015	11.0	4.3	6	50	2
2FESM042-110-06	●	4.2	0 -0.015	11.0	4.4	6	50	2
2FESM043-110-06	●	4.3	0 -0.015	11.0	4.5	6	50	2
2FESM044-110-06	●	4.4	0 -0.015	11.0	4.6	6	50	2
2FESM045-110-06	●	4.5	0 -0.015	11.0	4.7	6	50	2
2FESM046-110-06	●	4.6	0 -0.015	11.0	4.8	6	50	2
2FESM047-110-06	●	4.7	0 -0.015	11.0	4.9	6	50	2
2FESM048-130-06	●	4.8	0 -0.015	13.0	5.0	6	50	2
2FESM049-130-06	●	4.9	0 -0.015	13.0	5.1	6	50	2
2FESM050-130-06	●	5.0	0 -0.015	13.0	5.2	6	50	2
2FESM051-130-06	●	5.1	0 -0.015	13.0	5.3	6	50	2
2FESM052-130-06	●	5.2	0 -0.015	13.0	5.4	6	50	2
2FESM053-130-06	●	5.3	0 -0.015	13.0	5.5	6	50	2
2FESM054-130-06	●	5.4	0 -0.015	13.0	5.6	6	50	2
2FESM055-130-06	●	5.5	0 -0.015	13.0	5.7	6	50	2
2FESM056-130-06	●	5.6	0 -0.015	13.0	5.8	6	50	2
2FESM057-130-06	●	5.7	0 -0.015	13.0	-	6	50	2
2FESM058-130-06	●	5.8	0 -0.015	13.0	-	6	50	2
2FESM059-130-06	●	5.9	0 -0.015	13.0	-	6	50	2
2FESM060-130-06	●	6.0	0 -0.020	13.0	-	6	50	2
2FESM060-150-06	●	6.0	0 -0.020	15.0	-	6	50	2
2FESM061-160-08	●	6.1	0 -0.020	16.0	6.3	8	60	2
2FESM062-160-08	●	6.2	0 -0.020	16.0	6.4	8	60	2
2FESM063-160-08	●	6.3	0 -0.020	16.0	6.5	8	60	2
2FESM064-160-08	●	6.4	0 -0.020	16.0	6.6	8	60	2
2FESM065-160-08	●	6.5	0 -0.020	16.0	6.7	8	60	2
2FESM066-160-08	●	6.6	0 -0.020	16.0	6.8	8	60	2
2FESM067-160-08	●	6.7	0 -0.020	16.0	6.9	8	60	2
2FESM068-160-08	●	6.8	0 -0.020	16.0	7.0	8	60	2
2FESM069-160-08	●	6.9	0 -0.020	16.0	7.1	8	60	2
2FESM070-160-08	●	7.0	0 -0.020	16.0	7.2	8	60	2
2FESM071-160-08	●	7.1	0 -0.020	16.0	7.3	8	60	2
2FESM072-160-08	●	7.2	0 -0.020	16.0	7.4	8	60	2
2FESM073-160-08	●	7.3	0 -0.020	16.0	7.5	8	60	2
2FESM074-160-08	●	7.4	0 -0.020	16.0	7.6	8	60	2
2FESM075-190-08	●	7.5	0 -0.020	19.0	7.7	8	60	2
2FESM076-190-08	●	7.6	0 -0.020	19.0	-	8	60	2
2FESM077-190-08	●	7.7	0 -0.020	19.0	-	8	60	2
2FESM078-190-08	●	7.8	0 -0.020	19.0	-	8	60	2
2FESM079-190-08	●	7.9	0 -0.020	19.0	-	8	60	2
2FESM080-190-08	●	8.0	-0.005 -0.025	19.0	-	8	60	2
2FESM080-200-08	●	8.0	-0.005 -0.025	20.0	-	8	60	2
2FESM081-190-10	●	8.1	-0.005 -0.025	19.0	8.3	10	70	2
2FESM082-190-10	●	8.2	-0.005 -0.025	19.0	8.4	10	70	2
2FESM083-190-10	●	8.3	-0.005 -0.025	19.0	8.5	10	70	2
2FESM084-190-10	●	8.4	-0.005 -0.025	19.0	8.6	10	70	2
2FESM085-190-10	●	8.5	-0.005 -0.025	19.0	8.7	10	70	2
2FESM086-190-10	●	8.6	-0.005 -0.025	19.0	8.8	10	70	2
2FESM087-190-10	●	8.7	-0.005 -0.025	19.0	8.9	10	70	2
2FESM088-190-10	●	8.8	-0.005 -0.025	19.0	9.0	10	70	2
2FESM089-190-10	●	8.9	-0.005 -0.025	19.0	9.1	10	70	2
2FESM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	10	70	2
2FESM091-190-10	●	9.1	-0.005 -0.025	19.0	9.3	10	70	2
2FESM092-190-10	●	9.2	-0.005 -0.025	19.0	9.4	10	70	2
2FESM093-190-10	●	9.3	-0.005 -0.025	19.0	9.5	10	70	2
2FESM094-190-10	●	9.4	-0.005 -0.025	19.0	9.6	10	70	2
2FESM095-190-10	●	9.5	-0.005 -0.025	19.0	9.7	10	70	2
2FESM096-220-10	●	9.6	-0.005 -0.025	22.0	-	10	70	2
2FESM097-220-10	●	9.7	-0.005 -0.025	22.0	-	10	70	2
2FESM098-220-10	●	9.8	-0.005 -0.025	22.0	-	10	70	2
2FESM099-220-10	●	9.9	-0.005 -0.025	22.0	-	10	70	2
2FESM100-220-10	●	10.0	-0.005 -0.025	22.0	-	10	70	2
2FESM100-250-10	●	10.0	-0.005 -0.025	25.0	-	10	70	2
2FESM105-220-12	●	10.5	-0.005 -0.025	22.0	10.7	12	75	2
2FESM110-220-12	●	11.0	-0.005 -0.025	22.0	11.2	12	75	2
2FESM115-220-12	●	11.5	-0.005 -0.025	22.0	11.7	12	75	2
2FESM120-260-12	●	12.0	-0.010 -0.030	26.0	-	12	75	2
2FESM130-260-16	●	13.0	-0.010 -0.030	26.0	13.2	16	75	2
2FESM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	16	75	2
2FESM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	16	90	2
2FESM160-320-16	●	16.0	-0.010 -0.030	32.0	-	16	90	2

2FESL (Long)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	DCON	LF	ZEFP
2FESL010-040-04	●	1.0	0 -0.015	4.0	1.1	4	45	2
2FESL015-060-04	●	1.5	0 -0.015	6.0	1.6	4	45	2
2FESL020-090-04	●	2.0	0 -0.015	9.0	2.1	4	45	2
2FESL025-120-04	●	2.5	0 -0.015	12.0	2.6	4	45	2
2FESL030-140-06	●	3.0	0 -0.015	14.0	3.2	6	50	2
2FESL040-170-06	●	4.0	0 -0.015	17.0	4.2	6	50	2
2FESL050-200-06	●	5.0	0 -0.015	20.0	5.2	6	60	2
2FESL060-240-06	●	6.0	-0.005 -0.025	24.0	-	6	60	2
2FESL080-280-08	●	8.0	-0.005 -0.025	28.0	-	8	70	2
2FESL100-340-10	●	10.0	-0.005 -0.025	34.0	-	10	90	2
2FESL120-400-12	●	12.0	-0.010 -0.030	40.0	-	12	90	2
2FESL160-480-16	●	16.0	-0.010 -0.030	48.0	-	16	115	2

● : Std. Item

Recommended Cutting Conditions ➡ L63~L64

Surface finish oriented, 2 flutes, Tough corner edge

No. of Flutes : 2

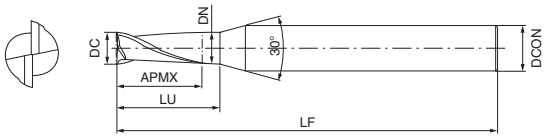
2FEKS, 2FEKM



Recommended Workpiece Materials ★ 1st Choice







2

MEGACOAT is applied

2FEKS (Short)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	LU	DCON	LF	ZEFP
2FEKS030-045-06	●	3.0	0 -0.015	4.5	3.15	6.5	6	50	2
2FEKS035-052-06	●	3.5	0 -0.015	5.2	3.68	7.2	6	50	2
2FEKS040-060-06	●	4.0	0 -0.015	6.0	4.2	8.2	6	50	2
2FEKS045-067-06	●	4.5	0 -0.015	6.7	4.7	8.9	6	50	2
2FEKS050-075-06	●	5.0	0 -0.015	7.5	5.2	10.1	6	50	2
2FEKS055-082-06	●	5.5	0 -0.015	8.2	5.7	10.8	6	50	2
2FEKS060-090-06	●	6.0	0 -0.020	9.0	-	-	6	50	2
2FEKS080-120-08	●	8.0	-0.005 -0.025	12.0	-	-	8	60	2
2FEKS100-150-10	●	10.0	-0.005 -0.025	15.0	-	-	10	70	2
2FEKS120-180-12	●	12.0	-0.010 -0.030	18.0	-	-	12	75	2
2FEKS140-210-16	●	14.0	-0.010 -0.030	21.0	14.2	31.4	16	75	2
2FEKS150-230-16	●	15.0	-0.010 -0.030	23.0	15.2	35	16	90	2
2FEKS160-240-16	●	16.0	-0.010 -0.030	24.0	-	-	16	90	2

2FEKM (Medium)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	LU	DCON	LF	ZEFP
2FEKM030-100-06	●	3.0	0 -0.015	10.0	3.15	12.0	6	50	2
2FEKM035-100-06	●	3.5	0 -0.015	10.0	3.68	12.0	6	50	2
2FEKM040-110-06	●	4.0	0 -0.015	11.0	4.2	13.2	6	50	2
2FEKM045-110-06	●	4.5	0 -0.015	11.0	4.7	13.2	6	50	2
2FEKM050-130-06	●	5.0	0 -0.015	13.0	5.2	15.6	6	50	2
2FEKM055-130-06	●	5.5	0 -0.015	13.0	5.7	15.6	6	50	2
2FEKM060-130-06	●	6.0	0 -0.020	13.0	-	-	6	50	2
2FEKM065-160-08	●	6.5	0 -0.020	16.0	6.7	22.4	8	60	2
2FEKM070-160-08	●	7.0	0 -0.020	16.0	7.2	22.4	8	60	2
2FEKM075-190-08	●	7.5	0 -0.020	19.0	7.7	26.6	8	60	2
2FEKM080-190-08	●	8.0	-0.005 -0.025	19.0	-	-	8	60	2
2FEKM085-190-10	●	8.5	-0.005 -0.025	19.0	8.7	26.6	10	70	2
2FEKM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	26.6	10	70	2
2FEKM095-190-10	●	9.5	-0.005 -0.025	19.0	9.7	26.6	10	70	2
2FEKM100-220-10	●	10.0	-0.005 -0.025	22.0	-	-	10	70	2
2FEKM110-220-12	●	11.0	-0.005 -0.025	22.0	11.2	30.8	12	75	2
2FEKM120-260-12	●	12.0	-0.010 -0.030	26.0	-	-	12	75	2
2FEKM130-260-16	●	13.0	-0.010 -0.030	26.0	13.2	36.4	16	75	2
2FEKM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	36.4	16	75	2
2FEKM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	42.0	16	90	2
2FEKM160-320-16	●	16.0	-0.010 -0.030	32.0	-	-	16	90	2

● MEGACOAT and sharp cutting edge enable high precision finishing owing to excellent wear and heat resistance.

Recommended Cutting Conditions ➔ L64

● : Std. Item

Surface finish oriented 4 flutes

No. of Flutes : 4

Sharp corner edge

4FESM

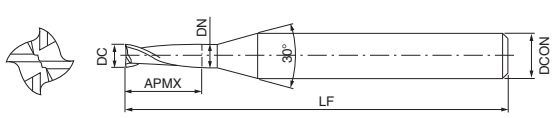
Recommended Workpiece Materials ★ 1st Choice

P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material



4 MEGACOAT is applied

MEGACOAT | Sharp | h5 Shank Dia. | 30°



Tough corner edge

4FEKM

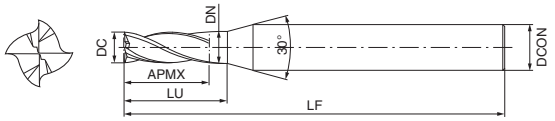
Recommended Workpiece Materials ★ 1st Choice

P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material



4 MEGACOAT is applied

MEGACOAT | Land | h5 Shank Dia. | 30°



4FESM

Shouldering

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	DCON	LF	ZEFP
4FESM010-025-04	●	1.0	0 -0.015	2.5	1.1	4	45	4
4FESM015-040-04	●	1.5	0 -0.015	4.0	1.6	4	45	4
4FESM020-060-04	●	2.0	0 -0.015	6.0	2.1	4	45	4
4FESM025-080-04	●	2.5	0 -0.015	8.0	2.6	4	45	4
4FESM030-100-06	●	3.0	0 -0.015	10.0	3.2	6	50	4
4FESM035-100-06	●	3.5	0 -0.015	10.0	3.7	6	50	4
4FESM040-110-06	●	4.0	0 -0.015	11.0	4.2	6	50	4
4FESM045-110-06	●	4.5	0 -0.015	11.0	4.7	6	50	4
4FESM050-130-06	●	5.0	0 -0.015	13.0	5.2	6	50	4
4FESM055-130-06	●	5.5	0 -0.015	13.0	5.7	6	50	4
4FESM060-130-06	●	6.0	0 -0.020	13.0	-	6	50	4
4FESM060-150-06	●	6.0	0 -0.020	15.0	-	6	50	4
4FESM070-160-08	●	7.0	0 -0.020	16.0	7.2	8	60	4
4FESM080-190-08	●	8.0	-0.005 -0.025	19.0	-	8	60	4
4FESM080-200-08	●	8.0	-0.005 -0.025	20.0	-	8	60	4
4FESM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	10	70	4
4FESM100-220-10	●	10.0	-0.005 -0.025	22.0	-	10	70	4
4FESM100-250-10	●	10.0	-0.005 -0.025	25.0	-	10	70	4
4FESM120-260-12	●	12.0	-0.010 -0.030	26.0	-	12	75	4
4FESM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	16	75	4
4FESM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	16	90	4
4FESM160-320-16	●	16.0	-0.010 -0.030	32.0	-	16	90	4

4FEKM

Shouldering

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DN	LU	DCON	LF	ZEFP
4FEKM030-100-06	●	3.0	0 -0.015	10.0	3.15	12	6	50	4
4FEKM035-100-06	●	3.5	0 -0.015	10.0	3.68	12	6	50	4
4FEKM040-110-06	●	4.0	0 -0.015	11.0	4.2	13.2	6	50	4
4FEKM045-110-06	●	4.5	0 -0.015	11.0	4.7	13.2	6	50	4
4FEKM050-130-06	●	5.0	0 -0.015	13.0	5.2	15.6	6	50	4
4FEKM055-130-06	●	5.5	0 -0.015	13.0	5.7	15.6	6	50	4
4FEKM060-130-06	●	6.0	0 -0.020	13.0	-	-	6	50	4
4FEKM080-190-08	●	8.0	-0.005 -0.025	19.0	-	-	8	60	4
4FEKM100-220-10	●	10.0	-0.005 -0.025	22.0	-	-	10	70	4
4FEKM120-260-12	●	12.0	-0.010 -0.030	26.0	-	-	12	75	4
4FEKM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	36.4	16	75	4
4FEKM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	42	16	90	4
4FEKM160-320-16	●	16.0	-0.010 -0.030	32.0	-	-	16	90	4

Recommended Cutting Conditions L65

● : Std. Item

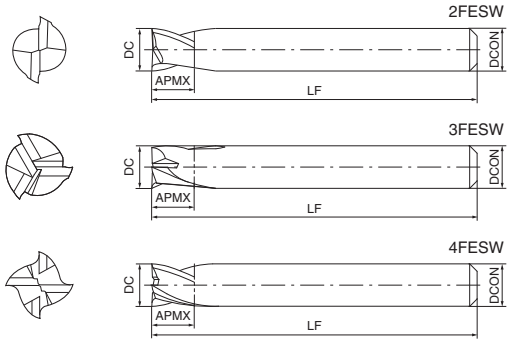
No. of Flutes : 2,3,4

2FESW, 3FESW, 4FESW
(Overall length 35mm / 45mm)



(2FESW)

MEGACOAT | Sharp | h6 Shank Dia. | 35°



Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material

2 | 3 | 4

MEGACOAT is applied

Sharp Cutting Edge Reduced Burrs

2FESW

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FESW050-050-05A	●	5	0 -0.020	5	5	35	2
2FESW060-060-05A	●	6	0 -0.020	6	5	35	2
2FESW030-030-04	●	3	0 -0.020	3	4	45	2
2FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	2
2FESW040-040-04	●	4	0 -0.020	4	4	45	2
2FESW050-050-06	●	5	0 -0.020	5	6	45	2
2FESW060-060-06	●	6	0 -0.020	6	6	45	2
2FESW070-070-07	●	7	0 -0.025	7	7	45	2
2FESW080-080-07	●	8	0 -0.025	8	7	45	2
2FESW080-080-08	●	8	0 -0.025	8	8	45	2
2FESW100-080-07	●	10	0 -0.025	8	7	45	2
2FESW100-080-10	●	10	0 -0.025	8	10	45	2
2FESW120-080-10	●	12	0 -0.025	8	10	45	2
2FESW120-080-12	●	12	0 -0.030	8	12	45	2
2FESW130-080-13	●	13	0 -0.030	8	13	45	2

3FESW

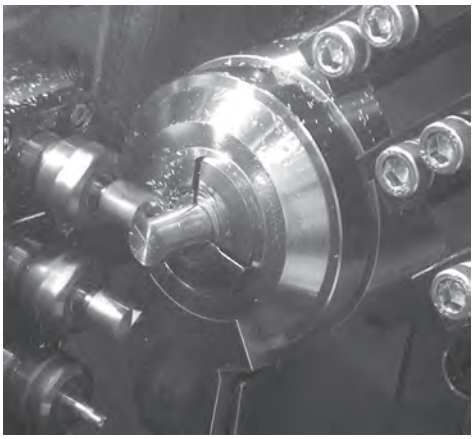
Shouldering | Slotting

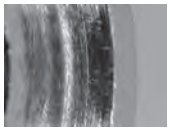
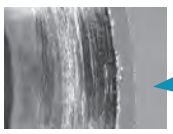
(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
3FESW050-050-05A	●	5	0 -0.020	5	5	35	3
3FESW060-060-05A	●	6	0 -0.020	6	5	35	3
3FESW030-030-04	●	3	0 -0.020	3	4	45	3
3FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	3
3FESW040-040-04	●	4	0 -0.020	4	4	45	3
3FESW050-050-06	●	5	0 -0.020	5	6	45	3
3FESW060-060-06	●	6	0 -0.020	6	6	45	3
3FESW070-070-07	●	7	0 -0.025	7	7	45	3
3FESW080-080-07	●	8	0 -0.025	8	7	45	3
3FESW080-080-08	●	8	0 -0.025	8	8	45	3
3FESW100-080-07	●	10	0 -0.025	8	7	45	3
3FESW100-080-10	●	10	0 -0.025	8	10	45	3
3FESW120-080-10	●	12	0 -0.025	8	10	45	3
3FESW120-080-12	●	12	0 -0.030	8	12	45	3
3FESW130-080-13	●	13	0 -0.030	8	13	45	3

Recommended Cutting Conditions ➡ L66

● : Std. Item



Workpiece Material: Ni-Co alloy		
2FES (ø3, 2flutes) Excellent surface finish		Facing of machine parts ·n=2,150min^{-1} (Vc=20m/min) ·Vf=100mm/min (fz=0.023mm/t)
Competitor A (ø3, 2flutes) × Large burrs		Large burrs (Internal evaluation)

Comparison with competitor's end mill after 600 passes

4FESW

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
4FESW030-030-04	●	3	0 -0.020	3	4	45	4
4FESW035-035-04	●	3.5	0 -0.020	3.5	4	45	4
4FESW040-040-04	●	4	0 -0.020	4	4	45	4
4FESW050-050-06	●	5	0 -0.020	5	6	45	4
4FESW060-060-06	●	6	0 -0.020	6	6	45	4
4FESW070-070-07	●	7	0 -0.025	7	7	45	4
4FESW080-080-07	●	8	0 -0.025	8	7	45	4

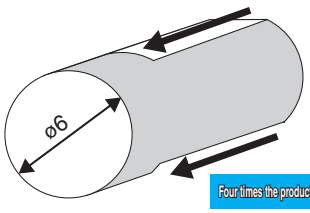
(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
4FESW080-080-08	●	8	0 -0.025	8	8	45	4
4FESW100-080-07	●	10	0 -0.025	8	7	45	4
4FESW100-080-10	●	10	0 -0.025	8	10	45	4
4FESW120-080-10	●	12	0 -0.025	8	10	45	4
4FESW120-080-12	●	12	0 -0.030	8	12	45	4
4FESW130-080-13	●	13	0 -0.030	8	13	45	4

Case Studies

Machine parts S45C

n=3,980min^{-1}
(Vc=100m/min)
Vf=800mm/min
(fz=0.05mm/t)
ap=0.45mm, Wet
4FESW080-080-08 (ø8, 4 flutes)



4FESW080-080-08 Vf=800mm/min

Competitor Coated Carbide B Vf=200mm/min

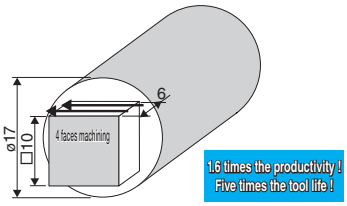
[Competitor Coated Carbide B]
ø8, 4 flutes
n=2,508min^{-1}
(Vc=63m/min)
Vf=200mm/min
(fz=0.02mm/t)
ap=0.45mm

Both cutting speed and table feed rate were improved. Despite the increase in cutting conditions, burr formation decreased.

(User Evaluation)

Machine parts SUM

n=3,200min^{-1}
(Vc=100m/min)
Vf =640mm/min
(fz=0.05mm/t)
ap x ae=3.5 x 3.0mm, Wet
4FESW100-080-10 (ø10, 4 flutes)



4FESW100-080-10 Vf=640mm/min

Competitor Coated Carbide C Vf=400mm/min

[Competitor Coated Carbide C]
ø7, 4 flutes
n=2,000min^{-1}
(Vc=44m/min)
Vf=400mm/min
(fz=0.05mm/t)
ap×ae=3.5×3.0mm

4FESW has a shorter edge length with improved rigidity, which enabled an increase from conventional ø7 to ø10, thus improving cutting conditions. Compared to conventional tools, tool life improved five times.

(User Evaluation)

Recommended Cutting Conditions L66

● : Std. Item

4MFK / 4MFR

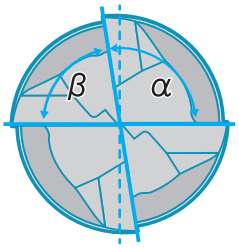
MEGACOAT NANO is applied

New standard of steel machining
Applicable for high feed machining by anti-chattering structure

1 Chattering control by varied interval flute and variable lead design

Excellent Surface Finish with Reduced Chattering

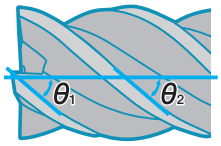
Varied interval flute design



Cutting force distribution varies due to variable flute width, which prevents periodical vibration during machining

$\alpha \neq \beta$

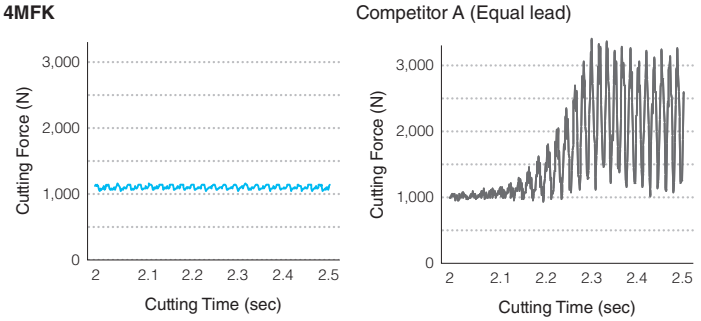
Variable lead



Each flute contains optimized helix angle (lead angleθ), which prevents vibration and achieves a clean surface finish
Chattering control, good surface finish

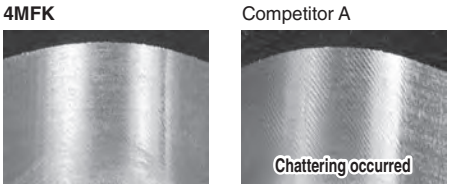
$\theta_1 \neq \theta_2$

Cutting Force Comparison (Internal evaluation) Drastically Reduced Vibration for Stable Machining



Cutting Conditions : n = 2,650 min^{-1}, Vf = 300 mm/min, ap × ae = 10 × 8 mm, End Mill Dia. ø8, Slotting Wet Workpiece Material : SCM440

Surface Comparison (Internal evaluation)

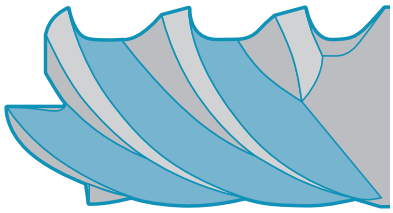


Cutting Conditions : n = 6,000 min^{-1}, Vf = 1,500 mm/min, ap × ae = 8 × 2 mm, End Mill Dia. ø8, Shouldering Wet Workpiece Material : S45C

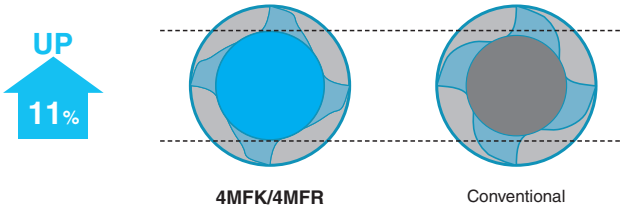
2 Good Chip Evacuation

Unique Flute Design for Smooth Chip Evacuation Even in Slotting and High Feed Machining Applications

Large Chip Pocket



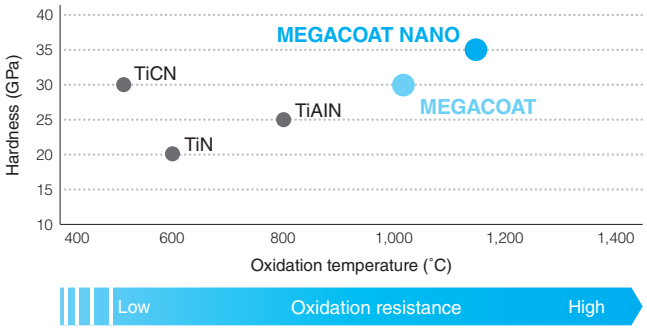
Core diameter comparison (Internal evaluation)



3 Achieves Long Tool Life and Stable Machining

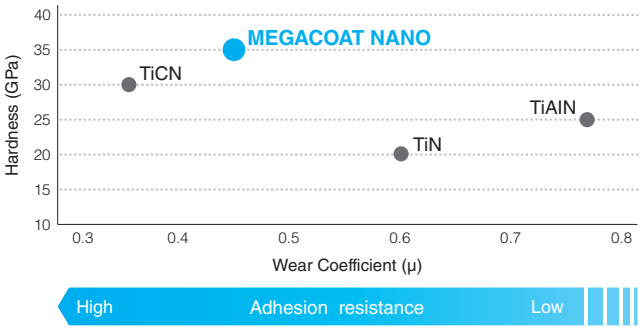
Special Nano-layer Coating MEGACOAT NANO controls wear progress and improves chipping resistance

Properties of PVD Coating (Abrasion Resistance)



Achieve long tool life with the combination of a tough substrate and a special Nano coating layer

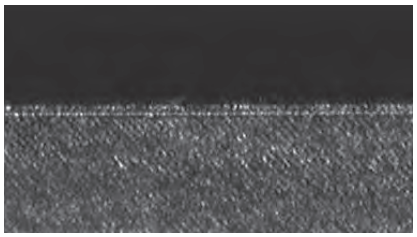
Properties of PVD Coating (Adhesion Resistance)



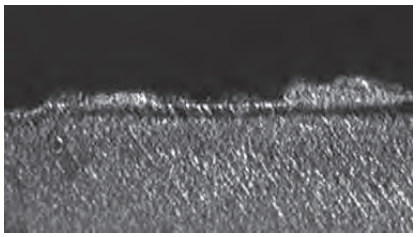
Stable Machining with Excellent Wear Resistance

Abrasion Resistance Comparison (Internal evaluation)

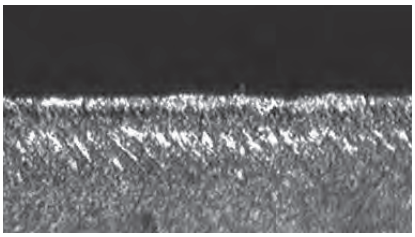
4MFK



Competitor B



Competitor C



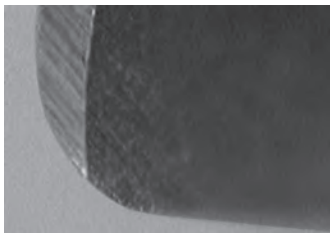
Edge Conditions after 140m Cutting

Cutting Conditions : n = 6,000 min^{-1}, Vf = 1,100 mm/min, ap × ae = 5.0 × 0.8 mm, End Mill Dia. ø8, Shouldering, Wet Workpiece Material : SCM440

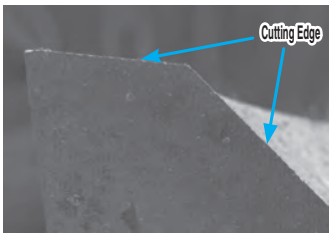
4 High Quality Sharp Edge

High Quality Sharp Edge with Advanced Grinding Technology Enables Excellent Surface Finish

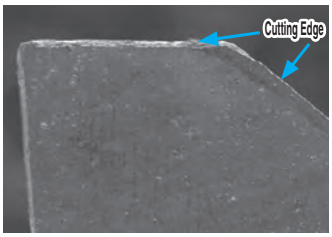
4MFR Corner Radius Type



Smooth and Sharp Cutting Edge Up to the Tip **Preventing Burrs**



4MFK



Competitor D

High feed rate, High efficiency

No. of Flutes : 4

4MFK

MEGACOAT NANO is applied



Recommended Workpiece Materials ★ 1st Choice

★ P ~30HRC	P 30~40HRC	H ~55HRC	M Stainless steel	S Titanium Alloy	K Cast Iron	N Aluminum & Non Ferrous Material

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land

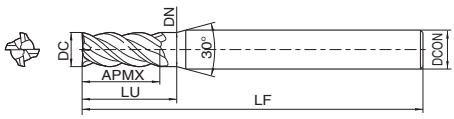


Fig.1

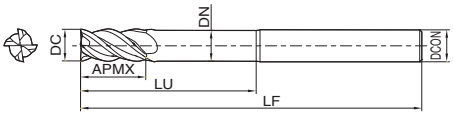


Fig.3

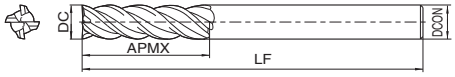


Fig.2

4

4MFK (With corner land)

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	* Cutting edge length	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4MFK030-045	●	3.0	0 -0.015	4.5	S	3.15	5.4	6	60	4	Fig.1
4MFK030-080	●			8	M		9.6				
4MFK030-120	●			12	L		14.4				
4MFK035-050	●	3.5	0 -0.015	5	S	3.7	6.0	6	60	4	
4MFK035-095	●			9.5	M		11.4				
4MFK035-140	●			14	L		16.8				
4MFK040-060	●	4.0	0 -0.015	6	S	4.2	7.2	6	60	4	
4MFK040-110	●			11	M		13.2				
4MFK040-120	●			12	M (3D)		14.4				
4MFK040-160	●			16	L		19.2				
4MFK045-065	●	4.5	0 -0.015	6.5	S	4.7	7.8	6	60	4	
4MFK045-120	●			12	M		14.4				
4MFK045-180	●			18	L		21.6				
4MFK050-075	●	5.0	0 -0.015	7.5	S	5.2	9.0	6	60	4	
4MFK050-130	●			13	M		15.6				
4MFK050-200	●			20	L		24.0				
4MFK055-080	●	5.5	0 -0.015	8	S	5.7	9.6	6	60	4	
4MFK055-130	●			13	M		15.6				
4MFK055-210	●			21	L		25.2				
4MFK060-090	●	6.0	0 -0.020	9	S	-	-	6	60	4	Fig.2
NEW 4MFK060-090-180	●				S'	5.8	18.0				Fig.3
NEW 4MFK060-090-300	●				S'		30.0		70		
4MFK060-130	●			13	M	-	-		60		Fig.2
4MFK060-150	●			15	M (2.5D)						
4MFK060-220	●			22	L						
NEW 4MFK065-160	●	6.5	0 -0.020	16	M	6.7	19.2	8	70	4	Fig.1
4MFK070-105	●	7.0	0 -0.020	10.5	S	7.2	12.6	8	70	4	
4MFK070-160	●			16	M		19.2				
4MFK070-250	●			25	L		30.0				

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	* Cutting edge length	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
NEW 4MFK075-190	●	7.5	0 -0.020	19	M	7.7	22.8	8	70	4	Fig.1
4MFK080-120	●	8.0	-0.005 -0.025	12	S	-	-	8	70	4	Fig.2
NEW 4MFK080-120-240	●				S'	7.7	24.0				Fig.3
NEW 4MFK080-120-400	●				S'		40.0		80		
4MFK080-190	●			19	M	-	-		70		Fig.2
4MFK080-200	●			20	M (2.5D)						
4MFK080-280	●			28	L						
NEW 4MFK085-190	●	8.5	-0.005 -0.025	19	M	8.7	22.8	10	80	4	Fig.1
4MFK090-135	●	9.0	-0.005 -0.025	13.5	S	9.2	16.2	10	80	4	
4MFK090-205	●			20.5	M		24.6				
NEW 4MFK095-220	●	9.5	-0.005 -0.025	22	M	9.7	26.4	10	80	4	Fig.1
4MFK100-150	●	10.0	-0.005 -0.025	15	S	-	-	10	80	4	Fig.2
NEW 4MFK100-150-300	●				S'	9.7	30.0				Fig.3
NEW 4MFK100-150-500	●				S'		50.0		100		
4MFK100-220	●			22	M	-	-		80		Fig.2
4MFK100-250	●			25	M (2.5D)						
4MFK100-330	●			33	L						
NEW 4MFK110-260	●	11.0	-0.010 -0.030	26	M	11.2	31.2	12	100	4	Fig.1
4MFK120-180	●	12.0	-0.010 -0.030	18	S	-	-	12	100	4	Fig.2
NEW 4MFK120-180-360	●				S'	11.7	36.0				Fig.3
NEW 4MFK120-180-600	●				S'		60.0		110		
4MFK120-260	●			26	M	-	-		100		Fig.2
4MFK120-360	●			36	L						
4MFK160-240	●	16.0	-0.010 -0.030	24	S	-	-	16	110	4	Fig.2
4MFK160-350	●			35	M						
4MFK160-480	●			48	L						

Recommended Cutting Conditions ➡ L67

* Applications for each cutting edge length

S : Short · · · · Shouldering Slotting

S' : Short (Long neck) · · · Shouldering

M : Medium · · · Shouldering Slotting

L : Long · · · · · · · · · Shouldering

● : Std. Item

4MFR



4

MEGACOAT NANO is applied

Recommended Workpiece Materials ★ 1st Choice

★ P	P	H	M	S	K	N
~30HRC	30~40HRC	~55HRC	Stainless steel	Titanium Alloy	Cast Iron	Aluminum & Non Ferrous Material

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Radius R

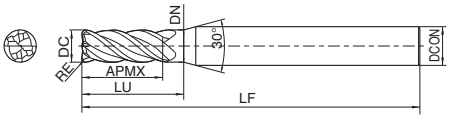


Fig.1

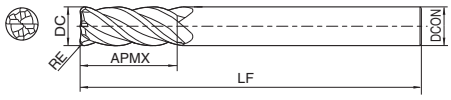


Fig.2

4MFR (Radius)

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4MFR030-080-R02	●	3.0	0 -0.015	0.2	8	3.15	9.6	6	60	4	Fig.1
4MFR030-080-R03	●			0.3							
4MFR030-080-R05	●			0.5							
4MFR035-095-R02	●	3.5	0 -0.015	0.2	9.5	3.7	11.4	6	60	4	
4MFR035-095-R03	●			0.3							
4MFR035-095-R05	●			0.5							
4MFR040-110-R02	●	4.0	0 -0.015	0.2	11	4.2	13.2	6	60	4	
4MFR040-110-R03	●			0.3							
4MFR040-110-R05	●			0.5							
4MFR040-110-R10	●			1.0							
4MFR045-120-R02	●	4.5	0 -0.015	0.2	12	4.7	14.4	6	60	4	
4MFR045-120-R03	●			0.3							
4MFR045-120-R05	●			0.5							
4MFR045-120-R10	●			1.0							
4MFR050-130-R02	●	5.0	0 -0.015	0.2	13	5.2	15.6	6	60	4	
4MFR050-130-R03	●			0.3							
4MFR050-130-R05	●			0.5							
4MFR050-130-R10	●			1.0							
NEW 4MFR055-130-R02	●	5.5	0 -0.015	0.2	13	5.7	15.6	6	60	4	
4MFR055-130-R03	●			0.3							
4MFR055-130-R05	●			0.5							
4MFR055-130-R10	●			1.0							
NEW 4MFR060-130-R02	●	6.0	0 -0.020	0.2	13	-	-	6	60	4	Fig.2
4MFR060-130-R03	●			0.3							
4MFR060-130-R05	●			0.5							
4MFR060-130-R10	●			1.0							
4MFR060-130-R15	●			1.5							

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
NEW 4MFR080-190-R02	●	8.0	-0.005 -0.025	0.2	19	-	-	8	70	4	Fig.2
4MFR080-190-R03	●			0.3							
4MFR080-190-R05	●			0.5							
4MFR080-190-R10	●			1.0							
4MFR080-190-R15	●			1.5							
4MFR080-190-R20	●			2.0							
4MFR080-190-R30	●			3.0							
NEW 4MFR100-220-R02	●	10.0	-0.005 -0.025	0.2	22	-	-	10	80	4	
4MFR100-220-R03	●			0.3							
4MFR100-220-R05	●			0.5							
4MFR100-220-R10	●			1.0							
4MFR100-220-R15	●			1.5							
4MFR100-220-R20	●			2.0							
4MFR100-220-R30	●			3.0							
NEW 4MFR120-260-R03	●	12.0	-0.010 -0.030	0.3	26	-	-	12	100	4	
4MFR120-260-R05	●			0.5							
4MFR120-260-R10	●			1.0							
4MFR120-260-R15	●			1.5							
4MFR120-260-R20	●			2.0							
4MFR120-260-R30	●			3.0							
4MFR160-350-R10	●	16.0	-0.010 -0.030	1.0	35	-	-	16	110	4	
4MFR160-350-R15	●			1.5							
4MFR160-350-R20	●			2.0							
4MFR160-350-R30	●			3.0							

Recommended Cutting Conditions L67

● : Std. Item

4TFK / 4TFR

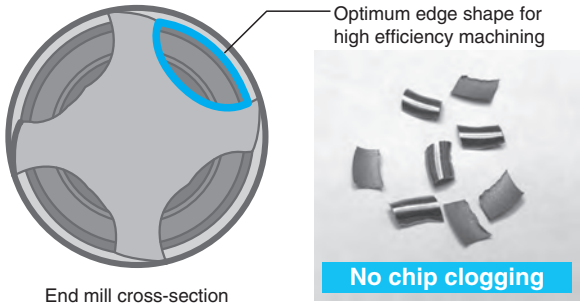
MEGACOAT NANO is applied

High feed and high efficiency machining of difficult-to-cut materials
Resistant to chattering and suppresses burr formation

1 Better chip evacuation at high feed machining

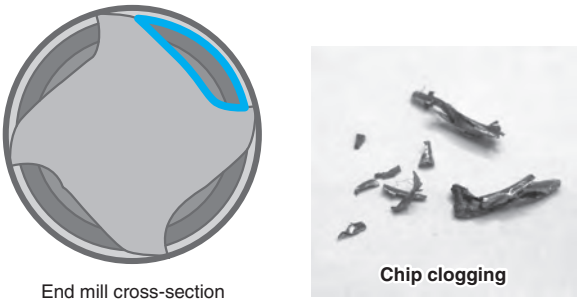
Excellent chip evacuation at high feed by large chip pocket and rake angle

4TFK / 4TFR



Cutting conditions : n = 2,800 min^{-1}, Vf = 550 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet Workpiece Material : SUS304

Conventional



Cutting Conditions : n = 2,800 min^{-1}, Vf = 270 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet Workpiece Material : SUS304

2 Decreased burr

Deep slotting (1xD) by low cutting force design and good chip evacuation

4TFK

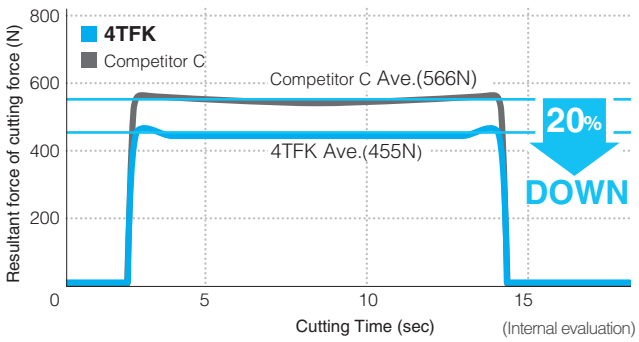


Competitor C



Cutting Conditions : n = 3,200 min^{-1}, Vf = 150 mm/min, ap = 6 mm
End Mill Dia. ø6 mm, Slotting, Wet Workpiece Material : SUS304

Cutting Force Comparison (Cutting force at machining 100mm)



Cutting Conditions : n = 4,800 min^{-1}, Vf = 500 mm/min, ap = 6 mm
End Mill Dia. ø6 mm, Dry Workpiece Material : SCM440

3 Chattering control by varied interval flute and variable lead design

4TFK, 4TFR

MEGACOAT NANO is applied



Recommended Workpiece Materials ★ 1st Choice

P	P	H	M	S	S	K
~30HRC	30~40HRC	~55HRC	Stainless steel	Titanium Alloy	Heat-resistant Alloy	Cast Iron

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land (4TFK) | Radius R (4TFR)



Fig.1

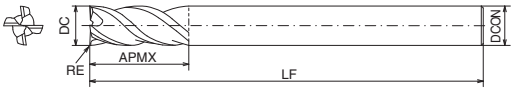


Fig.2

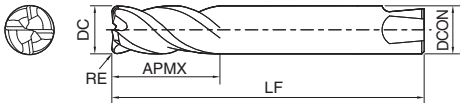


Fig.3 (X-Treme Shank)

4

4TFK (With corner land)

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	*Cutting edge length	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4TFK030-045	●	3.0	0 -0.015	4.5	S	3.15	5.4	6	60	4	Fig.1
4TFK030-080	●			8	M		9.6				
4TFK030-120	●			12	L		14.4				
4TFK040-060	●	4.0	0 -0.015	6	S	4.2	7.2	6	60	4	
4TFK040-120	●			12	M		14.4				
4TFK040-160	●			16	L		19.2				
4TFK050-075	●	5.0	0 -0.015	7.5	S	5.2	9	6	60	4	
4TFK050-130	●			13	M		15.6				
4TFK050-200	●			20	L		24				
4TFK060-090	●	6.0	0 -0.020	9	S	-	-	6	60	4	Fig.2
4TFK060-150	●			15	M						
4TFK060-220	●			22	L						
4TFK070-105	●	7.0	0 -0.020	10.5	S	7.2	12.6	8	70	4	Fig.1
4TFK070-160	●			16	M		19.2				
4TFK070-250	●			25	L		30				
4TFK080-120	●	8.0	-0.005 -0.025	12	S	-	-	8	70	4	Fig.2
4TFK080-200	●			20	M						
4TFK080-280	●			28	L						
4TFK090-135	●	9.0	-0.005 -0.025	13.5	S	9.2	16.2	10	80	4	Fig.1
4TFK090-205	●			20.5	M		24.6				
4TFK100-150	●	10.0	-0.005 -0.025	15	S	-	-	10	80	4	Fig.2
4TFK100-250	●			25	M						
4TFK100-330	●			33	L						
4TFK120-180	●	12.0	-0.010 -0.030	18	S	-	-	12	100	4	
4TFK120-260	●			26	M						
4TFK120-360	●			36	L						
4TFK160-240	●	16.0	-0.010 -0.030	24	S	-	-	16	110	4	
4TFK160-350	●			35	M						
4TFK160-480	●			48	L						
4TFK200-300	●	20.0	-0.010 -0.030	30	S	-	-	20	125	4	
4TFK200-450	●			45	M						

* Applications for each cutting edge length

S : Short
M : Medium } Shouldering, Slotting
L : Long — Shouldering

*4TFR...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck

4TFR (Radius)

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4TFR030-080-R02	●	3.0	0 -0.015	0.2	8	3.15	9.6	6	60	4	Fig.1
4TFR030-080-R05	●			0.5							
4TFR040-120-R02	●	4.0	0 -0.015	0.2	12	4.2	14.4	6	60	4	
4TFR040-120-R05	●			0.5							
4TFR050-130-R02	●	5.0	0 -0.015	0.2	13	5.2	15.6	6	60	4	
4TFR050-130-R05	●			0.5							
4TFR050-130-R10	●			1.0							
4TFR060-150-R03	●	6.0	0 -0.020	0.3	15	-	-	6	60	4	Fig.2
4TFR060-150-R05	●			0.5							
4TFR060-150-R10	●			1.0							
4TFR080-200-R03	●	8.0	-0.005 -0.025	0.3	20	-	-	8	70	4	
4TFR080-200-R05	●			0.5							
4TFR080-200-R10	●			1.0							
4TFR080-200-R20	●			2.0							
4TFR100-250-R03	●	10.0	-0.005 -0.025	0.3	25	-	-	10	80	4	
4TFR100-250-R05	●			0.5							
4TFR100-250-R10	●			1.0							
4TFR100-250-R15	●			1.5							
4TFR100-250-R20	●			2.0							
4TFR100-250-R30	●			3.0							
4TFR120-260-R05	●	12.0	-0.010 -0.030	0.5	26	-	-	12	100	4	
4TFR120-260-R10	●			1.0							
4TFR120-260-R15	●			1.5							
4TFR120-260-R20	●			2.0							
4TFR120-260-R30	●			3.0							
4TFR160-350-R10	●	16.0	-0.010 -0.030	1.0	35	-	-	16	110	4	
4TFR160-350-R20	●			2.0							
4TFR160-350-R30	●			3.0							
4TFR200-450-R10	●	20.0	-0.010 -0.030	1.0	45	-	-	20	125	4	
4TFR200-450-R20	●			2.0							
4TFR200-450-R30	●			3.0							
4TFR120-260-R10-XT	●	12.0	-0.010 -0.030	1.0	26	-	-	12	94	4	Fig.3
4TFR120-260-R20-XT	●			2.0							
4TFR120-260-R30-XT	●			3.0							
4TFR160-350-R10-XT	●	16.0	-0.010 -0.030	1.0	35	-	-	16	116	4	
4TFR160-350-R20-XT	●			2.0							
4TFR160-350-R30-XT	●			3.0							
4TFR200-450-R10-XT	●	20.0	-0.010 -0.030	1.0	45	-	-	20	130	4	
4TFR200-450-R20-XT	●			2.0							
4TFR200-450-R30-XT	●			3.0							

Applicable chuck for 4TFR...XT ➔ M90
Recommended Cutting Conditions ➔ L68

● : Std. Item

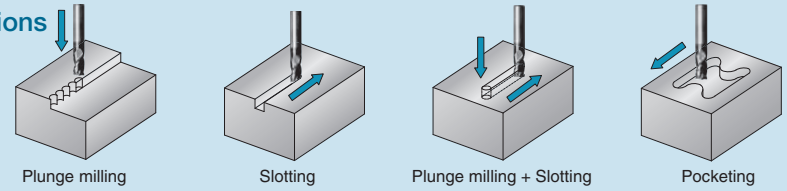
3ZFK



Triple functions

Applicable for plunge milling, slotting and finishing with one end mill

● Applications

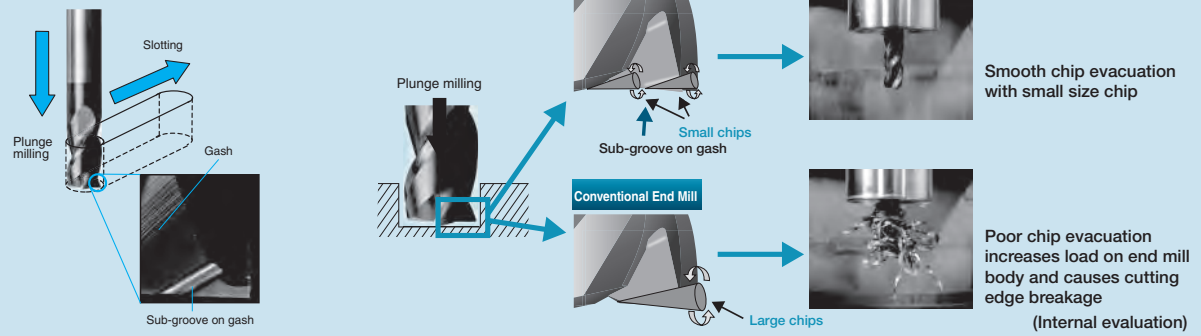


Triple Performances

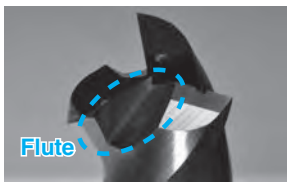
1. High efficiency machining with new design

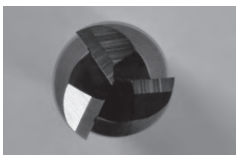
· Smooth chip evacuation because sub-groove on gash breaks chips during plunge milling

● Effect of sub-groove on gash

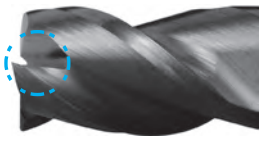


· Prevents chip clogging owing to deep flute and gash design

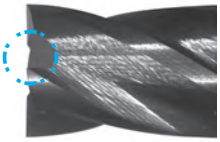




Bottom surface of 3ZFK cutting edge



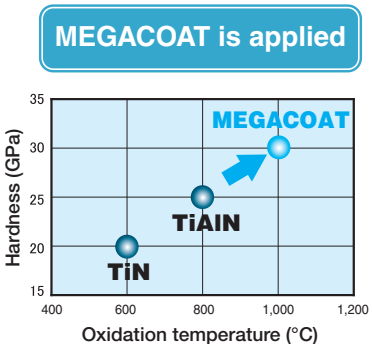
3ZFK



Conventional

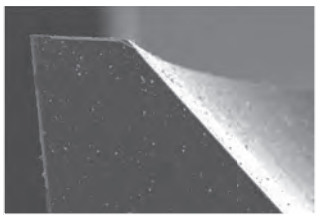
2. Longer tool life with MEGACOAT

· Excellent wear resistance and heat resistance



3. Better surface finish owing to sharp cutting edge quality

· Smooth and sharp to the tip of the cutting edge
· Controls burr formation. Better surface roughness



MEGACOAT

Smooth and sharp to the tip of the cutting edge
Longer tool life and improved surface finish



Competitor Coating A

Rough coating surface and round blunt cutting edge

(Internal evaluation)

3ZFKS, 3ZFKM



3

MEGACOAT is applied

Recommended Workpiece Materials ★ 1st Choice





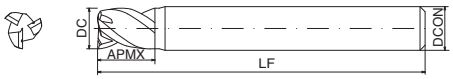


Fig.1

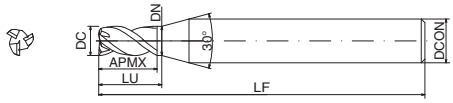


Fig.2

3ZFKS (Short)

Shouldering Slotting Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
3ZFKS060-090-06	●	6.0	0 -0.020	9.0	-	-	6	50	3	Fig.1
3ZFKS070-105-08	●	7.0	0 -0.020	10.5	7.2	11.3	8	60	3	Fig.2
3ZFKS080-120-08	●	8.0	-0.005 -0.025	12.0	-	-	8	60	3	
3ZFKS100-150-10	●	10.0	-0.005 -0.025	15.0	-	-	10	70	3	Fig.1
3ZFKS120-180-12	●	12.0	-0.010 -0.030	18.0	-	-	12	75	3	

3ZFKM (Medium)

Shouldering Slotting Plunge milling

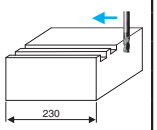
(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
3ZFKM030-060-06	●	3.0	0 -0.015	6.0	3.2	6.5	6	50	3	
3ZFKM030-080-06	●	3.0	0 -0.015	8.0	3.2	8.6	6	50	3	
3ZFKM040-080-06	●	4.0	0 -0.015	8.0	4.2	8.6	6	50	3	Fig.2
3ZFKM040-120-06	●	4.0	0 -0.015	12.0	4.2	13.0	6	50	3	
3ZFKM050-100-06	●	5.0	0 -0.015	10.0	5.2	10.8	6	50	3	
3ZFKM050-130-06	●	5.0	0 -0.015	13.0	5.2	14.0	6	50	3	
3ZFKM060-130-06	●	6.0	0 -0.020	13.0	-	-	6	50	3	Fig.1
3ZFKM070-160-08	●	7.0	0 -0.020	16.0	7.2	17.3	8	60	3	Fig.2
3ZFKM080-190-08	●	8.0	-0.005 -0.025	19.0	-	-	8	60	3	
3ZFKM100-220-10	●	10.0	-0.005 -0.025	22.0	-	-	10	70	3	Fig.1
3ZFKM120-260-12	●	12.0	-0.010 -0.030	26.0	-	-	12	75	3	
3ZFKM160-350-16	●	16.0	-0.010 -0.030	35.0	-	-	16	90	3	

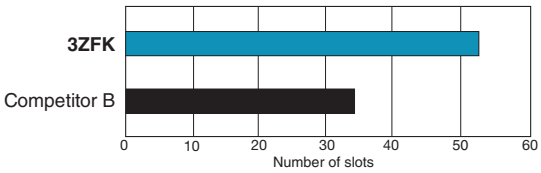
Case Studies

● Slotting of Titanium Alloy

Outside Dia.	ø10
Workpiece Material	Ti-6Al-4V
Spindle Revolution	3ZFK : n=1,700min^{-1}
	Competitor B:n=1,300min^{-1}
Feed Rate	Vf =460mm/min
Depth of Cut	ap x ae=2 x 10mm



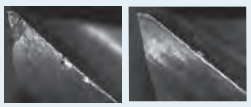
(Wet)



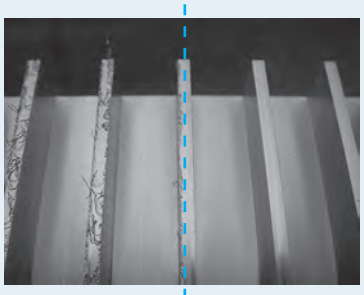
(Internal evaluation)

- Better surface finish and longer tool life with 3ZFK.
- Compared to competitor's coated product, the 3ZFK has a 1.4 times longer tool life.
- 3ZFK prevents burr formation due to sharp cutting edge.

◆ Cutting edge after 35 passes



Competitor B 3ZFK



Competitor B 3ZFK

(Internal evaluation)

Recommended Cutting Conditions L69

● : Std. Item

No. of Flutes : 5

5DERM

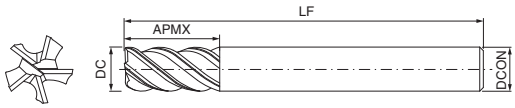




Recommended Workpiece Materials ★ 1st Choice







5DERM (Radius)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	Spec of Corners	No. of Flutes ZEFP
5DERM040-120-06-R025	▲	4	-0.020 -0.038	12	6	55	R0.25	5
5DERM050-130-06-R025	▲	5	-0.020 -0.038	13	6	57	R0.25	5
5DERM060-130-06-R040	▲	6	-0.020 -0.038	13	6	57	R0.4	5
5DERM080-160-08-R050	▲	8	-0.025 -0.047	16	8	63	R0.5	5
5DERM090-190-10-R050	▲	9	-0.025 -0.047	19	10	72	R0.5	5
5DERM100-220-10-R050	▲	10	-0.025 -0.047	22	10	72	R0.5	5
5DERM120-260-12-R075	▲	12	-0.032 -0.059	26	12	83	R0.75	5

● 5 flutes design enables high feed rate machining. Varied intervals prevent vibration.
Maximum groove width is 0.8DC.

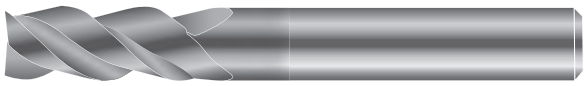
Recommended Cutting Conditions ➔ L70

▲ : To be replaced by a new product

3 flutes, Multi-purpose

No. of Flutes : 3

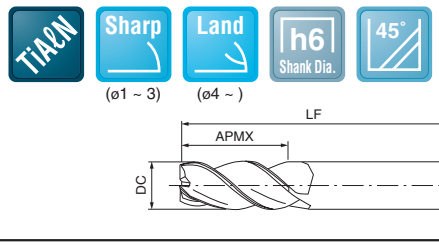
3UFSM





Recommended Workpiece Materials ★ 1st Choice





3UFSM

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
3UFSM010-030-04	▲	1	-0.014 -0.028	3	4	50	3
3UFSM015-030-04	▲	1.5	-0.014 -0.028	3	4	50	3
3UFSM020-030-04	▲	2	-0.014 -0.028	3	4	50	3
3UFSM025-040-04	▲	2.5	-0.014 -0.028	4	4	50	3
3UFSM030-080-06	▲	3	-0.014 -0.028	8	6	50	3
3UFSM040-120-06	▲	4	-0.020 -0.038	12	6	50	3
3UFSM050-140-06	▲	5	-0.020 -0.038	14	6	50	3
3UFSM060-160-06	▲	6	-0.020 -0.038	16	6	50	3
3UFSM080-200-08	▲	8	-0.025 -0.047	20	8	63	3
3UFSM100-220-10	▲	10	-0.025 -0.047	22	10	76	3
3UFSM120-250-12	▲	12	-0.032 -0.059	25	12	76	3
3UFSM160-320-16	▲	16	-0.032 -0.059	32	16	89	3
3UFSM200-380-20	▲	20	-0.040 -0.073	38	20	104	3

● Products emphasizing high efficiency machining, three flutes type for general semi finishing.
It is available for slotting and shouldering of wide range of workpiece materials.

Recommended Cutting Conditions L71

▲ : To be replaced by a new product

6PFK/8PFK

High efficiency machining and superior surface finish with new special flute design

● Varied interval flute design / Variable lead

Superior chattering resistance performance with Kyocera's unique varied interval flute design / variable lead

Varied interval flute design



α≠β≠γ

Cutting force varies due to varied interval flute, which prevents periodical vibration during machining

Variable Lead



$\theta_1 \neq \theta_2 \neq \theta_3$

Every flute has its optimum helix angle (lead angleθ), which enables excellent and anti vibration effect and good surface finish

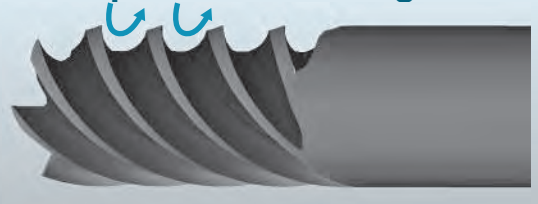
Surface finish comparison (side surface) End Mill Dia. ø12 (Internal evaluation)

Workpiece Material	SCM440	SUS304	Ti-6Al-4V
Cutting Conditions	n=3,300min^{-1} (Vc=124m/min) Vf=2,000mm/min(fz=0.1mm/t) ap×ae=30×1.5mm	n=2,500min^{-1} (Vc=94m/min) Vf=1,130mm/min (fz=0.08mm/t) ap×ae=30×0.6mm	n=2,500min^{-1} (Vc=94m/min) Vf=1,130mm/min (fz=0.08mm/t) ap×ae=30×0.6mm
Results	6PFK ○	6PFK ○	6PFK ○
	Competitor A Chattering occurred	Competitor A Chattering occurred	Competitor A Dull surface due to poor approach

High feed rate and high efficiency shouldering with Multi-edge design (6 flutes /8 flutes)
Varied interval flute design and variable lead to minimize chattering
Good surface finish

● Special Flute Design

New Special Flute Design Enables Stable Chip Evacuation



Good chip evacuation with wide chip pocket
Good performance at high feed rate machining

6PFK, 8PFK



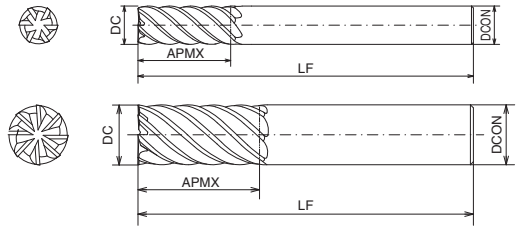
6 8

MEGACOAT NANO is applied

Recommended Workpiece Materials ★ 1st Choice

P ~30HRC ★ | P 30~40HRC | H ~55HRC | M Stainless steel ★ | S Titanium Alloy ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land



6PFK, 8PFK (Medium)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
6PFK060-150	●	6.0	0 -0.020	15	6	60	6	Fig.1
6PFK080-200	●	8.0	-0.005 -0.025	20	8	70	6	
6PFK100-250	●	10.0	-0.005 -0.025	25	10	80	6	
6PFK120-300	●	12.0	-0.010 -0.030	30	12	100	6	
6PFK160-400	●	16.0	-0.010 -0.030	40	16	110	6	
6PFK200-450	●	20.0	-0.010 -0.030	45	20	125	6	
8PFK250-500	●	25.0	-0.010 -0.030	50	25	140	8	Fig.2

6PFK, 8PFK (Long)

Shouldering

(Unit : mm)

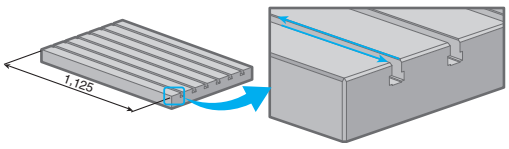
Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
6PFK060-250	●	6.0	0 -0.020	25	6	70	6	Fig.1
6PFK080-350	●	8.0	-0.005 -0.025	35	8	90	6	
6PFK100-450	●	10.0	-0.005 -0.025	45	10	100	6	
6PFK120-550	●	12.0	-0.010 -0.030	55	12	120	6	
6PFK160-650	●	16.0	-0.010 -0.030	65	16	135	6	
6PFK200-750	●	20.0	-0.010 -0.030	75	20	155	6	
6PFK200-1000	●	20.0	-0.010 -0.030	100	20	180	6	
8PFK250-1000	●	25.0	-0.010 -0.030	100	25	180	8	Fig.2

Recommended Cutting Conditions ➡ L72

Case Studies

Machine table FC250

6PFK200-450
Finishing (1 pass)
n = 2,500 min^{-1}
(Vc = 157 m/min)
Vf = 3,500 mm/min
(fz = 0.23 mm/t)
ap x ae = 35 x 1.2 mm



Competitor Coated Carbide B (2 passes)
Semi finishing n = 2,500 min^{-1} (Vc = 157 m/min)
Vf = 1,500 mm/min (fz = 0.1 mm/t)
ap x ae = 35 x 1.0 mm
Finishing n = 2,000 min^{-1} (Vc = 125 m/min)
Vf = 1,000 mm/min (fz = 0.1 mm/t)
ap x ae = 35 x 0.2 mm

Cutting Time (1,125mm x 24 slots)

6PFK 200-450 **10** min

1/8 Cutting Time

Competitor Coated Carbide B **80** min

Competitor B machined the workpiece with 2 passes due to chattering.
6PFK machined the workpiece with 1 pass without chattering.
Productivity has greatly improved by increasing cutting conditions.

(User Evaluation)

● : Std. Item

4JER

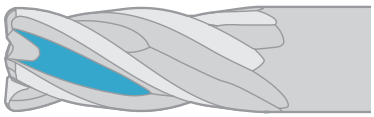
High Efficiency and Stable Machining for Superalloy such as Inconel®

Long Tool Life Machining with MEGACOAT HARD for Excellent Heat Resistance

1 Resistant to Breakage

Stable Slotting and Trochoid Machining with Chip Pocket Grooves and Large Core Thickness

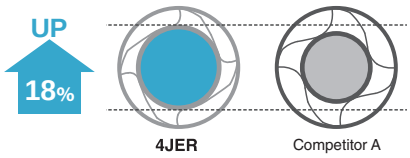
● Chip Pocket for Smooth Chip Evacuation During Slotting Applications



Excellent Chip Evacuation

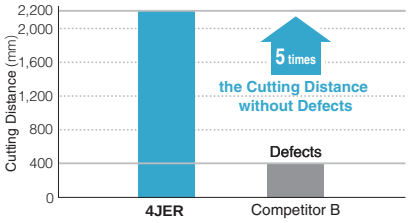


● Core Thickness Comparison



Decreases Tool Deflection and Achieves Excellent Machining Precision

● Slotting Performance Comparison (Internal evaluation)

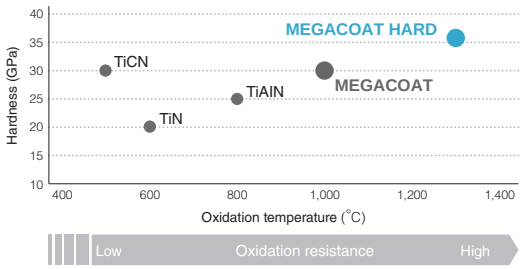


Cutting Conditions : n = 1,200 min^{-1}, Vf = 140 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet
Workpiece Material : Inconel®718 (Aging treatment, 40HRC)

2 Achieves Long Tool Life and Stable Machining

The MEGACOAT HARD coating technology delivers the highest hardness and heat resistance in Kyocera's PVD coating

● Properties of Coating

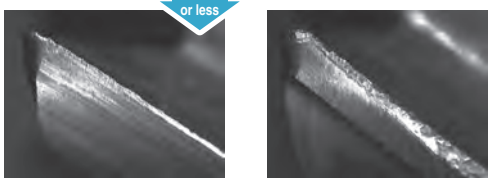


● Wear resistance comparison (Cutting distance 975mm)

4JER
(Wear 0.11mm)

Wear 1/2 or less

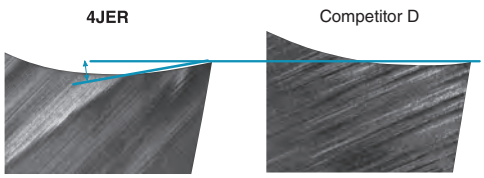
Competitor C
(Wear 0.28mm)



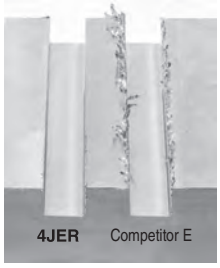
Cutting Conditions : n= 1,200 min^{-1}, Vf = 140 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet
Workpiece Material : Inconel®718 (Aging treatment, 40HRC)

3 Decreased burr

High Sharpness with a Large Rake Angle



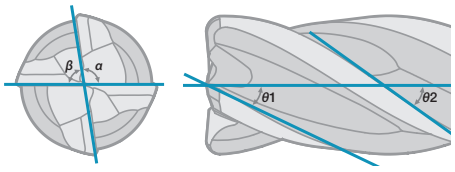
Burring During Slotting (Inconel® 718)



Cutting Conditions : n = 1,200 min^{-1}, Vf = 140 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Wet

4 Resistance to chattering

Improved Chatter Resistance with Varied interval flute and Variable Lead



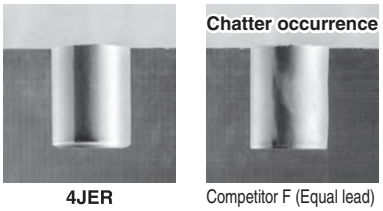
$\alpha \neq \beta$

Varied interval flute design
Prevents periodical vibration during machining

$\theta 1 \neq \theta 2$

Variable Lead
Anti vibration effect
Prevents chattering, and superior surface finish

Slotting Surface in Trochoidal Machining (Inconel® 718)



Cutting Conditions : n =1,200min^{-1}, Vf = 300 mm/min, ap = 20 mm
End Mill Dia. ø16 mm, Width 20mm, Wet

4JER



4

MEGACOAT HARD is applied

Recommended Workpiece Materials ★ 1st Choice

P	P	M	S	S
~30HRC	30~40HRC	Stainless steel	Titanium Alloy	Heat-resistant Alloy
★				★

MEGACOAT HARD | Radius R | h5 Shank Dia. | 32° 35°

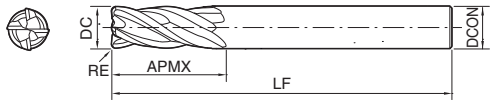


Fig.1

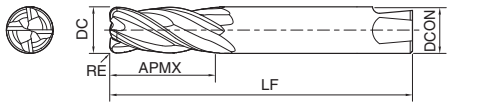


Fig.2

(X-Treme Shank)

4JER (Short)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4JER060-090-R03	●	6.0	0 -0.020	0.3	9	6	60	4	Fig.1
4JER060-090-R05	●			0.5					
4JER060-090-R10	●			1.0					
4JER080-120-R03	●	8.0	-0.005 -0.025	0.3	12	8	70	4	
4JER080-120-R05	●			0.5					
4JER080-120-R10	●			1.0					
4JER080-120-R15	●			1.5					
4JER100-150-R03	●	10.0	-0.005 -0.025	0.3	15	10	80	4	
4JER100-150-R05	●			0.5					
4JER100-150-R10	●			1.0					
4JER100-150-R15	●			1.5					
4JER100-150-R20	●			2.0					
4JER100-150-R30	●			3.0					
4JER120-180-R05	●	12.0	-0.010 -0.030	0.5	18	12	100	4	
4JER120-180-R10	●			1.0					
4JER120-180-R15	●			1.5					
4JER120-180-R20	●			2.0					
4JER120-180-R30	●			3.0					
4JER160-240-R10	●	16.0	-0.010 -0.030	1.0	24	16	110	4	
4JER160-240-R20	●			2.0					
4JER160-240-R30	●			3.0					
4JER200-300-R10	●	20.0	-0.010 -0.030	1.0	30	20	125	4	
4JER200-300-R20	●			2.0					
4JER200-300-R30	●			3.0					

*4JER...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck

4JER (Medium)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4JER060-150-R03	●	6.0	0 -0.020	0.3	15	6	60	4	Fig.1
4JER060-150-R05	●			0.5					
4JER060-150-R10	●			1.0					
4JER080-200-R03	●	8.0	-0.005 -0.025	0.3	20	8	70	4	
4JER080-200-R05	●			0.5					
4JER080-200-R10	●			1.0					
4JER080-200-R15	●			1.5					
4JER100-250-R03	●	10.0	-0.005 -0.025	0.3	25	10	80	4	
4JER100-250-R05	●			0.5					
4JER100-250-R10	●			1.0					
4JER100-250-R15	●			1.5					
4JER100-250-R20	●			2.0					
4JER100-250-R30	●			3.0					
4JER120-260-R05	●	12.0	-0.010 -0.030	0.5	26	12	100	4	
4JER120-260-R10	●			1.0					
4JER120-260-R15	●			1.5					
4JER120-260-R20	●			2.0					
4JER120-260-R30	●			3.0					
4JER160-350-R10	●	16.0	-0.010 -0.030	1.0	35	16	110	4	
4JER160-350-R20	●			2.0					
4JER160-350-R30	●			3.0					
4JER200-450-R10	●	20.0	-0.010 -0.030	1.0	45	20	125	4	
4JER200-450-R20	●			2.0					
4JER200-450-R30	●			3.0					
4JER120-260-R10-XT	●	12.0	-0.010 -0.030	1.0	26	12	94	4	Fig.2
4JER120-260-R20-XT	●			2.0					
4JER120-260-R30-XT	●			3.0					
4JER160-350-R10-XT	●	16.0	-0.010 -0.030	1.0	35	16	116	4	
4JER160-350-R20-XT	●			2.0					
4JER160-350-R30-XT	●			3.0					
4JER200-450-R10-XT	●	20.0	-0.010 -0.030	1.0	45	20	130	4	
4JER200-450-R20-XT	●			2.0					
4JER200-450-R30-XT	●			3.0					

Applicable chuck for 4JER...XT ➡ **M90**

Recommended Cutting Conditions ➡ **L73**

● : Std. Item

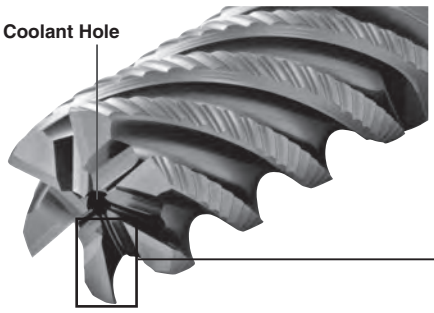
4 / 5 / 6RFH

High Efficiency and Stable Machining with Multi-edge Design and Coolant Hole Deep Slotting for Stainless Steel and Titanium Alloy

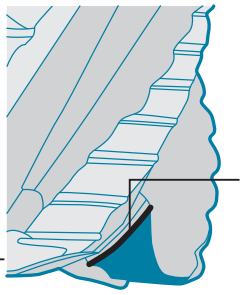
1 High Efficiency Machining with Multi-edge Design

Multi-edge Design with Coolant Hole. Good Chip Evacuation with Original Gash Shape

● Multi-edge Design (ø16 - 6 flutes)



● Original Gash Shape



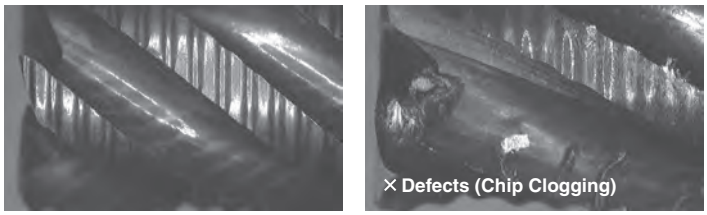
Deep Slotting (ap = 2 x DC) for Stainless Steel and Titanium Alloy

● Slotting Performance Comparison (Internal Evaluation)

After Machining 1 Pass



Competitor A | 5RFH



Cutting Conditions : n = 2,550 min^{-1}, Vf = 336 mm/min, ap = 20 mm
End Mill Dia. ø10, Wet, Slotting Workpiece Material : SUS304

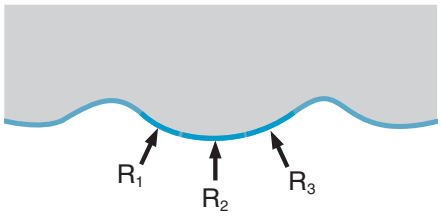
No Defects when Deep Slotting

2 Defect Resistant

Reduces Cutting Pressure and Defect with Special Curved Radius Serrated Edge. Enables Stable Machining

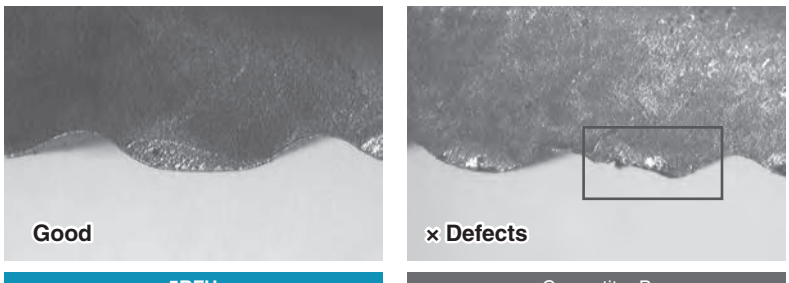
Cutting Conditions : n = 2,900 min^{-1}, Vf = 712 mm/min, ap x ae = 5 x 3 mm
End Mill Dia. ø10, Wet, Shouldering Workpiece Material : Ti-6Al-4V

● Special Curved Radius Serrated Edge



Serrated Curved Edge with Different Radii (Compound Radius Shape)
Distributes cutting pressure and increase defect resistance

● Blade Edge after Machining 12m (Internal Evaluation)



5RFH | Competitor B

3 Achieves Long Tool Life and Stable Machining

The MEGACOAT HARD coating technology delivers the highest hardness and heat resistance in Kyocera's PVD coating

4 / 5 / 6RFH



4 5 6

MEGACOAT HARD is applied

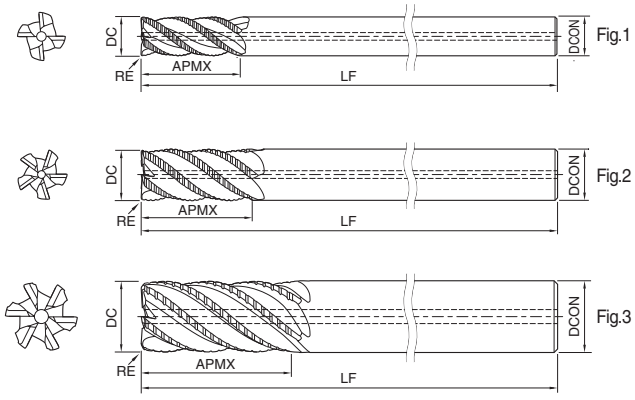
with Coolant hole



Recommended Workpiece Materials ★ 1st Choice

P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel ★ | S Titanium Alloy ★ | S Heat-resistant Alloy | K Cast Iron

MEGACOAT HARD | Cutting shape | Radius R | h6 Shank Dia. | 40°



4 / 5 / 6RFH (Medium)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	* Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4RFH060-150	●	6.0	0 -0.050	0.3	15	6	60	4	Fig.1
4RFH080-200	●	8.0	0 -0.050	0.3	20	8	70	4	
5RFH100-250	●	10.0	0 -0.050	0.5	25	10	80	5	Fig.2
5RFH120-260	●	12.0	0 -0.050	0.5	26	12	100	5	
6RFH160-350	●	16.0	0 -0.060	0.5	35	16	110	6	Fig.3
6RFH200-450	●	20.0	0 -0.060	0.5	45	20	125	6	

* Corner-R dimension is reference only

4 / 5 / 6RFH (Long)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	* Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4RFH060-300	●	6.0	0 -0.050	0.3	30	6	80	4	Fig.1
4RFH080-400	●	8.0	0 -0.050	0.3	40	8	100	4	
5RFH100-500	●	10.0	0 -0.050	0.5	50	10	110	5	Fig.2
5RFH120-600	●	12.0	0 -0.050	0.5	60	12	130	5	
6RFH160-800	●	16.0	0 -0.060	0.5	80	16	160	6	Fig.3
6RFH200-1000	●	20.0	0 -0.060	0.5	100	20	180	6	

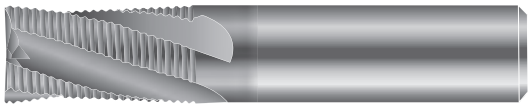
* Corner-R dimension is reference only

● : Std. Item

Recommended Cutting Conditions L74

No. of Flutes : 3,4,5

3RDS, 4RDS, 5RDS

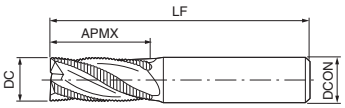


3 4 5

Recommended Workpiece Materials ★ 1st Choice

★ P ~30HRC ★ P 30~40HRC M Stainless steel ★ K Cast Iron

TiAlN Cutting shape C h6 Shank Dia. 20°



3RDSM, 4RDSM, 5RDSM (Medium)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Shank Dia.	Overall length	Spec of Corners	No. of Flutes
		DC		APMX	DCON	LF	CHW	ZEFP
3RDSM040-110-06	●	4	-0.030 -0.105	11	6	55	0.3	3
3RDSM050-130-06	●	5	-0.030 -0.105	13	6	57	0.3	3
3RDSM060-130-06	●	6	-0.030 -0.105	13	6	57	0.3	3
3RDSM080-160-08	●	8	-0.040 -0.130	16	8	63	0.3	3
4RDSM100-220-10	●	10	-0.040 -0.130	22	10	72	0.5	4
4RDSM120-260-12	●	12	-0.050 -0.160	26	12	83	0.5	4
4RDSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.5	4
4RDSM200-380-20	●	20	-0.065 -0.195	38	20	104	0.5	4
5RDSM250-450-25	●	25	-0.065 -0.195	45	25	121	0.5	5

3RDSL, 4RDSL, 5RDSL (Long)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Shank Dia.	Overall length	Spec of Corners	No. of Flutes
		DC		APMX	DCON	LF	CHW	ZEFP
3RDSL060-240-06	●	6	-0.030 -0.105	24	6	76	0.3	3
3RDSL080-280-08	●	8	-0.040 -0.130	28	8	76	0.3	3
4RDSL100-340-10	●	10	-0.040 -0.130	34	10	89	0.5	4
4RDSL120-450-12	●	12	-0.050 -0.160	45	12	100	0.5	4
4RDSL160-560-16	●	16	-0.050 -0.160	56	16	125	0.5	4
4RDSL200-600-20	●	20	-0.065 -0.195	60	20	125	0.5	4
5RDSL250-800-25	●	25	-0.065 -0.195	80	25	150	0.5	5

● Three, four and five flutes types are available for roughing. Their edge design with sine-curve pattern reduce cutting force.

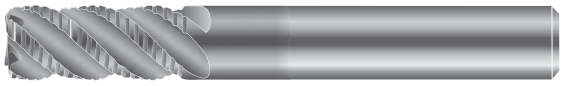
L
Solid Tools
End Mills
Solid Tools for CFRP
Drills
Cutting Conditions

Recommended Cutting Conditions ➔ L75

● : Std. Item

No. of Flutes : 4,6

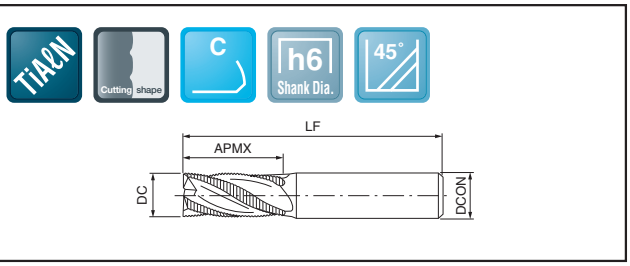
4RFSM, 6RFSM





Recommended Workpiece Materials ★ 1st Choice

P	P★	H★	H	M	S★	S	K
~30HRC	30~40HRC	~55HRC	~68HRC	Stainless steel	Titanium Alloy	Heat-resistant Alloy	Cast Iron



4RFSM

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Shank Dia.	Overall length	Spec of Corners	No. of Flutes
		DC		APMX	DCON	LF	CHW	ZEFP
4RFSM060-130-06	●	6	-0.030 -0.105	13	6	57	0.3	4
4RFSM080-160-08	●	8	-0.040 -0.130	16	8	63	0.4	4
4RFSM100-220-10	●	10	-0.040 -0.130	22	10	72	0.5	4
4RFSM120-260-12	●	12	-0.050 -0.160	26	12	83	0.6	4
4RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.6	4
4RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	1.0	4

6RFSM

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Shank Dia.	Overall length	Spec of Corners	No. of Flutes
		DC		APMX	DCON	LF	CHW	ZEFP
6RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.6	6
6RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	1.0	6
6RFSM250-450-25	●	25	-0.065 -0.195	45	25	121	1.1	6

Recommended Cutting Conditions L76

● RFS has notched surface edge of 45˚ helix angle. It is applicable for hard materials and titanium alloys due to strong cutting edge.

● : Std. Item

2SEB

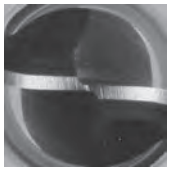
Special cutting edge concept and nano layer coating realized high precision and long tool life machining

Point 1 Sharp cutting with special nose geometry

Arc-like cutting edge distributes the cutting force and controls wear progress



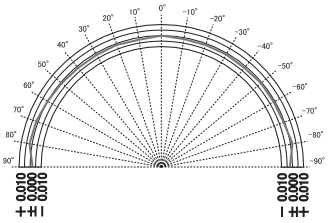
2SEB

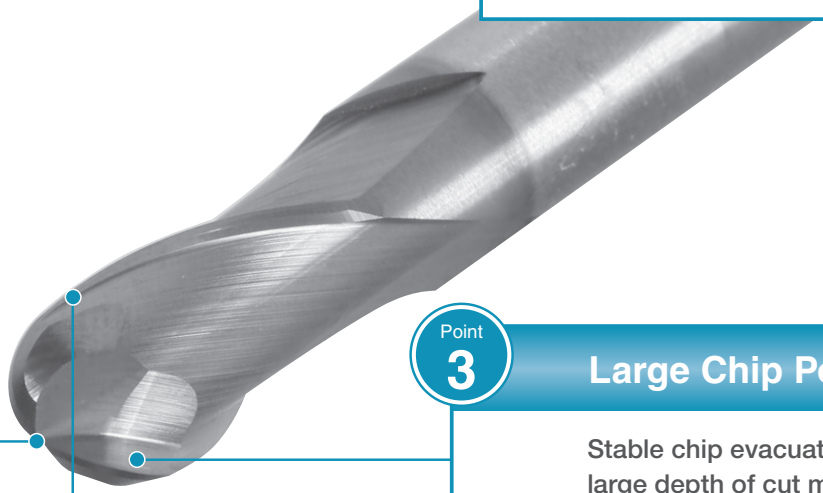


Conventional
(Internal evaluation)

Point 2 R±0.005mm close tolerance edge diameter (R8.0 excluded)

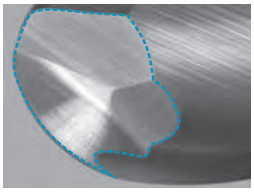
Excellent surface finish quality when using entire cutting edge in machining of the mold's draft angle or profiling



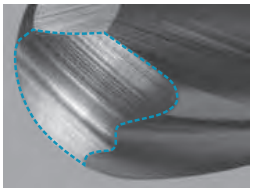


Point 3 Large Chip Pocket

Stable chip evacuation at large depth of cut machining

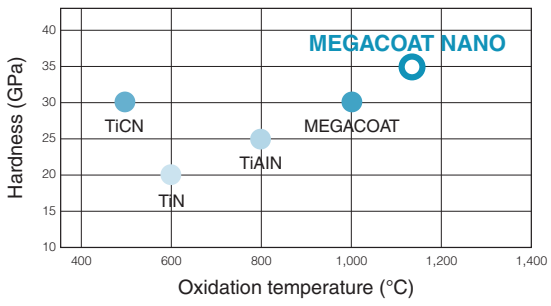


2SEB

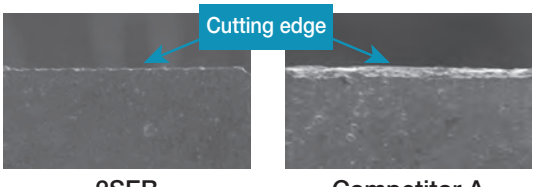


Conventional
(Internal evaluation)

Point 4 High quality cutting edge by MEGACOAT NANO



Smooth and sharp cutting edge with superior wear resistance and adhesion resistance



2SEB

Competitor A
(Internal evaluation)

2SEB



2

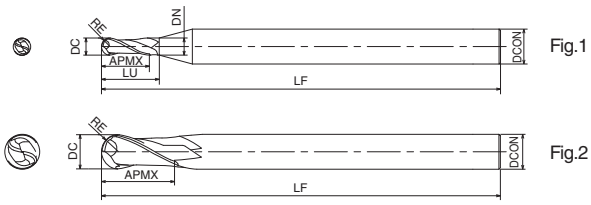
MEGACOAT NANO is applied

Recommended Workpiece Materials ★ 1st Choice





R8.0



2SEB (Ball-nose End Mill with 2 Flutes)

Copying

(Unit : mm)

Description	Stock	Radius of Ball-nose RE	Radius of Ball-nose Tolerance	Outside Dia. DC	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
2SEB020-050-R10	●	1.0	±0.005	2.0	5	2.10	6.6	6	50	2	Fig.1
2SEB030-080-R15	●	1.5	±0.005	3.0	8	3.15	9.8	6	70	2	
2SEB040-080-R20	●	2.0	±0.005	4.0	8	4.2	10.0	6	70	2	
2SEB050-100-R25	●	2.5	±0.005	5.0	10	5.2	12.4	6	80	2	
2SEB060-120-R30	●	3.0	±0.005	6.0	12	-	-	6	90	2	Fig.2
2SEB080-140-R40	●	4.0	±0.005	8.0	14	-	-	8	100	2	
2SEB100-180-R50	●	5.0	±0.005	10.0	18	-	-	10	100	2	
2SEB120-220-R60	●	6.0	±0.005	12.0	22	-	-	12	110	2	
2SEB160-300-R80	●	8.0	±0.010	16.0	30	-	-	16	140	2	

Solid End Mill Identification System

2 S E B 020 - 050 - R10

(1) (2) (3) (4) (5) (6) (7)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Outside Dia.	(6) Length of cut	(7) Radius of Ball-nose
2	S : High efficiency	E : 30-39°	B : Ball-nose End Mill	020 ↓ 2.0mm	050 ↓ 5.0mm	R10 ↓ R1.0mm

Recommended Cutting Conditions L77

● : Std. Item

No. of Flutes : 3

3UEBS (Ball-nose End Mill with 3 Flutes)

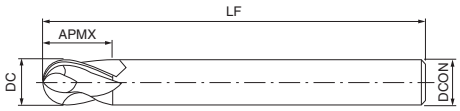




Recommended Workpiece Materials ★ 1st Choice







3UEBS (Ball-nose End Mill with 3 Flutes)

Copying

(Unit : mm)

Description	Stock	* Radius of Ball-nose	Outside Dia.	Length of cut	Shank Dia.	Overall length
		RE	DC	APMX	DCON	LF
3UEBS030-070-06	▲	R1.5	3	7	6	57
3UEBS040-080-06	▲	R2	4	8	6	57
3UEBS050-100-06	▲	R2.5	5	10	6	57
3UEBS060-100-06	▲	R3	6	10	6	57
3UEBS080-160-08	▲	R4	8	16	8	63
3UEBS100-190-10	▲	R5	10	19	10	72
3UEBS120-220-12	▲	R6	12	22	12	83

● Ball-nose end mill with three flutes for machining of difficult-to-cut materials.

Recommended Cutting Conditions ➔ L77

No. of Flutes : 4

4YEBM

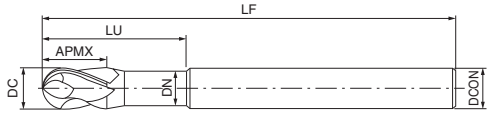




Recommended Workpiece Materials ★ 1st Choice







4YEBM (Ball-nose End Mill with 4 Flutes)

Shouldering Slotting

(Unit : mm)

Description	Stock	* Radius of Ball-nose	Outside Dia.	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length
		RE	DC	APMX	DN	LU	DCON	LF
4YEBM050-090-06	▲	R2.5	5	9	4.5	15	6	57
4YEBM060-100-06	▲	R3	6	10	5.5	15	6	57
4YEBM080-120-08	▲	R4	8	12	7.4	20	8	63
4YEBM100-140-10	▲	R5	10	14	9.2	25	10	72
4YEBM120-160-12	▲	R6	12	16	11	30	12	83
4YEBM160-220-16	▲	R8	16	22	15	38	16	92
4YEBM200-260-20	▲	R10	20	26	19	50	20	104

● Ball-nose end mill for semi-finishing of difficult-to-cut materials.

Recommended Cutting Conditions ➔ L78

* Actual ball-nose radius will be half of actual measurement of outside diameter.

▲ : To be replaced by a new product

No. of Flutes : 4,5,6,7,8

4HFS, 5HFS, 6HFS, 7HFS, 8HFS



4 5 6 7 8 HFSM

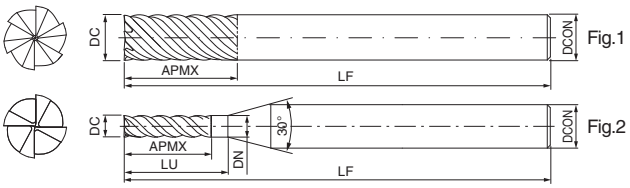
MEGACOAT HARD is applied

High Efficiency Machining

Recommended Workpiece Materials ★ 1st Choice





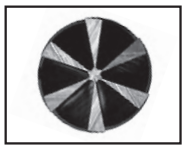


4HFSS, 5HFSS, 6HFSS, 7HFSS (Short)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4HFSS010-040-06	●	1	0 -0.015	4	1.05	4.8	6	60	4	Fig.2
4HFSS020-060-06	●	2	0 -0.015	6	2.10	7.2	6	60	4	
4HFSS030-080-06	●	3	0 -0.015	8	3.15	9.6	6	60	4	
4HFSS040-100-06	●	4	0 -0.015	10	4.2	12.0	6	60	4	
4HFSS050-120-06	●	5	0 -0.015	12	5.2	14.4	6	60	4	
5HFSS040-100-06	●	4	0 -0.015	10	4.2	12.0	6	60	5	
6HFSS060-140-06	●	6	0 -0.020	14	-	-	6	60	6	Fig.1
6HFSS080-180-08	●	8	-0.005 -0.025	18	-	-	8	70	6	
6HFSS100-220-10	●	10	-0.005 -0.025	22	-	-	10	80	6	
6HFSS120-260-12	●	12	-0.010 -0.030	26	-	-	12	90	6	
7HFSS060-140-06	●	6	0 -0.020	14	-	-	6	60	7	
7HFSS080-180-08	●	8	-0.005 -0.025	18	-	-	8	70	7	
7HFSS100-220-10	●	10	-0.005 -0.025	22	-	-	10	80	7	
7HFSS120-260-12	●	12	-0.010 -0.030	26	-	-	12	90	7	



Bottom surface of 6HFSS cutting edge

4HFSM, 5HFSM, 6HFSM, 7HFSM, 8HFSM (Medium)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4HFSM010-050-06	●	1	0 -0.015	5	1.05	6	6	60	4	Fig.2
4HFSM020-090-06	●	2	0 -0.015	9	2.10	10.8	6	60	4	
4HFSM030-120-06	●	3	0 -0.015	12	3.15	14.4	6	60	4	
4HFSM040-140-06	●	4	0 -0.015	14	4.2	16.8	6	60	4	
4HFSM050-170-06	●	5	0 -0.015	17	5.2	20.4	6	60	4	
5HFSM040-140-06	●	4	0 -0.015	14	4.2	16.8	6	60	5	
6HFSM060-170-06	●	6	0 -0.020	17	-	-	6	60	6	Fig.1
6HFSM070-200-08	●	7	-0.005 -0.025	20	7.2	24.0	8	70	6	Fig.2
6HFSM080-230-08	●	8	-0.005 -0.025	23	-	-	8	70	6	Fig.1
6HFSM100-280-10	●	10	-0.005 -0.025	28	-	-	10	80	6	
6HFSM120-330-12	●	12	-0.010 -0.030	33	-	-	12	90	6	
6HFSM140-370-16	●	14	-0.010 -0.030	37	14.2	44.4	16	105	6	Fig.2
6HFSM150-420-16	●	15	-0.010 -0.030	42	15.2	50.4	16	105	6	
6HFSM160-420-16	●	16	-0.010 -0.030	42	-	-	16	105	6	Fig.1
6HFSM200-480-20	●	20	-0.010 -0.030	48	-	-	20	110	6	
7HFSM060-170-06	●	6	0 -0.020	17	-	-	6	60	7	
7HFSM080-230-08	●	8	-0.005 -0.025	23	-	-	8	70	7	
7HFSM100-280-10	●	10	-0.005 -0.025	28	-	-	10	80	7	
7HFSM120-330-12	●	12	-0.010 -0.030	33	-	-	12	90	7	
7HFSM160-420-16	●	16	-0.010 -0.030	42	-	-	16	105	7	
8HFSM250-530-25	●	25	-0.010 -0.030	53	-	-	25	125	8	

● PVD coating "MEGACOAT HARD" for hard materials is applied.
Achieves high rigidity by ensuring a large core diameter, longer tool life and stable machining.
Also increases cutting edge strength and chip evacuation with a negative rake angle.

Recommended Cutting Conditions L78

● : Std. Item

Special corner-R shaped, 6 flutes, High feed rate

No. of Flutes : 6

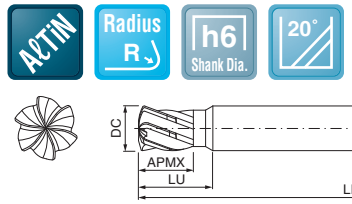
6PDRS





Recommended Workpiece Materials ★ 1st Choice





6PDRS

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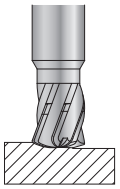
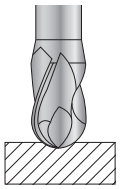
(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
6PDRS060-045-06	●	6	-0.020 -0.038	4.5	9	6	57	6
6PDRS080-060-08	●	8	-0.025 -0.047	6	12	8	63	6
6PDRS100-075-10	●	10	-0.025 -0.047	7.5	15	10	72	6
6PDRS120-090-12	●	12	-0.032 -0.059	9	18	12	83	6

- Increased rigidity with large core diameter. 6 flutes design enables high feed rate machining.
  Achieves large cutting allowance and high efficiency machining with special corner-R shaped.
  Ramping and arc cutting are possible.

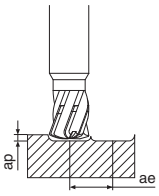


PDR



General Purpose Ball-nose End Mill

Recommended Cutting Conditions



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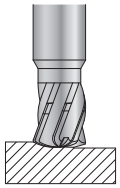
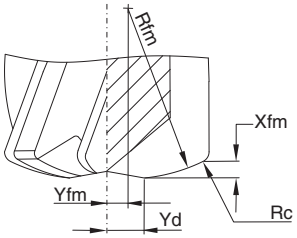
Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia.DC (mm)	ø6	ø8	ø10	ø12
Prehardened Steel	52HRC	ø6 : 0.32 x 3.3mm (0.32 x 0.55DC) ø8 : 0.42 x 4.4mm (0.42 x 0.55DC) ø10: 0.53 x 5.5mm (0.53 x 0.55DC) ø12: 0.63 x 6.6mm (0.63 x 0.55DC)	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200
			Feed Rate (mm/min)	7,600	7,200	6,900	7,600
Carbon Steel / Alloy Steel	< 45HRC		Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200
			Feed Rate (mm/min)	15,300	15,300	15,300	12,700

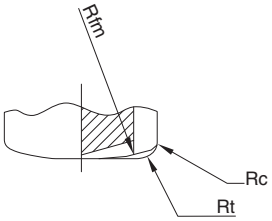
● : Std. Item

6PDRS Ramping / Arc cutting

Details of 6PDRS cutting edge shape







Xfm : Maximum Depth of Cut
Yfm : Distance between the center line of tool and the center of Rfm
Yd : Distance between the center line of tool and the start position of cutting edge
Rfm : Radius of tool tip
Rc : Corner-R
Rt : Virtual radius in program

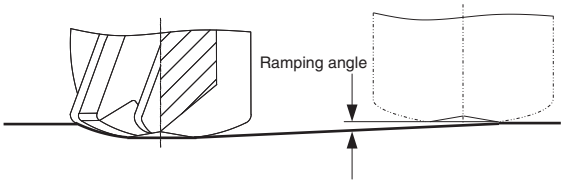
(Unit : mm)

Description	Outside Dia.	Maximum Depth of Cut	Radius of tool tip	Corner-R	Distance between the center line of tool and the center of Rfm	Distance between the center line of tool and the start position of cutting edge	Virtual radius in program
	DC	Xfm	Rfm	Rc	Yfm	Yd	Rt
6PDRS060-045-06	6	0.32	6	0.62	0.75	1.32	0.62
6PDRS080-060-08	8	0.42	8	0.83	1.00	1.76	0.83
6PDRS100-075-10	10	0.53	10	1.04	1.25	2.20	1.04
6PDRS120-090-12	12	0.63	12	1.24	1.50	2.64	1.24

- Cutting with cut amount exceeding the Xfm value is not recommended.

Ramping

During ramping, lower the feed rate to the ratio in the chart on the right.

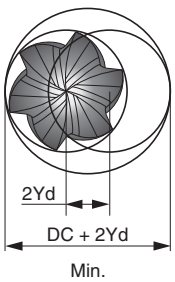


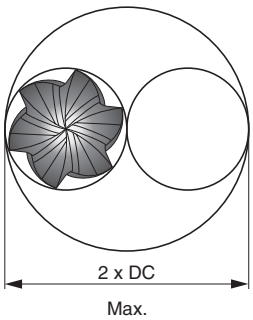
Ramping angle	1°	2°	3°	4°	5°
Ratio of feed rate	100%	70%	50%	30%	10%

- During pocket machining, set the ramping angle at 0.5°.
- Plunge milling is not recommended.

Arc cutting

For arc cutting, hole diameter of each machining should be within the range in the chart on the right.





(Unit : mm)

Description	Min.	Max.
6PDRS060-045-06	8.64	12.00
6PDRS080-060-08	11.52	16.00
6PDRS100-075-10	14.40	20.00
6PDRS120-090-12	17.28	24.00

3AFK

High Efficiency and Excellent Precision Machining with 3 Flutes

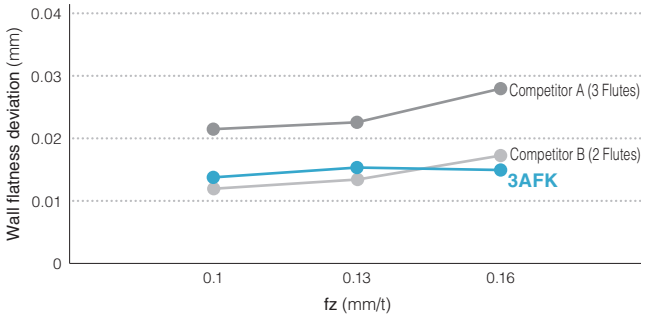
Stable Machining with Sharp Edge for Anti-chattering Performance

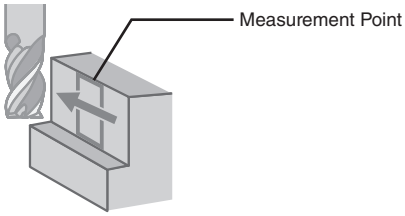
Wide Range of Applications including Slotting, Shouldering, Ramping, and Plunge milling

1 High-efficiency and High-precision Machining

High Efficiency with 3 Flutes. Excellent Machining Precision

Comparison of wall flatness (Internal evaluation)





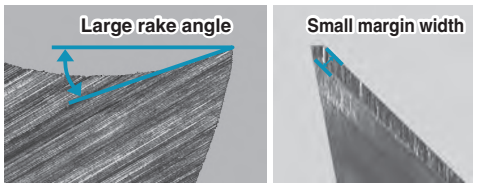
Cutting Conditions : n = 11,700 min^{-1}, Vf = 3,500 - 5,600 mm/min, ap x ae = 15 x 1 mm
End Mill Dia. ø10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A5052

2 Decreased burr

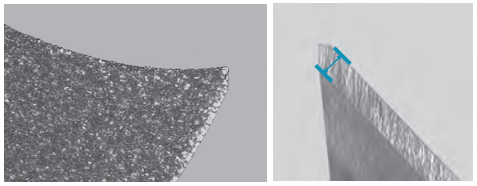
Excellent Sharpness with Large Rake Angle and Small Margin Width

Comparison of the Rake Angle and Margin Width (Internal evaluation)

3AFK



Competitor C

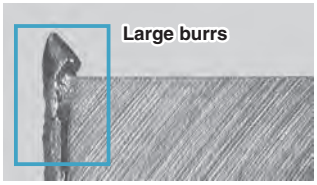


Burr Comparison after Machining (Internal evaluation)

3AFK

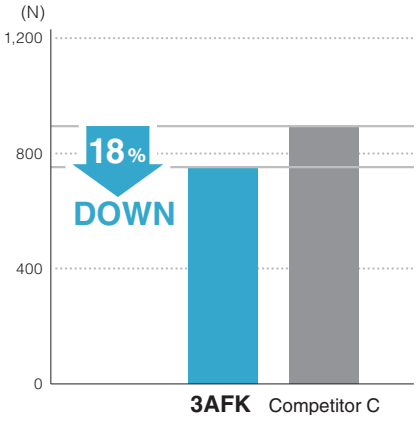


Competitor C



Burr Comparison after Machining Cutting Conditions : n = 11,700 min^{-1}, Vf = 4,600 mm/min, ap x ae = 10 x 1 mm
End Mill Dia. ø10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A7075

Cutting Force Comparison (Internal evaluation)

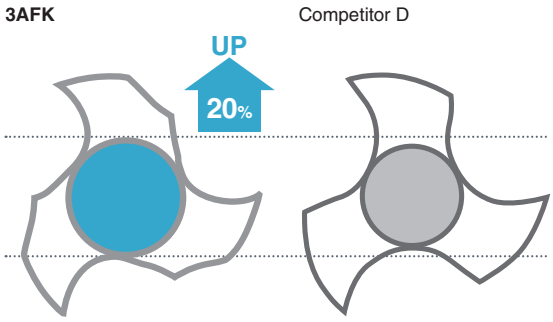


Cutting Conditions : n = 11,700 min^{-1}, Vf = 3,400 mm/min
ap x ae = 10 x 10 mm
End Mill Dia. ø10, Slotting, Wet, BT50 Workpiece Material : A5052

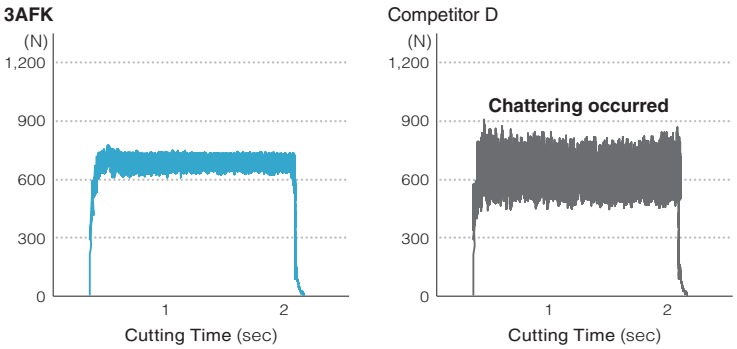
3 Resistance to chattering

Larger Core Thickness to Reduce Chattering

Core Thickness Comparison (Internal evaluation)

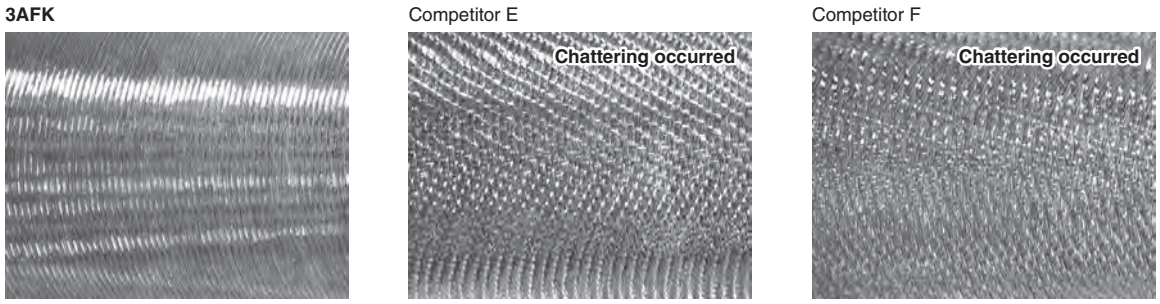


Cutting Force Comparison (Internal evaluation)



Cutting Conditions : n = 11,700 min^{-1}, Vf = 3,400 mm/min, ap x ae = 10 x 10 mm, End Mill Dia. ø10, Slotting, Wet, BT50 Workpiece Material : A5052

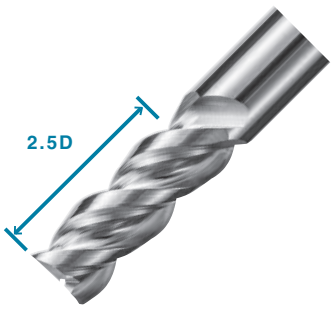
Comparison of Bottom Surface at Slotting (Internal evaluation)



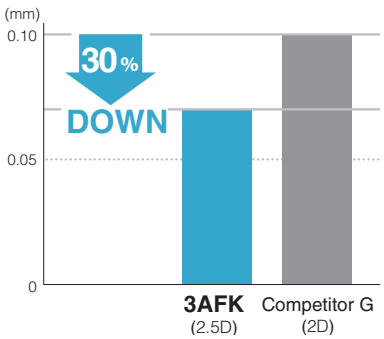
Cutting Conditions : n = 11,100min^{-1}, Vf = 2,600 mm/min, ap = 10 mm, Wet Workpiece Material : A5052

4 Flute Length 2.5 D (medium type) Added to the Lineup

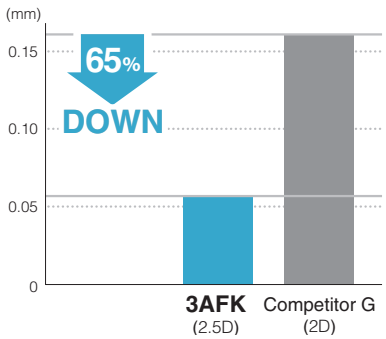
Stable Machining even while Deep Slotting



Comparison of wall flatness (Internal evaluation)



Burr Height Comparison (Internal evaluation)



Cutting Conditions : n = 11,100 min^{-1}, Vf = 3,800 mm/min, ap x ae = 20 x 1 mm
End Mill Dia. ø10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A7075

No. of Flutes : 3

3AFK



Recommended Workpiece Materials ★ 1st Choice

N Aluminum & Non Ferrous Material

Uncoated | Land | h5 Shank Dia. | 45°

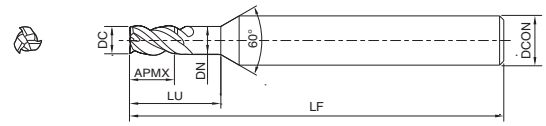


Fig.1

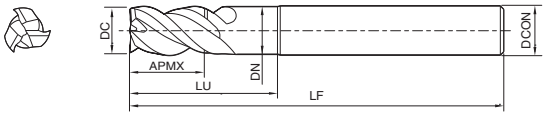


Fig.2

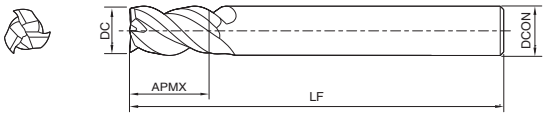


Fig.3

3AFK (Short : 1.5D)

Shouldering | Slotting | Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
3AFK030-045-090	●	3.0	0 -0.015	4.5	2.7	9	6	70	3	Fig.1
3AFK040-060-120	●	4.0	0 -0.015	6	3.7	12	6	70	3	
3AFK050-075-150	●	5.0	0 -0.015	7.5	4.7	15	6	70	3	
3AFK060-090	●	6.0	0 -0.005	9	-	-	6	70	3	Fig.3
3AFK060-090-180	●	6.0	0 -0.005	9	5.7	18	6	70	3	Fig.2
3AFK070-105-210	●	7.0	0 -0.015	10.5	6.7	21	8	80	3	Fig.1
3AFK080-120	●	8.0	0 -0.006	12	-	-	8	80	3	Fig.3
3AFK080-120-240	●	8.0	0 -0.006	12	7.7	24	8	80	3	Fig.2
3AFK090-135-270	●	9.0	0 -0.015	13.5	8.7	27	10	90	3	Fig.1
3AFK100-150	●	10.0	0 -0.006	15	-	-	10	90	3	Fig.3
3AFK100-150-300	●	10.0	0 -0.006	15	9.7	30	10	90	3	Fig.2
3AFK110-165-330	●	11.0	0 -0.015	16.5	10.7	33	12	110	3	Fig.1
3AFK120-180	●	12.0	0 -0.008	18	-	-	12	110	3	Fig.3
3AFK120-180-360	●	12.0	0 -0.008	18	11.7	36	12	110	3	Fig.2
3AFK160-240	●	16.0	0 -0.008	24	-	-	16	120	3	Fig.3
3AFK160-240-480	●	16.0	0 -0.008	24	15.7	48	16	120	3	Fig.2

Recommended Cutting Conditions L79

● : Std. Item



3AFK (Medium : 2.5D)

Shouldering | Slotting | Plunge milling

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes	Shape
		DC		APMX	DN	LU	DCON	LF	ZEFP	
3AFK030-075-150	●	3.0	0 -0.015	7.5	2.7	15	6	70	3	Fig.1
3AFK040-100-200	●	4.0	0 -0.015	10	3.7	20	6	70	3	
3AFK050-125-250	●	5.0	0 -0.015	12.5	4.7	25	6	70	3	
3AFK060-150	●	6.0	0 -0.005	15	-	-	6	70	3	Fig.3
3AFK060-150-300	●	6.0	0 -0.005	15	5.7	30	6	70	3	Fig.2
3AFK070-175-350	●	7.0	0 -0.015	17.5	6.7	35	8	80	3	Fig.1
3AFK080-200	●	8.0	0 -0.006	20	-	-	8	80	3	Fig.3
3AFK080-200-400	●	8.0	0 -0.006	20	7.7	40	8	80	3	Fig.2
3AFK090-225-450	●	9.0	0 -0.015	22.5	8.7	45	10	90	3	Fig.1
3AFK100-250	●	10.0	0 -0.006	25	-	-	10	90	3	Fig.3
3AFK100-250-500	●	10.0	0 -0.006	25	9.7	50	10	90	3	Fig.2
3AFK110-275-550	●	11.0	0 -0.015	27.5	10.7	55	12	110	3	Fig.1
3AFK120-300	●	12.0	0 -0.008	30	-	-	12	110	3	Fig.3
3AFK120-300-600	●	12.0	0 -0.008	30	11.7	60	12	110	3	Fig.2
3AFK160-400	●	16.0	0 -0.008	40	-	-	16	120	3	Fig.3
3AFK160-400-800	●	16.0	0 -0.008	40	15.7	80	16	120	3	Fig.2

Recommended Cutting Conditions L79

● : Std. Item

No. of Flutes : 3

3NESM

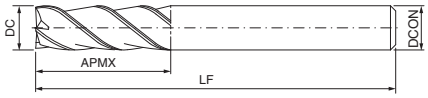
Recommended Workpiece Materials ★ 1st Choice











3NESM

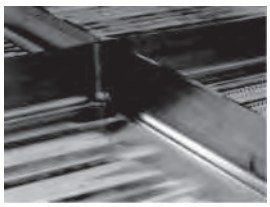
Shouldering Slotting

(Unit : mm)

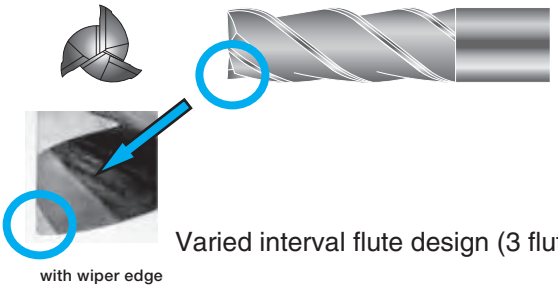
Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Shank Dia.	Overall length	No. of Flutes
		DC		APMX	DCON	LF	ZEFP
3NESM030-120-06	●	3	-0.014 -0.028	12	6	50	3
3NESM040-120-06	●	4	-0.020 -0.038	12	6	50	3
3NESM050-140-06	●	5	-0.020 -0.038	14	6	50	3
3NESM060-160-06	●	6	0 -0.008	16	6	50	3
3NESM080-200-08	●	8	0 -0.009	20	8	63	3
3NESM100-220-10	●	10	0 -0.009	22	10	76	3
3NESM120-250-12	●	12	0 -0.011	25	12	76	3
3NESM160-320-16	●	16	0 -0.011	32	16	89	3
3NESM200-380-20	●	20	0 -0.013	38	20	104	3

* Cutting edge of over 6mm øDC has margin.

● A wiper is attached at the lower edge for improving the bottom surface finish.
Chattering is controlled with cutting edge slots at varied intervals, and finishing of lateral surfaces is improved.



Finished surface of aluminum alloy at high speed machining.
Reached 0.25μmRa
(Bottom face / side face / corner)



Varied interval flute design (3 flutes)
with wiper edge

Recommended Cutting Conditions ➔ L79

● : Std. Item

End Mill 4FCX-KCD · Drill 2ZDF-KCD

NEW

Diamond Coated Solid Tools

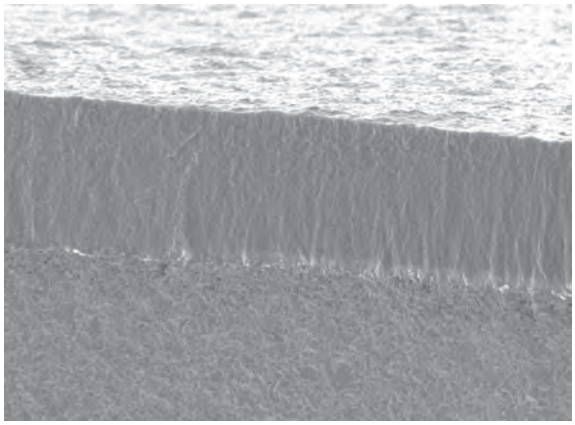
Newly Developed High Performance Diamond Coating
Long Tool Life and High Precision Machining of CFRP

End Mill	4FCX-KCD
Drill	2ZDF-KCD
Special Order Items	* Special order items such as routers are also available

1 Diamond Coating with Superior Wear Resistance and Fracture Resistance
High Degree of Crystallinity, Adhesion and Toughness Improve Tool Durability

Unique Preprocessing Technology and Special Carbide Material
Superior Adhesion Ensures Stable Machining

Smooth and Even Coating Surface



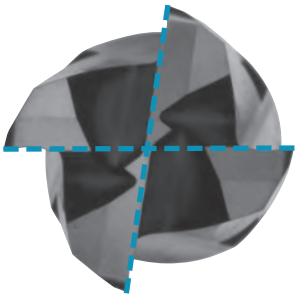
Cross-section of Diamond Coating



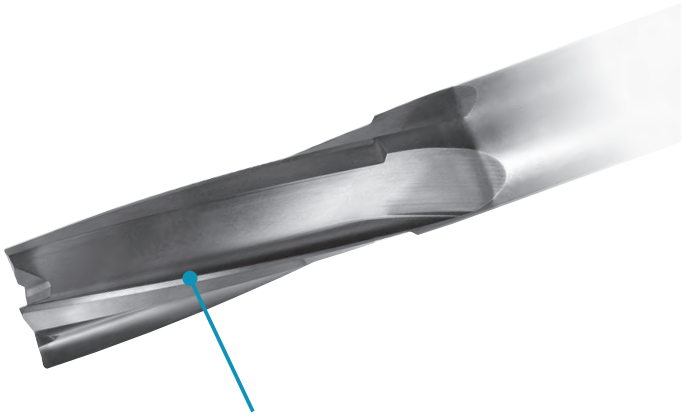
2 Special Tool Geometry Coated with a Smooth Diamond Coating Reduces Cutting Force Long Tool Life, High Precision and High Quality Machining of CFRP

End Mill Variable Flute Design Prevents Chattering and Stable Machining Provides High-quality Surface finishes
Sharp Cutting Edges Cut Off Strong Carbon Fibers. Reduces Delamination and Burr Build Up

New Geometry (Variable Flute Design)



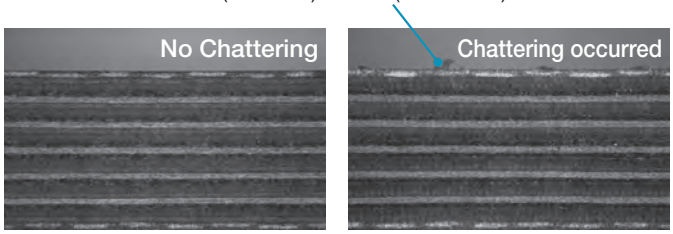
Variable flute design prevents chattering



Cutting edge with excellent sharpness

Surface Finish Comparison (Internal evaluation)

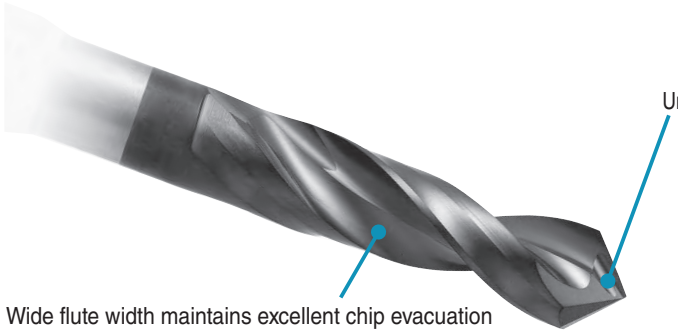
Excellent surface finish (Side wall) Burr (Uncut fiber)



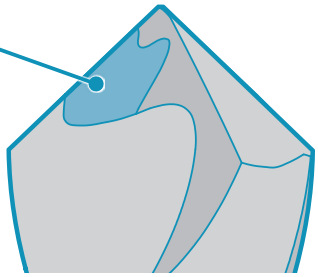
Kyocera Conventional A

Cutting Conditions : Vc = 280 m/min, f = 0.1 mm/rev
Outside Dia. ø10 mm, ae = 10 mm (Slotting), Dry Workpiece Material : CFRP 4.6 mm (Thickness)

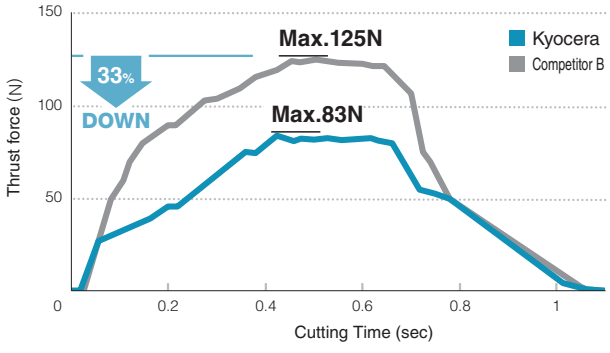
Drill Unique Rake Face Delivers Sharpness at the top of Drill
Low Cutting Force Provides Long Tool Life



Wide flute width maintains excellent chip evacuation



Cutting Force Comparison (Internal evaluation)



Cutting Conditions : Vc = 100 m/min, f = 0.08 mm/rev
Outside Dia. ø6 mm (Special order item), Dry Workpiece Material : CFRP 4.6 mm (Thickness)

No. of Cutting Holes Comparison (Internal evaluation)



Surface finish



Provides high quality surface finish and long tool life

Cutting Conditions : Vc = 100 m/min, f = 0.08 mm/rev
Outside Dia. ø7 mm (Special order item), Dry Workpiece Material : CFRP 4.6 mm (Thickness)

4FCX-KCD NEW

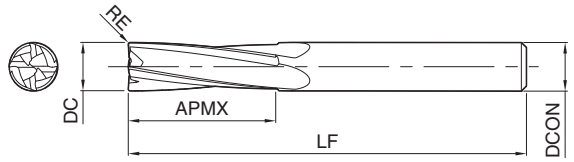


4

Recommended Workpiece Materials ★ 1st Choice

N Non Metal

Diamond h5 Shank Dia.



Shouldering

(Unit : mm)

Description	Stock	Outside Dia.	Corner-R	Length of cut	Shank Dia.	Overall length	No. of Flutes
		DC	RE	APMX	DCON	LF	ZEFP
4FCX080-250-KCD	●	8	0.4	25	8	80	4
4FCX100-300-KCD	●	10	0.4	30	10	80	4
4FCX120-300-KCD	●	12	0.4	30	12	100	4

* Special order items such as routers are also available

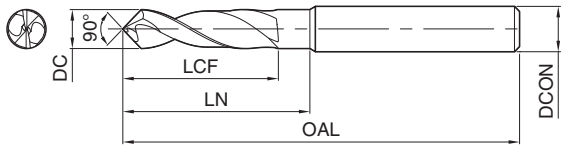
2ZDF-KCD NEW



Recommended Workpiece Materials ★ 1st Choice

N Non Metal

Diamond h6 Shank Dia.



(Unit : mm)

Description	Stock	Outside Dia.		Flute length	Under Neck Length	Overall length	Shank Dia.
		DC (mm)	DC (inch)	LCF	LN	OAL	DCON
2ZDF04763-KCD	●	4.763	3/16	35	40	70	6
2ZDF06350-KCD	●	6.350	1/4	40	45	90	8
2ZDF07938-KCD	●	7.938	5/16	50	55	90	8

* Special ordering is available

Solid Drill Identification System

2ZDF - 04763 - KCD

(1) (2) (3)

(1) Series	(2) Outside Dia.	(3) Others
2ZDF : Drill for CFRP	04763 ↓ 4.763mm	KCD : Diamond Coating

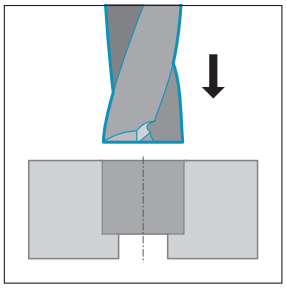
Recommended Cutting Conditions L79

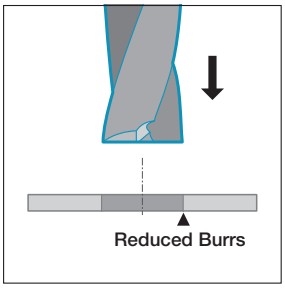
● : Std. Item

2ZDK-HP NEW

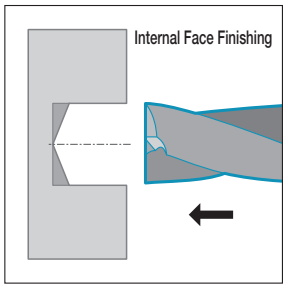
New Generation Flat Bottom Drill
Stable Machining in a Wide Range of Applications Including Counterboring and Drilling in Cylinder Surfaces
Low Cutting Force Corner Edge Prevents Burr Formation

1 Flat Bottom Used in a Wide Range of Machining Applications

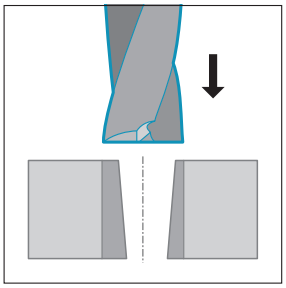

Counterboring

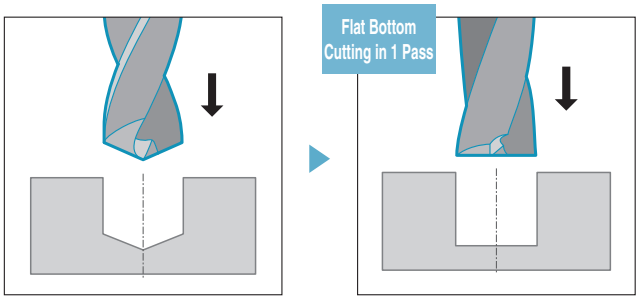


Plunge Milling on Thin Plate

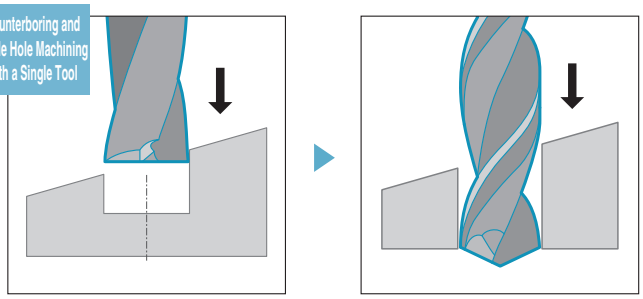


Turning in Automatic Lathes

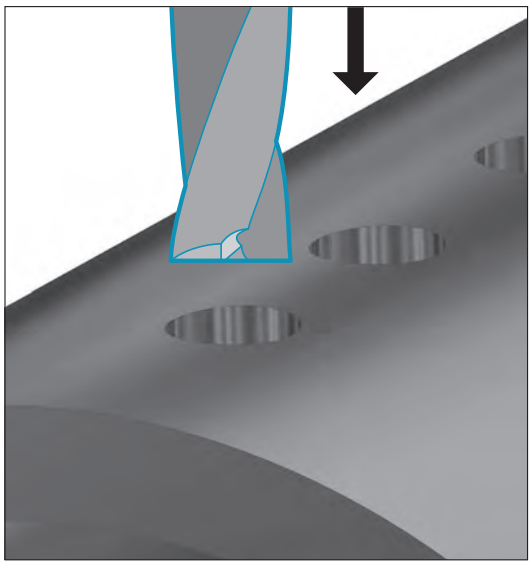

Hole Expanding



Bottom Finishing after Drilling



Counterboring on Slant Surface / Guide Hole Machining

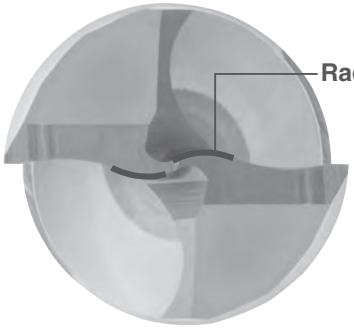

Drilling in Cylinder and Curved Surfaces

Achieves Stable Machining even in Difficult Drilling Situations

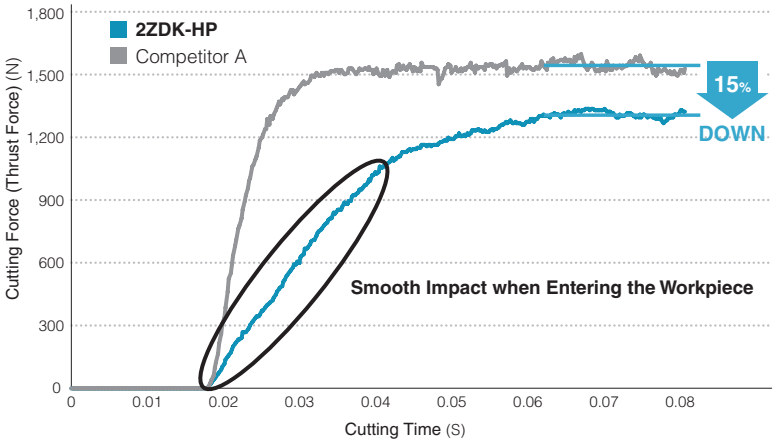
2 High-Precision Machining

Chisel Edge with S-curve Provides Lower Cutting Forces
Reduced Impact Forces when Entering the Workpiece and Provides Excellent Vibration Control for High Precision Drilling

Special Thinning Shape



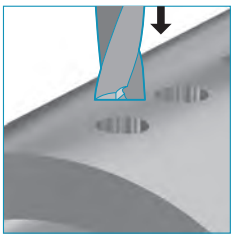
Cutting Force Comparison (Internal evaluation)



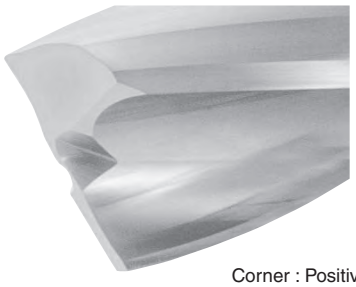
Cutting Conditions : n = 1,800 min-1, Vf = 400 mm/min, Drilling Depth 10 mm, Dry Drill Dia. ø12 mm (3D type)
Workpiece Material : S50C

3 Decreased burr

Low Cutting Force with Flat Bottom and Sharp Cutting Edge
Decreased burr



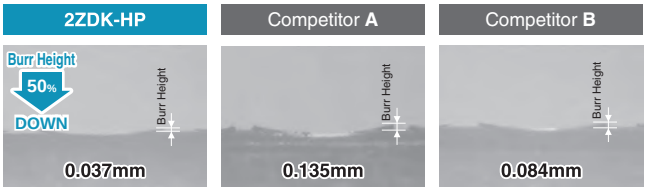
Low Cutting Force Corner Edge Design



Corner : Positive Rake Angle

Burr Comparison (Internal evaluation)

Drilling in Cylinder Surface

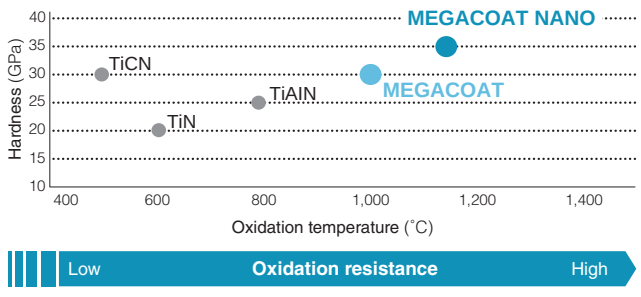


Cutting Conditions : n = 7,000 min-1, Vf = 420 mm/min, Wet Drill Dia. ø3.5 mm (3D type)
Workpiece Material : Carbon Steel Pipe ø17.3 mm (Thickness 3.2 mm)

4 Extended Tool Life by MEGACOAT NANO Technology

The special Multilayer Nano Coating prevents wear and chipping with high hardness (35GPa) and superior oxidation resistance (oxidation temperature : 1,150 ˚C)

Properties of Coating



Flat Bottom Drill (Counterboring)

No. of Flutes : 2

2ZDK-HP (Drilling Depth Short type) NEW

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material



2

MEGACOAT NANO is applied

MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12) | h6 Shank Dia. (ø12.5~)



Fig.1

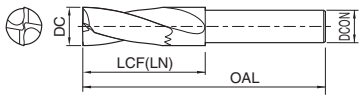


Fig.2

2ZDK-HP (Drilling Depth Short type)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK010HP-1.5D	●	1.0	0 -0.010	3.5	4.3	4	50	Fig.1
2ZDK011HP-1.5D	●	1.1		3.9	4.7			
2ZDK012HP-1.5D	●	1.2		4.3	5.1			
2ZDK013HP-1.5D	●	1.3		4.7	5.5			
2ZDK014HP-1.5D	●	1.4		5.1	5.9			
2ZDK015HP-1.5D	●	1.5		5.5	6.3			
2ZDK016HP-1.5D	●	1.6		5.7	6.5			
2ZDK017HP-1.5D	●	1.7		5.9	6.7			
2ZDK018HP-1.5D	●	1.8		6.1	6.9			
2ZDK019HP-1.5D	●	1.9		6.3	7.1			
2ZDK020HP-1.5D	●	2.0		6.5	7.3			
2ZDK021HP-1.5D	●	2.1		6.9	7.7			
2ZDK022HP-1.5D	●	2.2		7.3	8.1			
2ZDK023HP-1.5D	●	2.3		7.7	8.5			
2ZDK024HP-1.5D	●	2.4		8.1	8.9			
2ZDK025HP-1.5D	●	2.5		8.5	9.3			
2ZDK026HP-1.5D	●	2.6		8.8	9.5			
2ZDK027HP-1.5D	●	2.7		9.1	9.8			
2ZDK028HP-1.5D	●	2.8		9.3	10.0			
2ZDK029HP-1.5D	●	2.9		9.5	10.3			
2ZDK030HP-1.5D	●	3.0		9	10	6	60	
2ZDK031HP-1.5D	●	3.1	0 -0.012	10	11			
2ZDK032HP-1.5D	●	3.2						
2ZDK033HP-1.5D	●	3.3						
2ZDK034HP-1.5D	●	3.4		11	12			

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK035HP-1.5D	●	3.5	0 -0.012	11	12	6	60	Fig.1
2ZDK036HP-1.5D	●	3.6						
2ZDK037HP-1.5D	●	3.7		12	13			
2ZDK038HP-1.5D	●	3.8						
2ZDK039HP-1.5D	●	3.9						
2ZDK040HP-1.5D	●	4.0						
2ZDK041HP-1.5D	●	4.1		13	14			
2ZDK042HP-1.5D	●	4.2						
2ZDK043HP-1.5D	●	4.3						
2ZDK044HP-1.5D	●	4.4		14	15			
2ZDK045HP-1.5D	●	4.5						
2ZDK046HP-1.5D	●	4.6						
2ZDK047HP-1.5D	●	4.7		15	16			
2ZDK048HP-1.5D	●	4.8						
2ZDK049HP-1.5D	●	4.9						
2ZDK050HP-1.5D	●	5.0		16	17			
2ZDK051HP-1.5D	●	5.1						
2ZDK052HP-1.5D	●	5.2						
2ZDK053HP-1.5D	●	5.3						
2ZDK054HP-1.5D	●	5.4		17	18			
2ZDK055HP-1.5D	●	5.5						
2ZDK056HP-1.5D	●	5.6						
2ZDK057HP-1.5D	●	5.7		18	19			
2ZDK058HP-1.5D	●	5.8						
2ZDK059HP-1.5D	●	5.9						

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

Recommended Cutting Conditions ➡ **L80**

· The drilling depth should be less than 1.5D(1.5 x DC).

● : Std. Item

2ZDK-HP (Drilling Depth Short type)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK060HP-1.5D	●	6.0	0 -0.012	19	21	6	60	Fig.1
2ZDK061HP-1.5D	●	6.1	0 -0.015	19	21	8	70	Fig.1
2ZDK062HP-1.5D	●	6.2						
2ZDK063HP-1.5D	●	6.3		20	22			
2ZDK064HP-1.5D	●	6.4						
2ZDK065HP-1.5D	●	6.5						
2ZDK066HP-1.5D	●	6.6						
2ZDK067HP-1.5D	●	6.7		21	23			
2ZDK068HP-1.5D	●	6.8						
2ZDK069HP-1.5D	●	6.9						
2ZDK070HP-1.5D	●	7.0		22	24			
2ZDK071HP-1.5D	●	7.1						
2ZDK072HP-1.5D	●	7.2						
2ZDK073HP-1.5D	●	7.3		23	25			
2ZDK074HP-1.5D	●	7.4						
2ZDK075HP-1.5D	●	7.5						
2ZDK076HP-1.5D	●	7.6		24	25			
2ZDK077HP-1.5D	●	7.7						
2ZDK078HP-1.5D	●	7.8						
2ZDK079HP-1.5D	●	7.9						
2ZDK080HP-1.5D	●	8.0		25	27			
2ZDK081HP-1.5D	●	8.1				10	80	
2ZDK082HP-1.5D	●	8.2						
2ZDK083HP-1.5D	●	8.3		26	28			
2ZDK084HP-1.5D	●	8.4						
2ZDK085HP-1.5D	●	8.5						
2ZDK086HP-1.5D	●	8.6		27	29			
2ZDK087HP-1.5D	●	8.7						
2ZDK088HP-1.5D	●	8.8						
2ZDK089HP-1.5D	●	8.9		28	30			
2ZDK090HP-1.5D	●	9.0						
2ZDK091HP-1.5D	●	9.1						
2ZDK092HP-1.5D	●	9.2		29	31			
2ZDK093HP-1.5D	●	9.3						
2ZDK094HP-1.5D	●	9.4						
2ZDK095HP-1.5D	●	9.5						
2ZDK096HP-1.5D	●	9.6		30	32			
2ZDK097HP-1.5D	●	9.7						
2ZDK098HP-1.5D	●	9.8						

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK099HP-1.5D	●	9.9	0 -0.015	31	33	10	80	Fig.1
2ZDK100HP-1.5D	●	10.0						
2ZDK101HP-1.5D	●	10.1	0 -0.018	31	33	12	100	
2ZDK102HP-1.5D	●	10.2		32	34			
2ZDK103HP-1.5D	●	10.3						
2ZDK104HP-1.5D	●	10.4						
2ZDK105HP-1.5D	●	10.5		33	35			
2ZDK106HP-1.5D	●	10.6						
2ZDK107HP-1.5D	●	10.7						
2ZDK108HP-1.5D	●	10.8						
2ZDK109HP-1.5D	●	10.9		34	36			
2ZDK110HP-1.5D	●	11.0						
2ZDK111HP-1.5D	●	11.1						
2ZDK112HP-1.5D	●	11.2		35	37			
2ZDK113HP-1.5D	●	11.3						
2ZDK114HP-1.5D	●	11.4						
2ZDK115HP-1.5D	●	11.5		36	38			
2ZDK116HP-1.5D	●	11.6						
2ZDK117HP-1.5D	●	11.7						
2ZDK118HP-1.5D	●	11.8						
2ZDK119HP-1.5D	●	11.9						
2ZDK120HP-1.5D	●	12.0		37	39			
2ZDK125HP-1.5D	●	12.5	0 -0.018	41	41	12	100	Fig.2
2ZDK130HP-1.5D	●	13.0		43	43			
2ZDK135HP-1.5D	●	13.5		44	44			
2ZDK140HP-1.5D	●	14.0		45	45			
2ZDK145HP-1.5D	●	14.5	0 -0.018	47	47	12	115	Fig.2
2ZDK150HP-1.5D	●	15.0		48	48			
2ZDK155HP-1.5D	●	15.5		50	50			
2ZDK160HP-1.5D	●	16.0	0 -0.018	52	52	16	115	Fig.1
2ZDK165HP-1.5D	●	16.5	0 -0.018	53	53	16	115	Fig.2
2ZDK170HP-1.5D	●	17.0		54	54			
2ZDK175HP-1.5D	●	17.5		56	56			
2ZDK180HP-1.5D	●	18.0		57	57			
2ZDK185HP-1.5D	●	18.5	0 -0.021	59	59	16	125	Fig.2
2ZDK190HP-1.5D	●	19.0		60	60			
2ZDK195HP-1.5D	●	19.5		62	62			
2ZDK200HP-1.5D	●	20.0	0 -0.021	63	63	20	125	Fig.1

Recommended Cutting Conditions ➡ L80

● : Std. Item

No. of Flutes : 2

2ZDK-HP (Drilling Depth Short type Long shank) NEW

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material



2

MEGACOAT NANO is applied

MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12)

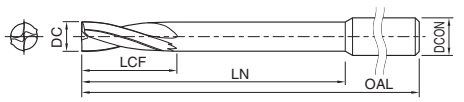


Fig.1

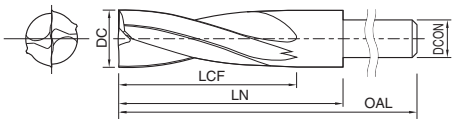


Fig.2

Plunge milling

2ZDK-HP (Drilling Depth Short type Long shank)

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK030HP-1.5D-LS	●	3.0	0 -0.010	9.0	30.0	6	100	Fig.1
2ZDK031HP-1.5D-LS	MTO	3.1	0 -0.012	10.0	31.0	6	100	Fig.1
2ZDK032HP-1.5D-LS	MTO	3.2			32.0			
2ZDK033HP-1.5D-LS	MTO	3.3			33.0			
2ZDK034HP-1.5D-LS	MTO	3.4		11.0	34.0			
2ZDK035HP-1.5D-LS	●	3.5			35.0			
2ZDK036HP-1.5D-LS	MTO	3.6			36.0			
2ZDK037HP-1.5D-LS	MTO	3.7		12.0	37.0			
2ZDK038HP-1.5D-LS	MTO	3.8			38.0			
2ZDK039HP-1.5D-LS	MTO	3.9			39.0			
2ZDK040HP-1.5D-LS	●	4.0			40.0			
2ZDK041HP-1.5D-LS	MTO	4.1		13.0	41.0			
2ZDK042HP-1.5D-LS	MTO	4.2			42.0			
2ZDK043HP-1.5D-LS	MTO	4.3			43.0			
2ZDK044HP-1.5D-LS	MTO	4.4		14.0	44.0			
2ZDK045HP-1.5D-LS	●	4.5			45.0			
2ZDK046HP-1.5D-LS	MTO	4.6			46.0			
2ZDK047HP-1.5D-LS	MTO	4.7		15.0	47.0			
2ZDK048HP-1.5D-LS	MTO	4.8			48.0			
2ZDK049HP-1.5D-LS	MTO	4.9			49.0			
2ZDK050HP-1.5D-LS	●	5.0	0 -0.012	16.0	50.0	6	110	Fig.1
2ZDK051HP-1.5D-LS	MTO	5.1			51.0			
2ZDK052HP-1.5D-LS	MTO	5.2			52.0			

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK053HP-1.5D-LS	MTO	5.3	0 -0.012	16.0	53.0	6	110	Fig.1
2ZDK054HP-1.5D-LS	MTO	5.4		17.0	54.0			
2ZDK055HP-1.5D-LS	●	5.5			55.0			
2ZDK056HP-1.5D-LS	MTO	5.6			56.0			
2ZDK057HP-1.5D-LS	MTO	5.7		18.0	57.0			
2ZDK058HP-1.5D-LS	MTO	5.8			58.0			
2ZDK059HP-1.5D-LS	MTO	5.9			59.0			
2ZDK060HP-1.5D-LS	●	6.0	0 -0.012	19.0	60.0	6	120	Fig.1
2ZDK061HP-1.5D-LS	MTO	6.1	0 -0.015	19.0	29.0	6	120	Fig.2
2ZDK062HP-1.5D-LS	MTO	6.2						
2ZDK063HP-1.5D-LS	MTO	6.3		20.0	29.5			
2ZDK064HP-1.5D-LS	MTO	6.4						
2ZDK065HP-1.5D-LS	●	6.5						
2ZDK066HP-1.5D-LS	MTO	6.6						
2ZDK067HP-1.5D-LS	MTO	6.7		21.0	30.0			
2ZDK068HP-1.5D-LS	MTO	6.8						
2ZDK069HP-1.5D-LS	MTO	6.9						
2ZDK070HP-1.5D-LS	●	7.0		22.0	30.0			
2ZDK071HP-1.5D-LS	MTO	7.1			30.5			
2ZDK072HP-1.5D-LS	MTO	7.2						
2ZDK073HP-1.5D-LS	MTO	7.3		23.0	30.5			
2ZDK074HP-1.5D-LS	MTO	7.4						
2ZDK075HP-1.5D-LS	●	7.5						

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

· The drilling depth should be less than 1.5D(1.5 x DC).

Recommended Cutting Conditions ➔ L81

● : Std. Item MTO : Made to order

2ZDK-HP (Drilling Depth Short type Long shank)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK076HP-1.5D-LS	MTO	7.6	0 -0.015	24.0	31.0	6	120	Fig.2
2ZDK077HP-1.5D-LS	MTO	7.7						
2ZDK078HP-1.5D-LS	MTO	7.8						
2ZDK079HP-1.5D-LS	MTO	7.9						
2ZDK080HP-1.5D-LS	●	8.0	0 -0.015	25.0	80.0	8	130	Fig.1
2ZDK081HP-1.5D-LS	MTO	8.1			31.5			Fig.2
2ZDK082HP-1.5D-LS	MTO	8.2						
2ZDK083HP-1.5D-LS	MTO	8.3		26.0				
2ZDK084HP-1.5D-LS	MTO	8.4			32.0			
2ZDK085HP-1.5D-LS	●	8.5						
2ZDK086HP-1.5D-LS	MTO	8.6	0 -0.015	27.0	32.0	8	130	Fig.2
2ZDK087HP-1.5D-LS	MTO	8.7						
2ZDK088HP-1.5D-LS	MTO	8.8			32.5			
2ZDK089HP-1.5D-LS	MTO	8.9		28.0				
2ZDK090HP-1.5D-LS	●	9.0						
2ZDK091HP-1.5D-LS	MTO	9.1						
2ZDK092HP-1.5D-LS	MTO	9.2	0 -0.015	29.0	32.5	8	130	Fig.2
2ZDK093HP-1.5D-LS	MTO	9.3						
2ZDK094HP-1.5D-LS	MTO	9.4						
2ZDK095HP-1.5D-LS	●	9.5						
2ZDK096HP-1.5D-LS	MTO	9.6	0 -0.015	30.0	33.5	8	130	Fig.2
2ZDK097HP-1.5D-LS	MTO	9.7						
2ZDK098HP-1.5D-LS	MTO	9.8						

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK099HP-1.5D-LS	MTO	9.9	0 -0.015	31.0	34.5	8	130	Fig.2
2ZDK100HP-1.5D-LS	●	10.0	0 -0.015	31.0	100.0	10	150	Fig.1
2ZDK101HP-1.5D-LS	MTO	10.1	0 -0.018	31.0	35.5	10	150	Fig.2
2ZDK102HP-1.5D-LS	MTO	10.2		32.0				
2ZDK103HP-1.5D-LS	MTO	10.3			36.0			
2ZDK104HP-1.5D-LS	MTO	10.4						
2ZDK105HP-1.5D-LS	●	10.5		33.0	36.5			
2ZDK106HP-1.5D-LS	MTO	10.6						
2ZDK107HP-1.5D-LS	MTO	10.7						
2ZDK108HP-1.5D-LS	MTO	10.8						
2ZDK109HP-1.5D-LS	MTO	10.9	0 -0.018	34.0	37.5	10	150	Fig.2
2ZDK110HP-1.5D-LS	●	11.0						
2ZDK111HP-1.5D-LS	MTO	11.1		35.0	38.5			
2ZDK112HP-1.5D-LS	MTO	11.2						
2ZDK113HP-1.5D-LS	MTO	11.3						
2ZDK114HP-1.5D-LS	MTO	11.4						
2ZDK115HP-1.5D-LS	●	11.5	0 -0.018	36.0	39.5	10	150	Fig.2
2ZDK116HP-1.5D-LS	MTO	11.6						
2ZDK117HP-1.5D-LS	MTO	11.7						
2ZDK118HP-1.5D-LS	MTO	11.8						
2ZDK119HP-1.5D-LS	MTO	11.9						
2ZDK120HP-1.5D-LS	●	12.0	0 -0.018	37.0	120.0	12	170	Fig.1

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

· The drilling depth should be less than 1.5D(1.5 x DC).

Recommended Cutting Conditions ➔ L81

● : Std. Item MTO : Made to order

No. of Flutes : 2

2ZDK-HP (Drilling Depth Regular type) NEW

Recommended Workpiece Materials

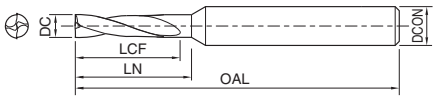
P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material



MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12) | h6 Shank Dia. (ø12.5~)

2

MEGACOAT NANO is applied



2ZDK-HP (Drilling Depth Regular type)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK030HP-3D	●	3.0	0 -0.010	14	15	6	60
2ZDK031HP-3D	●	3.1	0 -0.012				
2ZDK032HP-3D	●	3.2					
2ZDK033HP-3D	●	3.3		15	16		
2ZDK034HP-3D	●	3.4					
2ZDK035HP-3D	●	3.5		17	18		
2ZDK036HP-3D	●	3.6					
2ZDK037HP-3D	●	3.7					
2ZDK038HP-3D	●	3.8					
2ZDK039HP-3D	●	3.9					
2ZDK040HP-3D	●	4.0		19	20		
2ZDK041HP-3D	●	4.1					
2ZDK042HP-3D	●	4.2		20	21		
2ZDK043HP-3D	●	4.3					
2ZDK044HP-3D	●	4.4					
2ZDK045HP-3D	●	4.5		21	22		
2ZDK046HP-3D	●	4.6					
2ZDK047HP-3D	●	4.7					
2ZDK048HP-3D	●	4.8					
2ZDK049HP-3D	●	4.9					
2ZDK050HP-3D	●	5.0		23	24		
2ZDK051HP-3D	●	5.1					
2ZDK052HP-3D	●	5.2					

(Unit : mm)

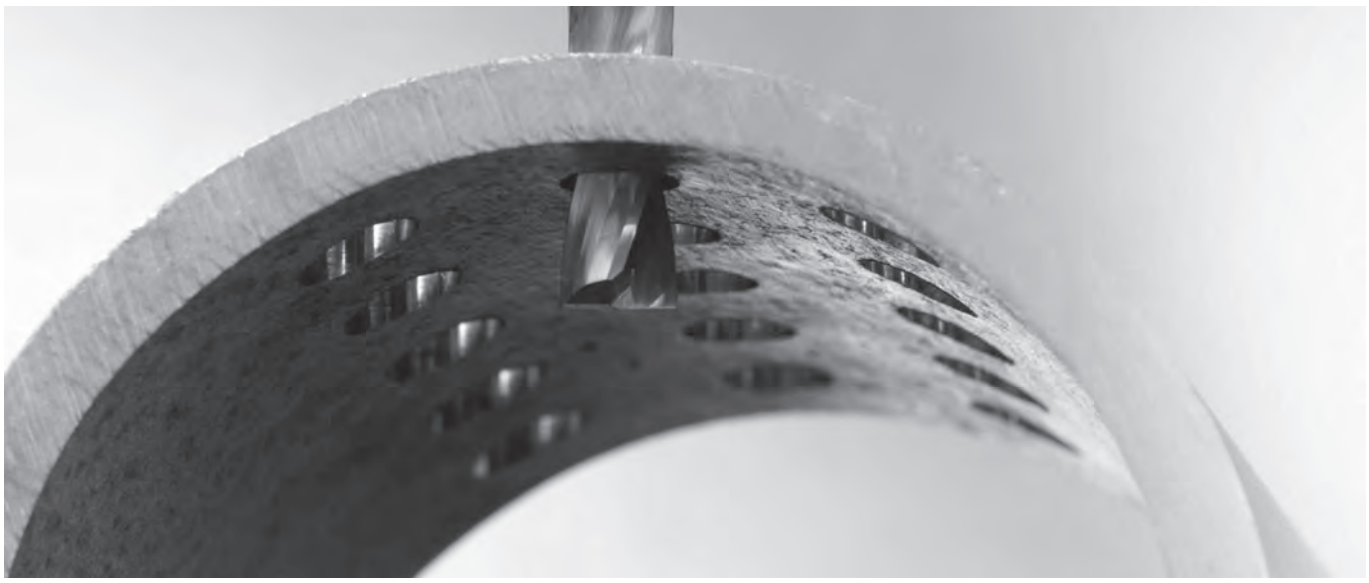
Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK053HP-3D	●	5.3	0 -0.012	24	25	6	60
2ZDK054HP-3D	●	5.4					
2ZDK055HP-3D	●	5.5		25	26		
2ZDK056HP-3D	●	5.6		26	27		
2ZDK057HP-3D	●	5.7					
2ZDK058HP-3D	●	5.8					
2ZDK059HP-3D	●	5.9					
2ZDK060HP-3D	●	6.0		28	28		
2ZDK061HP-3D	●	6.1	0 -0.015	28	29	8	70
2ZDK062HP-3D	●	6.2					
2ZDK063HP-3D	●	6.3					
2ZDK064HP-3D	●	6.4					
2ZDK065HP-3D	●	6.5		30	31		
2ZDK066HP-3D	●	6.6					
2ZDK067HP-3D	●	6.7					
2ZDK068HP-3D	●	6.8		31	32		
2ZDK069HP-3D	●	6.9					
2ZDK070HP-3D	●	7.0		32	33		
2ZDK071HP-3D	●	7.1					
2ZDK072HP-3D	●	7.2					
2ZDK073HP-3D	●	7.3					
2ZDK074HP-3D	●	7.4					
2ZDK075HP-3D	●	7.5		34	35		

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

Recommended Cutting Conditions ➡ **L80**

· The drilling depth should be less than 3.0D(3.0 x DC).

● : Std. Item



2ZDK-HP (Drilling Depth Regular type)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK076HP-3D	●	7.6	0 -0.015	34	35	8	70
2ZDK077HP-3D	●	7.7					
2ZDK078HP-3D	●	7.8					
2ZDK079HP-3D	●	7.9					
2ZDK080HP-3D	●	8.0		36	36		
2ZDK081HP-3D	●	8.1		36	37	10	80
2ZDK082HP-3D	●	8.2					
2ZDK083HP-3D	●	8.3					
2ZDK084HP-3D	●	8.4					
2ZDK085HP-3D	●	8.5		38	39		
2ZDK086HP-3D	●	8.6					
2ZDK087HP-3D	●	8.7					
2ZDK088HP-3D	●	8.8		39	40		
2ZDK089HP-3D	●	8.9					
2ZDK090HP-3D	●	9.0		40	41		
2ZDK091HP-3D	●	9.1					
2ZDK092HP-3D	●	9.2					
2ZDK093HP-3D	●	9.3					
2ZDK094HP-3D	●	9.4					
2ZDK095HP-3D	●	9.5		42	43		
2ZDK096HP-3D	●	9.6					
2ZDK097HP-3D	●	9.7					
2ZDK098HP-3D	●	9.8					

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK099HP-3D	●	9.9	0 -0.015	42	43	10	80
2ZDK100HP-3D	●	10.0		45	45		
2ZDK101HP-3D	●	10.1	0 -0.018	45	46	12	100
2ZDK102HP-3D	●	10.2					
2ZDK103HP-3D	●	10.3		46	47		
2ZDK104HP-3D	●	10.4					
2ZDK105HP-3D	●	10.5		47	48		
2ZDK106HP-3D	●	10.6					
2ZDK107HP-3D	●	10.7					
2ZDK108HP-3D	●	10.8					
2ZDK109HP-3D	●	10.9					
2ZDK110HP-3D	●	11.0		51	52		
2ZDK111HP-3D	●	11.1					
2ZDK112HP-3D	●	11.2					
2ZDK113HP-3D	●	11.3					
2ZDK114HP-3D	●	11.4					
2ZDK115HP-3D	●	11.5		53	54		
2ZDK116HP-3D	●	11.6					
2ZDK117HP-3D	●	11.7					
2ZDK118HP-3D	●	11.8					
2ZDK119HP-3D	●	11.9					
2ZDK120HP-3D	●	12.0		54	54		

Recommended Cutting Conditions ➡ L80

● : Std. Item

No. of Flutes : 2

2ZDK-HP-OH (Drilling Depth Regular type with oil holes) NEW

Recommended Workpiece Materials

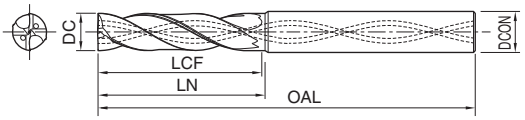
P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material



MEGACOAT NANO | 30° | h5 Shank Dia. (~ø12)

2

MEGACOAT NANO is applied



2ZDK-HP-OH (Drilling Depth Regular type with oil holes)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK030HP-3D-OH	●	3.0	0 -0.010	13.5	15.5	3	68
2ZDK031HP-3D-OH	●	3.1	0 -0.012	14	16	4	72
2ZDK032HP-3D-OH	●	3.2		14.4	16.4		
2ZDK033HP-3D-OH	●	3.3		14.9	16.9		
2ZDK034HP-3D-OH	●	3.4		15.3	17.3		
2ZDK035HP-3D-OH	●	3.5		15.8	17.8		
2ZDK036HP-3D-OH	●	3.6		16.2	18.2		
2ZDK037HP-3D-OH	●	3.7		16.7	18.7		
2ZDK038HP-3D-OH	●	3.8		17.1	19.1		
2ZDK039HP-3D-OH	●	3.9		17.6	19.6		
2ZDK040HP-3D-OH	●	4.0		18	20		
2ZDK041HP-3D-OH	●	4.1		18.5	20.5	5	80
2ZDK042HP-3D-OH	●	4.2		18.9	20.9		
2ZDK043HP-3D-OH	●	4.3		19.4	21.4		
2ZDK044HP-3D-OH	●	4.4		19.8	21.8		
2ZDK045HP-3D-OH	●	4.5		20.3	22.3		
2ZDK046HP-3D-OH	●	4.6		20.7	22.7		
2ZDK047HP-3D-OH	●	4.7		21.2	23.2		
2ZDK048HP-3D-OH	●	4.8		21.6	23.6		
2ZDK049HP-3D-OH	●	4.9		22.1	24.1		
2ZDK050HP-3D-OH	●	5.0		22.5	24.5		
2ZDK051HP-3D-OH	●	5.1		23	25	6	82
2ZDK052HP-3D-OH	●	5.2		23.4	25.4		

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK053HP-3D-OH	●	5.3	0 -0.012	23.9	25.9	6	82
2ZDK054HP-3D-OH	●	5.4		24.3	26.3		
2ZDK055HP-3D-OH	●	5.5		24.8	26.8		
2ZDK056HP-3D-OH	●	5.6		25.2	27.2		
2ZDK057HP-3D-OH	●	5.7		25.7	27.7		
2ZDK058HP-3D-OH	●	5.8		26.1	28.1		
2ZDK059HP-3D-OH	●	5.9		26.6	28.6		
2ZDK060HP-3D-OH	●	6.0		27	29		
2ZDK061HP-3D-OH	●	6.1	0 -0.015	27.5	29.5	7	88
2ZDK062HP-3D-OH	●	6.2		27.9	29.9		
2ZDK063HP-3D-OH	●	6.3		28.4	30.4		
2ZDK064HP-3D-OH	●	6.4		28.8	30.8		
2ZDK065HP-3D-OH	●	6.5		29.3	31.3		
2ZDK066HP-3D-OH	●	6.6		29.7	31.7		
2ZDK067HP-3D-OH	●	6.7		30.2	32.2		
2ZDK068HP-3D-OH	●	6.8		30.6	32.6		
2ZDK069HP-3D-OH	●	6.9		31.1	33.1		
2ZDK070HP-3D-OH	●	7.0		31.5	33.5		
2ZDK071HP-3D-OH	●	7.1		32	34	8	94
2ZDK072HP-3D-OH	●	7.2		32.4	34.4		
2ZDK073HP-3D-OH	●	7.3		32.9	34.9		
2ZDK074HP-3D-OH	●	7.4		33.3	35.3		
2ZDK075HP-3D-OH	●	7.5		33.8	35.8		

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

Recommended Cutting Conditions ➔ **L81**

· The drilling depth should be less than 3.0D(3.0 x DC).

● : Std. Item

2ZDK-HP-OH

Coolant-Through Holes for Efficient and Stable Machining of Stainless Steel Machining



2ZDK-HP-OH (Drilling Depth Regular type with oil holes)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK076HP-3D-OH	●	7.6	0 -0.015	34.2	36.2	8	94
2ZDK077HP-3D-OH	●	7.7		34.7	36.7		
2ZDK078HP-3D-OH	●	7.8		35.1	37.1		
2ZDK079HP-3D-OH	●	7.9		35.6	37.6		
2ZDK080HP-3D-OH	●	8.0		36	38		
2ZDK081HP-3D-OH	●	8.1		36.5	38.5	9	100
2ZDK082HP-3D-OH	●	8.2		36.9	38.9		
2ZDK083HP-3D-OH	●	8.3		37.4	39.4		
2ZDK084HP-3D-OH	●	8.4		37.8	39.8		
2ZDK085HP-3D-OH	●	8.5		38.3	40.3		
2ZDK086HP-3D-OH	●	8.6		38.7	40.7		
2ZDK087HP-3D-OH	●	8.7		39.2	41.2		
2ZDK088HP-3D-OH	●	8.8		39.6	41.6		
2ZDK089HP-3D-OH	●	8.9		40.1	42.1		
2ZDK090HP-3D-OH	●	9.0		40.5	42.5		
2ZDK091HP-3D-OH	●	9.1		41	43	10	106
2ZDK092HP-3D-OH	●	9.2		41.4	43.4		
2ZDK093HP-3D-OH	●	9.3		41.9	43.9		
2ZDK094HP-3D-OH	●	9.4		42.3	44.3		
2ZDK095HP-3D-OH	●	9.5		42.8	44.8		
2ZDK096HP-3D-OH	●	9.6		43.2	45.2		
2ZDK097HP-3D-OH	●	9.7		43.7	45.7		
2ZDK098HP-3D-OH	●	9.8		44.1	46.1		

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK099HP-3D-OH	●	9.9	0 -0.015	44.6	46.6	10	106
2ZDK100HP-3D-OH	●	10.0		45	47		
2ZDK101HP-3D-OH	●	10.1	0 -0.018	45.5	47.5	11	116
2ZDK102HP-3D-OH	●	10.2		45.9	47.9		
2ZDK103HP-3D-OH	●	10.3		46.4	48.4		
2ZDK104HP-3D-OH	●	10.4		46.8	48.8		
2ZDK105HP-3D-OH	●	10.5		47.3	49.3		
2ZDK106HP-3D-OH	●	10.6		47.7	49.7		
2ZDK107HP-3D-OH	●	10.7		48.2	50.2		
2ZDK108HP-3D-OH	●	10.8		48.6	50.6		
2ZDK109HP-3D-OH	●	10.9		49.1	51.1		
2ZDK110HP-3D-OH	●	11.0		49.5	51.5		
2ZDK111HP-3D-OH	●	11.1		50	52	12	122
2ZDK112HP-3D-OH	●	11.2		50.4	52.4		
2ZDK113HP-3D-OH	●	11.3		50.9	52.9		
2ZDK114HP-3D-OH	●	11.4		51.3	53.3		
2ZDK115HP-3D-OH	●	11.5		51.8	53.8		
2ZDK116HP-3D-OH	●	11.6		52.2	54.2		
2ZDK117HP-3D-OH	●	11.7		52.7	54.7		
2ZDK118HP-3D-OH	●	11.8		53.1	55.1		
2ZDK119HP-3D-OH	●	11.9		53.6	55.6		
2ZDK120HP-3D-OH	●	12.0		54	56		

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

Recommended Cutting Conditions ➔ **L81**

· The drilling depth should be less than 3.0D(3.0 x DC).

● : Std. Item

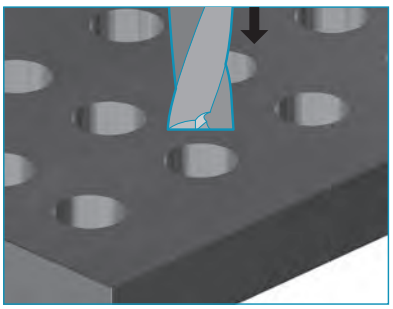
Flat Bottom Drill (Counterboring)

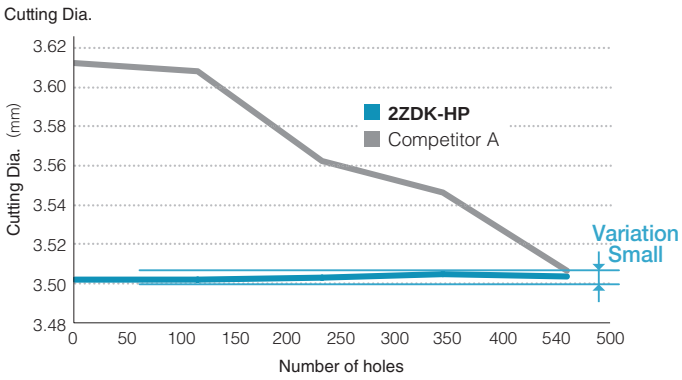
Drilling in Flat Surface

Cutting Performance Comparison (Internal evaluation)

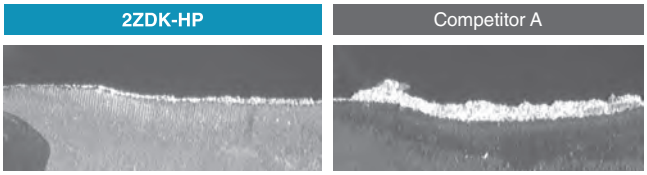
Drill Dia. : ø3.5mm

Stable and High Precision Machining with Less Variation in Hole Diameter
Excellent Cutting Edge Condition





Cutting Edge after Machining 500 holes



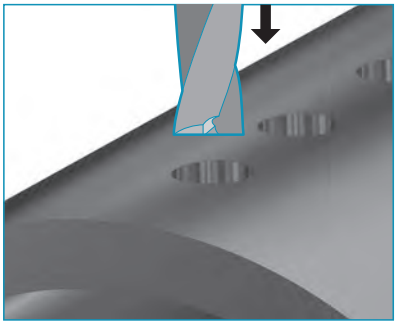
Cutting Conditions : n = 6,000 min^{-1}, Vf = 360 mm/min, Drilling Depth 5 mm, Wet
Drill Dia. ø3.5 mm (Regular type) Workpiece Material : SCM440

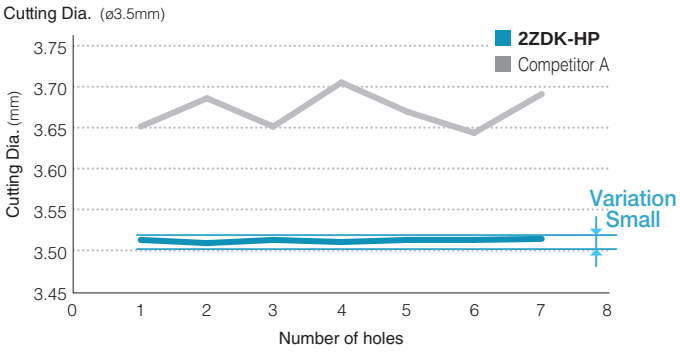
Drilling in Cylinder Surface

Cutting Performance Comparison (Internal evaluation)

Drill Dia. : ø3.5mm

Stable and High Precision Machining with Less Variation in Hole Diameter



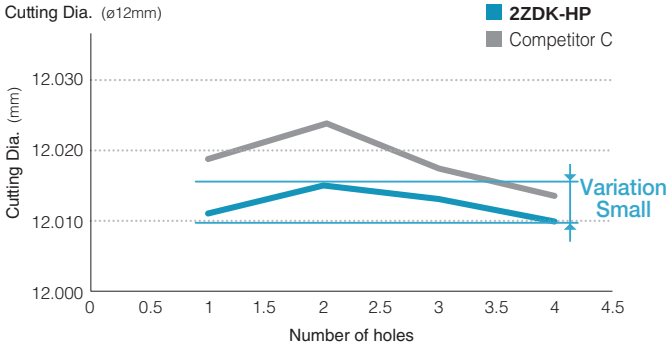


Cutting Conditions : n = 7,000 min^{-1}, Vf = 420 mm/min, Wet Drill Dia. ø3.5 mm (Regular type)
Workpiece Material : Carbon Steel Pipe ø17.3 mm (Thickness 3.2 mm)

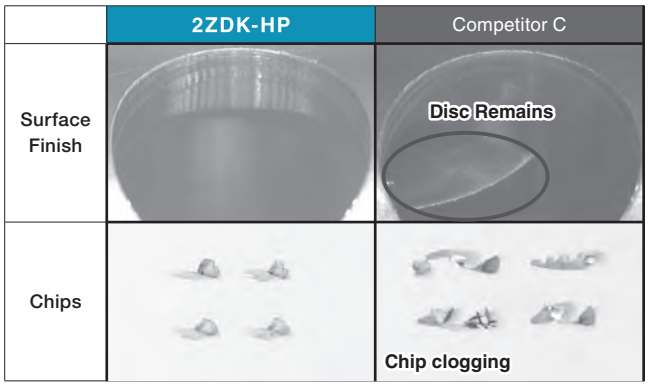
Cutting Performance Comparison (Internal evaluation)

Drill Dia. : ø12mm

Minimizes Hole Diameter Variation even at Feed Rates as High as 0.3mm/rev.
Stable Machining without Chip Clogging

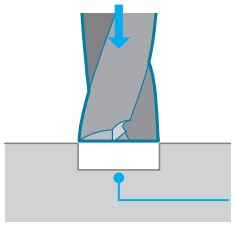
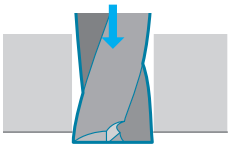
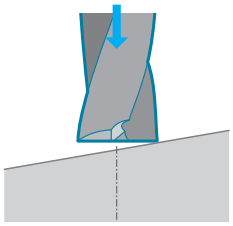
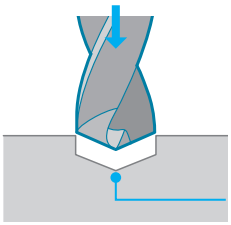
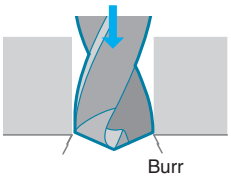
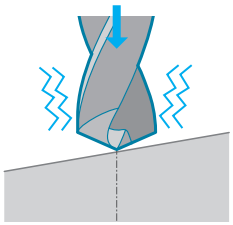


Surface Finish and Chips



Cutting Conditions : n = 1,800 min^{-1}, Vf = 540 mm/min, Wet Drill Dia. ø12 mm (Regular type)
Workpiece Material : Carbon Steel Pipe ø25 mm (Thickness 4 mm)

Comparison with Standard Drill

	Shape of the bottom	Burr	Drilling in Slant Surface
2ZDK-HP	 Almost even	 Decreased burr	 Stable machining (Lowered the Feed)
Standard Drill	 Same as Bottom Shape	 Burr Build-up	 Unstable



Flat Bottom Drill (Counterboring)

No. of Flutes : 2

2ZDK (Short type)

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material



MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12) | h6 Shank Dia. (ø12.5~)

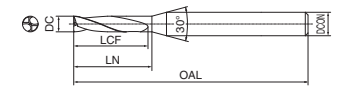


Fig.1

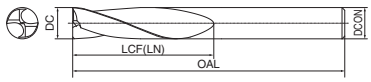


Fig.2

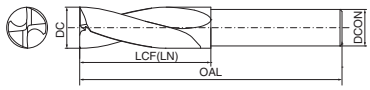


Fig.3

2 MEGACOAT NANO is applied

2ZDK (Drilling Depth Short type) (Refer to L50 for 2ZDK-HP)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK010S	▲	1.0	0 -0.010	3	4	4	50	Fig.1
2ZDK011S	MTO	1.1		3.5	4.5			
2ZDK012S	MTO	1.2						
2ZDK013S	MTO	1.3		4	5			
2ZDK014S	MTO	1.4		4.5	5.5			
2ZDK015S	▲	1.5		5	6			
2ZDK016S	▲	1.6						
2ZDK017S	MTO	1.7		5.5	6.5			
2ZDK018S	MTO	1.8		6	7			
2ZDK019S	MTO	1.9						
2ZDK020S	▲	2.0						
2ZDK021S	MTO	2.1		7	8			
2ZDK022S	MTO	2.2						
2ZDK023S	MTO	2.3						
2ZDK024S	▲	2.4		8	9			
2ZDK025S	▲	2.5						
2ZDK026S	▲	2.6						
2ZDK027S	▲	2.7		9	10			
2ZDK028S	MTO	2.8						
2ZDK029S	▲	2.9						
2ZDK030S	▲	3.0				6	60	
2ZDK031S	▲	3.1	0 -0.012	10	11			
2ZDK032S	MTO	3.2						
2ZDK033S	▲	3.3						
2ZDK034S	▲	3.4		11	12			
2ZDK035S	▲	3.5						
2ZDK036S	MTO	3.6						
2ZDK037S	▲	3.7		12	13			
2ZDK038S	MTO	3.8						
2ZDK039S	MTO	3.9						
2ZDK040S	▲	4.0						
2ZDK041S	▲	4.1		13	14			

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK042S	▲	4.2	0 -0.012	13	14	6	60	Fig.1
2ZDK043S	▲	4.3						
2ZDK044S	MTO	4.4		14	15			
2ZDK045S	▲	4.5						
2ZDK046S	MTO	4.6						
2ZDK047S	MTO	4.7		15	16			
2ZDK048S	▲	4.8						
2ZDK049S	▲	4.9						
2ZDK050S	▲	5.0		16	17			
2ZDK051S	▲	5.1						
2ZDK052S	▲	5.2						
2ZDK053S	▲	5.3						
2ZDK054S	MTO	5.4		17	18			
2ZDK055S	▲	5.5						
2ZDK056S	▲	5.6						
2ZDK057S	MTO	5.7		18	19			
2ZDK058S	▲	5.8						
2ZDK059S	MTO	5.9						
2ZDK060S	▲	6.0		19	(21)			Fig.2
2ZDK060S-P	▲	6.0	*+0.012 0	19	21	8	70	Fig.1
2ZDK061S	▲	6.1	0 -0.015	19	21	8	70	Fig.1
2ZDK062S	▲	6.2						
2ZDK063S	▲	6.3		20	22			
2ZDK064S	▲	6.4						
2ZDK065S	▲	6.5						
2ZDK066S	▲	6.6						
2ZDK067S	MTO	6.7		21	23			
2ZDK068S	▲	6.8						
2ZDK069S	MTO	6.9						
2ZDK070S	▲	7.0		22	24			
2ZDK071S	MTO	7.1						
2ZDK072S	MTO	7.2						

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

· The drilling depth should be less than 1.5D(1.5 x DC).

* Mill Dia. tolerance of 2ZDK60S-P is plus tolerance.

Recommended Cutting Conditions ➡ L82

▲ :To be replaced by a new product
MTO : Made to order

2ZDK (Drilling Depth Short type) (Refer to L50 and L51 for 2ZDK-HP)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK073S	▲	7.3	0 -0.015	23	25	8	70	Fig.1
2ZDK074S	MTO	7.4						
2ZDK075S	▲	7.5						
2ZDK076S	MTO	7.6		24				
2ZDK077S	▲	7.7						
2ZDK078S	▲	7.8						
2ZDK079S	MTO	7.9						
2ZDK080S	▲	8.0		25	(27)			Fig.2
2ZDK081S	MTO	8.1			27	10	80	Fig.1
2ZDK082S	▲	8.2						
2ZDK083S	MTO	8.3		26	28			
2ZDK084S	MTO	8.4						
2ZDK085S	▲	8.5						
2ZDK086S	MTO	8.6		27	29			
2ZDK087S	▲	8.7						
2ZDK088S	▲	8.8						
2ZDK089S	MTO	8.9		28	30			
2ZDK090S	▲	9.0						
2ZDK091S	MTO	9.1						
2ZDK092S	MTO	9.2		29	31			
2ZDK093S	MTO	9.3						
2ZDK094S	MTO	9.4						
2ZDK095S	▲	9.5						
2ZDK096S	MTO	9.6		30	32			
2ZDK097S	MTO	9.7						
2ZDK098S	▲	9.8						
2ZDK099S	MTO	9.9		31	33			
2ZDK100S	▲	10.0			(33)			Fig.2
2ZDK101S	MTO	10.1	0 -0.018		33	12	100	Fig.1
2ZDK102S	MTO	10.2		32	34			
2ZDK103S	▲	10.3						
2ZDK104S	MTO	10.4						

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK105S	▲	10.5	0 -0.018	33	35	12	100	Fig.1
2ZDK106S	MTO	10.6						
2ZDK107S	MTO	10.7						
2ZDK108S	MTO	10.8						
2ZDK109S	MTO	10.9		34	36			
2ZDK110S	▲	11.0						
2ZDK111S	MTO	11.1						
2ZDK112S	MTO	11.2		35	37			
2ZDK113S	MTO	11.3						
2ZDK114S	MTO	11.4						
2ZDK115S	▲	11.5		36	38			
2ZDK116S	MTO	11.6						
2ZDK117S	MTO	11.7						
2ZDK118S	MTO	11.8						
2ZDK119S	MTO	11.9						
2ZDK120S	▲	12.0		37	(39)			Fig.2
2ZDK125S	▲	12.5		41	41			Fig.3
2ZDK130S	▲	13.0		43	43			
2ZDK135S	▲	13.5		44	44			
2ZDK140S	▲	14.0		45	45			
2ZDK145S	▲	14.5		47	47		115	
2ZDK150S	▲	15.0		48	48			
2ZDK155S	▲	15.5		50	50			
2ZDK160S	▲	16.0		52	(52)	16		Fig.2
2ZDK165S	▲	16.5		53	53			Fig.3
2ZDK170S	▲	17.0		54	54			
2ZDK175S	▲	17.5		56	56			
2ZDK180S	▲	18.0		57	57			
2ZDK185S	▲	18.5	0 -0.021	59	59		125	
2ZDK190S	▲	19.0		60	60			
2ZDK195S	▲	19.5		62	62			
2ZDK200S	▲	20.0		63	(63)	20		Fig.2

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

· The drilling depth should be less than 1.5D(1.5 x DC).

Recommended Cutting Conditions ➡ L82

▲ :To be replaced by a new product
MTO : Made to order

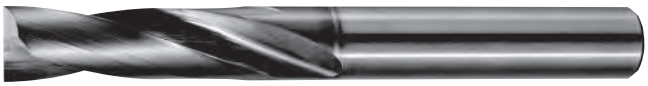
Flat Bottom Drill (Counterboring)

No. of Flutes : 2

2ZDK

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material



MEGACOAT NANO | 20° | h5 Shank Dia.

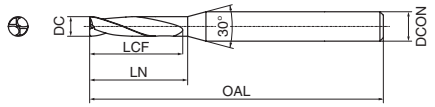


Fig.1

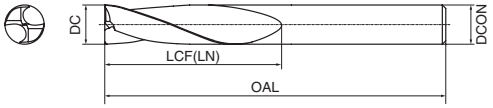


Fig.2

2

MEGACOAT NANO is applied

2ZDK (Refer to L54 and L55 for 2ZDK-HP)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK030	▲	3.0	0 -0.010	14	15	6	60	Fig.1
2ZDK033	▲	3.3	0 -0.012	15	16			
2ZDK035	▲	3.5		17	18			
2ZDK040	▲	4.0		19	20			
2ZDK042	▲	4.2		20	21			
2ZDK045	▲	4.5		21	22			
2ZDK050	▲	5.0		23	24			
2ZDK053	▲	5.3		24	25			
2ZDK055	▲	5.5		25	26			
2ZDK056	▲	5.6		26	27			
2ZDK060	▲	6.0		28	(28)			Fig.2
2ZDK065	▲	6.5	0 -0.015	30	31	8	70	Fig.1
2ZDK068	▲	6.8		31	32			

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK070	▲	7.0	0 -0.015	32	33	8	70	Fig.1
2ZDK075	▲	7.5		34	35			
2ZDK080	▲	8.0		36	(36)			Fig.2
2ZDK085	▲	8.5	0 -0.015	38	39	10	80	Fig.1
2ZDK088	▲	8.8		39	40			
2ZDK090	▲	9.0		40	41			
2ZDK095	▲	9.5		42	43			
2ZDK100	▲	10.0		45	(45)			Fig.2
2ZDK103	▲	10.3	0 -0.018	46	47	12	100	Fig.1
2ZDK105	▲	10.5		47	48			
2ZDK110	▲	11.0		51	52			
2ZDK115	▲	11.5		53	54			
2ZDK120	▲	12.0		54	(54)			Fig.2

*** This tool is specially designed for plunge milling and NOT recommended for slotting.**

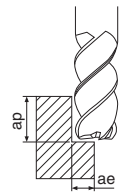
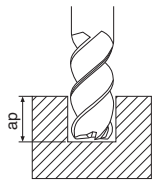
· The drilling depth should be less than 2D(2 x DC).

Recommended Cutting Conditions L82

▲ :To be replaced by a new product

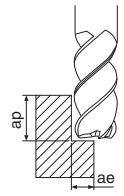
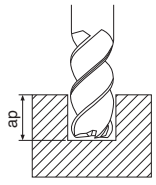
Recommended Cutting Conditions

2FESS

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
 Shouldering **Depth of Cut (ap x ae) (mm)** 1.2DC x 0.05DC (DC < ø3) 1.2DC x 0.1DC (DC ≥ ø3)  Slotting **Depth of Cut (ap) (mm)** 0.1DC (DC < ø1) 0.3DC (ø1 ≤ DC < ø3) 0.5DC (DC ≥ ø3)	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	25,500	13,200	6,600	4,400	3,300	2,200	1,700
			Feed Rate (mm/min)	225	230	375	415	420	310	240
		Slotting	Spindle Revolution (min^{-1})	19,000	11,000	6,000	4,000	3,000	2,000	1,500
			Feed Rate (mm/min)	135	140	225	250	250	245	245
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	195	220	285	315	310	230	200
		Slotting	Spindle Revolution (min^{-1})	18,000	9,500	4,800	3,200	2,400	1,600	1,200
			Feed Rate (mm/min)	115	130	170	190	185	185	185
	Prehardened Steel	Shouldering	Spindle Revolution (min^{-1})	17,000	8,800	4,400	3,000	2,200	1,500	1,100
			Feed Rate (mm/min)	55	80	100	105	105	110	110
		Slotting	Spindle Revolution (min^{-1})	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	35	50	60	63	63	65	65
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	95	95	110	115	115	115	115
		Slotting	Spindle Revolution (min^{-1})	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	60	60	65	70	70	70	70

* Machining with water soluble coolant is recommended for stainless steel.

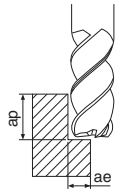
2FESM

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø0.5	ø1	ø2	ø4	ø6	ø8	ø12	ø16
 Shouldering **Depth of Cut (ap x ae) (mm)** 1.5DC x 0.05DC (DC < ø3) 1.5DC x 0.1DC (DC ≥ ø3)  Slotting **Depth of Cut (ap) (mm)** 0.1DC (DC < ø1) 0.3DC (ø1 ≤ DC < ø3) 0.5DC (DC ≥ ø3)	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	32,000	25,500	13,200	6,600	4,400	3,300	2,200	1,700
			Feed Rate (mm/min)	210	225	230	375	415	420	310	240
		Slotting	Spindle Revolution (min^{-1})	29,000	19,000	11,000	6,000	4,000	3,000	2,000	1,500
			Feed Rate (mm/min)	130	135	140	225	250	250	245	245
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	180	195	220	285	315	310	230	200
		Slotting	Spindle Revolution (min^{-1})	27,000	18,000	9,500	4,800	3,200	2,400	1,600	1,200
			Feed Rate (mm/min)	105	115	130	170	190	185	185	185
	Prehardened Steel	Shouldering	Spindle Revolution (min^{-1})	25,000	17,000	8,800	4,400	3,000	2,200	1,500	1,100
			Feed Rate (mm/min)	50	55	80	100	105	105	110	110
		Slotting	Spindle Revolution (min^{-1})	25,000	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	30	35	50	60	63	63	65	65
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
			Feed Rate (mm/min)	60	95	95	110	115	115	115	115
		Slotting	Spindle Revolution (min^{-1})	25,000	16,000	8,000	4,000	2,700	2,000	1,300	990
			Feed Rate (mm/min)	35	60	60	65	70	70	70	70

* Machining with water soluble coolant is recommended for stainless steel.

Recommended Cutting Conditions

2FESL (Shouldering)

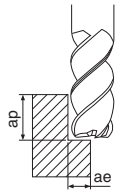
Applications	Workpiece Material	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
 Shouldering	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	19,000	9,500	4,800	3,200	2,400	1,600	1,200
		Feed Rate (mm/min)	210	210	210	210	210	210	210
	Alloy Steel	Spindle Revolution (min^{-1})	14,300	7,200	3,600	2,400	2,000	1,300	1,000
		Feed Rate (mm/min)	155	160	160	160	170	170	150
	Prehardened Steel (30 ~ 45HRC)	Spindle Revolution (min^{-1})	11,200	5,600	2,800	1,900	1,600	1,000	800
		Feed Rate (mm/min)	85	85	90	90	100	95	80
	Stainless Steel	Spindle Revolution (min^{-1})	14,300	7,200	3,600	2,400	2,000	1,300	1,000
		Feed Rate (mm/min)	95	95	95	95	105	105	80

Depth of Cut (ap x ae) (mm)
2.5DC x 0.05DC (DC < ø3) 2.5DC x 0.1DC (DC ≥ ø3)

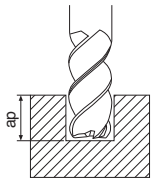
* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

2FEKS, 2FEKM

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø6	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	9,300	7,000	4,600	3,600	2,900	2,400	2,000
			Feed Rate (mm/min)	450	450	470	430	400	360	320
		Slotting	Spindle Revolution (min^{-1})	7,500	6,000	4,400	3,300	2,700	2,300	1,900
			Feed Rate (mm/min)	240	260	340	340	340	340	320
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	8,800	6,600	4,400	3,300	2,600	2,200	1,800
			Feed Rate (mm/min)	370	370	440	400	360	330	290
		Slotting	Spindle Revolution (min^{-1})	7,200	5,400	3,600	2,700	2,200	1,800	1,500
			Feed Rate (mm/min)	270	270	270	270	270	270	270
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	6,400	4,800	3,200	2,400	1,900	1,600	1,200
			Feed Rate (mm/min)	130	130	130	140	140	140	140
		Slotting	Spindle Revolution (min^{-1})	5,300	4,000	2,600	2,000	1,600	1,300	1,000
			Feed Rate (mm/min)	120	120	120	120	120	120	120
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	8,000	6,000	4,000	3,000	2,400	2,000	1,500
			Feed Rate (mm/min)	140	140	140	140	140	140	140
		Slotting	Spindle Revolution(min^{-1})	5,300	4,000	2,600	2,000	1,600	1,300	1,000
			Feed Rate (mm/min)	80	90	100	100	100	90	90

Depth of Cut (ap x ae) (mm)
1.2DC x 0.1DC

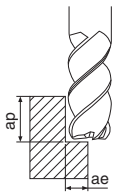


Slotting

Depth of Cut (ap) (mm)
0.5DC

* Machining with water soluble coolant is recommended for stainless steel.

4FESM (Shouldering)

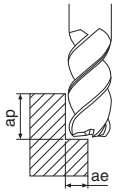
Applications	Workpiece Material	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
 Shouldering	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	25,500	13,000	6,600	4,400	3,300	2,200	1,700
		Feed Rate (mm/min)	335	345	580	620	625	630	600
	Alloy Steel	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	290	290	395	455	455	470	460
	Prehardened Steel (30 ~ 45HRC)	Spindle Revolution (min^{-1})	12,000	7,200	4,200	3,000	2,200	1,500	1,100
		Feed Rate (mm/min)	105	125	150	160	160	165	140
	Stainless Steel	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	130	145	165	165	170	175	155

Depth of Cut (ap x ae) (mm)
1.5DC x 0.05DC (DC < ø3) 1.5DC x 0.1DC (DC ≥ ø3)

* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

4FEKM (Tough corner edge, Shouldering)

Applications	Workpiece Material	Outside Dia. DC (mm)	ø3	ø4	ø6	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	10,600	8,000	5,300	4,000	3,200	2,700	2,100
		Feed Rate (mm/min)	680	690	770	770	770	770	770
	Alloy Steel	Spindle Revolution (min^{-1})	8,800	6,600	4,400	3,300	2,600	2,200	1,800
		Feed Rate (mm/min)	500	550	620	630	630	630	610
	Prehardened Steel (30 ~ 45HRC)	Spindle Revolution (min^{-1})	6,400	4,800	3,200	2,400	1,900	1,600	1,200
		Feed Rate (mm/min)	180	180	180	190	190	190	190
	Stainless Steel	Spindle Revolution (min^{-1})	8,000	4,800	4,000	2,400	2,300	2,000	1,500
		Feed Rate (mm/min)	190	200	200	200	210	210	210

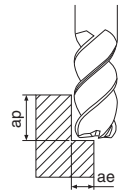
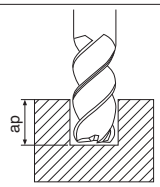
Depth of Cut (ap x ae) (mm)
1.5DC x 0.1DC

* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

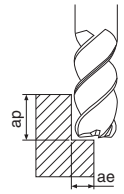
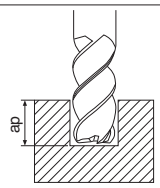
Recommended Cutting Conditions

2FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 Shouldering Depth of Cut (ap x ae) (mm) 1DC x 0.2DC  Slotting Depth of Cut (ap) (mm) 0.2DC	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	660	640	640	640	520	450	410	400
		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	550	480	510	530	480	440	410	400
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	420	430	430	430	350	300	270	260
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	300	340	360	370	340	310	270	260
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	160	160	160	160	140	140	140	140
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	110	110	120	120	120	120	120	120
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	180	240	240	240	200	170	160	160
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	120	120	130	130	130	130	130	130

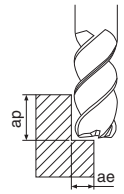
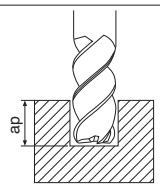
* Machining with water soluble coolant is recommended for stainless steel.

3FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 Shouldering Depth of Cut (ap x ae) (mm) 1DC x 0.2DC  Slotting Depth of Cut (ap) (mm) 0.2DC	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	200	200	200	200	180	180	180	180
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	140	140	150	150	150	150	150	150
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	300	300	300	300	240	210	200	200
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	150	150	160	160	160	160	160	160

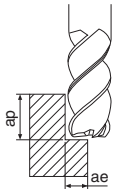
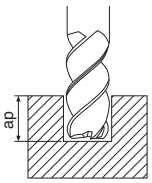
* Machining with water soluble coolant is recommended for stainless steel.

4FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 Shouldering Depth of Cut (ap x ae) (mm) 1DC x 0.2DC  Slotting Depth of Cut (ap) (mm) 0.2DC	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	240	240	240	240	210	210	210	210
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	160	160	180	180	180	180	180	180
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	360	360	360	360	300	260	240	240
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	180	180	200	200	200	200	200	200

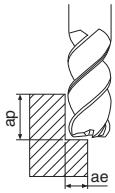
* Machining with water soluble coolant is recommended for stainless steel.

4MFK (Short, Medium), 4MFR (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel	Shouldering	Short 1.2DC x 0.15DC Medium 1.5DC x 0.15DC	Spindle Revolution (min^{-1})	13,800	10,700	8,800	7,500	6,000	4,800	4,000	3,300
				Feed Rate (mm/min)	1,400	1,400	1,400	1,500	1,500	1,400	1,400	1,300
		Slotting	ap ≤ 1DC	Spindle Revolution (min^{-1})	13,800	10,700	8,800	7,500	6,000	4,800	4,000	3,300
				Feed Rate (mm/min)	620	700	750	780	830	850	800	750
	Alloy Steel	Shouldering	Short 1.2DC x 0.1DC Medium 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	10,600	9,300	8,300	7,400	6,000	4,700	3,800	2,800
				Feed Rate (mm/min)	1,000	1,000	1,000	1,100	1,100	1,000	1,000	900
		Slotting	ap ≤ 1DC	Spindle Revolution (min^{-1})	10,600	9,300	8,300	7,400	6,000	4,700	3,800	2,800
				Feed Rate (mm/min)	500	510	520	530	550	570	530	450
 Slotting	Prehardened Steel (30 ~ 45HRC)	Shouldering	Short 1.2DC x 0.07DC Medium 1.5DC x 0.07DC	Spindle Revolution (min^{-1})	8,700	6,800	5,500	4,600	3,500	2,800	2,300	1,700
				Feed Rate (mm/min)	670	730	790	840	900	810	770	630
		Slotting	ap ≤ 1DC	Spindle Revolution (min^{-1})	6,700	5,800	4,800	4,000	3,000	2,300	1,900	1,400
				Feed Rate (mm/min)	320	330	360	370	400	420	380	300
	Stainless Steel Titanium Alloys	Shouldering	Short 1.2DC x 0.1DC Medium 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	8,700	7,000	6,000	5,200	4,000	3,000	2,500	1,700
				Feed Rate (mm/min)	670	720	780	830	840	760	710	520
		Slotting	ap ≤ 0.3DC	Spindle Revolution (min^{-1})	6,800	6,000	5,100	4,300	3,400	2,600	2,000	1,400
				Feed Rate (mm/min)	190	220	240	250	250	240	230	190

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

4MFK (Long)

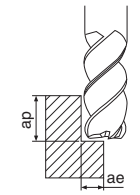
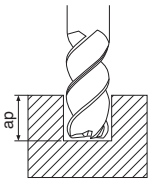
Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel	Shouldering	3DC x 0.02DC	Spindle Revolution (min^{-1})	11,000	8,500	7,000	6,000	4,800	3,800	3,200	2,600
				Feed Rate (mm/min)	910	910	910	970	970	910	910	840
	Alloy Steel	Shouldering		Spindle Revolution (min^{-1})	6,500	5,700	5,100	4,500	3,700	2,900	2,300	1,700
				Feed Rate (mm/min)	540	540	540	600	600	540	540	490
	Prehardened Steel (30 ~ 45HRC)	Shouldering		Spindle Revolution (min^{-1})	4,900	3,900	3,100	2,600	2,000	1,600	1,300	1,000
				Feed Rate (mm/min)	330	360	400	420	450	400	380	310
	Stainless Steel Titanium Alloys	Shouldering		Spindle Revolution (min^{-1})	4,300	3,500	3,000	2,600	2,000	1,500	1,300	900
				Feed Rate (mm/min)	330	360	390	410	420	380	350	260

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

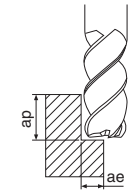
Recommended Cutting Conditions

4TFK (Short, Medium), 4TFR (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering  Slotting	Carbon Steel, Cast Iron	Shouldering	1.5DC x 0.2DC	Spindle Revolution (min^{-1})	13,800	10,300	8,300	6,900	5,200	4,100	3,400	2,600	2,100
				Feed Rate (mm/min)	1,490	1,570	1,590	1,660	1,630	1,490	1,410	1,240	1,080
		Slotting	DC ≤ ø12 : ap ≤ 1.0DC DC > ø12 : ap ≤ 12	Spindle Revolution (min^{-1})	11,100	8,400	6,700	5,600	4,200	3,300	2,800	2,100	1,700
				Feed Rate (mm/min)	770	790	790	800	750	690	600	540	410
	Alloy Steel	Shouldering	1.5DC x 0.2DC	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	900	1,020	1,020	1,020	920	870	800	720	640
		Slotting	DC ≤ ø12 : ap ≤ 1.0DC DC > ø12 : ap ≤ 12	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	540	530	550	590	570	530	500	450	410
	Prehardened Steel (30 ~ 45HRC)	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	9,500	7,200	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	690	760	810	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	480	540	570	600	550	490	460	380	340
	Stainless Steel	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	9,500	7,200	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	690	760	810	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	5,500	4,200	3,800	3,500	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	120	130	180	360	420	370	340	280	250
	Titanium Alloys	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	500	520	520	640	700	730	670	560	450
		Slotting	DC ≤ ø12 : ap ≤ 1.0DC DC > ø12 : ap ≤ 12	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	290	330	330	350	370	410	380	290	230
	Superalloy	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	640
				Feed Rate (mm/min)	250	250	250	250	240	230	220	210	200
		Slotting	ap ≤ 0.3 x DC	Spindle Revolution (min^{-1})	3,000	2,200	1,800	1,500	1,100	900	700	600	400
				Feed Rate (mm/min)	90	100	100	100	110	130	120	90	70

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and Superalloy.

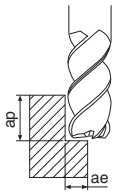
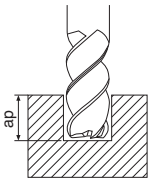
4TFK (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering	Carbon Steel, Cast Iron	Shouldering	2.5DC x 0.1DC	Spindle Revolution (min^{-1})	11,000	8,200	6,600	5,500	4,200	3,300	2,700	2,100	1,700
				Feed Rate (mm/min)	970	1,020	1,030	1,080	1,060	970	920	810	700
	Alloy Steel	Shouldering	2.5DC x 0.1DC	Spindle Revolution (min^{-1})	6,000	4,600	3,600	3,000	2,300	1,800	1,500	1,100	910
				Feed Rate (mm/min)	490	550	550	550	500	470	430	390	350
	Prehardened Steel (30 ~ 45HRC)	Shouldering	2.5DC x 0.05DC	Spindle Revolution (min^{-1})	6,000	4,600	3,600	3,000	2,300	1,800	1,500	1,100	910
				Feed Rate (mm/min)	490	550	550	550	500	470	430	390	350
	Stainless Steel	Shouldering	2.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,500	1,200	900	700
				Feed Rate (mm/min)	350	380	410	430	420	400	390	320	300
	Titanium Alloys	Shouldering	2.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,300	3,200	2,600	2,100	1,600	1,300	1,100	800	700
				Feed Rate (mm/min)	250	260	260	320	350	370	340	280	230
	Superalloy	Shouldering	2.5DC x 0.02DC	Spindle Revolution(min^{-1})	2,100	1,600	1,300	1,100	800	650	550	400	320
				Feed Rate (mm/min)	125	125	125	125	120	115	110	105	100

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and Superalloy.

Slotting is not recommended.

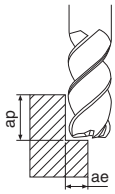
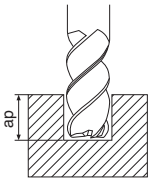
3ZFKS (Short), 3ZFKM (Medium)

Applications	Workpiece Material	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)		ø3	ø4	ø5	ø6	ø7	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel	Shouldering Short 1.2DC x 0.3DC Medium 1.5DC x 0.3DC Plunge milling Slotting 1DC	Spindle Revolution (min^{-1})		13,800	10,700	8,800	7,500	6,600	6,000	4,800	4,000	3,000
			Feed Rate (mm/min)	Shouldering	850	950	1,100	1,200	1,100	1,000	910	850	800
				Plunge milling	180	170	170	170	160	150	120	100	70
				Slotting	570	650	700	730	750	780	800	750	650
	Alloy Steel	Shouldering Short 1.2DC x 0.3DC Medium 1.5DC x 0.3DC Plunge milling Slotting 0.5DC	Spindle Revolution (min^{-1})		10,600	9,300	8,300	7,400	6,500	6,000	4,700	3,500	1,900
			Feed Rate (mm/min)	Shouldering	700	780	900	980	900	850	750	700	560
				Plunge milling	120	120	130	140	130	130	120	100	70
				Slotting	500	540	570	590	610	600	580	500	340
	Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min^{-1})		5,200	4,000	3,200	2,600	2,300	2,000	1,600	1,400	1,000
			Feed Rate (mm/min)	Shouldering	440	440	490	490	490	440	400	370	300
				Plunge milling	90	110	110	130	110	100	80	70	50
				Slotting	220	270	270	320	330	330	230	200	140
 Plunge milling Slotting	Stainless Steel	Shouldering Short 1.2DC x 0.2DC Medium 1.5DC x 0.2DC Plunge milling Slotting 0.5DC	Spindle Revolution (min^{-1})		3,300	2,500	2,000	1,700	1,400	1,300	1,100	900	750
			Feed Rate (mm/min)	Shouldering	280	270	330	340	330	330	350	320	300
				Plunge milling	20	30	40	40	40	30	20	20	20
				Slotting	110	110	130	140	130	130	120	120	120
	Titanium Alloys		Spindle Revolution (min^{-1})		3,300	2,500	2,000	1,700	1,400	1,300	1,100	900	750
			Feed Rate (mm/min)	Shouldering	280	270	330	340	330	330	350	320	300
				Plunge milling	20	30	40	40	40	30	20	20	20
				Slotting	110	110	130	140	130	130	120	120	120

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

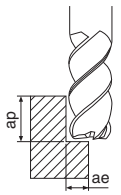
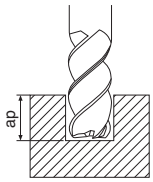
Recommended Cutting Conditions

5DERM

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø4	ø5	ø6	ø8	ø10	ø12
 Shouldering	Medium Carbon Steel High Carbon Steel (> 0.3%C)	Shouldering	Spindle Revolution (min^{-1})	16,000	12,700	10,600	8,000	6,400	5,300
			Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900
		Slotting	Spindle Revolution (min^{-1})	16,000	12,700	10,600	8,000	6,400	5,300
			Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900
Depth of Cut (ap x ae) (mm) 1.5DC x 0.5DC	Alloy Steel Alloy Tool Steel (< 330HB < 35HRC)	Shouldering	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800
			Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700
		Slotting	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800
			Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700
	Alloy Steel Alloy Tool Steel (340 ~ 450HB 36 ~ 48HRC)	Shouldering	Spindle Revolution (min^{-1})	13,000	10,000	8,500	6,400	5,100	4,200
			Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300
		Slotting	Spindle Revolution (min^{-1})	13,000	10,000	8,500	6,400	5,100	4,200
			Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300
	Austenitic Stainless Steel SUS302 SUS303 SUS304	Shouldering	Spindle Revolution (min^{-1})	9,200	7,300	6,100	4,600	3,700	3,100
			Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100
		Slotting	Spindle Revolution (min^{-1})	9,200	7,300	6,100	4,600	3,700	3,100
			Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100
	Austenitic Stainless Steel SUS316 SUS316L	Shouldering	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100
			Feed Rate (mm/min)	640	760	640	640	640	640
		Slotting	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100
			Feed Rate (mm/min)	640	760	640	640	640	640
 Slotting	Titanium Alloys	Shouldering	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600
			Feed Rate (mm/min)	480	380	480	480	380	400
		Slotting	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600
			Feed Rate (mm/min)	480	380	480	480	380	400
Depth of Cut (ap) (mm) 0.8DC	Superalloy	Shouldering	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100
			Feed Rate (mm/min)	160	130	210	240	190	210
		Slotting	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100
			Feed Rate (mm/min)	160	130	210	240	190	210
	Gray Cast Iron	Shouldering	Spindle Revolution (min^{-1})	14,000	11,000	9,000	6,800	5,400	4,500
			Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800
		Slotting	Spindle Revolution (min^{-1})	14,000	11,000	9,000	6,800	5,400	4,500
			Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800
	Nodular Cast Iron Malleable Cast Iron	Shouldering	Spindle Revolution (min^{-1})	10,000	8,300	6,900	5,200	4,100	3,500
			Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000
		Slotting	Spindle Revolution (min^{-1})	10,000	8,300	6,900	5,200	4,100	3,500
			Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

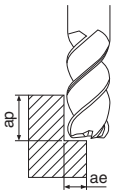
3UFSM

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
 **Shouldering**	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	18,000	12,000	9,200	7,300	6,100	4,600	3,700	3,100	2,300	1,800
			Feed Rate (mm/min)	380	430	440	500	510	500	560	560	590	590
		Slotting	Spindle Revolution (min^{-1})	16,000	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
			Feed Rate (mm/min)	190	230	240	290	300	290	280	290	310	350
Depth of Cut (ap x ae) (mm)	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	14,000	9,000	6,800	5,400	4,500	3,400	2,700	2,300	1,700	1,400
1.5DC x 0.1DC			Feed Rate (mm/min)	250	270	270	320	350	340	360	350	390	420
		Slotting	Spindle Revolution (min^{-1})	11,000	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
			Feed Rate (mm/min)	130	130	150	180	190	180	170	180	190	210
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	10,000	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,200	1,000
			Feed Rate (mm/min)	180	170	170	210	230	220	230	220	220	230
		Slotting	Spindle Revolution (min^{-1})	10,000	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,200	1,000
			Feed Rate (mm/min)	120	120	120	140	150	140	140	140	150	180
 **Slotting**	Titanium Alloys Heat-resistant Alloys (40 ~ 50HRC)	Shouldering	Spindle Revolution (min^{-1})	6,000	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	600
			Feed Rate (mm/min)	60	90	100	120	110	110	120	110	120	130
		Slotting	Spindle Revolution (min^{-1})	6,000	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	600
			Feed Rate (mm/min)	50	60	70	80	90	90	90	80	90	100
Depth of Cut (ap) (mm)	Aluminum Alloys	Shouldering	Spindle Revolution (min^{-1})	32,000	21,000	16,000	13,000	11,000	8,000	6,400	5,300	4,000	3,200
0.25DC (Carbon Steel, Cast Iron) 0.5DC			Feed Rate (mm/min)	670	760	770	900	920	860	1,000	1,100	1,100	1,200
		Slotting	Spindle Revolution (min^{-1})	32,000	21,000	16,000	13,000	11,000	8,000	6,400	5,300	4,000	3,200
			Feed Rate (mm/min)	480	440	480	590	630	580	670	730	860	960

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

Recommended Cutting Conditions

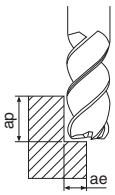
6PFK, 8PFK (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
 Shouldering	Carbon Steel, Cast Iron	Shouldering	DC < ø20 : 1.5DC x 0.2DC DC ≥ ø20 : 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,800
				Feed Rate (mm/min)	2,650	2,640	2,410	2,250	2,010	1,700	1,500
	Alloy Steel	Shouldering	DC < ø20 : 1.5DC x 0.2DC DC ≥ ø20 : 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
				Feed Rate (mm/min)	2,250	2,090	1,950	1,910	1,720	1,450	1,220
	Prehardened Steel (30 ~ 38HRC)	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	5,600	4,200	3,300	2,800	2,100	1,700	1,300
				Feed Rate (mm/min)	1,780	1,710	1,520	1,400	1,220	1,120	980
	Stainless Steel Titanium Alloys	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	5,000	3,800	3,000	2,500	1,900	1,500	1,200
				Feed Rate (mm/min)	1,350	1,320	1,200	1,130	970	850	720

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

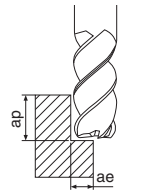
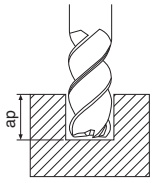
6PFK, 8PFK (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
 Shouldering	Carbon Steel, Cast Iron	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	4,600	3,500	2,800	2,300	1,700	1,400	1,100
				Feed Rate (mm/min)	1,830	1,730	1,530	1,380	1,120	880	660
	Alloy Steel	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,800	1,400	1,100	900
				Feed Rate (mm/min)	1,490	1,340	1,220	1,120	940	720	540
	Prehardened Steel (30 ~ 38HRC)	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	2,800	2,100	1,700	1,400	1,100	850	650
				Feed Rate (mm/min)	920	680	750	670	550	480	390
	Stainless Steel Titanium Alloys	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	2,500	1,900	1,500	1,300	950	750	600
				Feed Rate (mm/min)	700	670	590	540	440	370	290

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

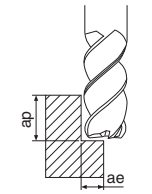
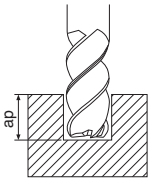
4JER (Short, Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering  Slotting	Carbon Steel, Cast Iron	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	6,900	5,200	4,100	3,400	2,600	2,100
				Feed Rate (mm/min)	1,500	1,500	1,400	1,400	1,300	1,100
		Slotting	DC ≤ ø12:ap ≤ 1.0DC DC > ø12:ap ≤ 12	Spindle Revolution (min^{-1})	5,600	4,200	3,300	2,800	2,100	1,700
				Feed Rate (mm/min)	720	670	620	540	480	360
	Alloy Steel	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	1,020	920	870	800	720	640
		Slotting	DC ≤ ø12:ap ≤ 1.0DC DC > ø12:ap ≤ 12	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	530	510	470	450	400	360
	Prehardened Steel (30 ~ 45HRC)	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,600	3,500	2,800	2,300	1,700	1,300
				Feed Rate (mm/min)	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	480	450	440	410	340	300
	Stainless Steel	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	3,500	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	300	280	250	230	190	170
	Titanium Alloys	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	580	630	660	600	500	400
		Slotting	DC ≤ ø12:ap ≤ 1.0DC DC > ø12:ap ≤ 12	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	320	340	370	340	260	210
	Superalloy Inconel® 718, etc.	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	2,400	1,800	1,400	1,200	900	720
				Feed Rate (mm/min)	330	320	320	320	320	290
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	1,600	1,200	950	800	600	480
				Feed Rate (mm/min)	180	140	110	100	80	60

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

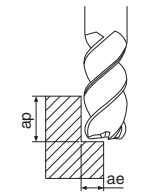
Recommended Cutting Conditions

4 / 5 / 6RFH (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering  Slotting	Carbon Steel / Alloy Steel / Cast Iron	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900
				Feed Rate (mm/min)	1,040	1,050	1,100	1,000	980	920
		Slotting	1DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	790	790	830	740	700	640
			2DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	550	550	580	510	490	450
	Prehardened Steel (30 ~ 45HRC)	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	490	620	580	540	490	460
		Slotting	1DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	410	410	430	400	370	360
			2DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	290	290	300	280	260	250
	Stainless Steel	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900
				Feed Rate (mm/min)	410	410	410	400	380	380
		Slotting	1DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	280	260	310	240	250	250
			2DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	220	210	250	190	200	200
	Titanium Alloys	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	330	420	410	390	380	370
		Slotting	1DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	220	240	240	240	250	250
			2DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	180	190	190	190	200	200
	Superalloy	Shouldering	1.5DC x 0.2DC	Spindle Revolution (min^{-1})	800	600	480	400	300	240
				Feed Rate (mm/min)	60	60	60	60	60	60
		Slotting	1DC	Spindle Revolution (min^{-1})	530	400	320	270	200	160
				Feed Rate (mm/min)	28	28	28	28	28	28
			2DC	Spindle Revolution (min^{-1})	530	400	320	270	200	160
				Feed Rate (mm/min)	20	20	20	20	20	20

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

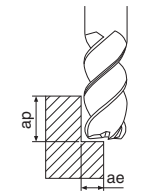
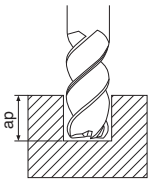
4 / 5 / 6RFH (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering	Carbon Steel / Alloy Steel / Cast Iron	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	5,100	3,800	3,100	2,500	1,900	1,500
				Feed Rate (mm/min)	620	630	660	600	590	550
	Prehardened Steel (30 ~ 45HRC)	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	3,400	2,500	2,000	1,700	1,300	1,000
				Feed Rate (mm/min)	340	430	410	380	340	320
	Stainless Steel	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	5,100	3,800	3,100	2,500	1,900	1,500
				Feed Rate (mm/min)	290	290	290	280	270	270
	Titanium Alloys	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	3,400	2,500	2,000	1,700	1,300	1,000
				Feed Rate (mm/min)	230	290	290	270	270	260
	Superalloy	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.0mm (DC > ø12)	Spindle Revolution (min^{-1})	640	480	380	320	240	190
				Feed Rate (mm/min)	20	20	20	20	20	20

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

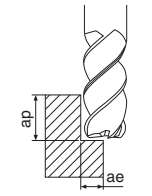
Slotting is not recommended.

3RDSM, 4RDSM, 5RDSM

Applications	Workpiece Material		Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
 Shouldering  Slotting	Steel	< 22HRC	Shouldering	1.5DC x 0.5DC	Spindle Revolution(min^{-1})	11,100	8,400	6,700	5,600	4,200	3,300	2,700
					Feed Rate (mm/min)	1,000	1,000	1,320	1,340	1,340	1,340	1,380
			Slotting	1DC	Spindle Revolution(min^{-1})	9,300	6,900	5,600	4,600	3,500	2,800	2,200
					Feed Rate (mm/min)	800	800	1,000	1,030	1,040	1,050	1,110
		22 ~ 32HRC	Shouldering	1.5DC x 0.4DC	Spindle Revolution(min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
					Feed Rate (mm/min)	720	720	860	860	860	920	1,030
			Slotting	0.75DC	Spindle Revolution(min^{-1})	7,900	5,900	4,800	4,000	3,000	2,400	1,900
					Feed Rate (mm/min)	550	550	740	740	740	760	860
		32 ~ 40HRC	Shouldering	1.5DC x 0.4DC	Spindle Revolution(min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
					Feed Rate (mm/min)	320	320	410	410	400	400	400
			Slotting	0.6DC	Spindle Revolution(min^{-1})	5,300	4,000	3,200	2,600	2,000	1,600	1,300
					Feed Rate (mm/min)	260	260	340	340	330	330	330
		40 ~ 45HRC	Shouldering	1DC x 0.4DC	Spindle Revolution(min^{-1})	4,800	3,600	2,900	2,400	1,800	1,400	1,100
					Feed Rate (mm/min)	220	220	260	260	250	250	250
			Slotting	0.5DC	Spindle Revolution(min^{-1})	4,300	3,200	2,600	2,200	1,600	1,300	1,000
					Feed Rate (mm/min)	180	180	240	230	230	220	220
		45 ~ 50HRC	Shouldering	1DC x 0.3DC	Spindle Revolution(min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,000
					Feed Rate (mm/min)	150	150	180	180	170	170	170
			Slotting	0.4DC	Spindle Revolution(min^{-1})	3,800	2,900	2,300	1,900	1,400	1,100	900
					Feed Rate (mm/min)	140	140	170	160	160	150	150
	Stainless Steel		Shouldering	1.5DC x 0.4DC	Spindle Revolution(min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
					Feed Rate (mm/min)	190	230	310	300	340	310	360
			Slotting	0.5DC	Spindle Revolution(min^{-1})	2,700	2,000	1,600	1,300	1,000	800	600
					Feed Rate (mm/min)	110	130	180	170	190	180	190
	Cast Iron		Shouldering	1.5DC x 0.5DC	Spindle Revolution(min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
					Feed Rate (mm/min)	850	850	1,030	1,030	1,030	1,100	1,380
			Slotting	1DC	Spindle Revolution(min^{-1})	7,900	5,900	4,800	4,000	3,000	2,400	1,900
					Feed Rate (mm/min)	700	700	900	900	900	910	1,140

* Machining with water soluble coolant is recommended for stainless steel.

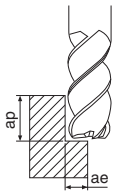
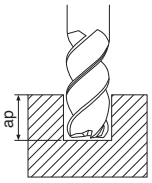
3RDSL, 4RDSL, 5RDSL (Shouldering)

Applications	Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
 Shouldering	Steel	< 22HRC	2.5DC x 0.5DC	Spindle Revolution(min^{-1})	7,800	5,900	4,700	3,900	2,900	2,300	1,900
				Feed Rate (mm/min)	700	700	770	780	840	840	940
		22 ~ 32HRC	2.5DC x 0.4DC	Spindle Revolution(min^{-1})	6,700	5,000	4,000	3,400	2,500	2,000	1,600
				Feed Rate (mm/min)	500	500	600	600	600	640	720
		32 ~ 40HRC		Spindle Revolution(min^{-1})	4,500	3,400	2,700	2,200	1,700	1,300	1,100
				Feed Rate (mm/min)	220	220	290	290	280	280	280
		40 ~ 45HRC		Spindle Revolution(min^{-1})	3,400	2,500	2,000	1,700	1,300	1,000	800
				Feed Rate (mm/min)	150	150	180	180	180	180	180
		45 ~ 50HRC	2.5DC x 0.3DC	Spindle Revolution(min^{-1})	2,900	2,200	1,800	1,500	1,100	900	700
				Feed Rate (mm/min)	110	110	130	130	120	120	120
	Stainless Steel		1.5DC x 0.1DC	Spindle Revolution(min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
				Feed Rate (mm/min)	120	150	200	200	220	200	230
	Cast Iron		2.5DC x 0.5DC	Spindle Revolution(min^{-1})	6,700	5,000	4,000	3,400	2,500	2,000	1,600
				Feed Rate (mm/min)	600	600	720	720	720	770	970

* Machining with water soluble coolant is recommended for stainless steel.

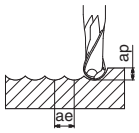
Slotting is not recommended.

4RFSM, 6RFSM

Applications	Workpiece Material		Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16		ø20		ø25
										4 flutes	6 flutes	4 flutes	6 flutes	
 Shouldering	Steel	35 ~ 45HRC	Shouldering	1.5DC x 0.4DC	Spindle Revolution (min^{-1})	8,000	6,000	4,800	4,000	3,000	3,000	2,400	2,400	1,900
					Feed Rate (mm/min)	630	630	630	640	640	900	640	930	800
			Slotting	0.5DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	2,400	1,900	1,900	1,500
					Feed Rate (mm/min)	480	480	490	500	500	720	500	750	640
		45 ~ 55HRC	Shouldering	1.5DC x 0.33DC	Spindle Revolution (min^{-1})	5,800	4,400	3,500	2,900	2,200	2,200	1,800	1,800	1,400
					Feed Rate (mm/min)	350	350	350	350	350	530	350	530	460
			Slotting	0.5DC	Spindle Revolution (min^{-1})	4,700	3,500	2,800	2,300	1,800	1,800	1,400	1,400	1,100
					Feed Rate (mm/min)	280	280	280	280	280	420	280	420	370
		55 ~ 60HRC	Shouldering	1.5DC x 0.25DC	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,800	1,400	1,400	1,100
					Feed Rate (mm/min)	190	220	230	240	220	320	230	340	310
			Slotting	0.3DC	Spindle Revolution (min^{-1})	3,800	2,900	2,300	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	150	170	180	180	180	260	180	280	250
	Stainless Steel		Shouldering	1.5DC x 0.4DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	300	280	260	300	280	420	290	430	380
			Slotting	0.5DC	Spindle Revolution (min^{-1})	3,200	2,400	1,900	1,600	1,200	1,200	1,000	1,000	800
					Feed Rate (mm/min)	200	190	180	200	190	290	210	310	270
 Slotting	Titanium Alloys	< 40HRC	Shouldering	2DC x 0.4DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	390	390	390	390	390	590	390	540	450
			Slotting	0.5DC	Spindle Revolution (min^{-1})	3,000	2,200	1,800	1,500	1,100	1,100	900	900	700
					Feed Rate (mm/min)	310	310	310	310	310	470	310	430	360
		> 40HRC	Shouldering	1.5DC x 0.25DC	Spindle Revolution (min^{-1})	3,200	2,400	1,900	1,600	1,200	1,200	1,000	1,000	800
					Feed Rate (mm/min)	300	300	300	300	300	430	300	430	370
			Slotting	0.3DC	Spindle Revolution (min^{-1})	2,500	1,900	1,500	1,300	1,000	1,000	800	800	600
					Feed Rate (mm/min)	230	230	230	230	230	340	230	340	290
	Heat-resistant Alloys (Ni-base heat-resistant alloys)		Shouldering	1DC x 0.2DC	Spindle Revolution (min^{-1})	1,600	1,200	1,000	800	600	600	500	500	400
					Feed Rate (mm/min)	100	100	100	100	100	140	100	140	130
			Slotting	0.25DC	Spindle Revolution (min^{-1})	1,300	1,000	800	600	500	500	400	400	300
					Feed Rate (mm/min)	80	80	80	80	80	120	80	120	100

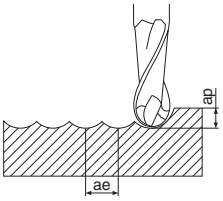
* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

2SEB

Applications	Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16
 Copying	Carbon Steel, Cast Iron		0.05DC x 0.05DC	Spindle Revolution (min^{-1})	25,900	22,800	21,300	19,700	16,000	14,000	12,800	11,800	9,500
				Feed Rate (mm/min)	3,910	3,570	3,290	3,070	2,890	2,660	2,540	2,500	2,470
	Tool Steel, Alloy Steel		0.04DC x 0.04DC	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,100	2,880	2,670	2,490	2,330	2,110	2,010	1,980	1,970
	Stainless Steel		0.05DC x 0.05DC	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,150	2,880	2,660	2,500	2,370	2,190	2,060	1,970	1,920
	Prehardened Steel	30 ~ 38HRC	0.05DC x 0.05DC	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,150	2,880	2,660	2,500	2,370	2,190	2,060	1,970	1,920
		38 ~ 45HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	20,900	18,500	17,200	15,900	13,700	11,300	10,400	9,500	7,700
				Feed Rate (mm/min)	2,550	2,330	2,170	2,040	1,940	1,800	1,680	1,590	1,550
		45 ~ 55HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	18,600	16,400	15,300	14,200	12,200	10,000	9,200	8,500	6,800
				Feed Rate (mm/min)	2,060	1,850	1,700	1,600	1,520	1,410	1,320	1,230	1,190
	Heat Treated Steel	45 ~ 55HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	18,600	16,400	15,300	14,200	12,200	10,000	9,200	8,500	6,800
				Feed Rate (mm/min)	2,060	1,850	1,700	1,600	1,520	1,410	1,320	1,230	1,190
		55 ~ 60HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	14,300	12,600	11,800	10,900	9,400	7,700	7,100	6,500	5,200
				Feed Rate (mm/min)	1,230	1,130	1,030	980	930	850	800	780	760

* Machining with water soluble coolant is recommended for stainless steel.

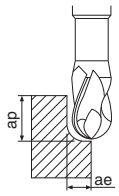
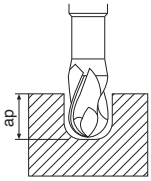
3UEBS

Applications	Workpiece Material	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12
 Copying	Carbon Steel, Cast Iron (< 20HRC)	0.2DC x 0.3DC	Spindle Revolution (min^{-1})	13,300	10,000	8,000	6,600	5,000	4,000	3,300
			Feed Rate (mm/min)	600	870	840	850	1,400	1,200	990
	Alloy Steel (< 35HRC)	0.2DC x 0.3DC	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,700
			Feed Rate (mm/min)	410	500	610	640	940	830	730
	Prehardened Steel (30 ~ 45HRC)	0.1DC x 0.2DC	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900
			Feed Rate (mm/min)	220	250	257	280	250	240	230
	Stainless Steel	0.05DC x 0.1DC	Spindle Revolution (min^{-1})	5,800	4,400	3,500	2,900	2,200	1,800	1,500
			Feed Rate (mm/min)	160	180	190	180	190	190	170

* Machining with water soluble coolant is recommended for stainless steel.

Recommended Cutting Conditions

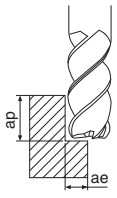
4YEBM

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø5	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering  Slotting	Low Carbon Steel	Shouldering	1DC x 0.5DC	Spindle Revolution (min^{-1})	9,400	7,900	5,900	4,700	3,900	2,900	2,400
				Feed Rate (mm/min)	1,020	1,130	1,270	1,020	990	800	760
		Slotting	1DC	Spindle Revolution (min^{-1})	8,600	7,200	5,400	4,300	3,600	2,700	2,200
				Feed Rate (mm/min)	930	1,030	1,160	930	900	730	700
	Stainless Steel	Shouldering	1DC x 0.5DC	Spindle Revolution (min^{-1})	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	620	630	630	640	560	450	390
		Slotting	1DC	Spindle Revolution (min^{-1})	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	550	610	570	550	500	400	350
	Titanium Alloys	Shouldering	1DC x 0.3DC	Spindle Revolution (min^{-1})	3,200	2,700	2,000	1,600	1,300	1,000	800
				Feed Rate (mm/min)	180	190	220	170	170	160	160
		Slotting	0.5DC	Spindle Revolution (min^{-1})	2,900	2,400	1,800	1,400	1,200	900	700
				Feed Rate (mm/min)	160	170	190	170	170	160	160
	Heat-resistant Alloys	Shouldering	1DC x 0.2DC	Spindle Revolution (min^{-1})	1,700	1,400	1,000	800	700	500	400
				Feed Rate (mm/min)	70	80	100	80	90	90	80
		Slotting	0.5DC	Spindle Revolution (min^{-1})	1,400	1,200	900	700	600	400	400
				Feed Rate (mm/min)	60	70	80	80	80	80	70
	Gray Cast Iron	Shouldering	1DC x 0.4DC	Spindle Revolution (min^{-1})	7,800	6,500	4,900	3,900	3,200	2,400	1,900
				Feed Rate (mm/min)	840	930	1,050	840	820	660	630
		Slotting	1DC	Spindle Revolution (min^{-1})	7,000	5,800	4,400	3,500	2,900	2,200	1,800
				Feed Rate (mm/min)	760	840	950	760	740	600	570

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

4HFSS, 5HFSS, 6HFSS, 7HFSS (Shouldering)

4HFSM, 5HFSM, 6HFSM, 7HFSM, 8HFSM (Shouldering)

Applications	Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12
 Shouldering	Tool Steel (< 40HRC) Prehardened Steel		1.5DC x 0.05DC (DC < ø3) 1.5DC x 0.1DC (ø3 ≤ DC)	Spindle Revolution (min^{-1})	20,700	20,000	11,100	7,400	5,600	3,700
				Feed Rate (mm/min)	910	1,750	2,000	2,900	2,930	2,930
	Tool Steel, Heat Treated Steel (40 ~ 45HRC) Prehardened Steel			Spindle Revolution (min^{-1})	20,700	20,000	9,900	6,600	5,000	3,300
				Feed Rate (mm/min)	910	1,750	1,800	2,630	2,650	2,650
	Heat Treated Steel	45 ~ 55HRC	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	20,700	16,000	8,000	5,300	4,000	2,700
				Feed Rate (mm/min)	910	1,400	1,400	2,100	2,100	2,100
		55 ~ 60HRC	1.5DC x 0.02DC	Spindle Revolution (min^{-1})	20,700	12,000	6,000	4,000	3,000	2,000
				Feed Rate (mm/min)	640	730	740	1,100	1,100	1,100
		60 ~ 65HRC		Spindle Revolution (min^{-1})	20,700	11,100	5,600	3,700	2,800	1,900
				Feed Rate (mm/min)	550	600	600	880	880	880
		65 ~ 70HRC		Spindle Revolution (min^{-1})	15,900	8,000	4,000	2,700	2,000	1,330
				Feed Rate (mm/min)	370	370	370	560	560	550

* Above is even number flute condition. In case of Odd number flute, please take standard with increasing feed rate 15 ~ 20% condition.

Slotting is not recommended.

3AFK (Short)

Workpiece Material	Applications	Depth of Cut (mm) ap x ae	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
			Spindle Revolution (min^{-1})	20,000	20,000	20,000	19,500	16,800	14,700	13,000	11,700	10,700	9,800	7,300
Aluminum Alloys	Shouldering	1.5DC x 0.3DC	Feed Rate (mm/min)	2,400	2,800	3,500	4,200	4,300	4,400	4,500	4,600	4,700	4,700	3,500
	Slotting	1DC		1,600	2,000	2,500	3,000	3,100	3,200	3,300	3,400	3,500	3,500	2,200
	Plunge milling	1DC		350	350	350	350	350	350	350	350	350	350	350
Workpiece Material	Applications	Depth of Cut (mm) ap x ae	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
			Spindle Revolution (min^{-1})	20,000	19,900	15,900	13,200	11,300	9,900	8,800	7,900	7,200	6,600	4,900
Aluminum Alloy Casting	Shouldering	1.5DC x 0.3DC	Feed Rate (mm/min)	2,400	2,500	2,500	2,500	2,500	2,600	2,600	2,600	2,600	2,600	1,900
	Slotting	1DC		1,300	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,800	1,300
	Plunge milling	1DC		300	250	200	200	190	150	150	100	100	80	60

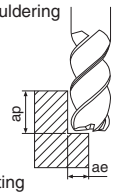
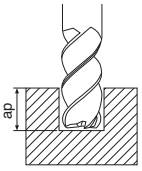
· Water soluble coolant is recommended.
· The cutting conditions should be adjusted based on the overhang of the tool and the machine or workpiece rigidity.
· Spindle revolution and feed rate should be adjusted by the same percentage.
· Pecking may be necessary if chips become clogged while plunge milling.

3AFK (Medium)

Workpiece Material	Applications	Depth of Cut (mm) ap x ae	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
			Spindle Revolution (min^{-1})	20,000	20,000	19,000	16,000	13,500	12,000	10,500	9,500	8,500	8,000	6,000
Aluminum Alloys	Shouldering	2.5DC x 0.3DC	Feed Rate (mm/min)	2,300	2,600	3,200	3,600	3,600	3,600	3,700	3,900	4,000	4,000	2,800
	Slotting	0.5DC		1,500	1,900	2,300	2,600	2,600	2,700	2,700	2,800	2,900	2,900	1,600
	Plunge milling	0.5DC		300	300	300	300	300	300	300	300	300	300	300
Workpiece Material	Applications	Depth of Cut (mm) ap x ae	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
			Spindle Revolution (min^{-1})	20,000	15,900	12,700	10,600	9,100	7,900	7,000	6,300	5,800	5,300	3,950
Aluminum Alloy Casting	Shouldering	2.5DC x 0.3DC	Feed Rate (mm/min)	2,300	2,200	2,000	2,000	2,000	2,000	2,000	2,000	2,100	2,100	1,500
	Slotting	0.5DC		1,300	1,300	1,300	1,400	1,400	1,400	1,400	1,400	1,400	1,500	1,100
	Plunge milling	0.5DC		300	200	150	160	160	120	120	80	80	60	50

· Water soluble coolant is recommended.
· The cutting conditions should be adjusted based on the overhang of the tool and the machine or workpiece rigidity.
· Spindle revolution and feed rate should be adjusted by the same percentage.
· Pecking may be necessary if chips become clogged while plunge milling.

3NESM

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20
Shouldering  Slotting 	Aluminum Alloys	Shouldering	1.5DC x 0.5DC	Spindle Revolution (min^{-1})	34,000	17,000	13,000	10,200	8,500	6,400	5,100
				Feed Rate (mm/min)	2,750	2,750	2,750	2,750	2,750	2,750	2,750
		Slotting	1DC	Spindle Revolution (min^{-1})	26,500	13,000	9,800	8,000	6,600	5,000	4,000
				Feed Rate (mm/min)	1,100	1,100	1,100	1,100	1,100	1,100	1,100

4FCX-KCD

Workpiece Material	Cutting Conditions	DC (mm)		
		ø8	ø10	ø12
CFRP	Spindle Revolution (min^{-1})	6,000~10,000	4,800~8,000	4,000~6,600
	Feed Rate (mm/rev)	0.05~0.08	0.05~0.08	0.05~0.08

2ZDF-KCD

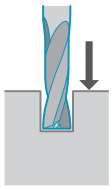
Workpiece Material	Cutting Conditions	DC (mm)		
		ø4.763	ø6.350	ø7.938
CFRP	Spindle Revolution (min^{-1})	3,400~6,700	2,500~5,000	2,000~4,000
	Feed Rate (mm/rev)	0.04~0.06	0.05~0.08	0.05~0.08

* The recommended cutting conditions are for Dry machining.
Adjust cutting conditions according to the machine rigidity, the workpiece rigidity and the overhang length.
Take sufficient measurement against the dust during machining.

Recommended Cutting Conditions (Plunge milling)

2ZDK-HP (Drilling Depth Short type) (Drilling Depth Regular type)

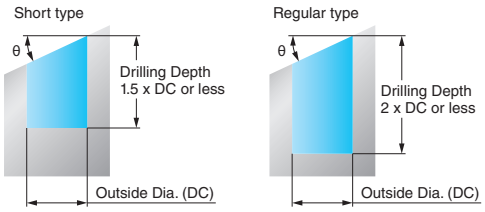
Drilling Depth Short : ap ≤ 1.5DC Regular : ap ≤ 2DC

Workpiece Material	Application	Outside Dia. DC (mm)	ø1	ø1.5	ø2	ø2.5	ø3	ø3.5	ø4	ø4.5	ø5	ø6	ø8	ø10	ø12	ø14	ø16	ø18	ø20
Structural Steel Carbon Steel	 Plunge milling	Spindle Revolution (min^{-1})	20,700	13,800	11,150	9,200	9,100	7,800	6,800	6,100	5,500	4,600	3,500	2,800	2,300	1,800	1,600	1,400	1,300
		Feed Rate (mm/min)	350	350	430	430	520	520	520	520	520	520	520	520	520	480	480	480	480
Alloy Steel		Spindle Revolution (min^{-1})	17,500	11,700	9,600	7,650	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800	1,500	1,350	1,200	1,100
		Feed Rate (mm/min)	290	290	380	380	450	450	450	450	450	450	450	450	450	420	420	420	420
Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min^{-1})	9,600	6,400	5,570	4,460	3,900	3,400	2,900	2,600	2,300	1,900	1,500	1,200	1,000	850	750	650	600
		Feed Rate (mm/min)	120	120	170	170	210	210	210	210	210	210	210	210	210	200	200	200	200
Nodular Cast Iron		Spindle Revolution (min^{-1})	15,900	10,600	10,360	8,290	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800	1,550	1,350	1,200	1,100
		Feed Rate (mm/min)	220	250	390	390	390	390	390	390	390	390	390	390	390	360	360	360	360
Aluminum Alloys		Spindle Revolution (min^{-1})	39,800	26,600	23,000	18,500	17,800	15,200	13,100	11,800	10,500	8,900	6,700	5,400	4,500	3,800	3,400	3,000	2,700
		Feed Rate (mm/min)	900	1,000	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270
Aluminum Alloy Casting		Spindle Revolution (min^{-1})	29,000	19,200	17,500	14,000	13,100	11,500	10,000	8,800	8,000	6,700	5,000	4,000	3,400	2,900	2,500	2,200	2,000
		Feed Rate (mm/min)	550	550	820	820	820	820	820	820	820	820	820	820	820	820	820	820	820

NOT recommended for slotting

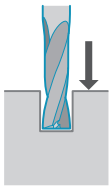
***This tool is specially designed for plunge milling and NOT recommended for slotting.**

- Coolant is recommended.
- Adjust cutting conditions to suit machine rigidity.
- Use chuck and machine with as high rigidity as possible.
- Pecking is recommended when drilling depth is 2D or over
- Stainless steel machining is NOT recommended.
- Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (Ref. to the right figure)
  When workpiece slant angle is 30˚ or less, reduce the feed rate by 50%.
  When workpiece slant angle is more than 30˚, reduce the revolution by 70% and the feed rate by 30%.



2ZDK-HP (Drilling Depth Short type Long shank)

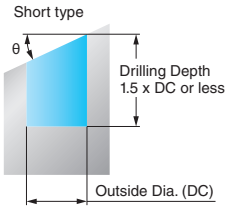
Drilling Depth : ap ≤ 1×D

Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø3.5	ø4	ø4.5	ø5	ø6	ø8	ø10	ø12
Structural Steel Carbon Steel	 Plunge milling	Spindle Revolution (min^{-1})	10,600	9,100	8,000	7,100	6,400	5,300	4,000	3,200	2,700
		Feed Rate (mm/min)	830	830	830	830	830	830	830	830	830
Alloy Steel		Spindle Revolution (min^{-1})	9,500	8,200	7,200	6,400	5,700	4,800	3,600	2,900	2,400
		Feed Rate (mm/min)	630	630	630	630	630	630	630	630	630
Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min^{-1})	7,400	6,400	5,600	5,000	4,500	3,700	2,800	2,200	1,900
		Feed Rate (mm/min)	365	365	365	365	365	365	365	365	365
Nodular Cast Iron		Spindle Revolution (min^{-1})	9,600	8,200	7,200	6,400	5,700	4,800	3,600	2,900	2,400
		Feed Rate (mm/min)	475	475	475	475	475	475	475	475	475
Aluminum Alloys		Spindle Revolution (min^{-1})	12,700	10,900	9,600	8,500	7,600	6,400	4,800	3,800	3,200
		Feed Rate (mm/min)	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
Aluminum Alloy Casting		Spindle Revolution (min^{-1})	9,500	8,200	7,200	6,400	5,700	4,800	3,600	2,900	2,400
		Feed Rate (mm/min)	675	675	675	675	675	675	675	675	675

NOT recommended for slotting

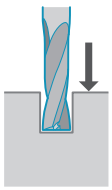
***This tool is specially designed for plunge milling and NOT recommended for slotting.**

- Coolant is recommended.
- Adjust cutting conditions to suit machine rigidity.
- Use chuck and machine with as high rigidity as possible.
- Pecking is recommended when drilling depth is 2D or over.
- Stainless steel machining is NOT recommended.
- Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (Ref. to the right figure)
  When workpiece slant angle is 30˚ or less, reduce the feed rate by 50%.
  When workpiece slant angle is more than 30˚, reduce the revolution by 70% and the feed rate by 30%.



2ZDK-HP-OH (Drilling Depth Regular type)

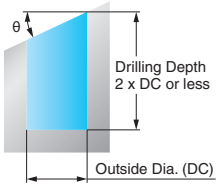
Drilling Depth : ap ≤ 3DC

Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12
Structural Steel Carbon Steel	 Plunge milling	Spindle Revolution (min^{-1})	10,600	7,950	6,350	5,300	3,980	3,180	2,650
		Feed Rate (mm/min)	750	750	750	750	750	750	750
Alloy Steel		Spindle Revolution (min^{-1})	9,550	7,160	5,730	4,770	3,580	2,860	2,390
		Feed Rate (mm/min)	700	680	630	600	600	600	600
Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min^{-1})	5,300	3,980	3,180	2,650	1,990	1,590	1,330
		Feed Rate (mm/min)	300	300	300	300	300	280	280
Stainless Steel		Spindle Revolution (min^{-1})	7,430	5,570	5,100	4,240	3,180	2,550	2,120
		Feed Rate (mm/min)	400	400	400	500	500	500	500
Nodular Cast Iron		Spindle Revolution (min^{-1})	9,550	7,160	5,730	4,770	3,580	2,860	2,390
		Feed Rate (mm/min)	580	580	500	500	500	450	450
Aluminum Alloys		Spindle Revolution (min^{-1})	18,000	13,500	10,800	9,000	6,800	5,400	4,500
		Feed Rate (mm/min)	1,270	1,270	1,270	1,270	1,270	1,270	1,270
Aluminum Alloy Casting		Spindle Revolution (min^{-1})	13,100	10,000	8,000	6,700	5,000	4,000	3,400
		Feed Rate (mm/min)	900	900	850	850	850	850	850

NOT recommended for slotting

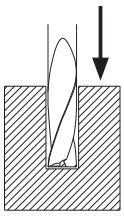
***This tool is specially designed for plunge milling and NOT recommended for slotting.**

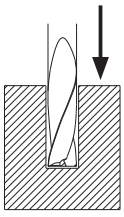
- Internal coolant is recommended.
- Adjust cutting conditions to suit machine rigidity.
- Use chuck and machine with as high rigidity as possible.
- Pecking is recommended when drilling depth is 2D or over.
- Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (Ref. to the right figure)
  When workpiece slant angle is 30˚ or less, reduce the feed rate by 50%.
  When workpiece slant angle is more than 30˚, reduce the revolution by 70% and the feed rate by 30%.
- If there is insufficient chip evacuation at the specified drill depth, it is recommended to peck or change cutting conditions.
- Pre-drilling is recommended if cutting is unstable.
- Pre-drilling and pecking are recommended for stainless steel machining.



Recommended Cutting Conditions (Plunge milling)

2ZDK

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø1	ø2	ø3	ø4	ø5	ø6	ø8
 Plunge milling	Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min^{-1})	19,500	11,200	8,300	6,200	5,000	4,200	3,200
			Feed Rate (mm/min)	300	380	520	520	520	520	520
	Alloy Steel		Spindle Revolution (min^{-1})	19,000	10,000	7,200	5,400	4,400	3,600	2,700
			Feed Rate (mm/min)	300	320	450	450	450	450	450
	Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min^{-1})	16,000	8,000	3,900	2,900	2,300	1,900	1,500
			Feed Rate (mm/min)	210	210	210	210	210	210	210
	Nodular Cast Iron		Spindle Revolution (min^{-1})	16,000	10,000	7,200	5,400	4,400	3,600	2,700
			Feed Rate (mm/min)	200	300	390	390	390	390	390
	Aluminum Alloys		Spindle Revolution (min^{-1})	20,000	20,000	17,800	13,100	10,500	8,900	6,700
			Feed Rate (mm/min)	500	850	1,270	1,270	1,270	1,270	1,270
	Aluminum Alloy Casting		Spindle Revolution (min^{-1})	20,000	20,000	13,100	10,000	8,000	6,700	5,000
			Feed Rate (mm/min)	450	750	820	820	820	820	820

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø10	ø12	ø14	ø16	ø18	ø20
 Plunge milling	Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min^{-1})	2,500	2,100	1,800	1,600	1,400	1,300
			Feed Rate (mm/min)	450	450	450	450	450	450
	Alloy Steel		Spindle Revolution (min^{-1})	2,200	1,800	1,500	1,350	1,200	1,100
			Feed Rate (mm/min)	400	400	400	400	400	400
	Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min^{-1})	1,200	1,000	850	750	650	600
			Feed Rate (mm/min)	190	190	190	190	190	190
	Nodular Cast Iron		Spindle Revolution (min^{-1})	2,200	1,800	1,550	1,350	1,200	1,100
			Feed Rate (mm/min)	340	340	340	340	340	340
	Aluminum Alloys		Spindle Revolution (min^{-1})	5,400	4,500	3,800	3,400	3,000	2,700
			Feed Rate (mm/min)	1,270	1,270	1,270	1,270	1,270	1,270
	Aluminum Alloy Casting		Spindle Revolution (min^{-1})	4,000	3,400	2,900	2,500	2,200	2,000
			Feed Rate (mm/min)	820	820	820	820	820	820

NOT recommended for slotting

***This tool is specially designed for plunge milling and NOT recommended for slotting.**

- Coolant is recommended.
- Adjust cutting conditions to suit machine rigidity.
- Use chuck and machine with as high rigidity as possible.
- Stainless steel machining is NOT recommended.
- Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (fig.1)
  When workpiece slant angle is 30˚ or less, reduce the feed rate by 50%.
  When workpiece slant angle is more than 30˚, reduce the revolution by 70% and the feed rate by 30%.

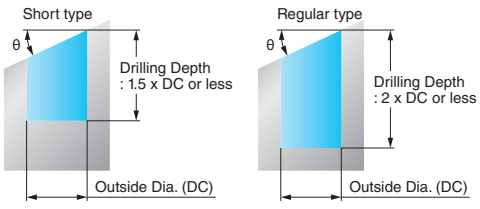


Fig. 1



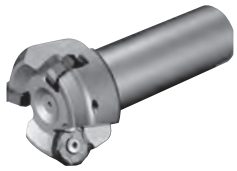
Milling

M1~M228

M

Milling Series		**M2~M10**
Product Lineup		M2
Milling Inserts		**M11~M29**
Milling Inserts Identification System		M11
Milling Inserts		M12
Lead Angle 45°/ 24°/ 20°		**M30~M50**
MFPN45		M30
MFPN66		M34
MFLN45 / MFLN70		M38
MFK		M44
MOF45		M50
Lead Angle 15°		**M51~M53**
MSRS15		M51
Lead Angle 0°/ 2°		**M54~M147**
MEW		M54
MEC / MECX		M64
MEV		M78
MEWH		M86
MECH		M90
MECHT		M98
MFWN		M100
MFWN Mini		M106
MFSN88		M110
MFLN90		M114
MSRS90		M118
MSR / MSR-BT50		M123
MTP90		M129
DMC / DMC-SX / DMC-H		M130
MFAH	High Efficiency Milling Cutter for Aluminum Alloys	M134
MEAS	End Mill for Aluminum Alloys Machining, High Efficiency End Mill	M142
High Feed Cutter		**M148~M167**
MFH	MFH Harrier	M148
MFH	MFH Mini	M157
MFH	MFH Micro	M162
For Finishing		**M168~M173**
MFF		M168
Multi-Function Machining End Mill		**M174~M179**
MEY		M174
MEZ-G		M178
Slot Mill		**M180~M205**
MSTA	Width 1.6, 2.2(2.25), 3.05, 4.05 mm fixed	M182
MSTB	Width 6 ~ 13mm Semi-Adjustable	M186
MSTC	Width 14 ~ 23.3 mm Full-Adjustable	M191
Ball-nose End Mill / Radius Series (Face Mill + End Mill)		**M206~M219**
MRF / MRFW		M206
MRW		M208
MRX		M214
Other Applications		**M220~M228**
MCSE	Chamfering End Mill	M220
MEF	Bolt Countersink End Mill	M222
METS	T-Slot Mill	M224
MGI	Grooving End Mill for M/C	M226
MVG	Ring Grooving End Mill for M/C	M228

Lead Angle 45˚/24˚/ 20˚ / 15˚

Lead Angle	Applications / Shape	Facing	Chamfering
45°	**MFPN45**  M30	●10-edge pentagonal inserts Double-sided pentagonal insert Economical with 10-edge insert ●Low cutting force with helical cutting-edge design ●Dual cutting edge design (High toughness)	
45°	**MFPN45**  M31	●10-edge pentagonal inserts Double-sided pentagonal insert Economical with 10-edge insert ●Low cutting force with helical cutting-edge design ●Dual cutting edge design (High toughness) ●With ø32 cylindrical shank	

Lead Angle	Applications / Shape	Facing	Chamfering
45°	**MFLN45**  M40	●For heavy milling ●Tough 4-edge vertical inserts ●For large depths of cut and high feed rates ●Max. ap 12mm	
45°	**MOF45**  M50	●Octagonal insert with 8-edge insert ●Insert sizes are available in 05 and 07 types ●Silver Coating	

Lead Angle	Applications / Shape	Facing
24°	**MFPN66**  M35	●Double-sided 10-edge insert ●Cutting edge angle 66˚ ●Reduces chattering with low cutting force design
24°	**MFPN66**  M36	●Double-sided 10-edge insert ●Cutting edge angle 66˚ ●Reduces chattering with low cutting force design ●With ø32,ø40 cylindrical shank
15°	**MSRS15**  M52	●For heavy milling ●Max. ap 12mm ●Chip evacuation per unit time is increased

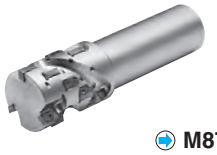
Lead Angle	Applications / Shape	Facing
20°	**MFLN70**  M41	●For heavy milling ●Tough 4-edge vertical inserts ●For large depths of cut and high feed rates ●Max. ap 17mm
20°	**MFK**  M46	●High efficiency multi-edge cutter for cast iron ●10-edge pentagonal inserts Economical double-sided 10-edge insert ●Low cutting force with helical cutting-edge design Improved surface finish, minimizing chattering and prevented burr formation ●Dual cutting edge design (High toughness)
20°	**MFK-SF**  M47	●Cutter for cast iron with adjustable cutting edge height ●High speed and high precision machining of cast iron by combining ceramic insert and CBN wiper insert

Lead Angle 0˚/2˚ (Double-sided Insert)

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MEW End Mill**  M56	● Economical double-sided 4-edge insert ● Obtuse edge increases cutting edge toughness ● Smooth surface wall with low cutting force and reduced chattering		
	MEW Face Mill  M57			
	MEW Head (Modular type)  M58			

Lead Angle	Shape \ Applications	Facing	Shouldering	Slotting
0°	**MFWN Face Mill**  M102	● Economical double-sided 6-edge insert ● Superior fracture resistance with thick edge design ● "Large slant edge" design reduces shock when cutting edge enters the workpiece ● Low cutting force and reduce chattering ● End mills have ø32 cylindrical shank		
	MFWN End Mill  M103			
	MFWN Mini Face Mill  M107	● Can be used up to 5mm D.O.C. ● Good cost performance ● Economical double-sided 6-edge insert ● Superior fracture resistance with thick edge design ● "Large slant edge" design reduces shock when cutting edge enters the workpiece ● Low cutting force and reduce chattering ● End mills have ø25,ø32 cylindrical shank		
	MFWN Mini End Mill  M108			
2°	**MFSN88 Face Mill**  M111	● Economical double-sided 8-edge insert ● Reduces chattering with low cutting force design ● Contribute to cost-cutting for Shoulder Roughing ● End mills have ø32,ø40 cylindrical shank		
	MFSN88 End Mill  M112			

Lead Angle 0° (Heavy Milling)

Lead Angle	Applications / Shape	Facing	Shouldering	Slotting
0°(Long Cutting Edge)	**MEWH**  M87	●Low cutting force and sharp cutting performance ●Excellent surface finish quality ●Economical double-sided 4-edge insert ●High quality and stable machining with heavy milling		
	MEWH Shell Mill  M88	●MEWH Shell Mill		
	MSR  M124	●Low cutting force and restrain chattering with notched insert ●Chipbreaker design with specialized notches improves chip evacuation ●Chipbreaker achieves stabilized machining for heavy milling		
	MSR-BT50  M125	●Highly rigid BT50 Arbor integrated for MSR		
	MFLN90  M116	●For heavy milling ●Tough 4-edge vertical inserts ●For large depths of cut and high feed rates ●Max. ap 20mm ●Chamfered corner type available Prevents chattering and insert fracturing		
	MSRS90  M120	●High efficiency, low cutting force and stable machining without chatter ●Various expansive possibilities with combining neutral insert and custom-ordered cutter		

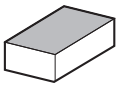
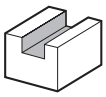
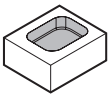
Lead Angle	Applications / Shape	Facing	Shouldering	Slotting
0°(Long Cutting Edge)	**MECH**  M90	●Notched insert improves higher productivity		
	MECH Shell Mill  M91	●MECH Shell Mill		
	MECH-BT50 **MECH-BT50SA**  M91	●Highly rigid BT50 Arbor integrated for MECH ●Head exchangeable type is available (MECH-BT50SA)		
	MECHT  M99	●Excellent chattering resistance and good chip control with special design for titanium alloys ●End mills have ø32 cylindrical shank		

Lead Angle 0˚

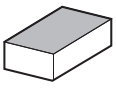
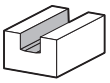
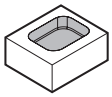
Lead Angle	Applications / Shape	Facing	Shouldering	Slotting
0°	**MEC End Mill**  M64	●Good squareness ●Low cutting force ●The silver coating prevents chip wear on the tool body ●With coolant hole (Over ø16)		
	MEC Face Mill  M66	●The twisted cutting edge improves cutting performance ●Smooth surface of shoulder wall ●Good squareness ●The silver coating prevents chip wear on the tool body ●With coolant hole		
	MEC Head (Modular type)  M67	●Good squareness ●Low cutting force ●The silver coating prevents chip wear on the tool body ●With coolant hole (Over ø16)		
	MECX End Mill  M74	●Good squareness ●Small size insert with multi-edge specification ●Low cutting force ●The silver coating prevents chip wear on the tool body ●With coolant hole		
	MECX Face Mill  M75	●Efficient machining with small diameter cutter that holds multiple inserts ●Recommended for small machines : low cutting force and high strength design ●The silver coating prevents chip wear on the tool body ●With coolant hole		
	MTP90  M129	●Medium to roughing of steel / cast iron ●For small machines and M/C		

Lead Angle	Applications / Shape	Facing	Shouldering	Slotting
0°	**MEV End Mill**  M80	●Newly developed vertical triangle inserts with 3 cutting edges ●Economical 3-edge insert ●The MEV can perform a wide variety of machining processes		
	MEV Face Mill  M81			
	MEV Head (Modular type)  M82			
	DMC  M130	●For small milling machine and M/C		
	DMC-H  M132	●High Rake ●For small milling machine and M/C		
	DMC-SX  M131	●For small milling machine and M/C		

Lead Angle 0° (For Aluminum Alloys)

Lead Angle	Applications / Shape	Facing	Shouldering	Slotting	Pocketing
					
0°	**MFAH**  M134	●High efficiency milling cutter for finishing aluminum alloys ●Light-weight hybrid body with internal coolant available / Steel body ●Adjustable cutting edge height ●3 Different cutting edge design			
	MEAS End Mill  M144	●High efficiency end mill for aluminum alloys ●Excellent scatter prevention to ensure stable ●Applicable to a wide range of application			
	MEAS Face Mill  M144	●High efficiency milling cutter for finishing aluminum alloys ●Excellent scatter prevention to ensure stable			

High Feed Cutter

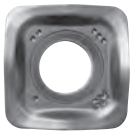
Applications / Shape	Facing	Shouldering	Slotting	Pocketing	Cutting Dia. DC
					ø8 ø16 ø25 ø32 ø40 ø50 ø80 ø160

MFH Harrier Face Mill



M150

●Various applications with 4 types of inserts



GM type
(General purpose)



GH type
(Tough Edge)

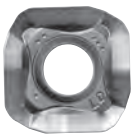
(SOMT10 type) ø50 ø80

ø50 ø160 (SOMT14 type)

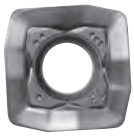
MFH Harrier End Mill



M152



LD type
(Large D.O.C.)
MAX.
ap=5mm



FL type
(With Wiper Edge)
Applicable for both
roughing and finishing

(SOMT10 type) ø25 ø40

(SOMT14 type) ø50 ø80

MFH Harrier Head (Modular type)



M154

●3D convex cutting edge reduces shock of biting workpiece
●Multi-functional cutter for ramping, helical milling vertical milling (plunging) etc. (GM type / GH type)

(SOMT10 type) ø25 ø40

MFH Mini Face Mill



M159

●Economical double-sided 4-edge insert



GM type
(General purpose)



GH type
(Tough Edge)

●High efficiency and high feed machining at small dia. machining and small machining center

ø40 ø50

MFH Mini End Mill



M158

ø16 ø32

MFH Mini Head (Modular type)



M159

ø16 ø32

MFH Micro End Mill



M164

●Micro Dia. cutter for high feed machining
●High efficiency machining with low cutting force and reduced chattering



GM type
(General purpose)

ø8 ø16

MFH Micro Head (Modular type)



M165

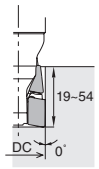
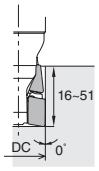
ø8 ø16

Product Lineup

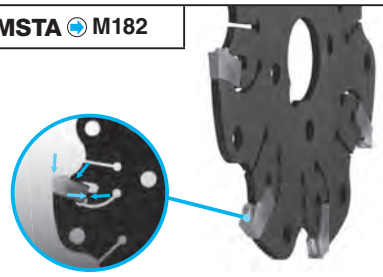
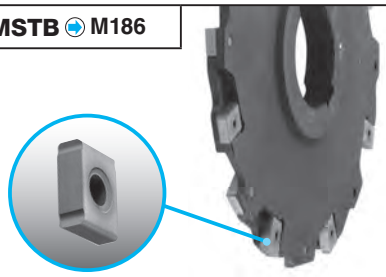
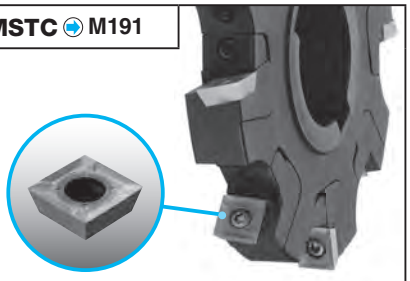
Cutter for Finishing

Lead Angle \ Applications / Shape	Facing
0° **MFF**  M172	●Cutter body design provides excellent reliability ●Molded Wiper Insert for High-Quality Surface Finish ●Easy-to-adjust Cutting Edge

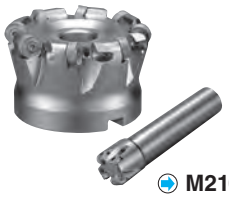
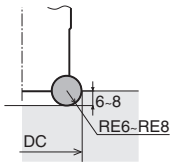
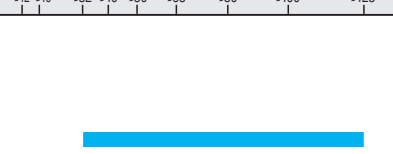
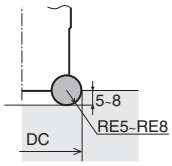
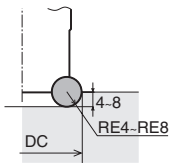
Multi-Function Machining End Mill

Applications / Shape	Facing	Shouldering	Slotting	Deep Slotting	Pocketing	Drilling	Lead Angle and Max. ap	Cutting Dia. DC (ø16 ø25 ø50)
MEY  M174	●Multi-function machining (Drilling / Ramping / Shouldering / Grooving) ●High efficiency mold machining ●Low cutting force, Good chip evacuation		●Full 2-insert structure and high stability ●Good chip control when Ramping		●Cutting diameters that are larger than the shank diameters enables wall shouldering ●The silver coating prevents chip wear on the tool body			ø16 ø50
MEZ-G  M178	●Multi-function machining (Drilling / Ramping / Shouldering / Grooving) ●High efficiency mold machining ●Low cutting force, Good chip evacuation		●The silver coating prevents chip wear on the tool body ●The clearance groove prevents chip welding					ø16 ø49

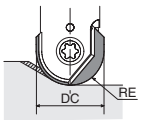
Slot Mill MST

MSTA M182	MSTB M186	MSTC M191
		
●Self-clamping type ●Remove insert with appropriate wrench	●Easy screw on tangential clamped insert	●Adjustable slotting width due to unique cam adjustment structure

Radius

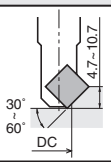
Shape \ Applications	Facing	Shouldering	Pocketing	Lead Angle and Max. ap	Cutting Dia. DC
MRW Face Mill End Mill  M210	● High efficiency radius cutter with double-sided insert ● Combine sharpness and cutting edge strength (A.R. Max. +12˚) ● Prevent insert rotation during machining with flat lock structure ● Wide application range from steel to heat-resistant alloys				
MRX Face Mill  M215	● Low cutting force and high performance radius cutter ● Low cutting force with helical cutting-edge design (A.R. Max. +10˚) ● Prevent insert rotation during machining with flat lock structure ● Wide application from facing, grooving, pocketing to plunging ● Wide application range from steel to heat-resistant alloys				
MRX End Mill  M216					
MRX Head (Modular type)  M217					

Ball-nose End Mill

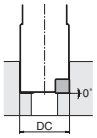
Shape \ Applications	Contouring / Profiling	Pocketing	Lead Angle and Max. ap	Cutting Dia. DC
MRF  M206	● For high quality mold finishing ● High R-accuracy (Insert's R-accuracy: ±0.01mm or under) ● The bushing ensures insert installation accuracy			
MRFW  M206	● Carbide shank ● For high quality mold finishing ● High R-accuracy (Insert's R-accuracy: ±0.01mm or under) ● The bushing ensures insert installation accuracy ● Superior to anti vibration, and stable machining is possible with long overhang length without chattering			

Product Lineup

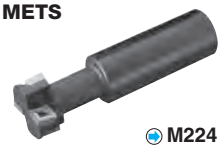
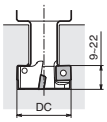
Chamfering

Applications / Shape	Chamfering	Back Chamfering	V Shape Slotting	Countersinking	Lead Angle and Max. ap
MCSE  M220	● For 30˚, 45˚, 60˚ Chamfering ● Economical 4-edge insert ● Available back chamfering				

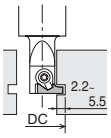
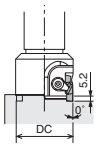
Bolt Countersinking

Applications / Shape	Bolt Countersinking	Facing	Shouldering	Lead Angle and Max. ap
MEF  M222	● Countersink for hexagon socket bolt (M6 ~ M30) ● Economical 4-edge insert			

T-Slotting

Applications / Shape	T-Slotting	Back side milling	Lead Angle and Max. ap
METS  M224	● T-Slotting ● Recommended for high feed machining with 2 flute design ● Economical 4-edge insert		

Grooving

Applications / Shape	Internal Grooving	Ring Grooving	Lead Angle and Max. ap
MGI  M226	● Edge Width 1.0 ~ 4.0mm ● Grooving for M/C		
MVG  M228		● Cutting Dia. ø30 ~ø75 ● Edge Width 4.0 ~ 4.9mm ● O-Ring Grooving (G Series)	

Milling Inserts Identification System

Symbol	Shape
H	Hexagon
O	Octagon
P	Pentagon
S	Square
T	Triangle
C	80° Rhombic
D	55° Rhombic
E	75° Rhombic
F	50° Rhombic
M	86° Rhombic
V	35° Rhombic
W	Trigon
L	Rectangle
A	85° Parallelogram
B	82° Parallelogram
K	55° Parallelogram
R	Round

Shown angle stands for acute angle for rhombic and parallelogram inserts.

(1) Shape

Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other angles

(2) Relief Angle

Symbol (Class)	Tolerance (mm)		
	Corner Height	Thickness	I.C. Size
A	±0.005	±0.025	±0.025
F			±0.013
C	±0.013		±0.025
H			±0.013
E	±0.025		±0.025
G		±0.13	
J	±0.005	±0.025	±0.05~±0.15
K*	±0.013		
L*	±0.025		
M*	±0.08~±0.18	±0.13	
N*		±0.025	
U*	±0.13~±0.38	±0.13	±0.08~±0.25

Insert's periphery is as fired.
* Tolerance difference is depending on insert size.

(3) Tolerance

Symbol	Shape
W	No chipbreaker, with hole
T	Single-sided chipbreaker, with hole
F	Double-sided chipbreakers, without hole
N	No chipbreaker, without hole
R	Single-sided chipbreaker, without hole
M	Single-sided chipbreaker, with hole
A	No chipbreaker, with hole

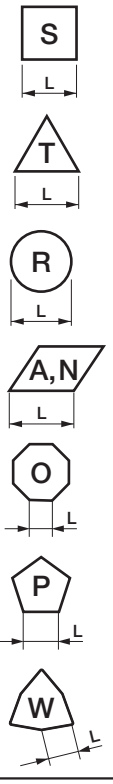
(4) Chipbreaker / Hole

Symbol	Shape
F	Sharp Edge
E	R-honed
T	Chamfered
S	Chamfered + R-honed

(9) Edge Preparation

S	E	K	N	12	03	A	F	T	N	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

(5) Edge Length



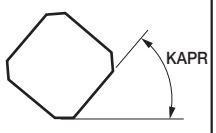
(6) Thickness

Symbol	Thickness (mm)
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35



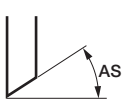
(7) Cutting Edge Angle

Symbol	Cutting Edge Angle
A	45°
D	60°
E	75°
F	85°
H	87°
P	90°
X	65°



(8) Relief Angle

Symbol	Relief Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
R	10°
S	14°
T	22°
U	23°



(10) Hand of Tool

Symbol	Hand of Tool
R	Right-hand
L	Left-hand
N	Neutral

(11) Manufacturer's Option

Chipbreaker, etc.

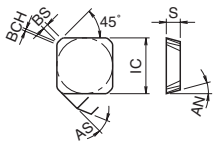
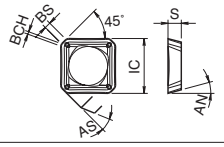
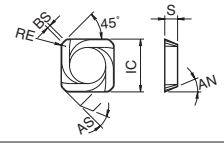
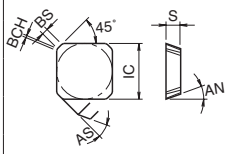
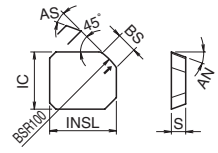
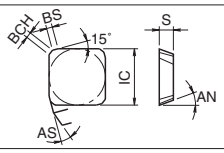
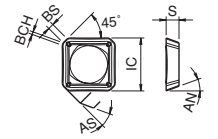
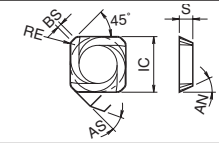
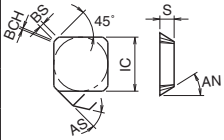
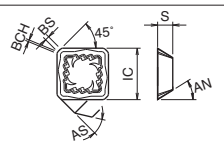
In case of indicating corner-R(RE) at (7) and (8)

(7) (8) Corner-R(RE) (mm)	
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0



Milling Inserts

Classification of usage													
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel		■				★					
		Mold Steel		■				★					
	M	Stainless Steel						★					
	K	Gray Cast Iron							★	☆			
		Nodular Cast Iron							★				
	N	Non-ferrous Metals								★			
	S	Heat-resistant Alloys						★					
		Titanium Alloys							★	☆			
	H	Hard Materials						□					

Insert Handed Insert shows Right-hand		Description	Dimension (mm) IC	S	BCH RE	BS	INSL	Angle AN	AS	Cermet TN60	Cermet TN100M	CVD Coated Carbide CA6535	CVD Coated Carbide CA4420M	MN PR1535	MEGACOAT PR1225	MEGACOAT PR1210	Carbide KW10	See Page for Applicable Toolholders
		SDKN 1203AUTN	12.70	3.18	0.5	1.2	-	15°	23°		●				●	●		-
		SDKN 1203AUFN															●	
		SDKN 1504AUTN	15.875	4.76							●				●			
		SDKR 1203AUEN-S	12.70	3.18	0.5	1.7	-	15°	23°		●				●			-
		SDMR 1203AUER-H	12.70	3.18	R1.0	0.8	-	15°	23°						●			
		SEEN 1203AFTN	12.70	3.18	0.5	1.4	-	20°	25°		●							-
		SEKN 1203AFTN									●				●	●		
		1203AFFN															●	
		SEKN 1204AFTN		4.76											●			
		SEKN 1504AFTN	15.875												●			
 Wiper Insert (1-edge)		SEEN 1203AFTR-W	12.70	3.18	-	3.5	14.56	20°	25°		●							-
		1203AFFR-W															●	
		SEKN 1203EFTR	12.70	3.18	1.2	1.4	-	20°	25°		●							-
		SEKR 1203AFEN-S	12.70	3.18	0.5	1.7	-	20°	25°		●				●			-
		SEMR 1203AFER-H	12.70	3.18	R1.0	1.0	-	20°	25°						●			
		SOKN 13T3AXTN	13.494	3.97	0.5	1.1	-	27°	32°		▲				▲	▲		-
		13T3AXFN															▲	
		SOKR 13T3AXEN-J	13.494	3.97	0.5	1.1	-	27°	32°		▲				▲		▲	

* MN indicates MEGACOAT NANO.

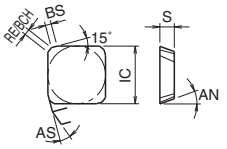
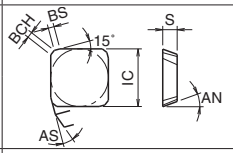
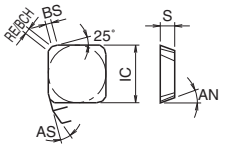
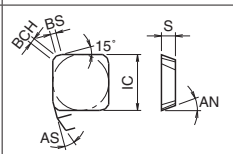
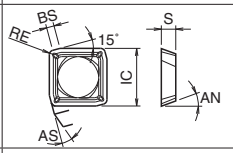
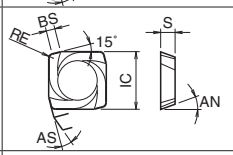
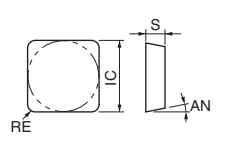
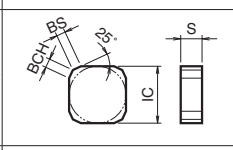
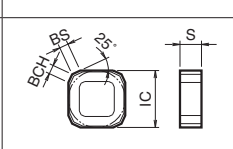
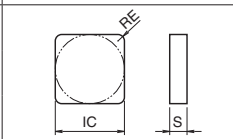
Inserts are sold in 10 piece boxes

SEEN-W (TN100M/KW10) Inserts are sold in 5 piece boxes

● : Std. Item
▲ : To be replaced by a new product

Milling Inserts

Classification of usage												
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel		■			★					
		Mold Steel		■			★					
	M	Stainless Steel					★					
	K	Gray Cast Iron				★			☆	☆		
		Nodular Cast Iron				★			☆			
	N	Non-ferrous Metals										★
	S	Heat-resistant Alloys					★					
		Titanium Alloys							★	☆		
	H	Hard Materials					□					

Insert Handed Insert shows Right-hand		Description		Dimension (mm)					Angle		Cermet		CVD Coated Carbide		MN	MEGACOAT		Carbide	See Page for Applicable Toolholders
				IC	S	BCH	BS	RE	AN	AS	TN60	TN100M	CA6535	CA420M	PR1535	PR1225	PR1210	KW10	
		SPCN	1203EDTR	12.70	3.18	-	2.0	1.0	11°	15°		●							-
		SPKN	1203EDTR									●				●			
			1203EDTL			1.0		-									●		
			1203EDER			-		1.0				●							
			1203EDFR			1.0	1.6	-										●	
		SPKN	1504EDTR	15.875	4.76		2.2					●				●	●		
			1504EDFR															●	
		SPEN	1203EEER	12.70	3.18	1.0	1.4	-	11°	20°				●					-
			1203EESR														●		
		SPCN	1203XPTR	12.70	3.18	-	2.0	1.0	11°	11°		●							-
		SPKN	1203XPTR									●							
			1203XPFR			1.0		-										●	
		SPKN	1504XETR	15.875	4.76					20°		●							
		SPCN	1904EETR1	19.05	4.76	0.7	1.2	-	11°	20°		●							-
		SPKR	1203EDER-S	12.70	3.18	-	2.0	1.0	11°	15°		●				●			-
		SPMR	1203EDER-H	12.70	3.18	-	2.0	1.0	11°	15°						●			
		SPMN	120308	12.70	3.18	-	-	0.8	11°	-	●	●							-
			120312					1.2			●	●							
		SPMN	120408		4.76			0.8						●			●		
			120412					1.2						●					
		SPGN	090304	9.525	3.18			0.4										●	
			090308					0.8										●	
		SPGN	120304	12.70				0.4										●	
			120308					0.8										●	
		SNCN	1204XNTN	12.70	4.76	2.0	2.0	-	-	-		●							-
		SNKN	1204XNTN									●							
		SNMF	1204XNTN	12.70	4.76	2.0	2.0	-	-	-		●							-
		SNMN	120408	12.70	4.76	-	-	0.8	-	-							●		-
			120412					1.2						●			●		
			120424					2.4						●					

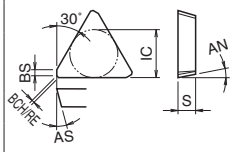
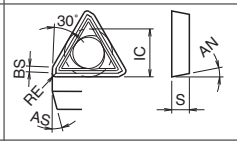
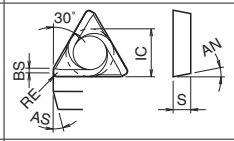
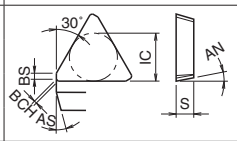
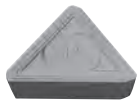
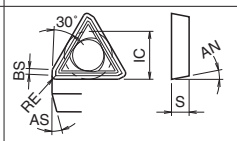
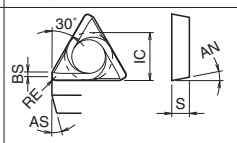
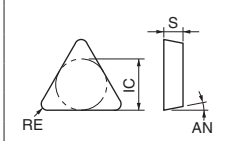
* MN indicates MEGACOAT NANO.

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts

Classification of usage											
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel		■				★			
		Mold Steel		■				★			
	M	Stainless Steel						★			
	K	Gray Cast Iron							★	☆	
		Nodular Cast Iron							★		
	N	Non-ferrous Metals									★
	S	Heat-resistant Alloys						★			
		Titanium Alloys							★	☆	
	H	Hard Materials						□			

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)					Angle		Cermet		CVD Coated Carbide		MN	MEGACOAT		Carbide	See Page for Applicable Toolholders
				IC	S	BCH	BS	RE	AN	AS	TN60	TN100M	CA6535	CA420M	PR1535	PR1225	PR1210	KW10	
		TEKN	1603PTTR	9.525	3.18	-	1.0	0.8	20°	22°		●				●			-
			1603PTFR			0.7	1.4	-									●	●	
		TEEN	2204PTTR	12.70	4.76	-		1.0				●							
		TEKN	2204PTTR									●				●			
			2204PTFR			0.7		-									●	●	
		TEKR	2204PTER-S	12.70	4.76	-	1.4	1.0	20°	22°		●				●			-
		TEMR	1603PTER-H	9.525	3.18	-	1.2	0.8	20°	22°						●			-
		TEMR	2204PTER-H	12.70	4.76	-	1.4	1.0								●			
		TPKN	1603PDTR	9.525	3.18	0.7	1.2	-	11°	15°		●				●	●		-
			1603PDFR															●	
		TPKN	2204PDTR	12.70	4.76	0.7	1.6					●				●	●		M129
			2204PDFR															●	
		TPKR	2204PDER-S	12.70	4.76	-	1.4	1.0	11°	15°		●				●			
		TPMR	1603PDER-H	9.525	3.18	-	1.2	0.8	11°	15°						●			-
		TPMR	2204PDER-H	12.70	4.76	-	1.4	1.0								●			M129
		TPMN	110304	6.35	3.18	-	-	0.4	11°	-								●	-
			110308					0.8										●	
			160304	9.525				0.4				●						●	
			160308					0.8				●						●	
			160312					1.2				●							
			220408	12.70	4.76			0.8				●							
		TPGN	090202	5.56	2.38			0.2										●	
			090204					0.4			●							●	
			090208					0.8			●								
			110302	6.35	3.18			0.2										●	
			110304					0.4			●							●	
			110308					0.8			●							●	
			160304	9.525				0.4			●							●	
			160308					0.8			●							●	

* MN indicates MEGACOAT NANO.

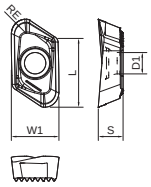
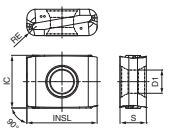
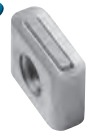
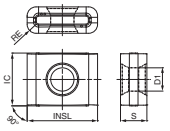
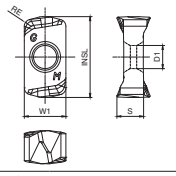
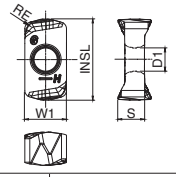
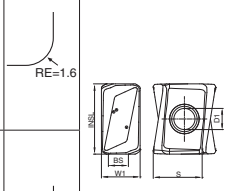
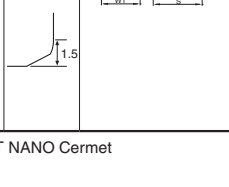
Cutting Range	Chipbreaker		Features
Finishing - Roughing	S		S chipbreaker is for general-purpose cutter. Low cutting force is possible with 13° chipbreaker rake angle. Recommended for various ap with 3-step chipbreaker design.
Medium - Roughing	H		H chipbreaker is for general-purpose cutter. The chipbreaker's smooth rake face enables smooth chip evacuation. 25° rake angle chipbreaker provides 20% less cutting force than non-chipbreaker type.

Inserts are sold in 10 piece boxes

● : Std. Item

Milling Inserts (With Hole)

Classification of usage			MN Cermet	CVD Coated Carbide		MEGACOAT (PVD Coated Carbide)						DLC Coated Carbide	Carbide	See Page for Applicable Toolholders
★ : Roughing / 1st Choice	P	Carbon Steel / Alloy Steel	■			☆	★							
☆ : Roughing / 2nd Choice		Mold Steel	■			☆	★							
■ : Finishing / 1st Choice	M Stainless Steel	Austenitic related				★	☆							
□ : Finishing / 2nd Choice		Martensitic related		★		☆								
		Precipitation Hardening				★								
	K	Gray Cast Iron						★						
		Nodular Cast Iron						★						
	N	Non-ferrous Metals										★	☆	
	S	Heat-resistant Alloys		★		☆								
		Titanium Alloys				★								
	H	Hard Materials										★		

Insert (Handed Insert shows Right-hand)		Description	W1 IC	S	D1	L INSL	BS	RE	PV60M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	PR015S	PDL025	GW25	See Page for Applicable Toolholders
		**KCGT 130504FR-AL**	9.9	5.1	4.4	14.1	-	0.4										●		M144 M145
		130508FR-AL				13.9		0.8										●		
		130512FR-AL				13.8		1.2										●		
		130516FR-AL				13.3		1.6										●		
		130520FR-AL						2.0										●		
		130524FR-AL						2.4										●		
		130530FR-AL						3.0										●		
		130532FR-AL						3.2										●		
Non-ferrous Metals (Single-sided / 2-edge)		**130540FR-AL**				12.8		4.0										●		
		130550FR-AL						5.0										●		
NEW  For steel and stainless steel (Low cutting force)		**LNGX 120916R-TT**	9.525	6.35	4.2	12.7	-	1.6	MTO				MTO							M172
NEW  For Cast Iron		**LNGX 120916**	9.525	6.35	4.2	12.7	-	1.6	MTO				MTO							M172
 General purpose		**LOGU 030310ER-GM**	6.2	3.96	3.45	11.9	-	1.0		●		●	●	●						M158 M159
NEW  Tough Edge		**LOGU 030310ER-GH**	6.2	3.96	3.45	11.9	-	1.0				●	●	●			●			M158 M159
NEW  Corner-R		**LOGU 221616ER-GM**	12.5	16.6	6.8	22.8	6.3	1.6				●	●							M40 M41 M116
NEW  Corner Chamfer		**LOGU 2216PAER-GM**	12.5	16.9	6.8	22.8	4.8	-				●	●							M116

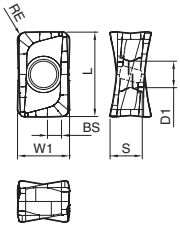
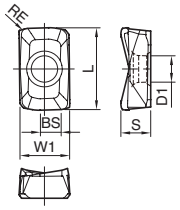
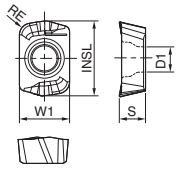
MN Cermet : MEGACOAT NANO Cermet

● : Std. Item
MTO : Made to order

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage			P	M (Stainless Steel)	K	N	S	H
★ : Roughing / 1st Choice		Carbon Steel / Alloy Steel						
☆ : Roughing / 2nd Choice		Mold Steel	☆ ★					
■ : Finishing / 1st Choice		Austenitic related	★ ☆					
□ : Finishing / 2nd Choice		Martensitic related	★ ☆					
		Precipitation Hardening	★					
		Gray Cast Iron	★					
		Nodular Cast Iron	★					
		Non-ferrous Metals					★	☆
		Heat-resistant Alloys	☆	★				
		Titanium Alloys	★					
		Hard Materials						★

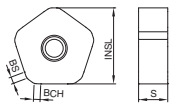
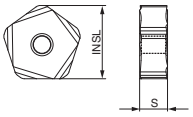
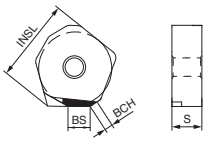
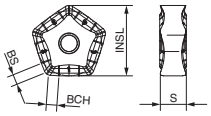
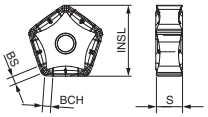
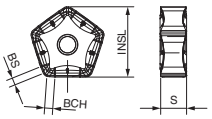
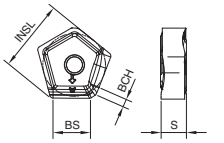
Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) W1	S	D1	L INSL	BS	RE	Cermet TN100M	CVD Coated Carbide CA6535	CVD Coated Carbide CA420M	MEGACOAT (PVD Coated Carbide) PR1535	PR1525	PR1510	PR1225	PR1210	PR015S	DLC Coated Carbide PDL025	Carbide GW25	See Page for Applicable Toolholders
 General purpose		LOMU 100404ER-GM	6.6	4.0	3.4	10.9	2.1	0.4		●		●	●	●						M56 M57 M58 M87 M88
		LOMU 100408ER-GM					1.7	0.8		●		●	●	●						
		LOMU 100412ER-GM					1.3	1.2		●		●	●	●						
		LOMU 100416ER-GM					1.0	1.6		●		●	●	●						
		LOMU 100420ER-GM					1.0	2.0		●		●	●	●						
		LOMU 150504ER-GM	9.2	5.6	4.8	15.7	2.2	0.4		●		●	●	●						
		LOMU 150508ER-GM					1.8	0.8		●		●	●	●						
		LOMU 150510ER-GM					1.6	1.0					●							
		LOMU 150512ER-GM					1.4	1.2		●		●	●	●						
		LOMU 150516ER-GM					1.0	1.6		●		●	●	●						
		LOMU 150520ER-GM					0.6	2.0		●		●	●	●						
 Low cutting force		LOMU 100408ER-SM	6.6	4.0	3.4	10.9	1.7	0.8		●		●	●	●						
		LOMU 150508ER-SM	9.2	5.6	4.8	15.7	1.8	0.8		●		●	●	●						
 Tough Edge (For Heavy Milling)		LOMU 100408ER-GH	6.6	4.0	3.4	10.9	1.7	0.8		●		●	●	●			●			
		LOMU 150508ER-GH	9.2	5.6	4.8	15.7	1.8	0.8		●		●	●	●			●			
 Non-ferrous Metals (Single-sided / 2-edge)		LOGT 100408FR-AM	6.8	4.0	3.6	11.2	2.8	0.8										●	●	
		LOGT 150508FR-AM	8.9	5.6	4.9	15.9	2.9	0.8										●	●	
 General purpose		LPGT 010210ER-GM	4.19	2.19	2.1	6.26	-	1.0		●		●	●							M164 M165

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage																
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel			★			☆					★	☆		
		Mold Steel			★			☆					☆	★		
	M (Stainless Steel)	Austenitic related														
		Martensitic related														
		Precipitation Hardening														
	K	Gray Cast Iron			★			☆					★	☆		
		Nodular Cast Iron			★			☆					☆	★		
	N	Non-ferrous Metals														
	S	Heat-resistant Alloys														
		Titanium Alloys														
	H	Hard Materials														

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm)					Cermet	CVD Coated Carbide		MEGACOAT (PVD Coated Carbide)					Silicon Nitride Ceramic	CVD Coated Silicon Nitride Ceramic	CBN	See Page for Applicable Toolholders
			INSL	S	D1	BCH	BS	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	KS6050	CS7050	KBN475	
High speed machining		**PNEA 1106XNTN-T01020**	16.94	6.5	-	1.5	1.5									●	●		M46 M47
High speed machining (With Chipbreaker)		**PNEG 1106XNTR-T00515**	17.07	6.35	-	-	-									●	●		
Wiper Insert (2-edge)		**PNEG 1106XNTR-T01015W**	18.06	6.5	-	1.7	4.8											●	
Surface-Finish Oriented		**PNEG 1106XNEN-GL**	17.18			2.6	2.6			●		●	●						
General purpose		**PNMG 1106XNEN-GM**	17.23	6.35	-	2.6	2.0			●		●	●						
Tough Edge		**PNMG 1106XNEN-GH**				2.0				●		●	●						
Wiper Insert (2-edge)		**PNEG 1106XNER-W**	18.02				10.0			●		●	●						

● : Std. Item

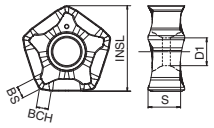
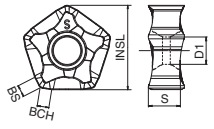
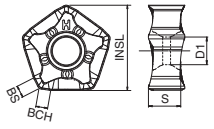
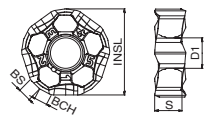
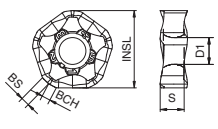
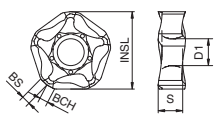
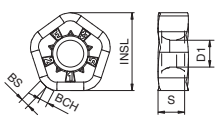
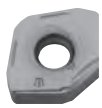
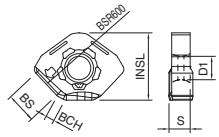
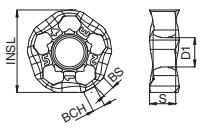
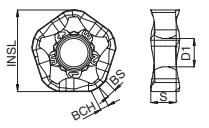
Inserts are sold in 10 piece boxes

PNEG1106XNER-W Inserts are sold in 5 piece boxes

PNEG1106XNTR-T01015W Inserts are sold in 1 piece boxes

Milling Inserts (With Hole)

Classification of usage			P	M Stainless Steel	K	N	S	H
★ : Roughing / 1st Choice		Carbon Steel / Alloy Steel	■					
☆ : Roughing / 2nd Choice		Mold Steel	■					
■ : Finishing / 1st Choice		Austenitic related		★				
□ : Finishing / 2nd Choice		Martensitic related		☆				
		Precipitation Hardening		★				
		Gray Cast Iron			★			
		Nodular Cast Iron			★			
		Non-ferrous Metals						
		Heat-resistant Alloys		★			☆	
		Titanium Alloys		★				
		Hard Materials						★

Insert	Description	Dimension (mm)					Cermet		CVD Coated Carbide		MEGACOAT (PVD Coated Carbide)						See Page for Applicable Toolholders
		INSL	S	D1	BCH	BS	TN620M	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	PR015S	
 General purpose		**PNMU 0905XNER-GM**	14.6	5.56	4.7	2.0	2.0	●			●	●	●				**M35 M36**
 Low cutting force		**PNMU 0905XNER-SM**									●	●	●				
 Tough Edge (For Heavy Milling)		**PNMU 0905XNER-GH**									●	●	●			●	
 Surface-Finish Oriented (Precision Class)		**PNEU 1205ANER-GL**	17.51	5.56	6.2	2.7	2.7	●		●	●	●	●	●	●		**M30 M31**
 General purpose		**PNMU 1205ANER-GM**	17.88			2.0	2.0	●		●	●	●	●	●	●		
 Low cutting force		**PNMU 1205ANER-SM**								●	●	●	●	●	●		
 Tough Edge (For Heavy Milling)		**PNMU 1205ANER-GH**	17.98	6.17					●		●	●	●	●	●	●	
 Wiper Insert (2-edge)		**PNEU 1205ANER-W**	17.85			2.3	8.1	●	●	●	●	●	●				
 Surface-Finish Oriented (Precision Class)		**PNEU 1205ANEL-GL**	17.51	5.56		2.7	2.7	●		●	●	●	●				**M30**
 General purpose		**PNMU 1205ANEL-GM**	17.88			2.0	2.0	●		●	●	●	●				

● : Std. Item

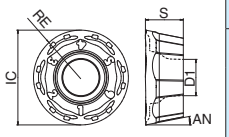
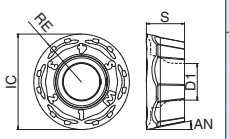
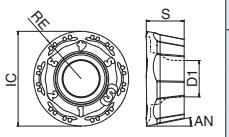
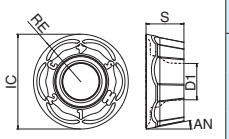
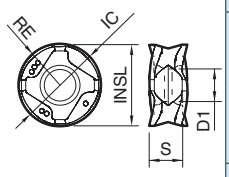
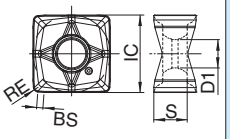
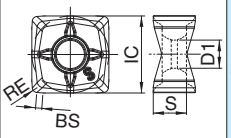
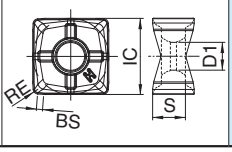
Inserts are sold in 10 piece boxes

PNEU1205ANER-W Inserts are sold in 5 piece boxes

Milling Inserts (With Hole)

Classification of usage
★ : Roughing / 1st Choice
☆ : Roughing / 2nd Choice
■ : Finishing / 1st Choice
□ : Finishing / 2nd Choice

P	Carbon Steel / Alloy Steel	■				☆	★				
	Mold Steel	■				☆	★				
M (Stainless Steel)	Austenitic related					★	☆				
	Martensitic related			★		☆					
	Precipitation Hardening					★					
K	Gray Cast Iron						★				
	Nodular Cast Iron						★				
N	Non-ferrous Metals										
S	Heat-resistant Alloys			★		☆					
	Titanium Alloys					★					
H	Hard Materials										★

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) IC	S	D1	INSL	BS	RE	Angle AN	Cermet TN620M	Cermet TN100M	CVD Coated Carbide CA6535	CVD Coated Carbide CA420M	MEGACOAT (PVD Coated Carbide) PR1535	PR1525	PR1510	PR1225	PR1210	PR015S	See Page for Applicable Toolholders
 General purpose (G Class)		RDGT	0803M0ER-GM	8	3.18	3.0			4	15°			●		●	●	●				M216 M217
		RPGT	10T3M0ER-GM	10	3.97	3.5			5				●		●	●	●				M215
			1204M0ER-GM	12	4.76	4.6			6	11°			●		●	●	●				M216
			1605M0ER-GM	16	5.56	5.8			8				●		●	●	●				M217
 General purpose (M Class)		RDMT	0803M0ER-GM	8	3.18	3.0			4	15°			●		●	●	●				M216 M217
		RPMT	10T3M0ER-GM	10	3.97	3.5			5				●		●	●	●				M215
			1204M0ER-GM	12	4.76	4.6			6	11°			●		●	●	●				M216
			1605M0ER-GM	16	5.56	5.8			8				●		●	●	●				M217
 Stainless Steel / Low cutting force		RDGT	0803M0ER-SM	8	3.18	3.0	-	-	4	15°			●		●	●					M216 M217
		RPGT	10T3M0ER-SM	10	3.97	3.5			5				●		●	●					M215
			1204M0ER-SM	12	4.76	4.6			6	11°			●		●	●					M216
			1605M0ER-SM	16	5.56	5.8			8				●		●	●					M217
 Tough Edge (For Heavy Milling)		RDMT	0803M0EN-GH	8	3.18	3.0			4	15°			●		●	●	●				M216 M217
		RPMT	10T3M0EN-GH	10	3.97	3.5			5				●		●	●	●				M215
			1204M0EN-GH	12	4.76	4.6			6	11°			●		●	●	●				M216
			1605M0EN-GH	16	5.56	5.8			8				●		●	●	●				M217
 General purpose		ROMU	1204M0ER-GM	12	4.75	4.6	11.8		6				●		●	●	●				M210 M211
			1605M0ER-GM	16	5.48	6.2	15.8		8				●		●	●	●				
 Low cutting force		ROMU	1204M0ER-SM	12	4.75	4.6	11.8	-	6	-			●		●	●					
			1605M0ER-SM	16	5.48	6.2	15.8		8				●		●	●					
 Tough Edge (For Heavy Milling)		ROMU	1204M0ER-GH	12	4.75	4.6	11.8		6				●		●	●	●				
			1605M0ER-GH	16	5.48	6.2	15.8		8				●		●	●	●				
 General purpose		SNMU	130508EN-GM	13	5.51	4.7	-	1.0	0.8	-	●				●	●	●				M111 M112
 Low cutting force		SNMU	130508EN-SM												●	●	●				
 Tough Edge (For Heavy Milling)		SNMU	130508EN-GH												●	●	●			●	

● : Std. Item

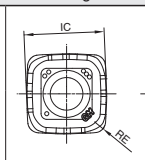
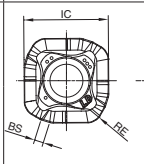
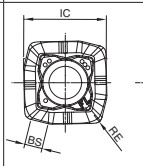
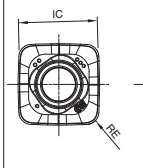
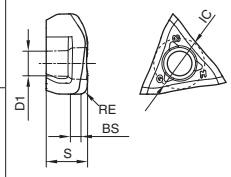
Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage

★ : Roughing / 1st Choice
☆ : Roughing / 2nd Choice
■ : Finishing / 1st Choice
□ : Finishing / 2nd Choice

		Carbon Steel / Alloy Steel	Mold Steel	Austenitic related	Martensitic related	Precipitation Hardening	Gray Cast Iron	Nodular Cast Iron	Non-ferrous Metals	Heat-resistant Alloys	Titanium Alloys	Hard Materials
P		■	■									
M	Stainless Steel			★	☆	★				★	★	
K							★	★				
N									★	☆		
S				☆		★						
H					★							★

Insert (Handed Insert shows Right-hand)		Description	IC	S	D1	BS	RE	AN	Cermet TN620M	Cermet TN100M	CVD Coated Carbide CA6535	CVD Coated Carbide CA420M	MEGACOAT (PVD Coated Carbide) PR1535	PR1525	PR1510	PR1225	PR1210	PR015S	D.L.C. Coated Carbide PDL025	Carbide GW25	See Page for Applicable Toolholders
General purpose		SOMT 100420ER-GM	10.30	4.58	4.6	-	2.0	16°			●		●	●	●						M150 M152 M154
		140520ER-GM	14.14	5.56	5.8						●		●	●	●						M150 M153
Large D.O.C.		SOMT 100420ER-LD	10.45	4.58	4.6	0.9	2.0	16°			●		●	●	●						M150 M152 M154
		140520ER-LD	14.76	5.56	5.8	1.6					●		●	●	●						M150 M153
With Wiper Edge		SOMT 100420ER-FL	10.44	4.58	4.6	1.4	2.0	16°			●		●	●	●						M150 M152 M154
		140514ER-FL	14.57	5.56	5.8	3.1	1.4				●		●	●	●						M150 M153
NEW Tough Edge		SOMT 100420ER-GH	10.43	4.57	4.55	-	2.0	16°					●	●	●			●			M150 M152 M154
		140520ER-GH	14.17	5.56	5.8	-							●	●	●			●			M150 M153
NEW General purpose		TOMT 060504ER-GM	7.2	5.7	3.4	1.9	0.4	-			●		●	●	●						M80 M81 M82
		060508ER-GM				1.5	0.8				●		●	●	●						
NEW Low cutting force		TOMT 060508ER-SM	7.2	5.7	3.4	1.5	0.8	-			●		●	●							

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage														
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice	P	Carbon Steel / Alloy Steel	■				☆	★						
		Mold Steel	■				☆	★						
	M (Stainless Steel)	Austenitic related					★	☆						
		Martensitic related			★		☆							
		Precipitation Hardening					★							
	K	Gray Cast Iron							★					
		Nodular Cast Iron							★					
	N	Non-ferrous Metals											★	☆
	S	Heat-resistant Alloys			★		☆							
		Titanium Alloys					★							
	H	Hard Materials										★		

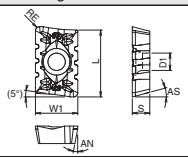
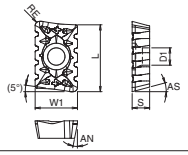
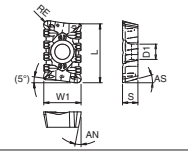
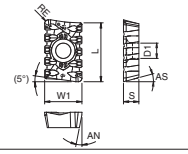
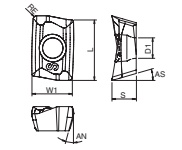
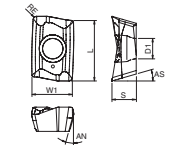
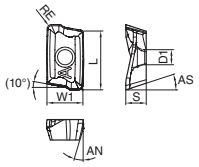
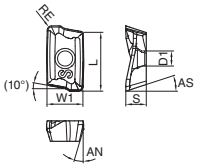
Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle	Cermet		CVD Coated Carbide		MEGACOAT (PVD Coated Carbide)						D.L.C. Coated Carbide	Carbide	See Page for Applicable Toolholders
			IC	S	D1	BS	RE	AN	TN620M	TN100M	CA6535	CA420M	PR1535	PR1525	PR1510	PR1225	PR1210	PR015S	PDL025	GW25	
NEW General purpose		WNMU 050408EN-GM	8.8	4.2	3.4	0.7	0.8	-					●	●	●						M107 M108
NEW Low cutting force		WNMU 050408EN-SM											●	●	●						
NEW Tough Edge		WNMU 050408EN-GH											●	●	●			●			
Surface-Finish Oriented (Precision Class)		WNEU 080608EN-GL	14.02	6.65	6.2	1.5	0.8	-	●		●		●	●	●						M102 M103
General purpose		WNMU 080604EN-GM				1.7	0.4		●		●		●	●	●						
		080608EN-GM				1.3	0.8		●		●		●	●	●						
Low cutting force		WNMU 080608EN-SM									●		●	●	●						
Tough Edge (For Heavy Milling)		WNMU 080608EN-GH									●		●	●	●			●			
Non-ferrous Metals (Single-sided / 3-edge)		WNGT 080608FN-AM				1.5													●	●	

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage												
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel			☆	★	★			
		Mold Steel			☆	★	★			
	M Stainless Steel	Austenitic related			★	☆	☆			
		Martensitic related		★	☆					
		Precipitation Hardening			★					
	K	Gray Cast Iron						★		
		Nodular Cast Iron						★		
	N	Non-ferrous Metals							★	☆
	S	Heat-resistant Alloys		★	☆	★	★			
		Titanium Alloys			★			★		☆
	H	Hard Materials				□				

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm)				Angle		Cermet	CVD Coated Carbide	MN	MEGACOAT			DLC Coated Carbide	Carbide	See Page for Applicable Toolholders
			W1	S	D1	L	RE	AN	AS	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	PDL025	GW25	
 3-Notched		APMT 250608ER-NB3	15.875	6.35	6.5	25	0.8	11°	15°					●	●			M124 M125
		250616ER-NB3					1.6							●	●			
		250640ER-NB3					4.0							●				
		APMT 250616EL-NB3					1.6							●				-
 4-Notched		APMT 250608ER-NB4	15.875	6.35	6.5	25	0.8	11°	15°					●	●			M124 M125
		250616ER-NB4					1.6							●	●			
		250640ER-NB4					4.0							●				
		APMT 250616EL-NB4					1.6							●				-
 3-Notched / Low cutting force		APMT 250616ER-NB3P	15.875	6.35	6.5	25	1.6	11°	15°					●	●			M124 M125
 4-Notched / Low Cutting Force		APMT 250616ER-NB4P	15.875	6.35	6.5	25	1.6	11°	15°					●	●			
 Stainless Steel / Low cutting force		BDMT 070302ER-JS	4.6	2.6	2.3	6.7	0.2	15°	16°		●	●	●					M74 M75
		070304ER-JS					0.4				●	●	●					
		070308ER-JS					0.8				●	●	●					
		BDMT 070302ER-JT	4.6	2.6	2.3	6.7	0.2	15°	16°		●	●	●		●			
		070304ER-JT					0.4				●	●	●		●			
		070308ER-JT					0.8				●	●	●		●			
 Non-ferrous Metals		BDGT 11T302FR-JA	6.7	3.8	2.8	11.0	0.2	13°	18°							●	●	M64 M65 M66 M67
		11T304FR-JA					0.4									●	●	
		11T308FR-JA					0.8									●	●	
		BDGT 170404FR-JA	9.6	4.9	4.4	17.0	0.4	13°	18°							●	●	M65 M66 M67
		170408FR-JA					0.8									●	●	
		170420FR-JA					2.0									●	●	
		170431FR-JA					3.1									●	●	
 Stainless Steel / Low cutting force		BDMT 110302ER-JS	6.3	3.0	2.8	11.0	0.2	15°	18°		●	●	●					M64 M65
		110304ER-JS					0.4				●	●	●					
		110308ER-JS					0.8				●	●	●					
		BDMT 11T302ER-JS	6.7	3.8	2.8	11.0	0.2	13°	18°		●	●	●					M64 M65 M66 M67
		11T304ER-JS					0.4				●	●	●					
		11T308ER-JS					0.8				●	●	●					
		BDMT 170404ER-JS	9.6	4.9	4.4	17.0	0.4	13°	18°		●	●	●					M65 M66 M67
		170408ER-JS					0.8				●	●	●					

* MN indicates MEGACOAT NANO.

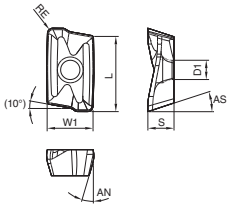
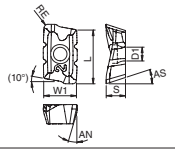
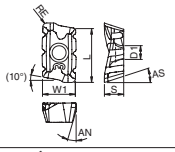
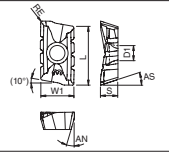
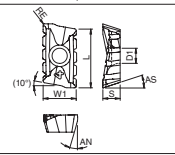
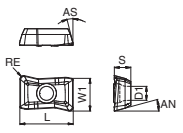
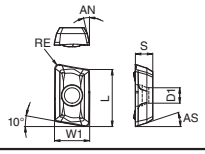
● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage
★ : Roughing / 1st Choice
☆ : Roughing / 2nd Choice
■ : Finishing / 1st Choice
□ : Finishing / 2nd Choice
(In case hardness is 45HRC or under)

P	Carbon Steel / Alloy Steel	■		☆	★	★	
	Mold Steel	■		☆	★	★	
M (Stainless Steel)	Austenitic related			★	☆	☆	
	Martensitic related		★	☆			
	Precipitation Hardening			★			
K	Gray Cast Iron						★
	Nodular Cast Iron						★
N	Non-ferrous Metals						
S	Heat-resistant Alloys		★	☆	★	★	
	Titanium Alloys			★			★
H	Hard Materials				□		

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) W1	S	D1	L	RE	Angle AN	AS	Cermet TN100M	CVD Coated Carbide CA6535	MN PR1535	MEGACOAT PR1225	PR1230	PR1210	Carbide GW25	See Page for Applicable Toolholders
		BDMT 110302ER-JT	6.3	3.0	2.8	11.0	0.2	15°	18°		●	●	●		●		M64 M65
		BDMT 110304ER-JT					0.4				●	●	●		●		
		BDMT 110308ER-JT					0.8				●	●	●		●		
		BDMT 11T302ER-JT	6.7	3.8	2.8	11.0	0.2	13°	18°			●	●		●		M64 M65 M66 M67
		BDMT 11T304ER-JT					0.4			●	●	●	●		●		
		BDMT 11T308ER-JT					0.8			●	●	●	●		●		
		BDMT 11T312ER-JT					1.2				●	●	●		●		
		BDMT 11T316ER-JT					1.6				●	●	●		●		
		BDMT 11T320ER-JT					2.0				●	●	●		●		
		BDMT 11T324ER-JT					2.4				●	●	●		●		
		BDMT 11T331ER-JT					3.1				●	●	●		●		
		BDMT 170404ER-JT	9.6	4.9	4.4	17.0	0.4	13°	18°			●	●		●		M65 M66 M67
		BDMT 170408ER-JT					0.8			●	●	●	●		●		
		BDMT 170412ER-JT					1.2				●	●	●		●		
		BDMT 170416ER-JT					1.6				●	●	●		●		
		BDMT 170420ER-JT					2.0				●	●	●		●		
		BDMT 170424ER-JT					2.4				●	●	●		●		
		BDMT 170431ER-JT					3.1				●	●	●		●		
		BDMT 170440ER-JT					4.0					●	●		●		
 2-Notched		BDMT 11T308ER-N2	6.7	3.8	2.8	11.0	0.8	13°	18°			●	●	●	●		M90 M91 M92 M93
 3-Notched		BDMT 11T308ER-N3	6.7	3.8	2.8	11.0	0.8	13°	18°			●	●	●	●		
 3-Notched		BDMT 170408ER-N3	9.6	4.9	4.4	17.0	0.8	13°	18°			●	●	●	●		
 4-Notched		BDMT 170408ER-N4	9.6	4.9	4.4	17.0	0.8	13°	18°			●	●	●	●		
		GOMT 08T208ER-D	5.21	2.78	2.3	8.7	0.8	17°	13°				●		●		M174
		GOMT 100308ER-D	6.56	3.30	2.8	10.7							●		●		
		GOMT 13T308ER-D	8.36	3.85	3.4	13.2							●		●		
		GOMT 160408ER-D	10.03	4.76	4.4	16.7							●		●		
		JOMT 08T208ER-D	5.14	2.78	2.3	8.5	0.8	13°	17°				●		●		
		JOMT 100308ER-D	6.41	3.18	2.8	10.2							●		●		
		JOMT 13T308ER-D	8.07	3.70	3.4	13.2							●		●		
		JOMT 160408ER-D	9.72	4.50	4.4	16.7							●		●		

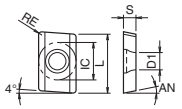
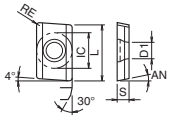
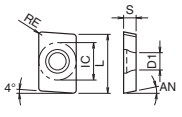
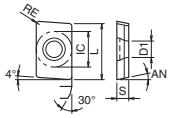
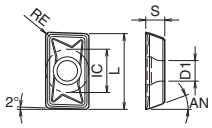
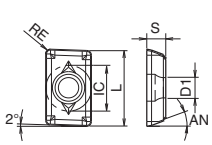
* MN indicates MEGACOAT NANO.

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage											
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel	■			★					
		Mold Steel	■			★					
	M	Stainless Steel				★					
	K	Gray Cast Iron							★	☆	
		Nodular Cast Iron							★		
	N	Non-ferrous Metals									★
	S	Heat-resistant Alloys				★					
		Titanium Alloys							★	☆	
	H	Hard Materials				□					

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle	Cermet	CVD Coated Carbide	MN	MEGACOAT			Carbide	See Page for Applicable Toolholders
			IC	S	D1	L	RE	AN	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	KW10	
		NDCT 090204TR	6.35	2.38	2.8	9.5	0.4	15°	●							M130
		NDCT 090204FR													●	
		NDCT 120208TR	7.94	2.38	3.4	12.7	0.8	15°	●							
		NDCT 120208FR													●	
		NDCT 150308TR	9.525	3.18	4.5	15.0	0.8	15°	●							M131
		NDCT 150308FR													●	
		NDCT 150308TRX	9.525	3.18	4.4	15.0	0.8	15°	●							M131 M132
		NDCW 150302TR	9.525	3.18	4.5	15.0	0.2	15°	●							M131
		NDCW 150304TR					0.4		●							
		NDCW 150308TR					0.8		●							
		NDCW 150320TR					2.0		●							
		NDCW 150330TR					3.0		●							
		NDCW 150340TR					4.0		●							
		NDCW 150308TRX	9.525	3.18	4.4	15.0	0.8	15°	●							M131 M132
		150308FRX													●	
		NDMT 080208ER-D	5.086	2.38	2.2	8.5	0.8	15°	●			●		●	●	M178
		NDMT 10T208ER-D	6.276	2.78	2.8	10.2			●			●		●	●	
		NEMT 120308ER-D	7.669	3.18	3.4	12.7	0.8	20°	●			●		●	●	
		NEMT 16T308ER-D	9.254	3.97	4.4	16.2			●			●		●	●	
 Tough Edge		NDMT 080208ER-DH	5.086	2.38	2.2	8.5	0.8	15°	●			●		●	●	
		NDMT 10T208ER-DH	6.276	2.78	2.8	10.2			●			●		●	●	
		NEMT 120308ER-DH	7.669	3.18	3.4	12.7	0.8	20°	●			●		●	●	
		NEMT 16T308ER-DH	9.254	3.97	4.4	16.2			●			●		●	●	

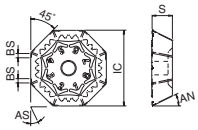
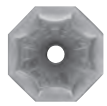
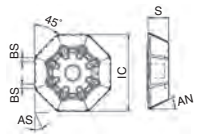
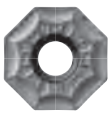
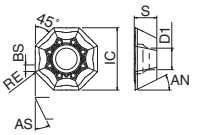
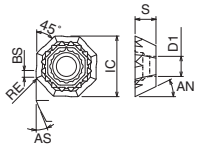
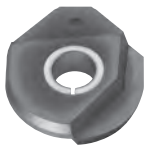
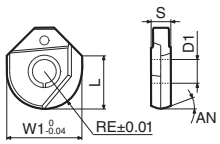
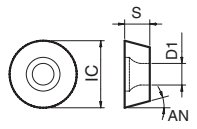
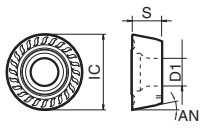
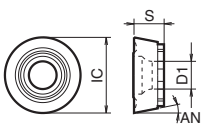
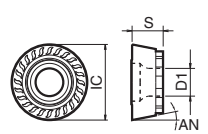
* MN indicates MEGACOAT NANO.

Inserts are sold in 10 piece boxes

● : Std. Item

Milling Inserts (With Hole)

Classification of usage																	
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel	■			★	★										
		Mold Steel	■			★	★										
	M	Stainless Steel				★	★										
	K	Gray Cast Iron						★		☆							
		Nodular Cast Iron						★									
	N	Non-ferrous Metals								★							
	S	Heat-resistant Alloys				★	★										
		Titanium Alloys						★		☆							
	H	Hard Materials				□	□										

Insert Handed Insert shows Right-hand		Description		Dimension (mm)					Angle		Cermet	CVD Coated Carbide		MN	MEGACOAT			PVD Coated Carbide	Carbide	See Page for Applicable Toolholders
				IC L	S	D1	BS W1	RE	AN	AS	TN100M	CA6535	PR1535		PR1225	PR1230	PR1210	PR915	KW10	
		OFMR	070405EN-SH	17.98	4.94	-	1.2	-	26°	26°					▲					-
		OFMR	070408EN-GT	17.85	5.14	-	1.1	-							▲		▲			
		OFMT	050405EN-GT	13.35	4.83	4.6	1.4	0.5	26°	26°					●		●			M50
			070408EN-GT	17.85	5.12	5.9	1.2	0.8							●		●			
		OFMT	050405ER-SH	13.47	4.76	4.4	1.7	0.5	26°	22°					●		●			
			070405EN-SH	17.98	4.87	5.8	-			26°					●		●			
		RDFG	08FR	6.6	2.1	3.1	8.0	4.0	15°	-								●		M206
			10FR	8.0	2.7	3.6	10.0	5.0										●		
			12FR	9.4	3.2	4.1	12.0	6.0										●		
			16FR	11.3	4.2	5.1	16.0	8.0	10°	-								●		
			20FR	14.1	5.2	6.1	20.0	10.0										●		
			25FR	15.5	6.2	6.1	25.0	12.5										●		
		RDHX	0702M0T	7.0	2.39	2.8	-	-	15°	-						●				-
			1003M0T	10.0	3.18	3.8										●				
			12T3M0T	12.0	3.97											●				
 Tough Edge		RDMT	08T2M0-H	8.0	2.78	3.4	-	-	15°	-						●	●		●	-
 Low cutting force		RPMT	10T3M0	10.0	3.97	3.4	-	-	11°	-						●	●		●	-
			1204M0	12.0	4.76	4.4										●	●		●	
 Tough Edge		RPMT	1204M0-H	12.0	4.76	4.4	-	-	11°	-	●					●	●		●	
			1606M0-H	16.0	6.35	5.5					●					●	●		●	
			2006M0-H	20.0	6.35	6.5										●	●		●	

* MN indicates MEGACOAT NANO.

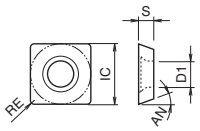
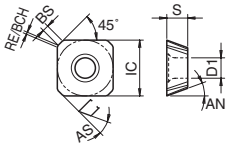
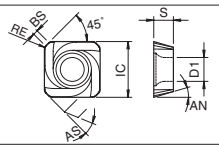
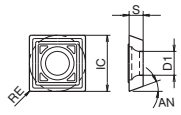
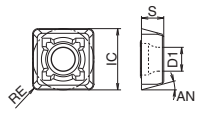
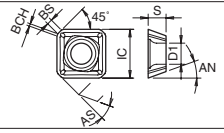
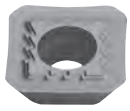
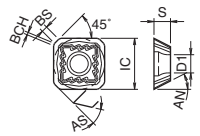
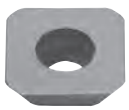
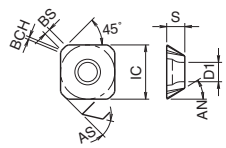
● : Std. Item
▲ : To be replaced by a new product

RDFG Inserts are sold in 2 piece boxes

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage												
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel	■			★	★			See Page for Applicable Toolholders
		Mold Steel	■			★	★			
	M	Stainless Steel				★	★			
	K	Gray Cast Iron						★	☆	
		Nodular Cast Iron						★		
	N	Non-ferrous Metals							★	
	S	Heat-resistant Alloys				★	★			
		Titanium Alloys						★	☆	
	H	Hard Materials				□	□			

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle		Cermet	CVD Coated Carbide	MN	MEGACOAT			Carbide	See Page for Applicable Toolholders
			IC	S	D1	RE BCH	BS	AN	AS	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	KW10	
		SDKW 09T204TN	9.525	2.78	3.4	0.4	-	15°	-	●			●				M220
		09T204FN														●	
		SEKW 120304TN	12.70	3.18	5.5			20°		●			●				
		120304FN														●	
		120308TN				0.8				●			●				
		120308FN														●	
		SDKW 1204AESN	12.70	4.76	5.5	RE= 1.0	1.5	15°	20°				●				-
		1204AETN													●		
		SEKW 1204AFTN				BCH= 0.5	1.7	20°	25°				●		●		-
		SDMT 1204AESR-H	12.70	4.76	5.5	1.0	0.8	15°	20°				●				-
 Low cutting force		SDMT 09T204C	9.525	2.78	3.4	0.4	-	15°	-	●			●			●	M220
		SEMT 120304C	12.70	3.18	5.5	0.4	-	20°	-				●			●	
		SDMT 060304E-K	6.35	3.18	2.8	0.4	-	15°	-					●	●	●	M224
		080308E-K	8.00		3.4	0.8								●	●	●	
		120408E-K	12.70	4.76	4.4									●	●	●	
		SEKT 1204AFEN-S	12.70	4.76	5.5	0.5	1.7	20°	25°				●				-
		SOMT 0903AXEN-J	9.525	3.18	3.4	0.5	1.1	27°	32°	▲						▲	-
		SOMW 0903AXTN	9.525	3.18	3.4	0.5	1.1	27°	32°	▲							
		0903AXFN														▲	

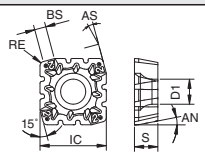
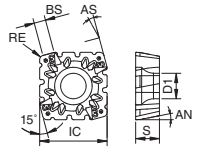
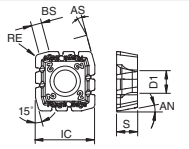
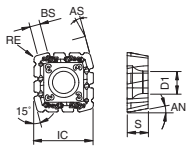
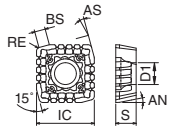
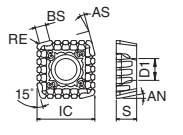
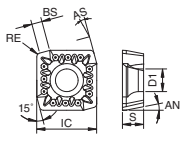
* MN indicates MEGACOAT NANO.

Inserts are sold in 10 piece boxes

● : Std. Item
▲ : To be replaced by a new product

Milling Inserts (With Hole)

Classification of usage										
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel				★	★			
		Mold Steel				★	★			
	M	Stainless Steel				★	★			
	K	Gray Cast Iron						★		
		Nodular Cast Iron						★		
	N	Non-ferrous Metals								
	S	Heat-resistant Alloys				★	★			
		Titanium Alloys						★		
	H	Hard Materials				□	□			

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle		Cermet	CVD Coated Carbide	MN	MEGACOAT			Carbide	See Page for Applicable Toolholders
			IC	S	D1	RE	BS	AN	AS	TN100M	CA6535	PR1535	PR1225	PR1230	PR1210	KW10	
 2-Notched / General purpose		**SPMT 1806EDER-NB2**	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●		**M52**
 3-Notched / General purpose		**SPMT 1806EDER-NB3**	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●		
 2-Notched / Tough Edge		**SPMT 1806EDSR-NB2T**	18	6.35	6.8	1.2	3.1	11°	15°					●	●		**M52**
 3-Notched / Tough Edge		**SPMT 1806EDSR-NB3T**	18	6.35	6.8	1.2	3.1	11°	15°					●	●		**M52**
 4-Notched / Low cutting force		**SPMT 1806EDER-NB2P**	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●		
 5-Notched / Low cutting force		**SPMT 1806EDER-NB3P**	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●		**M52**
 Without notch		**SPMT 1806EDER-V**	18	6.35	6.8	1.2	3.1	11°	15°				●	●	●		

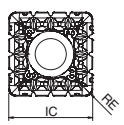
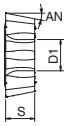
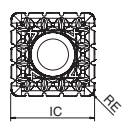
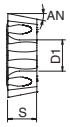
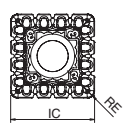
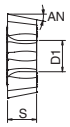
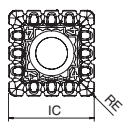
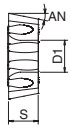
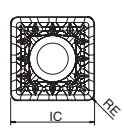
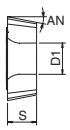
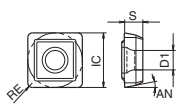
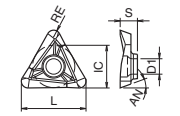
* MN indicates MEGACOAT NANO.

● : Std. Item

Inserts are sold in 10 piece boxes

Milling Inserts (With Hole)

Classification of usage														
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel						★	★			See Page for Applicable Toolholders
		Mold Steel						★	★			
	M	Stainless Steel						★	★			
	K	Gray Cast Iron								★	☆	
		Nodular Cast Iron								★		
	N	Non-ferrous Metals									★	
	S	Heat-resistant Alloys						★	★			
		Titanium Alloys								★	☆	
	H	Hard Materials						□	□			

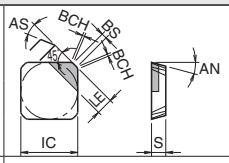
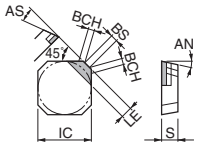
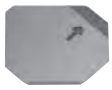
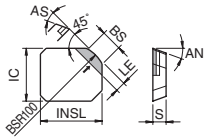
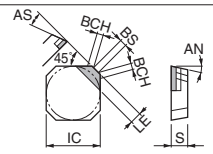
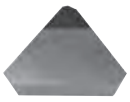
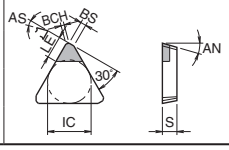
Insert Handed Insert shows Right-hand			Description	Dimension (mm)						Angle	Cermet	CVD Coated Carbide	MEGACOAT NANO			MEGACOAT			Carbide	See Page for Applicable Toolholders
				IC	S	D1	L	BS	RE	AN	TN100M	CA6535	PR1535	PR1525	PR1510	PR1225	PR1230	PR1210	KW10	
3-Notched			**SPMT 180616EN-NB3**	18	6.35	6.8	-	-	1.6	11°							●	●		**M120**
4-Notched			**SPMT 180616EN-NB4**	18	6.35	6.8	-	-	1.6	11°							●	●		
3-Notched / Low cutting force			**SPMT 180616EN-NB3P**	18	6.35	6.8	-	-	1.6	11°							●	●		
4-Notched / Low cutting force			**SPMT 180616EN-NB4P**	18	6.35	6.8	-	-	1.6	11°							●	●		
Without notch			**SPMT 180616EN-V**	18	6.35	6.8	-	-	1.6	11°							●	●		
			**SPMT 060204E-Z**	6.35	2.38	2.5	-	-	0.4	11°						●		●	●	**M222**
			060208E-Z						0.8							●		●	●	
			SPMT 090304E-Z	9.525	3.18	3.4	-	-	0.4	11°						●		●	●	
			090308E-Z						0.8							●		●	●	
			**TEMT 250624-AQ**	15.875	6.35	5.5	23.0	-	2.4	20°									▲	-

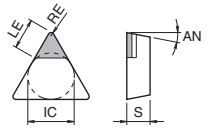
● : Std. Item
▲ : To be replaced by a new product

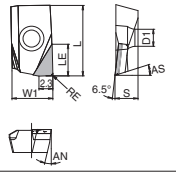
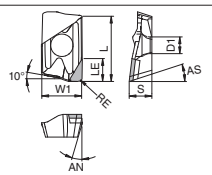
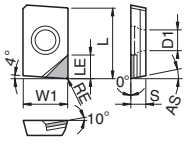
Inserts are sold in 10 piece boxes

Milling Inserts (PCD)

Classification of usage						
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice	P	Carbon Steel / Alloy Steel				
		Mold Steel				
	M	Stainless Steel				
	K	Gray Cast Iron				
		Nodular Cast Iron				
	N	Non-ferrous Metals	□		■	
	S	Heat-resistant Alloys				
		Titanium Alloys	□		■	
	H	Hard Materials				

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) IC	S	BCH	BS	LE	INSL	Angle AN	AS	PCD KPD001	KPD010	KPD230	See Page for Applicable Toolholders
		SDKN	1203AUFN-NE	12.70	3.18	0.5	1.2	3.1	-	15°	23°	●			-
			1203AUFN					3.6				●	●		
		SEEN	1203AFFN-NE	12.70	3.18	0.5	1.4	3.0	-	20°	25°	●			-
			1203AFFN					3.5				●	●		
 Wiper Insert		SEEN	1203AFFR-W	12.50	3.18	-	3.5	1.7	14.56	20°	25°	●			-
		SOKN	13T3AXFN-NE	13.494	3.97	0.4	1.1	3.0	-	27°	32°			▲	-
		TEEN	1603PTFR-NE	9.525	3.18	0.6	1.4	4.1	-	20°	22°	●		●	-
			1603PTFR					4.7				●	●		
		TEKN	2204PTFR-NE	12.70	4.76	0.7	1.8	4.2	-	20°	22°	●		●	-
			2204PTFR					4.8				●	●		

Insert		Description		Dimension (mm) IC	S	RE	LE	Angle AN	PCD KPD001	KPD010	KPD230	See Page for Applicable Toolholders
		TPGN	110302	6.35	3.18	0.2	3.9	11°	●	●		-
			110304			0.4	3.7		●	●		
			110308			0.8	3.4			●		

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) W1	S	D1	L	RE	LE	Angle AN	AS	PCD KPD001	KPD010	KPD230	See Page for Applicable Toolholders
		BDGT	11T302FR	6.7	3.8	2.8	11.5	0.2	3.8	13°	18°	●		●	M64 M65 M66 M67
			11T304FR					0.4				●		●	
			11T308FR					0.8				●		●	
		BDGT	11T302FR-LE					0.2	5.2			●		●	
			11T304FR-LE					0.4				●		●	
			11T308FR-LE					0.8				●		●	
		BDMT	11T302FR	6.7	3.8	2.8	11.0	0.2	3.6	13°	18°	●		●	
			11T304FR					0.4				●		●	
		BDMT	170402FR	9.6	4.9	4.4	17.0	0.2	4.4	13°	18°	●		●	
			170404FR					0.4				●		●	
		NDCW	150302FRX-NE	9.525	3.18	4.4	15.0	0.2	5.1	-	15°	●		●	M132
			150302FRX						5.7			●	●		

● : Std. Item
▲ : To be replaced by a new product

CBN & PCD Inserts are sold in 1 piece boxes

MFPN45 Face Mill



Rake Angle	A.R.	R.R.	
	(max.)+10°	DC=63 : -10°	DC=100-315 : -6°
		DC=80 : -8°	

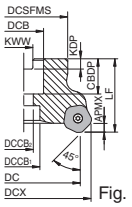


Fig. 1

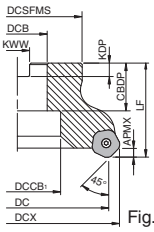


Fig. 2

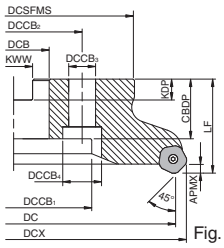


Fig. 3

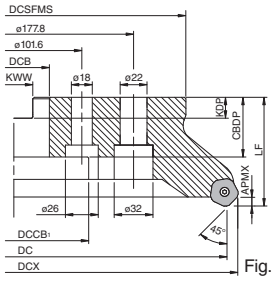


Fig. 4

Toolholder Dimensions

Description				Stock R	Stock L	No. of Inserts	Dimension (mm) DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	$DCCB_3$	$DCCB_4$	Drawing	Weight (kg)	Shim
Metric	Coarse pitch	MFPN	45063R-4T-M	●		4	63	76	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5	Yes
			45080R-5T-M	●		5	80	93	60	27	22	13	50	24	7	12.4	-	-		1.1	
			45100R-6T-M	●		6	100	113	70	32	48	-		30	8	14.4			Fig. 2	1.4	
			45125R-7T-M	●		7	125	138	87	40	58		63	32	9	16.4				2.6	
			45160R-8T-M	●		8	160	173	102		68	66.7					14	20	Fig. 3	3.8	
			45200R-10T-M	●		10	200	213	142	60	110	101.6		40	14	25.7	18	26		6.4	
			45250R-12T-M	●		12	250	263												9.1	
			45315R-14T-M	MTO		14	315	328	220			-	80				-	-	Fig. 4	21.3	
	Fine pitch	MFPN	45063R-5T-M	●		5	63	76	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5	No
			45080R-6T-M	●		6	80	93	60	27	22	13	50	24	7	12.4	-	-		1.0	
			45100R-8T-M	●		8	100	113	70	32	48	-		30	8	14.4			Fig. 2	1.4	
			45125R-10T-M	●		10	125	138	87	40	58		63	32	9	16.4				2.5	
			45160R-12T-M	●		12	160	173	102		68	66.7					14	20	Fig. 3	3.8	
			45200R-14T-M	●		14	200	213	142	60	110	101.6		40	14	25.7	18	26		6.5	
			45250R-16T-M	●		16	250	263												9.1	
			45315R-18T-M	MTO		18	315	328	220			-	80				-	-	Fig. 4	21.7	
	Extra fine pitch	MFPN	45063R-6T-M	●		6	63	76	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5	No
			45080R-8T-M	●		8	80	93	60	27	22	13	50	24	7	12.4	-	-		1.1	
			45100R-10T-M	●		10	100	113	70	32	48	-		30	8	14.4			Fig. 2	1.3	
			45125R-13T-M	●		13	125	138	87	40	58		63	32	9	16.4				2.6	
Bore Dia. Inch spec	Coarse pitch	MFPN	45080R/L-5T	●	●	5	80	93	60	25.4	22	13	50	27	6	9.5			Fig. 1	1.1	Yes
			45100R/L-6T	●	●	6	100	113	70	31.75	48			32	8	12.7	-	-		1.4	
			45125R/L-7T	●	●	7	125	138	87	38.1	58	-	63	36	10	15.9			Fig. 2	2.6	
			45160R/L-8T	●	●	8	160	173	102	50.8	72			38	11	19.1				4.0	
			45200R-10T	●		10	200	213	142	47.625	110	101.6		40	14	25.4	18	26	Fig. 3	6.7	
			45250R-12T	●		12	250	263												9.4	
			45315R-14T	MTO		14	315	328	220			-	80				-	-	Fig. 4	21.2	
	Fine pitch	MFPN	45080R-6T	●		6	80	93	60	25.4	22	13	50	27	6	9.5			Fig. 1	1.1	No
			45100R-8T	●		8	100	113	70	31.75	48			32	8	12.7	-	-		1.4	
			45125R-10T	●		10	125	138	87	38.1	58	-	63	36	10	15.9			Fig. 2	2.7	
			45160R-12T	●		12	160	173	102	50.8	72			38	11	19.1				4.0	
			45200R-14T	●		14	200	213	142	47.625	110	101.6		40	14	25.4	18	26	Fig. 3	6.9	
			45250R-16T	●		16	250	263												9.6	
			45315R-18T	MTO		18	315	328	220			-	80				-	-	Fig. 4	21.5	
	Extra fine pitch	MFPN	45080R-8T	●		8	80	93	60	25.4	22	13	50	27	6	9.5			Fig. 1	1.1	No
			45100R-10T	●		10	100	113	70	31.75	48			32	8	12.7	-	-		1.3	
			45125R-13T	●		13	125	138	87	38.1	58	-	63	36	10	15.9			Fig. 2	2.7	
			45160R-16T	●		16	160	173	102	50.8	72			38	11	19.1				4.0	
			45200R-18T	●		18	200	213	142	47.625	110	101.6		40	14	25.4	18	26	Fig. 3	6.9	
			45250R-20T	●		20	250	263												9.6	

* APMX : 6 mm (GM, SM, GH Chipbreakers), 5 mm (GL Chipbreaker), 3 mm (W Chipbreaker)

Recommended Cutting Conditions ➔ M32

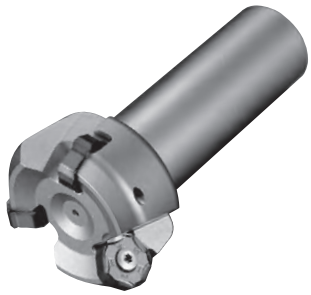
● : Std. Item
MTO : Made to order

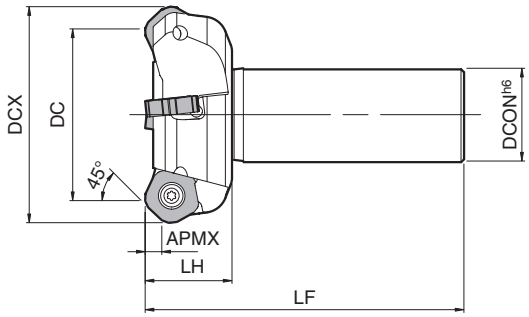
Spare Parts (common to Metric / Inch spec)

Description		Spare Parts							
		Clamp Screw	Wrench TTW	Wrench DTM	Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt
Coarse pitch	MFPN 45063R-4T-M	SB-50140TR for Insert Clamp Tightening torque 4.2N·m	TTW-15 for Insert Clamp Tightening torque 4.2N·m	-	MFPN-45	SPW-7050 for Shim Clamp Tightening torque 6.0N·m	LW-5	P-37	HH10X30
	MFPN 45080R/L-5T(-M)								HH12X35
	MFPN 45100R/L-6T(-M) ~ 45315R-14T(-M)								-
Fine pitch	MFPN 45063R-5T-M	SB-50140TR for Insert Clamp Tightening torque 4.2N·m	TTW-15 for Insert Clamp Tightening torque 4.2N·m	-	-	-	-	P-37	HH10X30
	MFPN 45080R-6T(-M)								HH12X35
	MFPN 45100R-8T(-M) ~ 45315R-18T(-M)								-
Extra fine pitch	MFPN 45063R-6T-M	SB-40140TRN for Insert Clamp Tightening torque 3.5N·m	-	DTM-15	-	-	-	P-37	HH10X30
	MFPN 45080R-8T(-M)								HH12X35
	MFPN 45100R-10T(-M) ~ 45250R-20T								-

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

MFPN45 with cylindrical shank





Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	DCX	DCON	LF	LH	*APMX	Rake Angle A.R. (MAX.)	R.R.	Spare Parts Clamp Screw	Wrench	Anti-seize Compound
MFPN	45050R-S32-3T	●	3	50	63	32	110	30	6 (5)	+ 10°	- 12°	SB-50140TR Tightening torque 4.2N·m	TTW-15	P-37
	45063R-S32-4T	●	4	63	76						- 10°			
	45080R-S32-5T	●	5	80	93						- 8°			

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

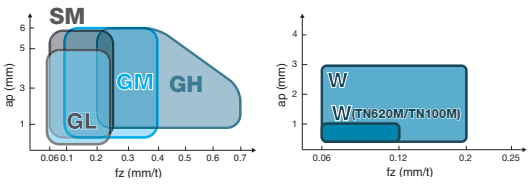
* APMX : 6 mm (GM, SM, GH Chipbreakers), 5 mm (GL Chipbreaker), 3 mm (W Chipbreaker)

Applicable Inserts (Common to face mill and end mill)

Description	Applicable Inserts ⊙M18						
MFPN 45...R-...	PNMU 1205ANER-GM	PNMU 1205ANER-SM	PNMU 1205ANER-GH	PNEU 1205ANER-GL	PNEU 1205ANER-W	-	-
MFPN 45...L-...	-	-	-	-	-	PNMU 1205ANEL-GM	PNEU 1205ANEL-GL

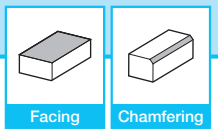
Recommended Cutting Conditions ⊙M32

Applicable Chipbreaker Range



● : Std. Item

MFPN45



Cutter type and chipbreaker selection

Milling Purpose	Cutter Type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	W
General milling for steel and alloy steel		●		●				
Steel and alloy steel (at chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) (ap=4mm or Over, fz=0.35mm/t or Over)	●					●		
Surface finish oriented	●	●					●	
General milling of stainless steel		●			●			
Stainless steel (to prevent chattering due to low rigidity machine or poor clamping power)	●				●			
Cast iron (for processing efficiency improvement)			●	●				
Cast iron (ap=4mm or Over, fz=0.35mm/t or Over)	●					●		
Improved Surface Finish in High Efficiency Milling		●	●					●

How to use wiper insert

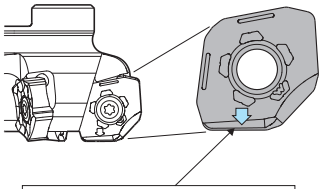
1) Please use one wiper insert on one cutter.
(If you use 2 inserts or more on one cutter, the workpiece surface may be muddy white.)

2) Combination of Wiper Insert with Other Chipbreakers

Combination \ Chipbreaker	GM	SM	W
Recommended Combination	●		●
Recommended Combination		●	●

The combinations of GH+W and GL+W are not recommended.

How to attach wiper inserts on MFPN cutter



The down arrow symbol (↓) indicates wiper cutting edge.
When attaching inserts, make sure that the arrow symbol points downward.

3) For checking the protrusion amount of the wiper insert, use tool presetter. (Appropriate protrusion : 0.1mm)

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t) ( ) : TN620M	Recommended Insert Grades (Cutting Speed Vc: m/min)					
			Cermet	MEGACOAT (PVD Coated Carbide)				CVD Coated Carbide
			TN620M	PR1535	PR1525 (PR1225)	PR1510 (PR1210)	PR015S	CA6535
GM	Carbon Steel	0.1~**0.2**~0.4 (0.06~**0.12**~0.20)	★200~**250**~300	☆120~**180**~250	★120~**180**~250	-	-	-
	Alloy Steel	0.1~**0.2**~0.4 (0.06~**0.12**~0.20)	★180~**220**~250	☆100~**160**~220	★100~**160**~220	-	-	-
	Mold Steel	0.1~**0.2**~0.35 (0.06~**0.08**~0.15)	★150~**180**~220	☆80~**140**~180	★80~**140**~180	-	-	-
	Stainless Steel (Austenitic related)	0.1~**0.2**~0.4	-	☆100~**160**~200	☆100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.1~**0.2**~0.4	-	☆150~**200**~250	-	-	-	☆180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.1~**0.2**~0.3	-	★90~**120**~150	-	-	-	-
	Gray Cast Iron	0.1~**0.2**~0.4	-	-	-	★120~**180**~250	-	-
	Nodular Cast Iron	0.1~**0.2**~0.35	-	-	-	★100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	-	☆20~**30**~50	-	-	-	★20~**30**~50
SM *1GL	Carbon Steel	0.06~**0.12**~0.25 (0.06~**0.10**~0.15)	★200~**250**~300	☆120~**180**~250	☆120~**180**~250	-	-	-
	Alloy Steel	0.06~**0.12**~0.25 (0.06~**0.10**~0.15)	★180~**220**~250	☆100~**160**~220	☆100~**160**~220	-	-	-
	Mold Steel	0.06~**0.1**~0.2 (0.06~**0.08**~0.12)	★150~**180**~220	☆80~**140**~180	☆80~**140**~180	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.12**~0.25	-	★100~**160**~200	☆100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.12**~0.25	-	☆150~**200**~250	-	-	-	★180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.12**~0.25	-	☆90~**120**~150	-	-	-	-
	Gray Cast Iron	0.06~**0.12**~0.25	-	-	-	☆120~**180**~250	-	-
	Nodular Cast Iron	0.06~**0.1**~0.2	-	-	-	☆100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.06~**0.1**~0.15	-	☆20~**30**~50	-	-	-	☆20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.15	-	★40~**60**~80	-	-	-	-
*2GH	Carbon Steel	0.2~**0.4**~0.7	-	☆120~**180**~250	☆120~**180**~250	-	-	-
	Alloy Steel	0.2~**0.4**~0.6	-	☆100~**160**~220	☆100~**160**~220	-	-	-
	Mold Steel	0.2~**0.35**~0.5	-	☆80~**140**~180	☆80~**140**~180	-	-	-
	Stainless Steel (Austenitic related)	0.2~**0.3**~0.4	-	☆100~**160**~200	☆100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.2~**0.3**~0.4	-	☆150~**200**~250	-	-	-	☆180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.2~**0.3**~0.4	-	☆90~**120**~150	-	-	-	-
	Gray Cast Iron	0.2~**0.4**~0.7	-	-	-	☆120~**180**~250	-	-
	Nodular Cast Iron	0.2~**0.35**~0.5	-	-	-	☆100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.3**~0.4	-	☆20~**30**~50	-	-	-	☆20~**30**~50
	Hard Materials (60HRC or less)	0.05~**0.1**~0.2	-	-	-	-	★50~**80**~100	-

· The bold-faced number indicates a center value of recommended cutting condition. ★ : 1st Recommendation ☆ : 2nd Recommendation
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
· Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
*1. GL Chipbreaker is recommended for Surface finish oriented milling.
*2. GH Chipbreaker : Fine pitch ⇒ fz≤0.4 (mm/t)
Extra fine pitch ⇒ Not recommended

● Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM (GL)	GH
Coarse pitch (with shim)	✓	✓	✓
Fine pitch (without shim)	✓	✓	△ (Feed rate is recommended fz=0.4mm/t or under)
Extra fine pitch (without shim)	✓	✓	Not recommended

Precautions for use (How to mount an insert)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, while pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten the screw with appropriate torque. (Ref. to Fig. 1 and Fig. 2)
   Recommended tightening torque : The torque for coarse pitch (using M5 screw) is 4.2 N·m
   The torque for extra fine pitch (using M4 screw) is 3.5 N·m.
3. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder and between the insert side surfaces and the constraint surface of the toolholder.
4. To change the cutting edge of the insert, turn the insert counterclockwise. (Fig. 3)
   Insert corner identification number is stamped on the top surface of insert. (Fig. 4) To protect the wiper edge, use the corners of insert in the sequence of corner numbers.



Fig. 1


Fig. 2


Fig. 3

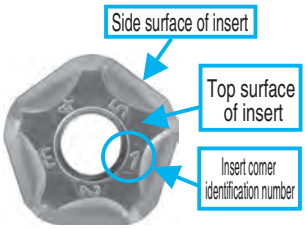


Fig. 4 (Right-hand insert)

How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (ref. to Fig. 5) and lightly pressing the shim toward the constraint surface, insert the screw into the hole of the shim and tighten it (ref. to Fig. 6).
   When tightening the screw, make sure that the screw is vertical to the bearing surface. Recommended tightening torque is 6.0 N·m.
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.



Fig. 5

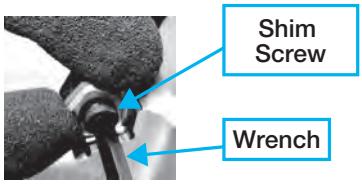


Fig. 6

Cutting Edge Angle 66˚, High Efficiency Cutter

MFPN66

Economical Double-sided 10-edge Insert Reduces Chattering with Low Cutting Force Design
Reduces Cutting Costs when Machining Auto Parts and Other General Purpose Machining Applications

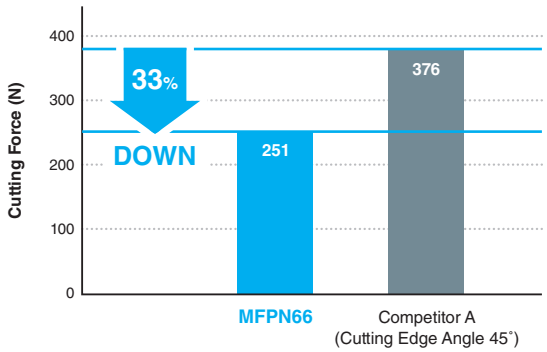
1 Economical Double-sided 10-edge Insert Applicable to various machining applications with wide size range from ø32

Cost reduction in various applications from general parts to automotive parts machining

2 Reduces Chattering with Low Cutting Force Design Available for Application from Small ap to Medium ap

Suppresses Vibration for Excellent Surface Finish with 66˚ Cutting Edge Angle

Cutting Force Comparison (Internal evaluation)



Cutting force is thrust force

Cutting Conditions : Vc = 200 m/min, ap = 3 mm, fz = 0.15 mm/t
Cutter Dia. ø63 Workpiece Material : S50C

Surface Finish (Machining with Workpiece Overhang Length of 80mm)



Excellent Surface Finish with Low Workpiece Clamping Rigidity

Cutting Conditions : Vc = 200 m/min, ap = 0.5 mm, fz = 0.2 mm/t
Cutter Dia. ø63 Workpiece Material : S50C

3 Extended Tool Life by MEGACOAT NANO Technology Insert Lineup Also Contains Cermet Grade for Better Surface Finish



1st Recommendation (General purpose)
GM Chipbreaker



Tough Edge
GH Chipbreaker



For Stainless Steel
SM Chipbreaker

MFPN66 Face Mill



Rake Angle	A.R.	R.R.	
	max.+12°	DC=50 : -9°	DC=80 : -7°
		DC=63 : -8°	DC=100-160 : -6°

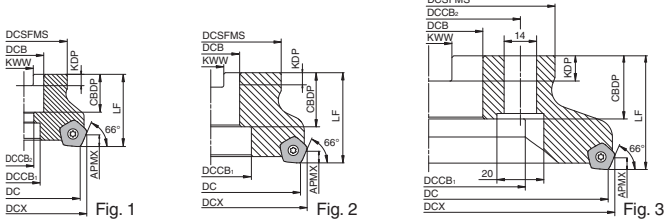


Fig. 1 Fig. 2 Fig. 3

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Shim
					DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW			
Metric	Fine pitch	MFPN 66050R-4T-M-G	●	4	50	58	48	22	18	11	40	21	6.3	10.4	Fig. 1	0.3	No
		66063R-5T-M-G	●	5	63	71										0.5	
		66080R-6T-M-G	●	6	80	88	70	27	20	13	50	24	7	12.4		1.2	
		66100R-7T-M-G	●	7	100	107	78	32	45	-		30	8	14.4	Fig. 2	1.6	
		66125R-9T-M-G	●	9	125	132	89	40	55		63	33	9	16.4		2.8	
		66160R-11T-M-G	●	11	160	167									Fig. 3	3.8	
	Extra fine pitch	MFPN 66050R-5T-M-G	●	5	50	58	48	22	18	11	40	21	6.3	10.4	Fig. 1	0.4	No
		66063R-7T-M-G	●	7	63	71										0.5	
		66080R-9T-M-G	●	9	80	88	70	27	20	13	50	24	7	12.4		1.2	
		66100R-11T-M-G	●	11	100	107	78	32	45	-		30	8	14.4	Fig. 2	1.6	
		66125R-13T-M-G	●	13	125	132	89	40	55		63	33	9	16.4		3	
		66160R-15T-M-G	●	15	160	167									Fig. 3	4	
Bore Dia. Inch spec	Fine pitch	MFPN 66080R-6T-G	●	6	80	88	70	25.4	20	13	50	27	6	9.5	Fig. 1	1.2	No
		66100R-7T-G	●	7	100	107	78	31.75	45	-		34	8	12.7		1.7	
		66125R-9T-G	●	9	125	132	89	38.1	55		63	38	10	15.9	Fig. 2	2.9	
		66160R-11T-G	●	11	160	167	110	50.8	72				11	19.1		4.5	
	Extra fine pitch	MFPN 66080R-9T-G	●	9	80	88	70	25.4	20	13	50	27	6	9.5	Fig. 1	1.2	No
		66100R-11T-G	●	11	100	107	78	31.75	45	-		34	8	12.7		1.7	
		66125R-13T-G	●	13	125	132	89	38.1	55		63	38	10	15.9	Fig. 2	3	
		66160R-15T-G	●	15	160	167	110	50.8	72				11	19.1		4.8	

*APMX : 5mm (GM (Coated Carbide), SM, GH Chipbreaker), 3mm (GM (Cermet))

Applicable Inserts ➔ M36

Spare Parts (common to Metric / Inch spec)

Description			Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
						
Fine pitch	MFPN	66050R-4T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		66063R-5T-M-G				HH10X30
		66080R-6T(-M)-G				HH12X35
		66100R-7T(-M)-G				-
		66125R-9T(-M)-G				
		66160R-11T(-M)-G				
Extra fine pitch	MFPN	66050R-5T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		66063R-7T-M-G				HH10X30
		66080R-9T(-M)-G				HH12X35
		66100R-11T(-M)-G				-
		66125R-13T(-M)-G				
		66160R-15T(-M)-G				

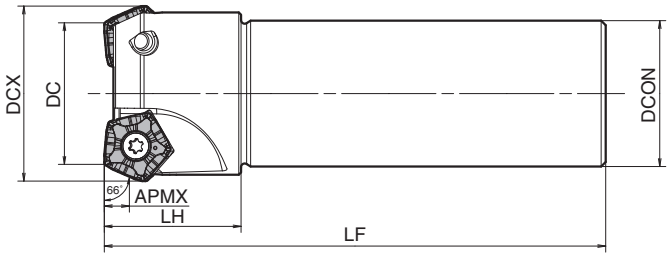
Recommended tightening torque for Insert Clamp 3.5N·m

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

MFPN66 End Mill





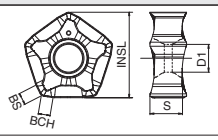
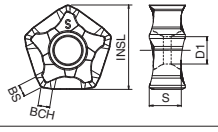
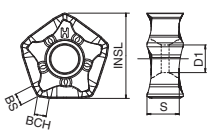
Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)						Rake Angle		Spare Parts		
				DC	DCX	DCON	LF	LH	*APMX	A.R. (MAX.)	R.R.	Clamp Screw	Wrench	Anti-seize Compound
MFPN	66032R-S32-2T-G	●	2	32	39.5	32	110	30	5	+12°	-14°	SB-4090TRP	DTPM-15	P-37
	66040R-S32-3T-G	●	3	40	47.5						-12°	Tightening Torque 3.5N·m		

*APMX : 5mm (GM (Coated Carbide), SM, GH Chipbreaker), 3mm (GM (Cermet))

Applicable Inserts

Classification of usage								
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice	P	Carbon Steel / Alloy Steel	■	☆	★		
		Mold Steel	■	☆	★		
	M	Stainless Steel (Austenitic related)		★	☆		
		Stainless Steel (Martensitic related)		★			
		Stainless Steel (Precipitation Hardening)		★			
	K	Gray Cast Iron				★	
		Nodular Cast Iron				★	
	N	Non-ferrous Metals					
	S	Ni-base heat-resistant alloys		★			
		Titanium Alloys		★			
	H	Hard Materials					★

Insert		Description	Dimension (mm)					Cermet	MEGACOAT (PVD Coated Carbide)			
			INSL	S	D1	BCH	BS	TN620M	PR1535	PR1525	PR1510	PR015S
 General purpose		PNMU 0905XNER-GM	14.6	5.56	4.7	2.0	2.0	●	●	●	●	
 Low cutting force		PNMU 0905XNER-SM							●	●	●	
 Tough Edge (For Heavy Milling)		PNMU 0905XNER-GH							●	●	●	●

Recommended Cutting Conditions ➔ M37

● : Std. Item

Recommended Cutting Conditions

Coated Carbide

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT (PVD Coated Carbide)			
			PR1535	PR1525	PR1510	PR015S
GM	Carbon Steel	0.1~**0.2**~0.3	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.1~**0.2**~0.3	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.1~**0.18**~0.25	★ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.1~**0.18**~0.25	☆ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless Steel (Martensitic related)	0.1~**0.18**~0.25	☆ 100~**150**~200	-	-	-
	Stainless Steel (Precipitation Hardening)	0.1~**0.18**~0.25	★ 90~**120**~150	-	-	-
	Gray Cast Iron	0.1~**0.2**~0.3	-	-	★ 120~**180**~250	-
	Nodular Cast Iron	0.1~**0.18**~0.25	-	-	★ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	☆ 20~**30**~50	-	-	-
SM	Carbon Steel	0.06~**0.12**~0.2	-	☆ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.12**~0.2	-	☆ 100~**160**~220	-	-
	Mold Steel	0.06~**0.1**~0.15	-	☆ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	-	-	-
	Stainless Steel (Precipitation Hardening)	0.06~**0.12**~0.2	☆ 90~**120**~150	-	-	-
	Gray Cast Iron	0.06~**0.12**~0.2	-	-	☆ 120~**180**~250	-
	Nodular Cast Iron	0.06~**0.1**~0.15	-	-	☆ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.15	★ 20~**30**~50	-	-	-
	Titanium Alloys	0.06~**0.08**~0.15	★ 40~**60**~80	-	-	-
GH	Carbon Steel	0.15~**0.25**~0.35	-	☆ 120~**180**~250	-	-
	Alloy Steel	0.15~**0.25**~0.35	-	☆ 100~**160**~220	-	-
	Mold Steel	0.1~**0.2**~0.3	-	☆ 80~**140**~180	-	-
	Gray Cast Iron	0.15~**0.25**~0.35	-	-	☆ 120~**180**~250	-
	Nodular Cast Iron	0.1~**0.2**~0.3	-	-	☆ 100~**150**~200	-
	Hard Materials (60HRC or less)	0.05~**0.08**~0.16	-	-	-	★ 50~**80**~100

★ : 1st Recommendation ☆ : 2nd Recommendation

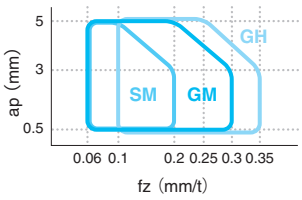
Cermet

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN620M
GM	Carbon Steel	0.06~**0.12**~0.15	★ 200~**250**~300
	Alloy Steel	0.06~**0.12**~0.15	★ 180~**220**~250
	Mold Steel	0.06~**0.1**~0.13	★ 150~**180**~220

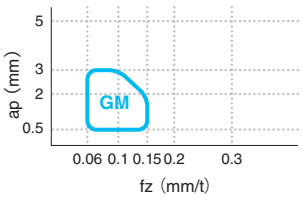
★1st Recommendation

Applicable Chipbreaker Range

Coated Carbide



Cermet



Applicable chipbreaker

Cutter Type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	△ (Feed rate is recommended fz=0.2mm/t or under)

High-Precision Cutter for Finishing Applications

MFLN

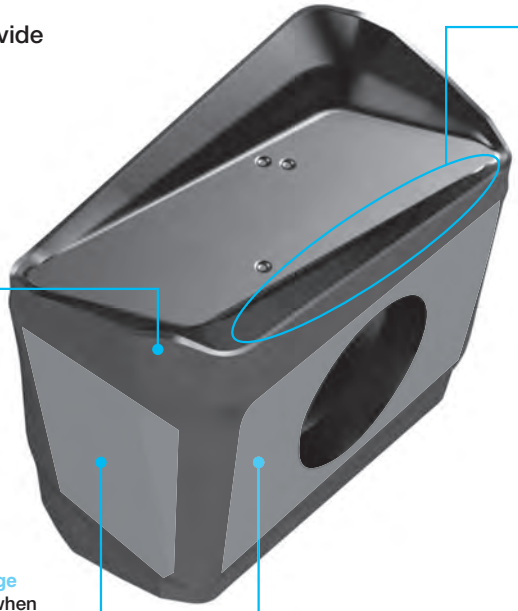
Tough 4-edge Vertical Inserts Provide High Reliability on Heavy Milling at Large Depths of Cut and High Feed Rates

Three Cutting Edge Angles (including MFLN90) Optimized for Various Machining Applications

1 Tough and Reliable Inserts for Stable Heavy Milling

22 mm long inserts offer increased rigidity

Tangentially mounted inserts provide
2 cutting edges on both sides

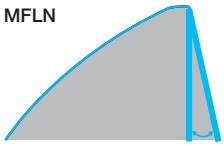


Obtuse Edge Design

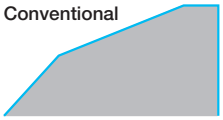
Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge (Image)

MFLN



Conventional



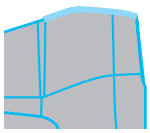
Corner Chamfer

(only available on MFLN90)

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing





Convex cutting edge ridge
Reduced impact forces when entering the workpiece

Wide Flat Mounting Surface

Hold an insert firmly in heavy milling

Tangentially mounted inserts increase rigidity

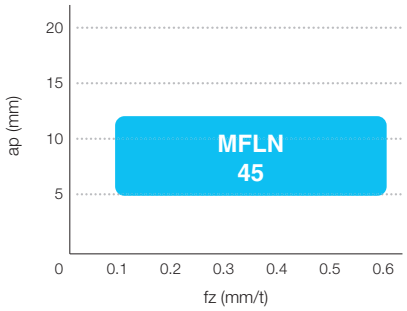




2 For Large Depths of Cut and High Feed Rates

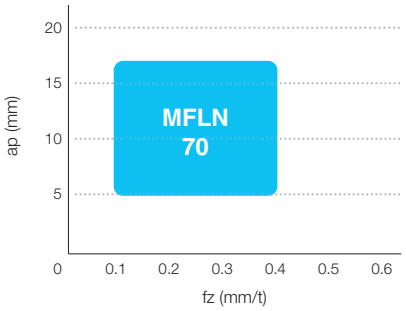
MFLN45
(Cutting edge angle 45°)





MFLN70
(Cutting edge angle 70°)

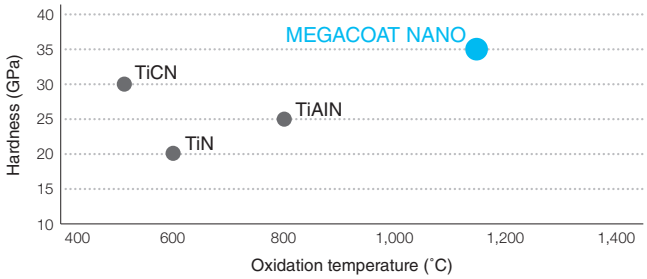




3 Stable machining and long tool life with MEGACOAT NANO

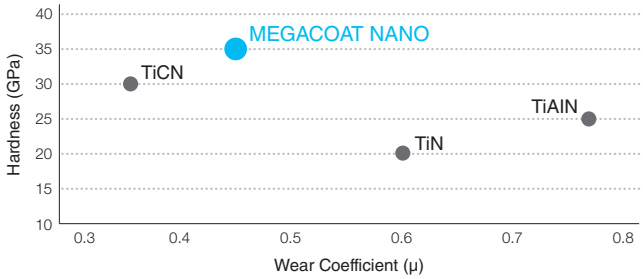
MEGACOAT NANO coating technology with high hardness (35Gpa) and excellent oxidation resistance (oxidation temperature: 1,150˚C) improves wear resistance and chipping resistance.

Coating Properties (Wear Resistance)



Long tool life with the combination of a tough substrate and a special nano layer coating

Coating Properties (Adhesion Resistance)



Stable Machining with Excellent Wear Resistance

PR1525 : 1st recommendation for wear resistance. Great for scale removal and cast iron machining

PR1535 : Defect resistant, tough substrate for stable machining



MFLN45 (Cutting edge angle 45°)



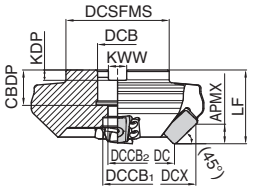


Fig.1

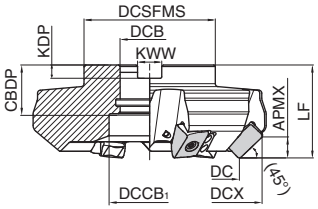


Fig.2

Rake Angle	A.R.	Max. +3.0°
	R.R.	-16.5°~-13.5°
Applicable Inserts	LOGU221616ER-GM	

LOGU2216PAER-GM is not applicable

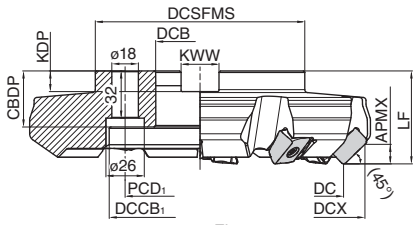


Fig.3

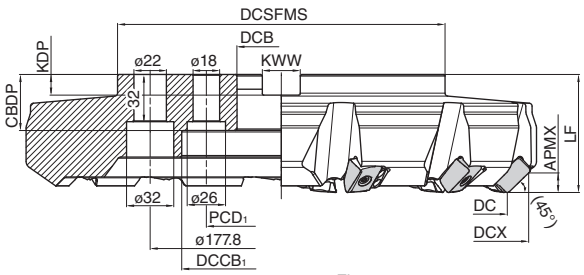


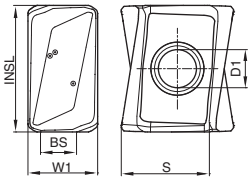
Fig.4

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)												Coolant Hole	Drawing	Weight (kg)
					DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	PCD_1			
Metric	MFLN	45080R-4T-M	●	4	80	104	70	27	20	13	50	24	7	12.4	12	-	Yes	Fig.1	2.0
		45100R-4T-M	●		100	124	78	32	45	-		30	8	14.4				Fig.2	2.7
		45125R-6T-M	●	6	125	149	89	40	55		63	33	9	16.4					4.6
		45160R-7T-M	●	7	160	184	110		90							66.7	No	Fig.3	6.7
		45200R-8T-M	●	8	200	224	142	60	124			38	14	25.7		101.6			9.7
		45250R-10T-M	●	10	250	274	222		160										16.9
		45315R-12T-M	MTO	12	315	339			215		80							Fig.4	25.1
Bore Dia. Inch spec	MFLN	45080R-4T	●	4	80	104	70	25.4	20	13	50	27	6	9.5	12	-	Yes	Fig.1	2.0
		45100R-4T	●		100	124	78	31.75	45	-		34	8	12.7				Fig.2	2.7
		45125R-6T	●	6	125	149	89	38.1	55		63	38	10	15.9					4.6
		45160R-7T	●	7	160	184	110	50.8	90				11	19.1			No		6.8
		45200R-8T	●	8	200	224	142	47.625	124				14	25.4		101.6		Fig.3	10.0
		45250R-10T	●	10	250	274	222		160										17.1
		45315R-12T	MTO	12	315	339			215		80							Fig.4	25.3

Applicable Inserts

Classification of usage					Applicable Toolholders
★ : 1st Recommendation ☆ : 2nd Recommendation	P	Carbon Steel / Alloy Steel	☆	★	➡ M40 M41 M116
		Mold Steel	☆	★	
	K	Gray Cast Iron	☆	★	
		Nodular Cast Iron	☆	★	

Insert			Description	Dimension (mm)					MEGACOAT NANO		Applicable Toolholders
				W1	S	D1	INSL	BS	PR1535	PR1525	
 Corner-R	 RE=1.6		LOGU 221616ER-GM	12.5	16.6	6.8	22.8	6.3	●	●	MFLN90.. MFLN70.. MFLN45..

● : Std. Item
MTO : Made to order

MFLN70 (Cutting edge angle 70°)



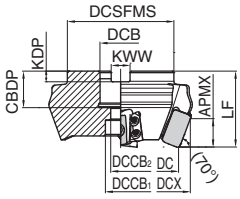


Fig.1

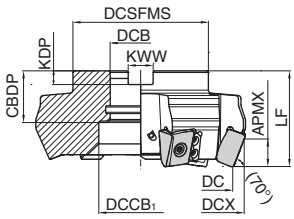


Fig.2

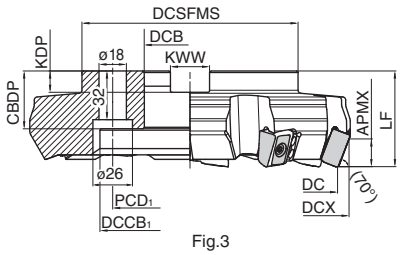


Fig.3

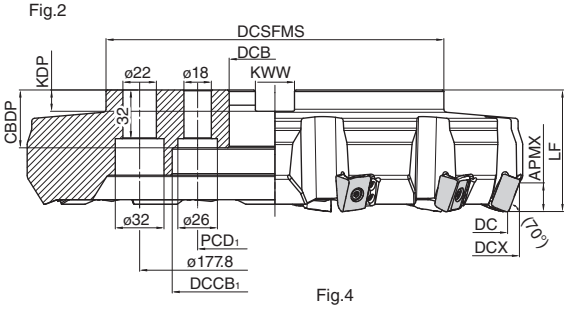


Fig.4

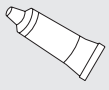
Rake Angle	A.R.	Max. +1.0°
	R.R.	-16.5°~-13.5°
Applicable Inserts	LOGU221616ER-GM	

LOGU2216PAER-GM is not applicable

Toolholder Dimensions

	Description		Stock	No. of Inserts	Dimension (mm) DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	PCD_1	Coolant Hole	Drawing	Weight (kg)
Metric	MFLN	70080R-4T-M	●	4	80	93	70	27	20	13	50	24	7	12.4	17	-	Yes	Fig.1	1.4
		70100R-4T-M	●		100	113	78	32	45	-		30	8	14.4				Fig.2	1.9
		70125R-6T-M	●	6	125	138	89	40	55		63	33	9	16.4					3.4
		70160R-7T-M	●	7	160	173	110		90							66.7	No	Fig.3	5.3
		70200R-8T-M	●	8	200	213	142	60	120			38	14	25.7		101.6			8.2
		70250R-10T-M	●	10	250	263	222		160										14.8
		70315R-12T-M	MTO	12	315	328			215		80							Fig.4	21.9
Bore Dia. Inch spec	MFLN	70080R-4T	●	4	80	93	70	25.4	20	13	50	27	6	9.5	17	-	Yes	Fig.1	1.4
		70100R-4T	●		100	113	78	31.75	45	-		34	8	12.7				Fig.2	2.0
		70125R-6T	●	6	125	138	89	38.1	55		63	38	10	15.9					3.5
		70160R-7T	●	7	160	173	110	50.8	70				11	19.1			No	Fig.3	5.8
		70200R-8T	●	8	200	213	142	47.625	120				14	25.4		101.6			8.5
		70250R-10T	●	10	250	263	222		160										15.1
		70315R-12T	MTO	12	315	328			215		80							Fig.4	22.2

Spare Parts

Description	Spare Parts: Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
							
MFLN ○○080R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
○○100R-4T(-M) ～ ○○315R-12T(-M)							–

Recommended tightening torque for Insert Clamp 6.0 N·m

Recommended tightening torque for Shim Clamp 3.5 N·m

● : Std. Item
MTO : Made to order

Recommended Cutting Conditions

	Workpiece Material	D.O.C. (mm) Width of Cut (≤0.5×DC)	D.O.C. (mm) Width of Cut (>0.5×DC)	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min) MEGACOAT NANO PR1535	MEGACOAT NANO PR1525
MFLN 45	Carbon Steel	~10	~8	0.1 - **0.3** - 0.6	☆ 80 – **120** – 150	★ 100 – **150** – 180
	Alloy Steel				☆ 80 – **120** – 150	★ 100 – **150** – 180
	Mold Steel				☆ 70 – **100** – 120	★ 80 – **120** – 150
	Gray Cast Iron	~12	~10	0.1 - **0.3** - 0.6	☆ 80 – **120** – 150	★ 100 – **150** – 180
	Nodular Cast Iron				☆ 80 – **120** – 150	★ 100 – **150** – 180
MFLN 70	Carbon Steel	~15	~12	0.1 - **0.2** - 0.4	☆ 80 – **120** – 150	★ 100 – **150** – 180
	Alloy Steel				☆ 80 – **120** – 150	★ 100 – **150** – 180
	Mold Steel				☆ 70 – **100** – 120	★ 80 – **120** – 150
	Gray Cast Iron	~17	~15	0.1 - **0.2** - 0.4	☆ 80 – **120** – 150	★ 100 – **150** – 180
	Nodular Cast Iron				☆ 80 – **120** – 150	★ 100 – **150** – 180

The table above provides recommendations based on product specifications. Before using the product, check the machine's specifications such as power. ★1st Recommendation ☆2nd Recommendation

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. Dry machining is recommended.

About Applicable Insert

	LOGU221616ER-GM (Corner-R)	LOGU2216PWER-GM (Corner Chamfer)
MFLN 45	✓	Not applicable
MFLN 70	✓	Not applicable

Max. Revolution for Each Cutting Diameter

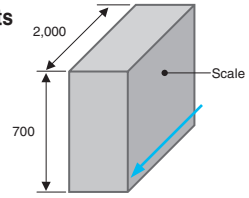
Cutting Dia. DC (mm)	Max. Revolution (min^{-1})
ø80	5,970
ø100	4,780
ø125	3,820
ø160	2,990
ø200	2,390
ø250	1,910
ø315	1,520

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Case Studies

Forging Die for Automotive Parts

Vc = 90 m/min
ap × ae = ~10 × ~80 mm
fz = 0.36 mm/t Dry
MFLN45080R-4T-M (ø80-4 flutes)
LOGU221616ER-GM PR1535



Chip Evacuation Rate

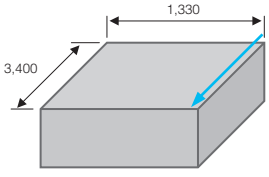
		Machining efficiency
MFLN45 (ø80-4 flutes)	Q=416cc/min	x1.2
Competitor H (ø100-5 flutes)	Q=336cc/min	

MFLN achieved 1.2 times machining efficiency.
Quieter machining and good chip shapes.

(User Evaluation)

Machining base FCD600

Vc = 120 m/min
ap = 11×165 mm
fz = 0.65 mm/t Dry
XMFLN70250R-13T-OH-M (ø250-13 flutes)
Fine pitch, internal coolant, custom holder
LOGU221616ER-GM PR1525



Chip Evacuation Rate

	Roughing	Finishing	Machining efficiency
MFLN70	Q=2,340cc/min	Q=2,340cc/min	x1.1
Competitor	Roughing (Competitor F) Q=2,100cc/min	Finishing (Competitor G) Q=1,970cc/min	

MFLN improved machining efficiency with lower cutting force.
Also it can be used both for roughing and finishing.

(User Evaluation)

How to mount an insert

1. Completely eliminate chips and dust from the insert mounting side.
2. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface. (Fig.1,2)
3. Make sure that the identification on the top of the insert is the same in each pocket. (Fig.3)
4. Tighten the wrench (TTP-20) in while holding parallel to the clamp screw.
5. Tighten the insert clamp screw at an appropriate torque. (Recommended torque : 6.0 N·m)
6. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.

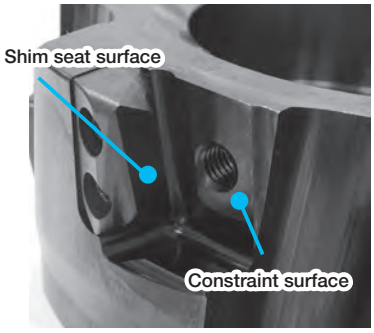


Fig.1

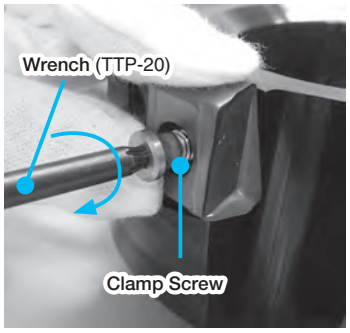


Fig.2


Fig.3

How to replace a shim

1. Completely eliminate chips and dust from the shim mounting side.
2. Coat medium strength screw locking adhesive on the screws.
3. Tighten the screw keeping the shim pushed against the pocket surface of toolholder.
4. After tightening both screws temporarily, tighten them with appropriate torque. (Recommended torque : 3.5 N·m)
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

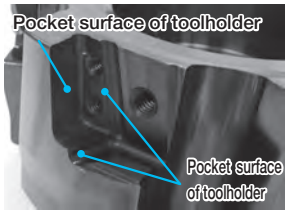


Fig.1

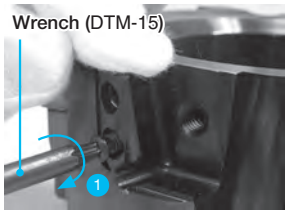


Fig.2

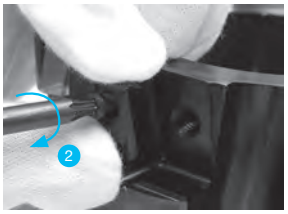


Fig.3


Fig.4

MFK Cutter for Cast Iron

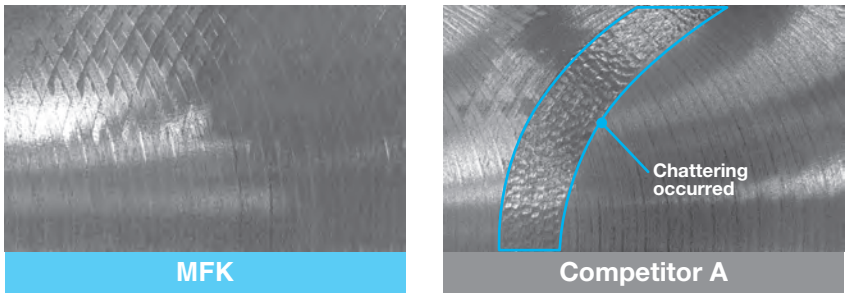
MFK



- Multi edge cutter realizes the high efficiency cast iron machining
- 10-edge pentagonal inserts for stable and economical machining

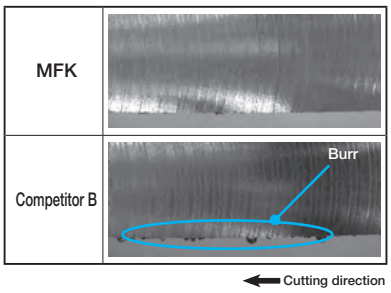
MFK reduces cutting force by good balanced design
Excellent surface finish by controlling chattering

Surface finish comparison (Internal evaluation)



<Cutting Conditions>
Workpiece Material : FCD600, Dry, Vc=180m/min, ap×ae=3×78mm, fz=0.3mm/t

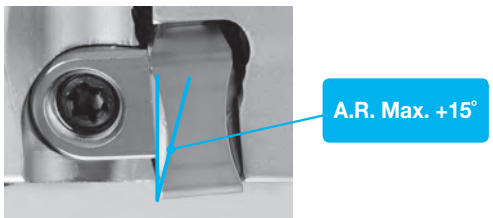
Burr comparison (Internal evaluation)



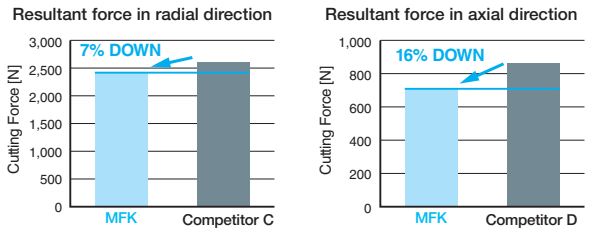
Sharp cutting prevents burr formation

Two points — Two special insert structures reduce cutting force and improve edge strength

POINT.1 Low cutting force with helical cutting-edge design

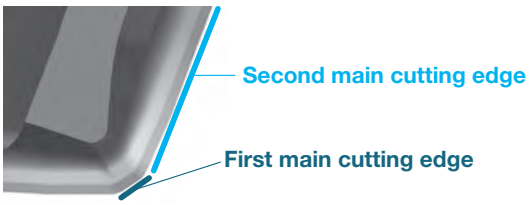


- Cutting Force Comparison (Internal evaluation)

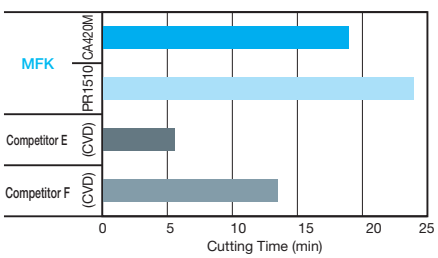


<Cutting Conditions>
Workpiece Material : FCD600, Dry, ø125
Vc=180m/min, ap×ae=3.0×62mm, fz=0.3mm/t

POINT.2 Dual Cutting Edge Design (High Toughness)



- Fracture Resistance Comparison (Internal evaluation)



<Cutting Conditions>
Workpiece Material : FCD450 with 4 bores
Vc=300m/min
ap=2.0mm
fz=0.5mm/t
Wet

Reducing impact load when biting into the workpiece

Toolholder lineup to meet various applications

Fine pitch type and extra fine pitch type are available
Choose most suitable cutter for your application



Fine pitch (Example : ø125 12 flutes)

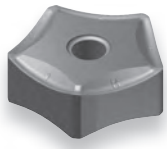
· Recommended for low rigid workpiece
· For wide application range



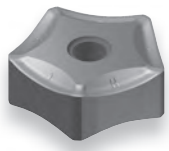
Extra fine pitch (Example : ø125 18 flutes)

· Recommended for high rigid workpiece
· For high efficiency machining

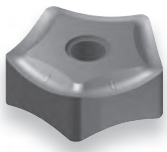
Applicable to various applications with wide range lineup of chipbreakers



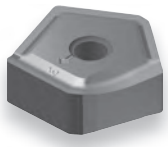
General purpose :
GM Chipbreaker



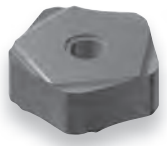
Tough Edge :
GH Chipbreaker



Finishing :
GL Ground Chipbreaker

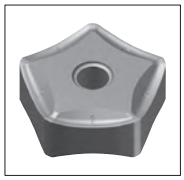


With Wiper Edge :
W Ground Chipbreaker

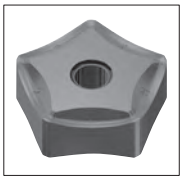


High speed machining :
Ceramic with chipbreaker

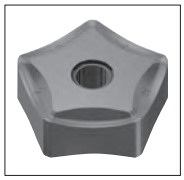
Insert grade lineup



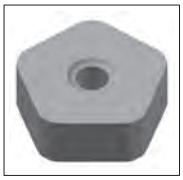
Long tool life
(1st recommendation)
CA420M
(CVD)



Stable machining
PR1510
(PVD)



Fracture Resistance Oriented
PR1525
(PVD)



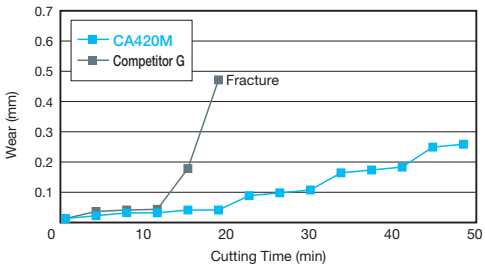
High speed machining
KS6050/CS7050
(Ceramic)



High speed and high precision machining
KBN475
(CBN Wiper Insert)

[Use CBN wiper inserts together with ceramic (KS6050/CS7050) inserts.]

Wear Resistance Comparison (Internal evaluation)



<Cutting Conditions>
Workpiece Material : FCD450, Dry
Vc=200m/min, apxae=2.0x80mm, fz=0.3mm/t

MFK Face Mill



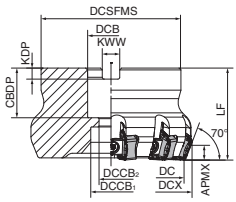


Fig. 1

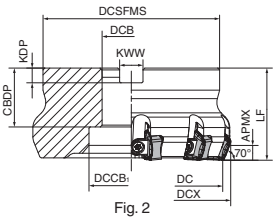


Fig. 2

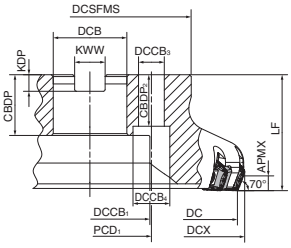


Fig. 3

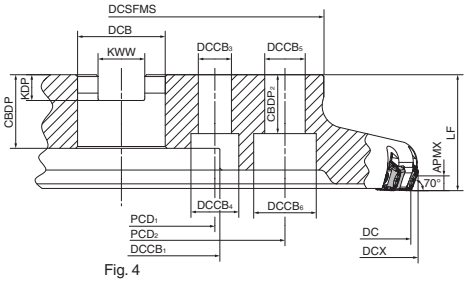


Fig. 4

Rake Angle		
Description	A.R.	R.R.
MFK080R-○○	(MAX.) +15°	-7°
MFK100R-○○		-6°
MFK125R-○○ ⋮ MFK315R-○○		-5°

Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)																			Drawing	Weight (kg)	Max. Revolution (min^{-1})
						DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	PCD_1	PCD_2	$CBDP_2$			
Metric	Fine pitch	MFK	080R-11-8T-M	●	8	80	89	76	27	20	13	63	24	7	12.4	6.0	-	-	-	-	-	-	-	Fig. 1	1.87	8,000
			100R-11-10T-M	●	10	100	109	96	32	26	17		28	8	14.4											2.99	7,000
			125R-11-12T-M	●	12	125	134	100	40	55	-		33	9	16.4				-	-		-			Fig. 2	3.56	6,100
			160R-11-16T-M	●	16	160	169			70							14	20			66.7		28			4.51	5,300
			200R-11-20T-M	●	20	200	209	142	60	110			40	14	25.7		18	26			101.6		32	Fig. 3		7.35	4,700
			250R-11-24T-M	●	24	250	259																			10.43	4,200
			315R-11-28T-M	MTO	28	315	324	220											22	32		177.8		Fig. 4	19.41	3,700
	Extra fine pitch	MFK	080R-11-10T-M	●	10	80	89	76	27	20	13	63	24	7	12.4	6.0	-	-	-	-	-	-	-	Fig. 1	1.81	8,000
			100R-11-14T-M	●	14	100	109	96	32	26	17		28	8	14.4											2.86	7,000
			125R-11-18T-M	●	18	125	134	100	40	55	-		33	9	16.4				-	-		-			Fig. 2	3.38	6,100
			160R-11-22T-M	●	22	160	169			70							14	20			66.7		28			4.32	5,300
			200R-11-28T-M	●	28	200	209	142	60	110			40	14	25.7		18	26			101.6		32	Fig. 3		7.10	4,700
			250R-11-36T-M	●	36	250	259																			10.07	4,200
			315R-11-44T-M	MTO	44	315	324	220											22	32		177.8		Fig. 4	18.92	3,700
Bore Dia. Inch spec	Fine pitch	MFK	080R-11-8T	●	8	80	89	76	31.75	26	17	63	32	8	12.7	6.0	-	-	-	-	-	-	-	Fig. 1	1.76	8,000
			100R-11-10T	●	10	100	109	96																		2.98	7,000
			125R-11-12T	●	12	125	134	100	38.1	55	-		38	10	15.9				-	-		-		Fig. 2	3.65	6,100
			160R-11-16T	●	16	160	169		50.8	70				11	19.1											4.62	5,300
			200R-11-20T	●	20	200	209	142	47.625	110			40	14	25.4		18	26			101.6		32	Fig. 3	7.65	4,700
			250R-11-24T	●	24	250	259																		10.73	4,200
			315R-11-28T	MTO	28	315	324	220											22	32		177.8		Fig. 4	19.71	3,700
	Extra fine pitch	MFK	080R-11-10T	●	10	80	89	76	31.75	26	17	63	32	8	12.7	6.0	-	-	-	-	-	-	-	Fig. 1	1.70	8,000
			100R-11-14T	●	14	100	109	96																		2.85	7,000
			125R-11-18T	●	18	125	134	100	38.1	55	-		38	10	15.9				-	-		-		Fig. 2	3.44	6,100
			160R-11-22T	●	22	160	169		50.8	70				11	19.1											4.44	5,300
			200R-11-28T	●	28	200	209	142	47.625	110			40	14	25.4		18	26			101.6		32	Fig. 3	7.40	4,700
			250R-11-36T	●	36	250	259																			10.36	4,200
			315R-11-44T	MTO	44	315	324	220											22	32		177.8		Fig. 4	19.21	3,700

■ Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Spare Parts and Applicable Inserts

Description		Spare Parts				Applicable Inserts ➔ M17
		Wedge	Wedge screw	Wrench	Mounting bolt	
MFK	080R-11-8T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM
	100R-11-10T-M				HH16X40	PNMG1106XNEN-GH
	125R-11-12T-M				-	PNEG1106XNEN-GL
	160R-11-16T-M					PNEG1106XNER-W
	200R-11-20T-M					PNEA1106XNTN-T01020
	250R-11-24T-M					PNEG1106XNTR-T00515
	315R-11-28T-M					PNEG1106XNTR-T01015W
MFK	080R-11-10T-M	C09N	W6X18N	TT-15	HH12X35	PNMG1106XNEN-GM
	100R-11-14T-M				HH16X40	PNMG1106XNEN-GH
	125R-11-18T-M				-	PNEG1106XNEN-GL
	160R-11-22T-M					PNEG1106XNER-W
	200R-11-28T-M					PNEA1106XNTN-T01020
	250R-11-36T-M					PNEG1106XNTR-T00515
	315R-11-44T-M					PNEG1106XNTR-T01015W

Description		Spare Parts				Applicable Inserts ➔ M17
		Wedge	Wedge screw	Wrench	Mounting bolt	
MFK	080R-11-8T	C09N	W6X18N	TT-15	HH16X40	PNMG1106XNEN-GM
	100R-11-10T					PNMG1106XNEN-GH
	125R-11-12T				-	PNEG1106XNEN-GL
	160R-11-16T					PNEG1106XNER-W
	200R-11-20T					PNEA1106XNTN-T01020
	250R-11-24T					PNEG1106XNTR-T00515
	315R-11-28T					PNEG1106XNTR-T01015W
MFK	080R-11-10T	C09N	W6X18N	TT-15	HH16X40	PNMG1106XNEN-GM
	100R-11-14T					PNMG1106XNEN-GH
	125R-11-18T				-	PNEG1106XNEN-GL
	160R-11-22T					PNEG1106XNER-W
	200R-11-28T					PNEA1106XNTN-T01020
	250R-11-36T					PNEG1106XNTR-T00515
	315R-11-44T					PNEG1106XNTR-T01015W

Recommended Cutting Conditions ➔ M48,M49

● : Std. Item
MTO : Made to order

MFK-SF Face Mill



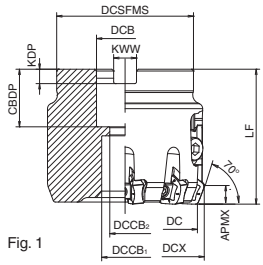


Fig. 1

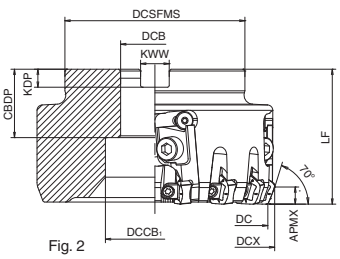


Fig. 2

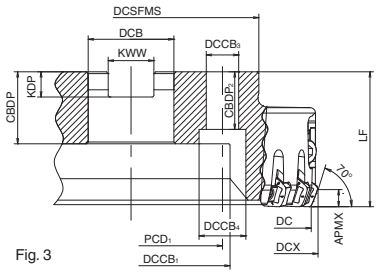


Fig. 3

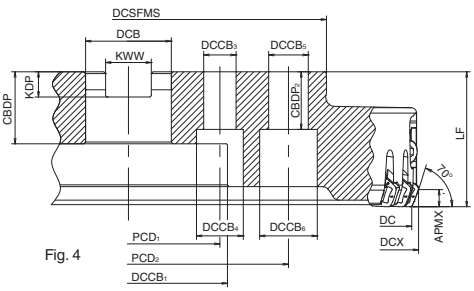


Fig. 4

Rake Angle		
Description	A.R.	R.R.
MFK080R-○○	(MAX.) +15°	-7°
MFK100R-○○		-6°
MFK125R-○○ ⋮ MFK315R-○○		-5°

Toolholder Dimensions

	Description		Stock	*No. of Inserts	Dimension (mm)																			Drawing	Weight (kg)	Max. Revolution (min^{-1})
					DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	DCCB3	DCCB4	DCCB5	DCCB6	PCD1	PCD2	CBDP2			
Metric	MFK	080R-11-9T-M-SF	●	9(3)	80	89	76	27	20	13	75	24	7	12.4	6.0	-	-	-	-	-	-	-	Fig. 1	2.21	8,000
		100R-11-12T-M-SF	●	12(4)	100	109	96	32	26	17		28	8	14.4										3.49	7,000
		125R-11-15T-M-SF	●	15(5)	125	134	100	40	55	-		33	9	16.4		-	-	-	-	66.7	-	28	Fig. 2	4.47	6,100
		160R-11-18T-M-SF	●	18(6)	160	169										14	20							6.99	5,300
		200R-11-24T-M-SF	●	24(8)	200	209	142	60	110			35	14	25.7		18	26			101.6		32	Fig. 3	9.89	4,700
		250R-11-30T-M-SF	MTO	30(10)	250	259																		16.35	4,200
		315R-11-39T-M-SF	MTO	39(13)	315	324	220											22	32		177.8		Fig. 4	28.14	3,700
Bore Dia. Inch spec	MFK	080R-11-9T-SF	●	9(3)	80	89	76	31.75	26	17	75	32	8	12.7	6.0	-	-	-	-	-	-	-	Fig. 1	2.08	8,000
		100R-11-12T-SF	●	12(4)	100	109	96																	3.49	7,000
		125R-11-15T-SF	●	15(5)	125	134	100	38.1	55	-		38	10	15.9		-	-	-	-	-	-	-	Fig. 2	4.54	6,100
		160R-11-18T-SF	●	18(6)	160	169		50.8	70				11	19.1										6.82	5,300
		200R-11-24T-SF	●	24(8)	200	209	142	47.625	110			40	14	25.4		18	26			101.6		32	Fig. 3	10.39	4,700
		250R-11-30T-SF	MTO	30(10)	250	259																		16.85	4,200
		315R-11-39T-SF	MTO	39(13)	315	324	220											22	32		177.8		Fig. 4	28.65	3,700

* Numbers in parenthese ( ) are the number of adjustable cutting edge pockets
Please install wiper inserts in the adjustable cutting edge pockets

■ **Max. Revolution**

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Spare Parts

Description		Spare Parts								Applicable Inserts ➡ M17
		Wedge	Wedge Screw	Wrench	Cartridge	Cartridge Clamp Screw	Wrench	Adjustment Screw	Mounting bolt	
MFK	080R-11-9T-M-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH12X35	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
	100R-11-12T-M-SF								HH16X40	
	125R-11-15T-M-SF								-	
	160R-11-18T-M-SF									
	200R-11-24T-M-SF									
	250R-11-30T-M-SF									
	315R-11-39T-M-SF									
MFK	080R-11-9T-SF	C09N	W6X18N	TT-15	CR-MFK70R	HH8X25	LW-6	AJ-519TR	HH16X40	PNMG1106XNEN-GM PNMG1106XNEN-GH PNEG1106XNEN-GL PNEG1106XNER-W PNEA1106XNTN-T01020 PNEG1106XNTR-T00515 PNEG1106XNTR-T01015W
	100R-11-12T-SF									
	125R-11-15T-SF								-	
	160R-11-18T-SF									
	200R-11-24T-SF									
	250R-11-30T-SF									
	315R-11-39T-SF									

Recommended Cutting Conditions ➡ M48,M49

● : Std. Item
MTO : Made to order

MFK Face Mill

Applicable Inserts

Description	Applicable Inserts ➡ M17			
	 General purpose	 Tough Edge	 Surface-Finish Oriented	 Wiper Insert (2-edge)
MFK...-11-...	PNMG1106XNEN-GM	PNMG1106XNEN-GH	PNEG1106XNEN-GL	PNEG1106XNER-W

Description	Applicable Inserts ➡ M17		
	 High speed machining	 High speed machining (With Chipbreaker)	 Wiper Insert (2-edge)
MFK...-11-...	PNEA1106XNTN-T01020	PNEG1106XNTR-T00515	PNEG1106XNTR-T01015W

Recommended Cutting Conditions (Ceramic / CBN)

Without Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Edge Preparation	fz(mm/t) 0.05 0.1 0.2 0.3 0.4
Gray Cast Iron	KS6050★ CS7050☆	600~**900**~1,200	0.10x20°	0.1
Nodular Cast Iron	KS6050☆ CS7050★	400~**600**~900		

With Chipbreaker

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Edge Preparation	fz(mm/t) 0.05 0.1 0.2 0.3 0.4
Gray Cast Iron	KS6050★ CS7050☆	600~**900**~1,200	0.05x15°	0.1
Nodular Cast Iron	KS6050☆ CS7050★	400~**600**~900		

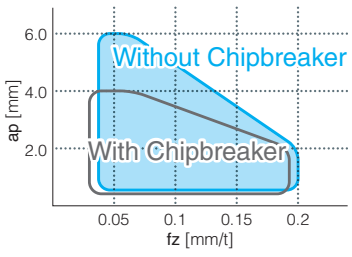
CBN Wiper Insert

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Edge Preparation	fz(mm/t) 0.05 0.1 0.2 0.3 0.4
Gray Cast Iron	KBN475	600~**900**~1,200	0.10x15°	0.1
Nodular Cast Iron		400~**600**~900		

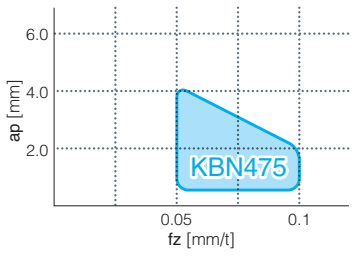
★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended application range (Ceramic / CBN)

Workpiece Material : Cast Iron (Ceramic)



Workpiece Material : Cast Iron (CBN)



When Using CBN Wiper Inserts
1. Please use CBN wiper inserts together with ceramic inserts.
   Feed rate should be fz=0.1mm/t or under.
2. The main cutting edge of CBN wiper insert is slightly higher than that of ceramic inserts.
   Therefore, the feed rate for the inserts next to CBN wiper inserts is double that of other inserts.

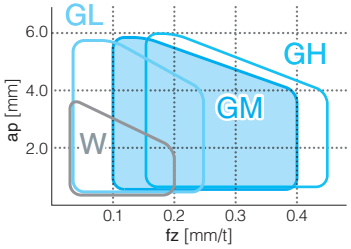
◆ Recommended Cutting Conditions (Coated Carbide)

Workpiece Material	Insert Grades	Cutting Speed Vc (m/min)	Chipbreaker	fz(mm/t) 0.06 0.1 0.2 0.3 0.4
Gray Cast Iron	**CA420M**	170~**230**~300	GM★	● 0.25
	PR1510	120~**180**~250	GH☆	● 0.3
	PR1525		GL	● 0.12
Nodular Cast Iron	**CA420M**	150~**200**~250	GM★	● 0.2
	PR1510	100~**150**~200	GH☆	● 0.25
	PR1525		GL	● 0.1

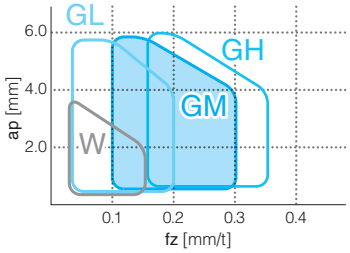
★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended application range

Workpiece Material : Gray Cast Iron



Workpiece Material : Nodular Cast Iron



Notes)
1. When using W, please use together with GM or GH.
2. If machining fz=0.2 or over, insert corner will be damaged. The main cutting edge of W insert is receding from that of GM and GH.
Therefore, the feed rate for the insert next to W type is double of the other inserts.

How to Adjust Cutting Edge Height

1. Assemble all related parts into the cutter.

2. Make sure the back end of cartridge makes contact with adjustment screw (Fig. 1), and pull them lightly inwards (Fig. 2).
Tighten the cartridge clamp screw temporary.

3. Install the insert (Fig. 3), and tighten the wedge screw temporary.
Temporarily tighten the screw with a 40 to 45 degree rotation after the wedge contacts the insert.

4. Loosen the cartridge clamp screw. (Fig. 4)

5. Adjust the extruding amount with adjustment screw. (Fig. 5)

6. Tighten the wedge screw and firmly fix the insert.
(Recommended tightening torque : 6N·m)

7. Tighten the cartridge clamp screw firmly.
(Recommended tightening torque : 10N·m)

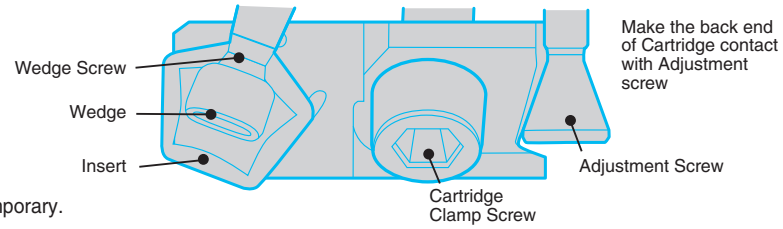


Fig. 1



Fig. 2



Fig. 3

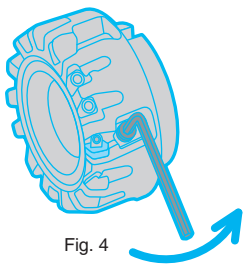


Fig. 4

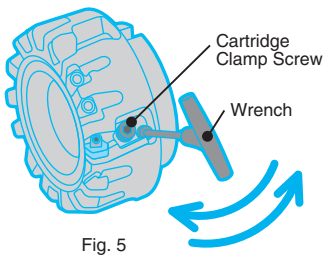


Fig. 5

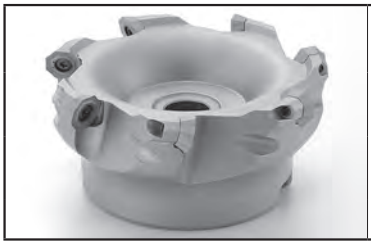
Notes :
1. Follow steps 1 ~ 7 above for adjustment.

2. To adjust the edge height adjust the wedge screw and loosen the cartridge clamp screw.
Tightening the adjustment screw with the clamp screw fixed firmly may damage the adjustment screw.

3. The adjusted edge height difference must be within 5μm.

Facing | Chamfering

MOF45 Face Mill (05 type / 07 type)



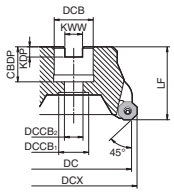


Fig. 1

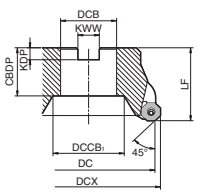


Fig. 2

Rake Angle	
A.R.	R.R.
+15°	+5°

Toolholder Dimensions

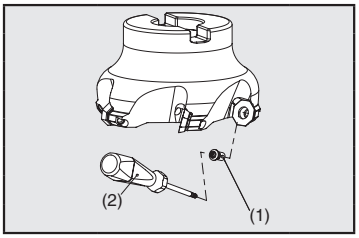
Description			Stock	No. of Inserts	Dimension (mm)										Drawing	Weight (kg)	Applicable Inserts ➡ M25
					DC	DCX	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX			
Metric	MOF	45040R-05-3T-M	▲	3	40	49	16	13.5	8.5	40	19	5.6	8.4	-	Fig. 1	0.3	OFMT05 type
		45050R-05-4T-M	▲	4	50	59	22	17	11		21	6.3	10.4			0.4	
		45063R-05-5T-M	▲	5	63	72										0.6	
		45080R-05-6T-M	▲	6	80	89	27	20	13	50	24	7	12.4			1.1	
	MOF	45063R-07-4T-M	▲	4	63	75	22	17	11	40	21	6.3	10.4	-	Fig. 1	0.6	OFMT07 type
		45080R-07-5T-M	▲	5	80	92	27	20	13	50	24	7	12.4			1.2	
		45100R-07-6T-M	▲	6	100	112	32	45	-		32	8	14.4		Fig. 2	1.9	
Bore Dia. Inch spec	MOF	45080R-05-6T	▲	6	80	89	25.4	20	13	50	26	6	9.5	-	Fig. 1	1.1	OFMT05 type
		45100R-05-7T	▲	7	100	109	31.75	45	-		32	8	12.7		Fig. 2	1.8	

Spare Parts

Description		(1) Clamp Screw	(2) Wrench	Mounting bolt
MOF	45040R-05-3T-M	SB-4082TPR	DTP-15	HH8X25
	45050R-05-4T-M			HH10X30
	45063R-05-5T-M			
	45080R-05-6T-M			HH12X35
MOF	45063R-07-4T-M	SB-50120TRS	DTP-15	HH10X30S
	45080R-07-5T-M			HH12X35
	45100R-07-6T-M			-
MOF	45080R-05-6T	SB-4082TPR	DTP-15	HH12X35
	45100R-05-7T			-

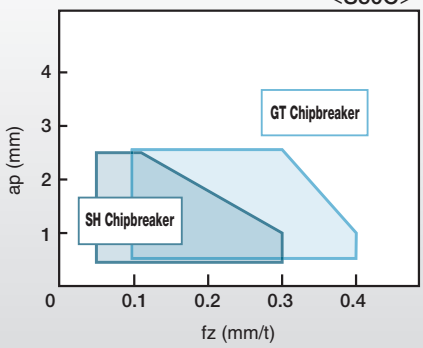
Max. ap and usable edges

Usable edges	Max. ap	
	OFMT05 type	OFMT07 type
4 edges	7mm	10mm
8 edges	2.5mm	4mm

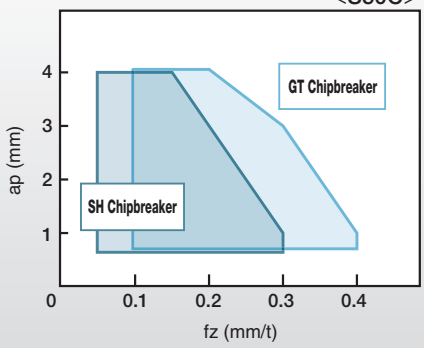


Applicable Chipbreaker Range

05 type <S50C>



07 type <S50C>



Recommended Cutting Conditions (MOF)

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)	
	GT Chipbreaker (Tough Edge)	SH Chipbreaker (General purpose)	MEGACOAT	
			PR1225	PR1210
Carbon Steel	0.10~**0.25**~0.40	0.10~**0.15**~0.30	★ 120~**180**~250	-
Alloy Steel	0.10~**0.25**~0.35	0.10~**0.15**~0.30	★ 100~**160**~220	-
Mold Steel	0.10~**0.20**~0.35	0.08~**0.12**~0.25	★ 80~**140**~180	-
Stainless Steel	-	0.08~**0.12**~0.25	★ 120~**160**~220	-
Gray Cast Iron	0.10~**0.25**~0.40	0.10~**0.15**~0.30	-	★ 120~**180**~250
Nodular Cast Iron	0.10~**0.20**~0.35	0.08~**0.12**~0.25	-	★ 100~**150**~200

★ : 1st Recommendation ☆ : 2nd Recommendation

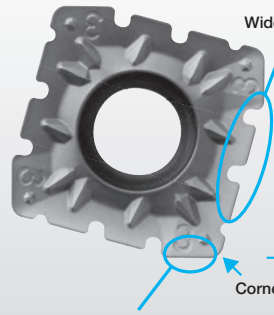
▲ : To be replaced by a new product

Face Mill for Heavy Milling MSRS15

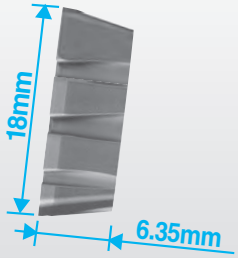
Facing

Large depth of cut and high feed rate achieve high efficiency machining

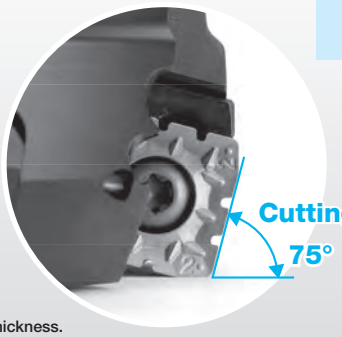
● Recommended ap : 5 ~ 10mm



Large wiper edges achieve high feed rate.

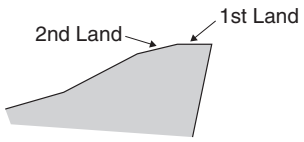
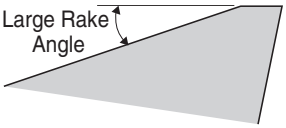
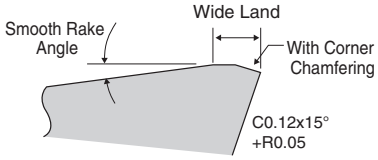


Inserts are strengthened with 6.35mm thickness.



A.R. +9°
R.R. -9°(ø80)
-5°(more than ø100)

● Selection of chipbreaker

	Low Cutting Force	General purpose	Edge Strength Oriented
Insert Type	 **NB2P** (4-Notched) **NB3P** (5-Notched)	 **NB2** (2-Notched) **NB3** (3-Notched)	 **NB2T** (2-Notched) **NB3T** (3-Notched)
Applications	When using long arbor or for machining of thin-plate workpieces	General purpose type with good balance of strength and cutting force	For interrupted machining and high load machining When feed rate is increased or workpiece material is Cast Iron
Edge preparation	As many as four (or five) notches help to alleviate the shock when biting into the workpiece	Strength, edge and chip control are all well balance	Strength is increased by the edge shape and moderate rake angle of the chamfer edge
			

A supplemental chipbreaker is used when it is necessary to increase strength and bite while focusing on resistance, as when machining welded areas.

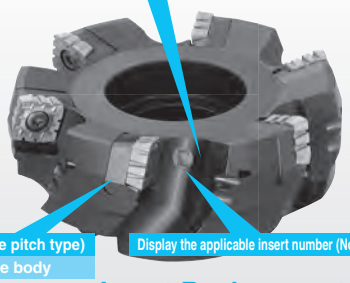


● About insert no. of NB2P (4-Notched) and NB3P (5-Notched)
In order to adjust applicable inserts on marked numbers on toolholders,
"2+" is marked for NB2P (4-Notched) and "3+" is marked on NB3P (5-Notched).

Features of Toolholder

Coarse pitch

Design of large chip pocket
Good Chip Evacuation



Adoption of cartridge (coarse pitch type)
Damage prevention of base body

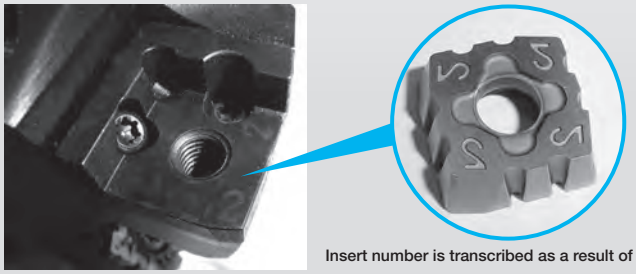
Display the applicable insert number (Notch number)

Fine pitch

Higher productivity with fine pitch design



Insert Replacement Identification



Insert number is transcribed as a result of the cutting tool load.

* Depending on the cutting conditions, marks are not transcribed.

MSRS15



(The photo shows the coarse pitch type)

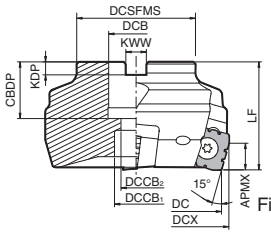


Fig. 1

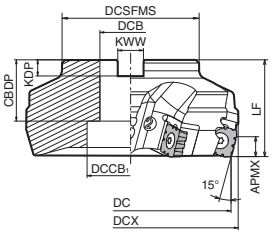


Fig. 2

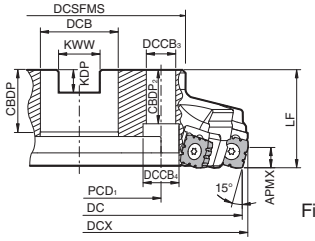


Fig. 3

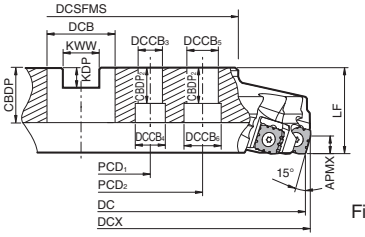


Fig. 4

Rake Angle		
Description	A.R.	R.R.
MSRS15080R-..	+9°	-9°
MSRS15100R-.. ~ MSRS15315R-..	+9°	-5°

Toolholder Dimensions (Metric)

	Description		Stock	No. of Inserts	Dimension (mm)																		Drawing	Weight (kg)
					DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	PCD_1	PCD_2	$CBDP_2$		
Coarse pitch	MSRS	15080R-4T-M	●	4	80	87	70	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig. 1	1.3
		15100R-4T-M	●	4	100	107	85	32	45	-		29	8	14.4									Fig. 2	2.0
		15125R-6T-M	●	6	125	132		40	55		60	33	9	16.4				-	-		-			3.6
		15160R-8T-M	●	8	160	167	110		68							14	20			66.7		28	Fig. 3	5.0
		15200R-10T-M	●	10	200	207	140	60	-			38	15	25.7		18	26			101.6		32		7.7
		15250R-12T-M	●	12	250	257																		12.0
		15315R-14T-M	●	14	315	322	230											22	32		177.8		Fig. 4	17.0
Fine pitch	MSRS	15080R-6T-M	●	6	80	87	70	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig. 1	1.3
		15100R-6T-M	●	6	100	107	85	32	45	-		29	8	14.4									Fig. 2	1.9
		15125R-8T-M	●	8	125	132		40	55		60	33	9	16.4				-	-		-			3.5
		15160R-10T-M	●	10	160	167	110		68							14	20			66.7		28	Fig. 3	4.9
		15200R-12T-M	●	12	200	207	140	60	-			38	15	25.7		18	26			101.6		32		7.6
		15250R-14T-M	●	14	250	257																		11.9
		15315R-16T-M	MTO	16	315	322	230											22	32		177.8		Fig. 4	17.0

· Mounting bolt (HH12X35) is included for MSRS15080R-○T-M.
· Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.

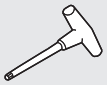
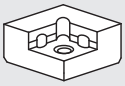
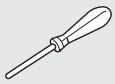
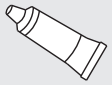
Toolholder Dimensions (Bore Dia. : Inch spec)

	Description		Stock	No. of Inserts	Dimension (mm)																		Drawing	Weight (kg)
					DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	PCD_1	PCD_2	$CBDP_2$		
Coarse pitch	MSRS	15080R-4T	●	4	80	87	55	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	-	Fig. 1	1.3
		15100R-4T	●	4	100	107	70	31.75	42	-		32	8	12.7									Fig. 2	2.0
		15125R-6T	●	6	125	132	85	38.1	54		60	38	10	15.9				-	-		-			3.6
		15160R-8T	●	8	160	167	100	50.8	68				11	19.0										5.0
		15200R-10T	●	10	200	207	130	47.625	-				14	25.4		18	26			101.6		32	Fig. 3	7.7
		15250R-12T	●	12	250	257																		12.0
		15315R-14T	●	14	315	322	220											22	32		177.8	25	Fig. 4	17.0
Fine pitch	MSRS	15080R-6T	●	6	80	87	55	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	-	Fig. 1	1.3
		15100R-6T	●	6	100	107	70	31.75	42	-		32	8	12.7									Fig. 2	1.9
		15125R-8T	●	8	125	132	85	38.1	54		60	38	10	15.9				-	-		-			3.5
		15160R-10T	●	10	160	167	100	50.8	68				11	19.0										4.9
		15200R-12T	●	12	200	207	130	47.625	-				14	25.4		18	26			101.6		32	Fig. 3	7.6
		15250R-14T	●	14	250	257																		11.9
		15315R-16T	MTO	16	315	322	220											22	32		177.8	25	Fig. 4	17.0

· Mounting bolt (HH12X35) is included for MSRS15080R-○T.
· Cartridge is included in the coarse pitch type, but no cartridge in the fine pitch type.

● : Std. Item
MTO : Made to order

Spare Parts

Description		Spare Parts						
		Clamp Screw	Wrench	Cartridge	Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
								
Coarse pitch	**MSRS 15080R-○○(M)**	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	P-37	HH12X35
	MSRS 15100R-○○(M) ~ **15315R-○○(M)**	Recommended tightening torque for Insert Clamp 7.5N·m		Recommended tightening torque for Cartridge Clamp 3.5N·m				-
Fine pitch	**MSRS 15080R-○○(M)**	SB-60120TR	TT-25L	-	-	-	P-37	HH12X35
	MSRS 15100R-○○(M) ~ **15315R-○○(M)**	Recommended tightening torque for Insert Clamp 7.5N·m						-

 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts

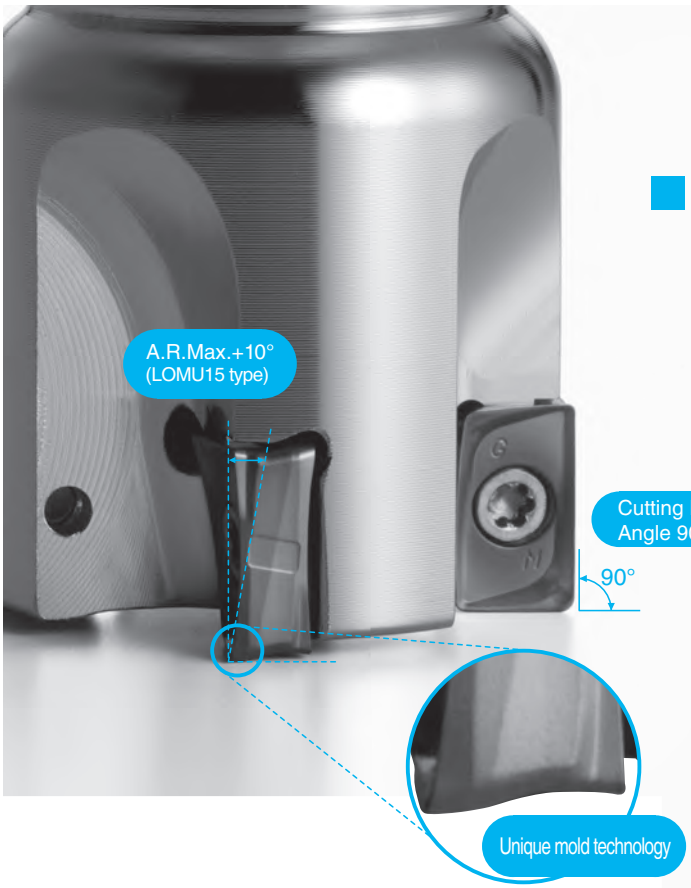
Description	Applicable Inserts ➡ M27 (Handed Insert shows Right-hand)			
	 2-Notched	 3-Notched	 2-Notched / Tough Edge	 3-Notched / Tough Edge
MSRS… MSRS…M	SPMT 1806EDER-NB2	SPMT 1806EDER-NB3	SPMT 1806EDSR-NB2T	SPMT 1806EDSR-NB3T

Description	Applicable Inserts ➡ M27			
	 4-Notched / Low cutting force	 5-Notched / Low cutting force	 Without notch	
MSRS… MSRS…M	SPMT 1806EDER-NB2P	SPMT 1806EDER-NB3P	SPMT 1806EDER-V	Selection of chipbreaker ➡ M51

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)			Recommended Insert Grades (Cutting Speed Vc: m/min)		
	NB2P + NB3P	NB2 + NB3	NB2T + NB3T	MEGACOAT		
				PR1225	**PR1230**	**PR1210**
Carbon Steel	0.15	0.2	0.3	☆ 120~**180**~250	★ 120~**180**~220	-
Alloy Steel	0.15	0.2	0.3	☆ 120~**180**~250	★ 120~**180**~220	-
Mold Steel	0.1	0.15	0.2	☆ 100~**160**~220	★ 100~**160**~200	-
Gray Cast Iron	0.2	0.25	0.35	-	-	★ 120~**180**~250
Nodular Cast Iron	0.15	0.2	0.3	-	-	★ 100~**160**~220
Stainless Steel	Not recommended					
Aluminum / Copper	Not recommended					

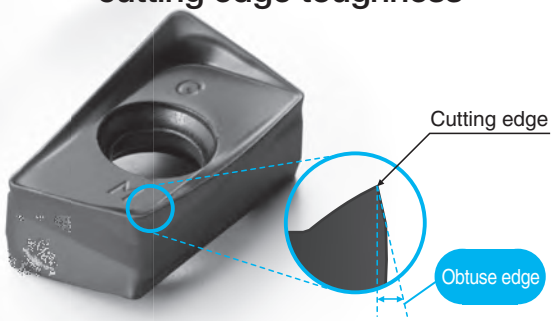
★ : 1st Recommendation ☆ : 2nd Recommendation



MEW

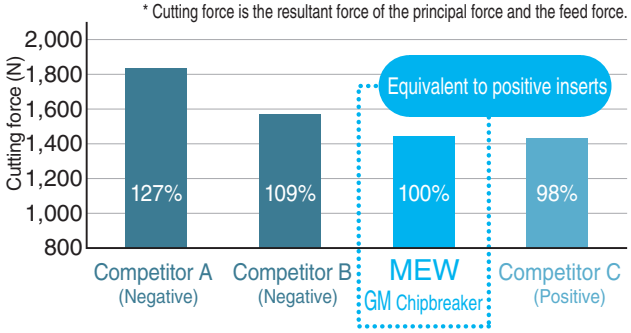
Double-sided 4-edge insert, Newly Developed End Mill Kyocera's unique mold technology reduces cutting force equivalent to positive inserts

Obtuse edge increases cutting edge toughness



Low cutting force equivalent to positive inserts

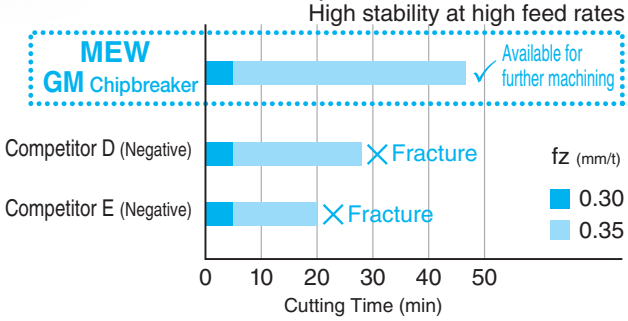
● Cutting Force Comparison (Internal evaluation)



<Cutting Conditions>
Vc=150m/min apxae=3x15mm fz=0.15mm/t S50C Cutting Dia.ø20

● Fracture Resistance Comparison (Internal evaluation)

High stability at high feed rates



<Cutting Conditions>
Vc=120m/min apxae=3x10mm fz=0.3~0.35mm/t
SCM440H (37~39HS) Cutting Dia.ø20

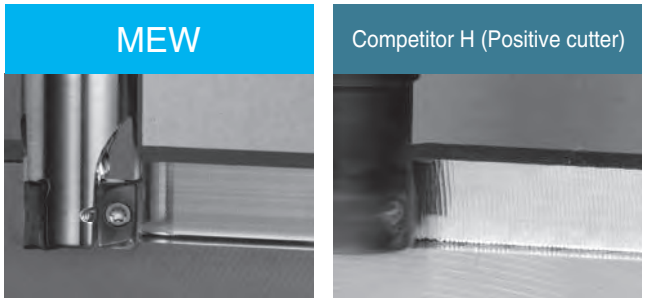
Improved surface finish, minimizing chattering

Sharp cutting and superior resistance to chattering and burrs with helical cutting edge and optimum axial rake design

MEW GM Chipbreaker	Competitor F (Negative)	Competitor G (Positive)
+20°	+17°	+17°

Large actual rake angle lowers cutting force

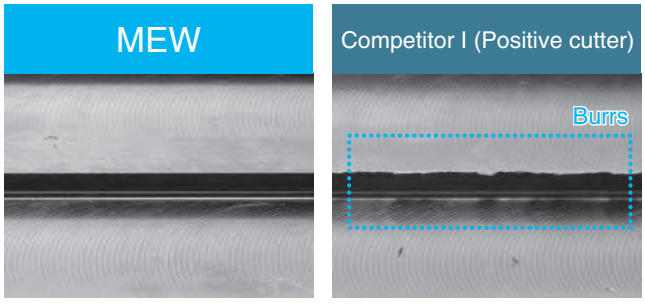
Surface of shoulder wall (Internal evaluation)



Smooth surface of MEW without chattering

<Cutting Conditions>
Vc=240m/min apxae=4(3 passes)x5mm fz=0.12mm/t Dry SS400 Cutting Dia.ø20

Burr comparison with positive cutters (Internal evaluation)



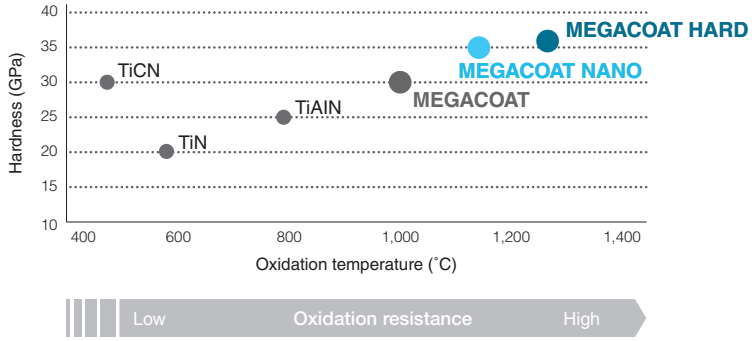
Sharp cutting enables less burrs than positive cutters

<Cutting Conditions>
Vc=250m/min apxae=4x5mm fz=0.1mm/t Dry S50C Cutting Dia.ø20

Extended Tool Life by New MEGACOAT NANO Technology

Stable and longer tool life by special nano coating layer "**MEGACOAT NANO**"
PR1525 for steel and stainless steel (austenitic related), **PR1510** for cast iron are available.
PR1535 for heat-resistant alloys, titanium and stainless steel (precipitation hardening) are available, too.
CA6535 (CVD coated carbide) for heat-resistant alloys and stainless steel (martensitic) is available.
PDL025 (DLC coated carbide) and **GW25** (Carbide) for non-ferrous metals,
PR015S (MEGACOAT HARD) for hard materials are available.

Properties of Coating

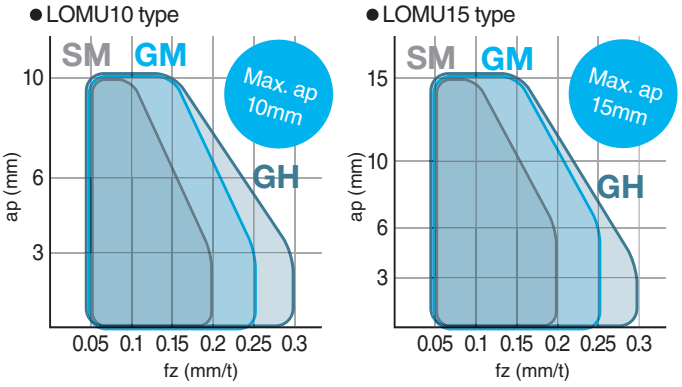


Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature : 1,150˚C)

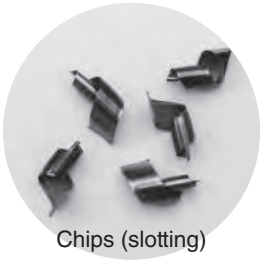
Various chipbreaker lineup

Newly developed 4 chipbreakers for various applications
Applicable to a wide range of application

Chipbreaker	Applications	Insert
GM	General purpose	
SM	Low cutting force	
GH	For Heavy Milling	
AM	For Non-ferrous Metals	



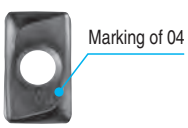
<Cutting Conditions> Vc=150m/min ae=DC/2mm Workpiece Material : S50C


Chips (slotting)

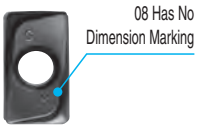

Chips (shouldering)

Lineup of Corner-R(RE)

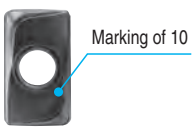
Corner-R(RE) 0.4, 1.0, 1.2, 1.6 and 2.0 added to GM chipbreaker lineup



LOMU100404ER-GM
LOMU150504ER-GM



LOMU100408ER-GM
LOMU150508ER-GM



LOMU150510ER-GM



LOMU100412ER-GM
LOMU150512ER-GM



LOMU100416ER-GM
LOMU150516ER-GM

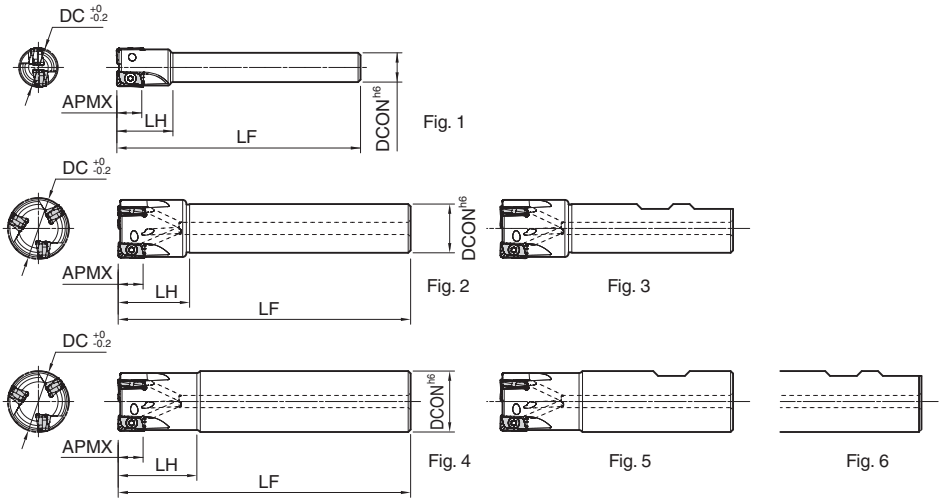


LOMU100420ER-GM
LOMU150520ER-GM

MEW End Mill



(Cylindrical)



Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Max. Revolution (min^{-1})
						DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			
Cylindrical	Standard Shank	MEW	16-S12-10-2T	●	2	16	12	100	23	10	+7°	-22°	No	Fig. 1	43,750
			18-S16-10-2T	●		18	16		25			-21°	Yes	Fig. 2	43,000
			20-S16-10-2T	●		20		110	26			-20°			41,000
			22-S20-10-3T	●	3	22	20								39,600
			25-S20-10-3T	●		25		120	29						37,500
			28-S25-10-3T	●		28	25								35,800
			30-S25-10-4T	●	4	30		130	32						34,800
			32-S25-10-4T	●		32									33,900
			40-S32-10-5T	●	5	40	32	150	50			-19°			30,000
			50-S32-10-5T	●		50		120	40						22,500
	Same Shank	MEW	16-S16-10-2T	●	2	16	16	100	26	10	+7°	-22°	Yes	Fig. 4	43,750
			20-S20-10-2T	●		20	20	110	30			-20°			41,000
			20-S20-10-3T	●	3										41,000
			25-S25-10-2T	●	2	25	25	120	32						37,500
			25-S25-10-3T	●	3										37,500
			32-S32-10-3T	●		32	32	130	40						33,900
			32-S32-10-4T	●	4										33,900
	Long Shank	MEW	20-S20-10-150-2T	●	2	20	20	150	40	10	+7°	-20°	Yes	Fig. 4	41,000
			25-S25-10-170-2T	●		25	25	170	50						37,500
	Standard Shank	MEW	25-S20-15-2T	●	2	25	20	120	29	15	+10°	-22°	Yes	Fig. 2	35,000
			32-S25-15-2T	●		32	25	130	32						30,000
			40-S32-15-3T	●	3	40	32	150	50			-21°			25,000
			40-S32-15-4T	●	4										25,000
			50-S32-15-4T	●		50		120	40						17,000
	Same Shank	MEW	25-S25-15-2T	●	2	25	25	120	32	15	+10°	-22°	Yes	Fig. 4	35,000
			32-S32-15-2T	●		32	32	130	40						30,000
			32-S32-15-3T	●	3										30,000
Weldon	Standard Shank	MEW	40-W32-10-5T	MTO	5	40	32	111	50	10	+7°	-19°	Yes	Fig. 3	30,000
		MEW	40-W32-15-4T	MTO	4					15	+10°	-21°			25,000
	Same Shank	MEW	16-W16-10-2T	MTO	2	16	16	75	25	10	+7°	-22°	Yes	Fig. 5	43,750
			20-W20-10-2T	MTO		20	20	77				-20°			41,000
			20-W20-10-3T	MTO	3										41,000
			25-W25-10-3T	MTO		25	25	90	32					Fig. 6	37,500
			32-W32-10-4T	MTO	4	32	32	102	40						33,900
		MEW	25-W25-15-2T	MTO	2	25	25	90	32	15	+10°	-22°	Yes	Fig. 6	35,000
			32-W32-15-3T	MTO	3	32	32	102	40						30,000

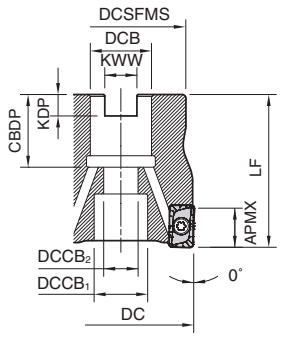
■ **Max. Revolution**

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

● : Std. Item
MTO : Made to order

MEW Face Mill





Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Weight (kg)	Max. Revolution (min^{-1})
				DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R. (MAX.)	R.R.			
MEW	032R-10-4T-M	●	4	32	30	16	14	9	35	19	5.6	8.4	10	+7°	-20°	Yes	0.1	33,900
	040R-10-5T-M	●	5	40	34				40						-19°		0.2	30,000
	050R-10-5T-M	●		50	45	22	18	11		21	6.3	10.4					0.4	22,500
	063R-10-6T-M	●	6	63	47												0.5	20,500
MEW	040R-15-4T-M	●	4	40	34	16	14	9	40	19	5.6	8.4	15	+10°	-21°	Yes	0.2	25,000
	050R-15-4T-M	●		50	45	22	18	11		21	6.3	10.4					0.3	17,000
	063R-15-5T-M	●	5	63	47												0.5	14,500
	080R-15-6T-M	●	6	80	60	27	20	13	50	25	7	12.4			-20°		1.0	12,000
	080R-15-6T	●				25.4				27	6	9.5					1.0	12,000

■ Max. Revolution
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Spare Parts and Applicable Inserts (end mill / face mill)

Description		Spare Parts				Applicable Inserts ➡ M16			
		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt	General purpose	Low cutting force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
MEW	...-10-_T	SB-3065TRP	DTPM-8	P-37	-	LOMU10...-GM	LOMU10...-SM	LOMU10...-GH	LOGT10...-AM
MEW	032R-10_-M				HH8X25				
	040R-10_-M	Recommended tightening torque for Insert Clamp 1.2N·m							
	050R-10_-M				HH10X30				
	063R-10_-M								
MEW	...-15-_T	SB-4090TRP	DTPM-15	P-37	-	LOMU15...-GM	LOMU15...-SM	LOMU15...-GH	LOGT15...-AM
MEW	040R-15_-M				HH8X25				
	050R-15_-M	Recommended tightening torque for Insert Clamp 3.5N·m			HH10X30				
	063R-15_-M								
	080R-15_(-M)				HH12X35				

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M62

About wrench specifications

Wrenches and clamp screws are "Torx Plus".

(1) Ref. to Fig. 1 for "Torx Plus" Wrench. (Purple grip)

(2) Ref. to Fig. 2 for "Torx" Wrench. (Black grip)

A "Torx Plus" Wrench and a "Torx" Wrench have different top shapes.
Please use a "Torx Plus" Wrench.

* If a "Torx" Wrench is used to tighten, the screw head might become damaged and then the screw cannot be removed.

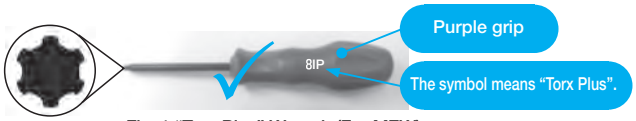


Fig. 1 "Torx Plus" Wrench (For MEW)

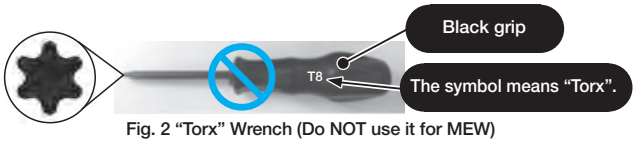
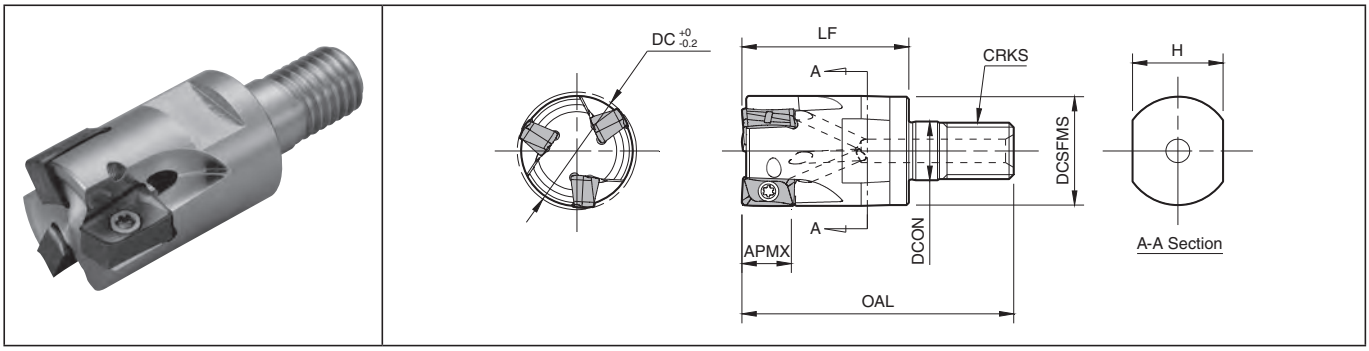


Fig. 2 "Torx" Wrench (Do NOT use it for MEW)

● : Std. Item

MEW Modular type

MEW Head



Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Rake Angle		Coolant Hole	Applicable Inserts ➡M16	Max. Revolution (min^{-1})
			DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R. (MAX.)	R.R.			
MEW 16-M08-10-2T	●	2	16	14.7	8.5	42	25	M8×P1.25	12	10	+7°	-22°	Yes	LOMU1004	43,750
20-M10-10-2T	●		20	18.7	10.5	48	30	M10×P1.5	15			-20°			41,000
20-M10-10-3T	●	3													41,000
25-M12-10-3T	●		25	23	12.5	56	35	M12×P1.75	19						37,500
32-M16-10-4T	●	4	32	30	17	62	40	M16×P2.0	24						33,900
MEW 25-M12-15-2T	●	2	25	23	12.5	56	35	M12×P1.75	19	15	+10°	-22°	Yes	LOMU1505	35,000
32-M16-15-3T	●	3	32	30	17	62	40	M16×P2.0	24						30,000

■ Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

See page ➡ **M60** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts ➡M16			
	Clamp Screw	Wrench	Anti-seize Compound	General purpose	Low cutting force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
							
MEW 16-M08-10-2T 20-M10-10-2T 20-M10-10-3T 25-M12-10-3T 32-M16-10-4T	SB-3065TRP	DTPM-8	P-37	LOMU10…-GM	LOMU10…-SM	LOMU10…-GH	LOGT10…-AM
	Recommended tightening torque for Insert Clamp 1.2N·m						
MEW 25-M12-15-2T 32-M16-15-3T	SB-4090TRP	DTPM-15	P-37	LOMU15…-GM	LOMU15…-SM	LOMU15…-GH	LOGT15…-AM
	Recommended tightening torque for Insert Clamp 3.5N·m						

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ **M62**

Modular End Mill Head Identification System

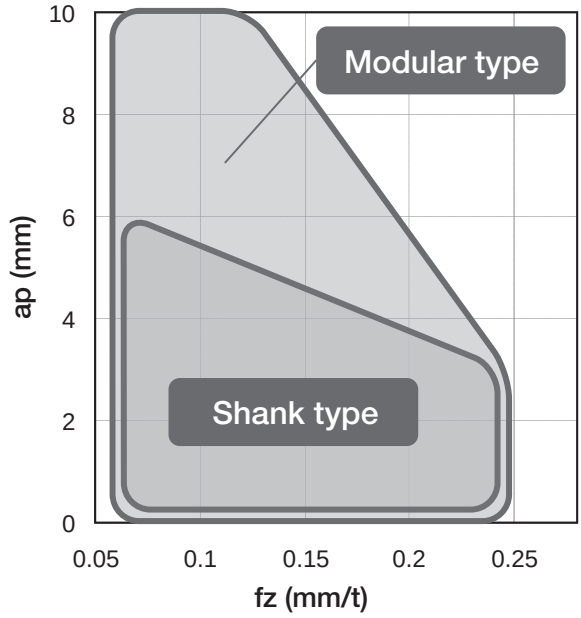
MEW **16** - **M08** - **10** - **2T**

Series	Cutting Dia.	Thread Size for Clamping	Insert Size	No. of Inserts

● : Std. Item

Feature of Modular type

● Applicable to a wide range of applications



<Cutting Conditions>

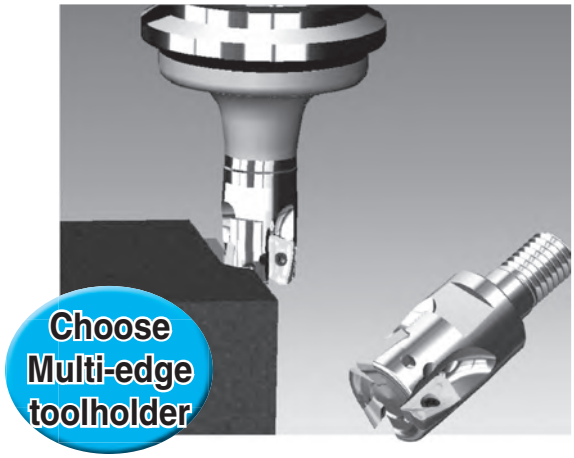
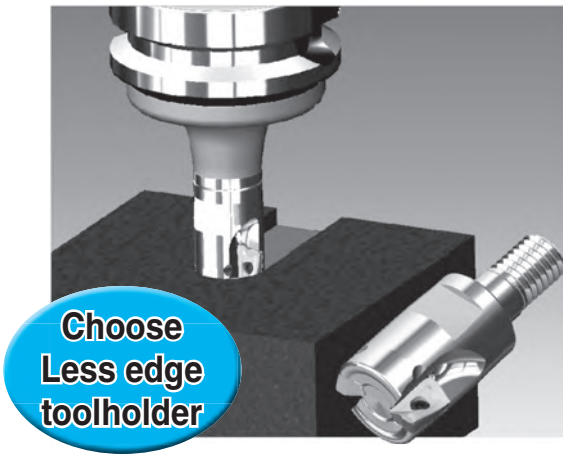
· Cutting Speed : Vc=150m/min (n=2,390min^{-1})
· Width of Cut : ae=10mm (Shouldering)
· Workpiece Material : S55C
· Machine : BT30 M/C

<Cutting Tool>

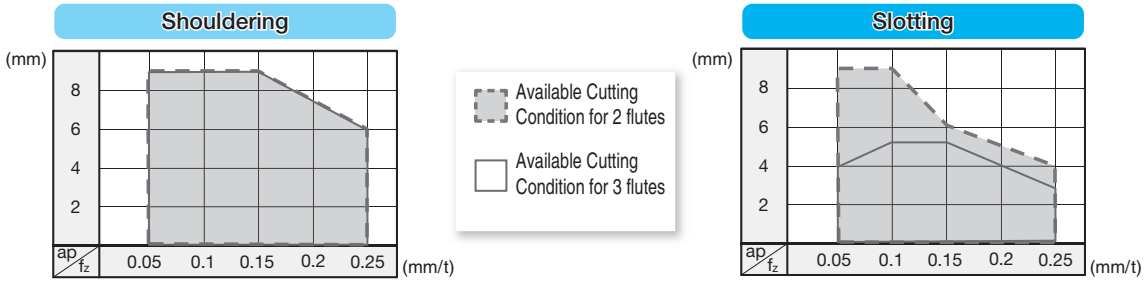
· Modular type
Head : MEW20-M10-10-3T
Arbor : BT30K-M10-45
Insert : LOMU100408ER-GM (PR1525)
· Shank type
Toolholder : MEW20-S20-10-3T
Arbor : BT30 Milling Chuck (Double-face clamping)
Insert : LOMU100408ER-GM (PR1525)

A wide range of applications even in BT30 M/C with the superior anti-chattering performance

● How to select Multi-edge or Less edge toolholder

Shouldering (ae=10mm)	Slotting
	
Choose Multi-edge toolholder	Choose Less edge toolholder

· Available Cutting Condition of Modular type

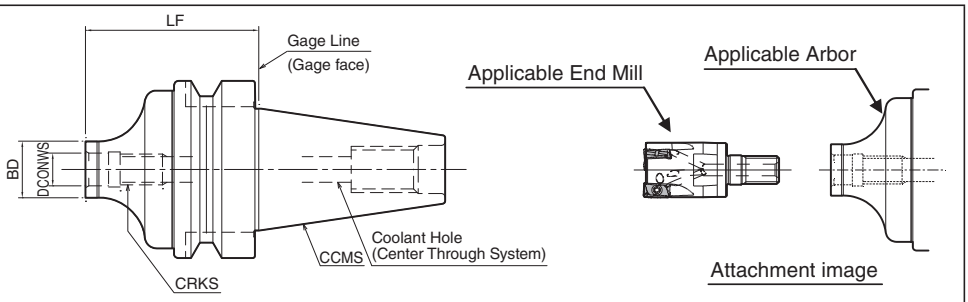


Choose Multi-edge toolholder for shouldering; higher efficiency in machining by higher feed rate.
For grooving, choose less edge toolholder to lower cutting force.

BT Arbor for Modular End Mill

BT Arbor (for exchangeable head / double-face clamping spindle)



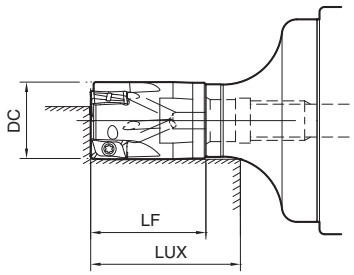


Dimensions

Description		Stock	Dimension (mm)				Coolant Hole	Arbor (Double-face clamping)	Applicable End Mill (Head) ➔ **M58(MEW), M67(MEC) M154(MFH Harrier) M159(MFH Mini) M165(MFH Micro) M217(MRX)**
			LF	BD	DCONWS	CRKS		CCMS	
BT30K-	**M08-45**	●	45	14.7	8.5	M8×P1.25	Yes	BT30	(MEW/MEC/MFH/MRX)..-M08-..
	M10-45	●		18.7	10.5	M10×P1.5			(MEW/MEC/MFH/MRX)..-M10-..
	M12-45	●		23	12.5	M12×P1.75			(MEW/MEC/MFH/MRX)..-M12-..
BT40K-	**M08-55**	●	55	14.7	8.5	M8×P1.25	Yes	BT40	(MEW/MEC/MFH/MRX)..-M08-..
	M10-60	●	60	18.7	10.5	M10×P1.5			(MEW/MEC/MFH/MRX)..-M10-..
	M12-55	●	55	23	12.5	M12×P1.75			(MEW/MEC/MFH/MRX)..-M12-..
	M16-65	●	65	30	17	M16×P2.0			(MEW/MEC/MFH/MRX)..-M16-..

· When using with MEV, see page **M82**.

Actual End Mill depth (See page **M165** for **MFH Micro**)



Arbor Description		Applicable End Mill (Head)			Actual End Mill depth (mm)
		Description	Cutting Dia. (mm)	Dimension (mm)	
			DC	LF	LUX
BT30K-	**M08-45**	...16-M08-...	16	25	31.8
		...17-M08-...	17		33.2
		...18-M08-...	18		34.2
	M10-45	...20-M10-...	20	30	36.8
		...22-M10-...	22		39.2
	M12-45	...25-M12-...	25	35	42.8
		...28-M12-...	28		45.5
BT40K-	**M08-55**	...16-M08-...	16	25	31.7
		...17-M08-...	17		33.2
		...18-M08-...	18		34.3
	M10-60	...20-M10-...	20	30	38.7
		...22-M10-...	22		44.5
	M12-55	...25-M12-...	25	35	44.6
		...28-M12-...	28		47.6
	M16-65	...32-M16-...	32	40	51.2
		...35-M16-...	35		60.2
		...40-M16-...	40		64

● : Std. Item

● Arbor Identification System

BT30 K - M08 - 45

- BT30: Arbor Size
- K: Double-face clamping spindle
- M08: Thread Size for Clamping
- 45: Length from Gauge Line

How to Attach Head

(1) When clamping the head on the arbor, make sure there is no dust or chips inside (Fig. 1).
Do NOT put lubricant on the clamping portion.

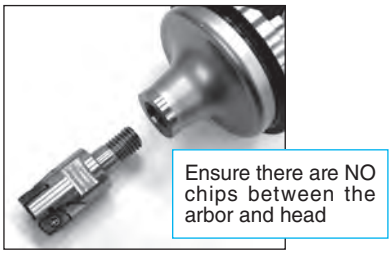


Fig. 1

(2) Attach the head on the arbor and fix it using the wrench (Fig. 2).
Ref. to the Table 1 for Recommended tightening torque.
Note) The wrench is NOT included in the products.

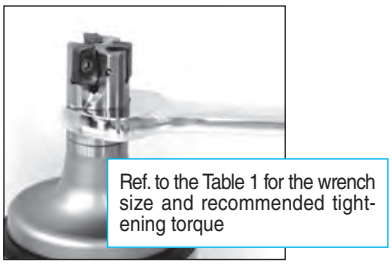


Fig. 2

Table 1 Recommended Head Tightening Torque

Thread Size for Clamping	Wrench Double width [mm]	Recommended tightening torque [N · m]
M8	12	23
M10	15	46
M12	19	80
M16	24	90

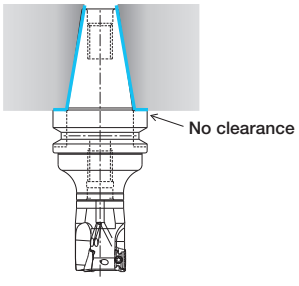
(3) Confirm that the head is fixed firmly on the arbor. (Fig. 3)



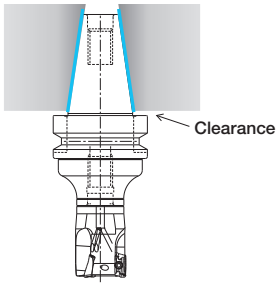
Fig. 3

Frequently Asked Question

Q : Can the double-face clamping arbor be mounted on a general BT spindle?
A : Yes. It can be used as a general BT arbor with a general BT spindle.



Double-face clamping arbor mounted on double-face clamping spindle



Double-face clamping arbor mounted on general spindle

It can be used as a general BT arbor, though the advantage of the double-face clamping will not be shown.

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp Screw
   (1) Apply anti-seize compound on portion of taper and thread of clamp screw.
   (2) Attach the screw (magnetic head) to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
   Tighten M3 screws (SB-3065TRP) slightly inclined from the insert surface. (Ref. to Fig. 2)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended tightening torque, see page M57, M58.
4. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder.
   If there is any clearance, remove the insert and mount it again according to the above steps.

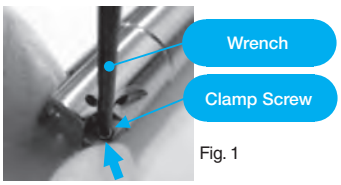


Fig. 1

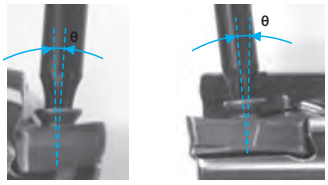


Fig. 2

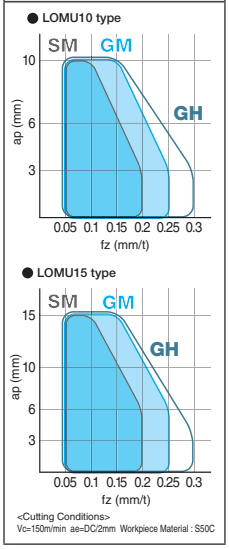
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t) Toolholder Description: MEW16~MEW18	fz (mm/t) Toolholder Description: MEW20~MEW40 MEW040R~MEW080R	Recommended Insert Grades (Cutting Speed Vc: m/min) MEGACOAT (PVD Coated Carbide): PR1535	PR1525	PR1510	PR015S	CVD Coated Carbide: CA6535
GM	Carbon Steel	0.06~**0.1**~0.2	0.08~**0.15**~0.25	☆ 120~**180**~250	★ 120~**180**~250	-	-	-
	Alloy Steel	0.06~**0.1**~0.14	0.08~**0.15**~0.2	☆ 100~**160**~220	★ 100~**160**~220	-	-	-
	Mold Steel	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 80~**140**~180	★ 80~**140**~180	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 150~**200**~250	-	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	★ 90~**120**~150	-	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.17	0.08~**0.18**~0.25	-	-	★ 120~**180**~250	-	-
	Nodular Cast Iron	0.06~**0.08**~0.12	0.08~**0.15**~0.2	-	-	★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 20~**30**~50	-	-	-	★ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	0.08~**0.15**~0.2	☆ 40~**60**~80	-	☆ 30~**50**~70	-	-
SM	Carbon Steel	0.06~**0.1**~0.17	0.08~**0.15**~0.2	☆ 120~**180**~250	★ 120~**180**~250	-	-	-
	Alloy Steel	0.06~**0.08**~0.12	0.08~**0.12**~0.18	☆ 100~**160**~220	★ 100~**160**~220	-	-	-
	Mold Steel	0.06~**0.08**~0.12	0.08~**0.1**~0.15	☆ 80~**140**~180	★ 80~**140**~180	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	0.08~**0.1**~0.15	★ 100~**160**~200	☆ 100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.12	0.08~**0.1**~0.15	☆ 150~**200**~250	-	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.12	0.08~**0.1**~0.15	☆ 90~**120**~150	-	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 20~**30**~50	-	-	-	★ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	0.08~**0.12**~0.15	★ 40~**60**~80	-	☆ 30~**50**~70	-	-
GH	Carbon Steel	0.06~**0.1**~0.2	0.08~**0.2**~0.3	☆ 120~**180**~250	★ 120~**180**~250	-	-	-
	Alloy Steel	0.06~**0.1**~0.14	0.08~**0.2**~0.25	☆ 100~**160**~220	★ 100~**160**~220	-	-	-
	Mold Steel	0.06~**0.08**~0.12	0.08~**0.15**~0.22	☆ 80~**140**~180	★ 80~**140**~180	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 150~**200**~250	-	-	-	☆ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.12	0.08~**0.12**~0.2	☆ 90~**120**~150	-	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.2	0.08~**0.22**~0.3	-	-	☆ 120~**180**~250	-	-
	Nodular Cast Iron	0.06~**0.08**~0.15	0.08~**0.18**~0.25	-	-	☆ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.12	0.08~**0.12**~0.15	☆ 20~**30**~50	-	-	-	☆ 20~**30**~50
	Titanium Alloys	0.06~**0.08**~0.12	0.08~**0.15**~0.2	☆ 40~**60**~80	-	☆ 30~**50**~70	-	-
	Hard Materials (60HRC or less)	0.06~**0.08**~0.12	0.08~**0.15**~0.22	-	-	-	★ 60~**80**~100	-

Chipbreaker	Workpiece Material	fz (mm/t) Toolholder Description: MEW16~MEW18	fz (mm/t) Toolholder Description: MEW20~MEW40 MEW040R~MEW080R	Recommended Insert Grades (Cutting Speed Vc: m/min): DLC Coated Carbide PDL025	Carbide GW25
AM	Aluminum Alloys	0.06~**0.1**~0.2	0.08~**0.15**~0.25	★ 200~**600**~900	☆ 200~**500**~800

★ : 1st Recommendation
☆ : 2nd Recommendation

Applicable Chipbreaker Range (Shouldering)

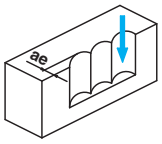


* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

Ramping, Helical milling and Vertical milling (Plunging)

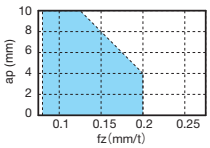
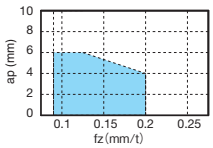
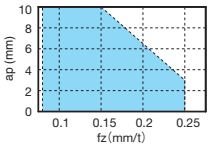
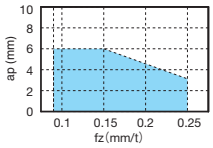
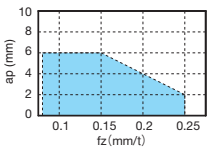
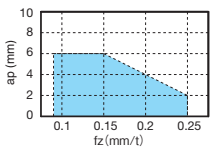
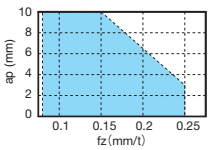
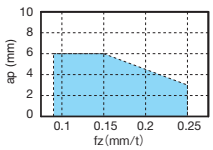
1. Available for vertical milling (plunging).
2. NOT available for ramping and helical milling, because interference between workpiece and insert may occur.

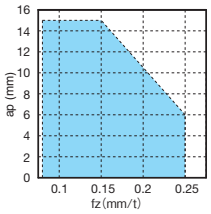
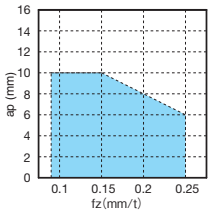
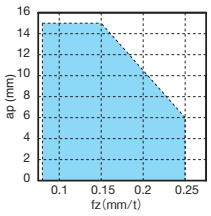
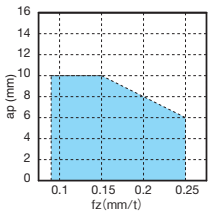
Vertical Milling (Plunging)



Insert Description	Max. Width of Cut (ae)
LOMU10 type	5mm
LOMU15 type	7mm

Cutting Performance

Description	Shouldering (Cutting width ae = DC/2)	Slotting
MEW16...-10 **MEW18...-10**		
MEW20...-10 ~ **MEW50...-10**		
MEW20-S20 **-10-150-2T** **MEW25-S25** **-10-170-2T** (Long Shank)		
MEW032R... **-10** ~ **MEW063R...** **-10**		

Description	Shouldering (Cutting width ae = DC/2)	Slotting
MEW25...-15 ~ **MEW50...-15**		
MEW040R... **-15** ~ **MEW080R...** **-15**		

<Cutting Conditions>
· Vc=180m/min
· GM Chipbreaker
· Workpiece Material : S50C
· Overhang Length
1. End mill : Same length as LH of the dimension
2. Face mill : LF of the dimension + minimum overhang length of the arbor

Case Studies

SS400

· Construction machine part
· Vc=250m/min
· apxae=4x20mm
· fz=0.14mm/t (Vf=1,350mm/min)
· Wet
· MEW32-S32-10-4T (4 Flutes)
· LOMU100408ER-GM (PR1525)

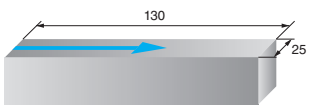


PR1525	Chip Evacuation Rate =108cc/min
Competitor A (Positive Cutter)	Chip Evacuation Rate = 72cc/min

MEW showed stable milling without chattering at higher feed, improving the machining efficiency by 150%.
Burrs are prevented and excellent surface finish is achieved. (User Evaluation)

15-5PH (42HRC)

· Aircraft Part
· Vc=180m/min
· apxae=2x25mm
· fz=0.1mm/t (Vf=716mm/min)
· Wet
· MEW32-S32-10-4T (4 Flutes)
· LOMU100408ER-GM (PR1525)



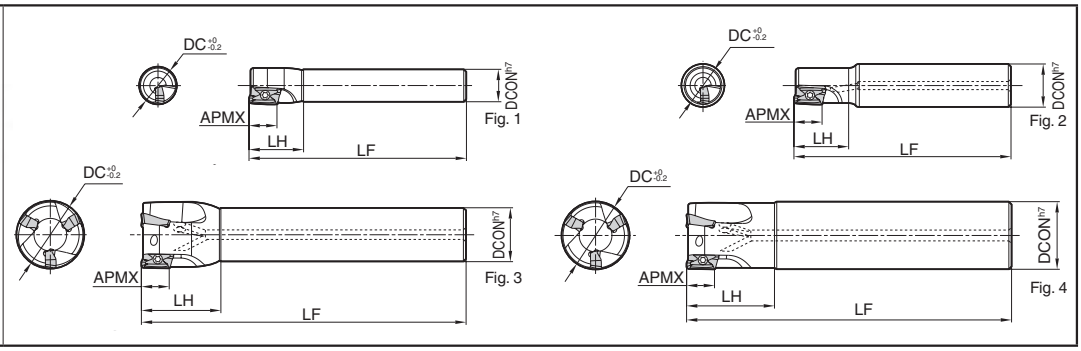
PR1525	Chip Evacuation Rate = 35.8cc/min (Further Machining Possible)
Competitor B (Positive Cutter)	Chip Evacuation Rate = 26.8cc/min (Unable to continue machining)

No chattering and more stable milling is possible with MEW.
Despite the milling difficulty because of the properties of the material (42HRC), PR1525 kept good cutting edge form, minimizing wear and adhesion. (User Evaluation)

MEC End Mill



(Cylindrical)



Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min^{-1})
						DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	
Cylindrical	Standard Shank	MEC	10-S10-11	●	1	10	10	80	17	10	+10°	-24°	No	Fig. 1	SB-2545TR	DTM-8	54,800
			10-S16-11	●			16						Yes	Fig. 2			
			12-S10-11	●		12	10		20		+12°	-21°	No	Fig. 1			50,800
			12-S12-11	●			12										
			12-S16-11	●			16						Yes	Fig. 2			
			13-S12-11	●		13	12					-19°	No	Fig. 1			49,200
			14-S12-11	●		14											47,700
			14-S16-11	●			16						Yes	Fig. 2			
		MEC	16-S12-11T	●	2	16	12	100	23	10	+18°	-14°	No	Fig. 1	SB-2555TRG	DTM-8	43,750
			17-S16-11T	●		17	16					-13°	Yes	Fig. 3			43,500
			18-S16-11T	●		18					+19°						43,000
			19-S16-11T	●	3	19		110	26		+20°	-10°					42,000
			20-S16-11T	●		20											41,000
			21-S20-11T	●		21	20					-9°					40,300
			22-S20-11T	●		22					+21°	-10°					39,600
			24-S20-11T	●		24		120	29								38,200
			25-S20-11T	●		25											37,500
			25-S20-11T-4	●	4												
			28-S25-11T	●	3	28	25				+22°	-9°					35,800
			30-S25-11T	●	4	30		130	32		+23°						34,800
			32-S25-11T	●		32											33,900
			32-S25-11T-5	●													
			40-S32-11T	●	5	40	32	150	50			-8°					30,000
			50-S32-11T	●		50						-7°					22,500
	Same Shank	MEC	16-S16-11T	●	2	16	16	100	30	10	+18°	-14°	Yes	Fig. 4	SB-2555TRG	DTM-8	43,750
			20-S20-11T	●	3	20	20	110			+20°	-10°					41,000
			25-S25-11T	●		25	25	120	32		+21°						37,500
			25-S25-11T-4	●	4												
			32-S32-11T	●		32	32	130	40		+23°	-9°					33,900
			32-S32-11T-5	●	5												
	Long Shank	MEC	20-S18-170-11T	●	2	20	18	170	30	10	+20°	-10°	Yes	Fig. 3	SB-2555TRG	DTM-8	41,000
			20-S20-140-11T	●			20	140	60					Fig. 4			
			20-S20-170-11T	●				170									
			22-S20-170-11T	●		22			30		+21°			Fig. 3			39,600
			25-S23-210-11T	●		25	23	210	32								37,500
			25-S25-160-11T	●			25	160	60					Fig. 4			
			25-S25-210-11T	●				210									
			28-S25-210-11T	●		28			32		+22°	-9°		Fig. 3			35,800
			32-S30-250-11T	●		32	30	250	40		+23°						33,900
			32-S32-200-11T	●			32	200	65					Fig. 4			
			32-S32-250-11T	●				250									
			35-S32-250-11T	●		35			40					Fig. 3			32,600
			40-S32-240-11T	●		40		240	65			-8°					30,000

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Max. Revolution

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

For more details, see "Warning" on page M69.

● : Std. Item

Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min^{-1})
						DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	
Cylindrical	Long Shank	MEC	20-S20-150-11T-3	●	3	20	20	150	60	10	+20°	-10°	Yes	Fig. 4	SB-2555TRG	DTM-8	41,000
			25-S25-170-11T-3	●		25	25	170			+21°						37,500
			25-S25-170-11T-4	●	4												
			30-S25-180-11T-3	●	3	30		180	32		+23°	-9°		Fig. 3			34,800
			32-S32-200-11T-3	●		32	32	200	65					Fig. 4			33,900
			32-S32-200-11T-4	●	4												
			32-S32-200-11T-5	●	5												
	Standard	MEC	25-S20-17	●	2	25	20	120	36	15.7	+16°	-11°	Yes	Fig. 3	SB-4070TRN	DTM-15	35,000
			32-S25-17	●	3	32	25	130	40		+17°	-7°					30,000
			40-S32-17	●	4	40	32	150	50		+19°						25,000
			50-S32-17	●		50											17,000
	Same Shank	MEC	25-S25-17	●	2	25	25	120	36	15.7	+16°	-11°	Yes	Fig. 4	SB-4070TRN	DTM-15	35,000
			32-S32-17	●	3	32	32	130	40		+17°	-7°					30,000
	Long Shank	MEC	25-S25-160-17	●	2	25	25	160	60	15.7	+16°	-11°	Yes	Fig. 4	SB-4070TRN	DTM-15	35,000
			25-S25-210-17	●				210									
			28-S25-210-17	●		28			36					Fig. 3			32,500
			32-S32-200-17	●		32	32	200	65		+17°	-7°		Fig. 4			30,000
			32-S32-250-17	●				250									
			35-S32-250-17	●		35			40					Fig. 3			27,700
			40-S32-240-17	●		40		240	65		+19°						25,000
		MEC	32-S32-250-17-3	●	3	32	32	250	65	15.7	+17°	-7°	Yes	Fig. 4	SB-4070TRN	DTM-15	30,000
			40-S32-250-17-3	●		40					+19°			Fig. 3			25,000
			40-S32-250-17-4	●	4												
			50-S42-250-17-4	●		50	42		64			-6°					17,000

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Applicable Inserts

Description	Applicable Inserts ➔ M22, M23			Applicable Inserts ➔ M29	
					
MEC....-11 **MEC....-1103**	BDMT 1103○○ER-JT	BDMT 1103○○ER-JS	-	-	-
MEC....-11T **MEC....-11T03**	BDMT 11T3○○ER-JT	BDMT 11T3○○ER-JS	BDGT 11T3○○FR-JA	BDGT 11T3○○FR(-LE)	BDMT 11T3○○FR
MEC....-17 **MEC....-1704**	BDMT 1704○○ER-JT	BDMT 1704○○ER-JS	BDGT 1704○○FR-JA	-	BDMT 1704○○FR

Recommended Cutting Conditions ➔ **M68, M69**

● : Std. Item

MEC Face Mill



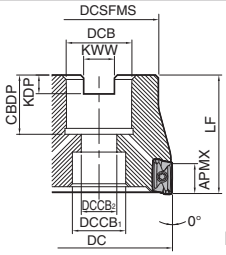


Fig.1

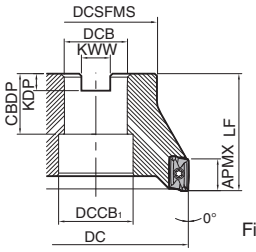


Fig.2

Rake Angle
11 type A.R.(MAX): +23° R.R. : -7°
17 type A.R.(MAX): +19° R.R. : -7°



Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)									Coolant Hole	Drawing	Weight (kg)	Spare Parts		Max. Revolution (min-1)
						DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX				Clamp Screw	Wrench	
Metric	Coarse pitch	MEC	040R-11-5T-M	●	5	40	34	16	14	8.5	40	20	5.5	8.5	10	Yes	Fig.1	0.2	SB-2555TRG	DTM-8	30,000
			050R-11-5T-M	●	5	50	40	22	18	12		22	6.3	10.4				0.3			22,500
			063R-11-6T-M	●	6	63												0.7			20,500
			080R-11-7T-M	●	7	80	52.5	27	20	14	50	26	7	12.4				1.0			18,500
			100R-11-9T-MN	●	9	100	65	32	26	17.6	55		8	14.4				1.6			17,000
			125R-11-11T-M	●	11	125	85	40	45	32	63	33	9.5	16.4				3.1			15,000
			160R-11-14T-M	●	14	160	110		68	-						No	Fig.2	4.5			13,900
	Fine pitch	MEC	032R-11-5T-M	●	5	32	30	16	11.5	8.5	35	20	5.6	8.4	10	Yes	Fig.1	0.1	SB-2555TRG	DTM-8	33,900
			040R-11-6T-M	●	6	40	34		14		40							0.2			30,000
			080R-11-10T-M	●	10	80	52.5	27	20	14	50	26.5	7	12.4				0.9			18,500
			100R-11-11T-M	●	11	100	65	32	26	17.6	55	34	8	14.4				1.7			17,000
	Coarse pitch	MEC	040R-17-4T-M	●	4	40	34	16	14	8.5	40	20	5.5	8.5	15.7	Yes	Fig.1	0.3	SB-4070TRN	DTM-15	25,000
			050R-17-4T-M	●	4	50	40	22	18	12		22	6.3	10.4				0.4			17,000
			063R-17-5T-M	●	5	63												0.6			14,500
			080R-17-6T-M	●	6	80	52.5	27	20	14	50	26	7	12.4				1.0			12,000
			100R-17-7T-MN	●	7	100	65	32	26	17.6	55		8	14.4				1.8			10,500
			125R-17-9T-M	●	9	125	85	40	45	32	63	33	9.5	16.4				3.1			8,900
			160R-17-12T-M	●	12	160	110		68	-						No	Fig.2	4.5			7,400
Bore Dia. Inch spec	Coarse pitch	MEC	063R-11-6T	●	6	63	40	25.4	20	14	50	26	6	9.5	10	Yes	Fig.1	0.8	SB-2555TRG	DTM-8	20,500
			080R-11-7T	●	7	80	52.5											1.0			18,500
			100R-11-9TN	●	9	100	65	31.75	26	17.6	63	32	8	12.7				1.8			17,000
			125R-11-11T	●	11	125	80	38.1	45	32		38	10	15.9				3.4			15,000
			160R-11-14T	●	14	160	100	50.8	70	-		47	10	19.1			Fig.2	4.4			13,900
	Fine pitch	MEC	063R-11-8T	●	8	63	40	25.4	20	14	50	26	6	9.5	10	Yes	Fig.1	0.8	SB-2555TRG	DTM-8	20,500
			080R-11-10T	●	10	80	52.5											1.0			18,500
	Coarse pitch	MEC	063R-17-5T	●	5	63	40	25.4	20	14	50	26	6	9.5	15.7	Yes	Fig.1	0.8	SB-4070TRN	DTM-15	14,500
			080R-17-6T	●	6	80	52.5											1.0			12,000
			100R-17-7TN	●	7	100	65	31.75	26	17.6	63	32	8	12.7				1.8			10,500
			125R-17-9T	●	9	125	80	38.1	45	32		38	10	15.9				3.4			8,900
			160R-17-12T	●	12	160	100	50.8	70	-		47	10	19.1			Fig.2	4.5			7,400
	Fine pitch	MEC	063R-17-6T	●	6	63	40	25.4	20	14	50	26	6	9.5	15.7	Yes	Fig.1	0.8	SB-4070TRN	DTM-15	14,500
			080R-17-8T	●	8	80	52.5											1.0			12,000
			100R-17-9TN	●	9	100	65	31.75	26	17.6	63	32	8	12.7				1.8			10,500

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ M68, M69

Max. Revolution

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
For more details, see "Warning" on page M69.

When using Center-through Air / Coolant / Mist

If Center Through air (Coolant, Mist) is used, please use appropriate arbor and clamp with mounting bolt. (Table1)

For good shoulder finishes by MEC multistage ap.

In order to obtain smooth machining wall surface by multiple passes of MEC Milling Cutter, please keep ap 5.5mm or less for 11T3 type and also keep ap 9mm or less for 1704 type.

Table 1

Description	Mounting bolt (Attachment)	Wrench
MEC032R·····M	SP8X35	LW-5 (Double width 5mm)
MEC040R·····M	HH8X25H	LW-5 (Double width 5mm)
MEC050R·····M MEC063R·····M	HH10X30H	LW-6 (Double width 6mm)
MEC063R···· MEC080R····(-M)	HH12X35H	LW-8 (Double width 8mm)
MEC100R····N/M	HH16X52H	LW-12 (Double width 12mm)
MEC125R····	HF20X53H	LW-14 (Double width 14mm)
MEC160R····	HF24X60H	LW-17 (Double width 17mm)

Wrench is not attached. Please purchase it separately.

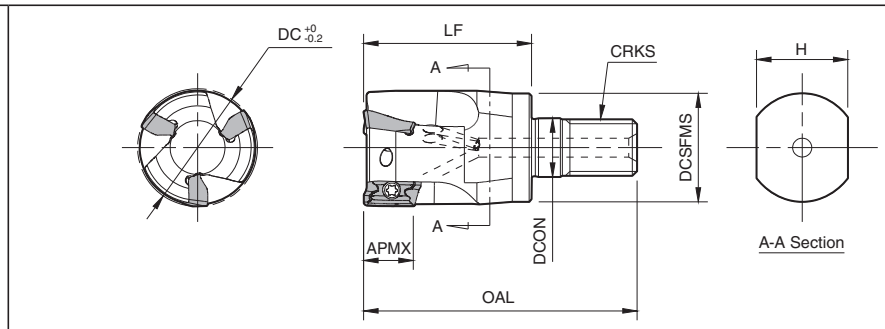
Applicable Inserts

Description	Applicable Inserts ➔ M22, M23			Applicable Inserts ➔ M29	
					
MEC..R-11	BDMT 11T3 ○○ ER-JT	BDMT 11T3 ○○ ER-JS	BDGT 11T3 ○○ FR-JA	BDGT 11T3 ○○ FR(-LE)	BDMT 11T3 ○○ FR
MEC..R-17	BDMT 1704 ○○ ER-JT	BDMT 1704 ○○ ER-JS	BDGT 1704 ○○ FR-JA	-	BDMT 1704 ○○ FR

● : Std. Item

MEC Head





Dimensions

Description		Stock	No. of Inserts	Dimension (mm)								Rake Angle		Coolant Hole	Applicable Inserts ➔ M22, M23 M29	Max. Revolution (min^{-1})
				DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R. (MAX.)	R.R.			
MEC	16-M08-11T-2T	●	2	16	14.7	8.5	42	25	M8×P1.25	12	10	+18°	-14°	Yes	BDMT11T3 BDGT11T3	43,750
	20-M10-11T-2T	●	2	20	18.7	10.5	48	30	M10×P1.5	15		+20°	-10°			41,000
	20-M10-11T-3T	●	3	20	18.7	10.5	48	30	M10×P1.5	15		+20°	-10°			41,000
	25-M12-11T-3T	●	3	25	23	12.5	56	35	M12×P1.75	19		+21°	-10°			37,500
	32-M16-11T-4T	●	4	32	30	17	62	40	M16×P2.0	24		+23°	-9°			33,900
MEC	25-M12-17-2T	●	2	25	23	12.5	56	35	M12×P1.75	19	15.7	+16°	-11°	Yes	BDMT1704 BDGT1704	35,000
	32-M16-17-3T	●	3	32	30	17	62	40	M16×P2.0	24		+17°	-7°			30,000

■ Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Recommended Cutting Conditions ➔ M68, M69

See page ➔ M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts

Description		Spare Parts		
		Clamp Screw	Wrench	Anti-seize Compound
				
MEC	16-M08-11T-2T	SB-2555TRG	DTM-8	P-37
	20-M10-11T-2T			
	20-M10-11T-3T			
	25-M12-11T-3T			
	32-M16-11T-4T			
MEC	25-M12-17-2T	SB-4070TRN	DTM-15	P-37
	32-M16-17-3T			

Recommended tightening torque for Insert Clamp 1.2N·m

Recommended tightening torque for Insert Clamp 3.5N·m

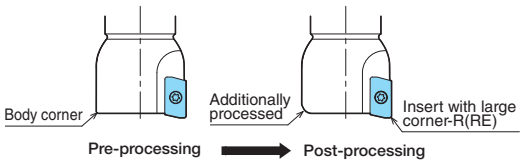
 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

■ When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary.
Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 1.2mm or less.)

Insert Corner-R(RE) (mm)	Additional Processing Dimension to Body Corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

* Round- shaped additional processing is recommended.
When applying chamfer shaped additional processing, do not cut away too much.



Recommended Cutting Conditions

· JT Chipbreaker

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)				
	Toolholder Description		Cermet	MEGACOAT NANO	MEGACOAT		CVD Coated Carbide
	MEC10~ MEC19	**MEC20~MEC40 MEC032R~MEC160R**	**TN100M**	**PR1535**	**PR1225**	**PR1210**	**CA6535**
Carbon Steel	0.06~**0.1**~0.15	0.08~**0.15**~0.25	☆ 120~**160**~200	☆ 120~**180**~250	★ 120~**180**~250	-	-
Alloy Steel	0.06~**0.1**~0.12	0.08~**0.15**~0.2	☆ 100~**140**~180	☆ 100~**160**~220	★ 100~**160**~220	-	-
Mold Steel	0.06~**0.08**~0.1	0.08~**0.12**~0.2	☆ 80~**120**~150	☆ 80~**140**~180	★ 80~**140**~180	-	-
Stainless Steel (Austenitic related)	0.06~**0.08**~0.1	0.08~**0.12**~0.15	-	☆ 100~**160**~200	☆ 100~**160**~200	-	-
Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	0.08~**0.12**~0.2	-	☆ 150~**200**~250	-	-	★ 180~**240**~300
Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	0.08~**0.12**~0.2	-	★ 90~**120**~150	-	-	-
Gray Cast Iron	0.06~**0.1**~0.15	0.08~**0.18**~0.25	-	-	-	★ 120~**180**~250	-
Nodular Cast Iron	0.06~**0.08**~0.1	0.08~**0.15**~0.2	-	-	-	★ 100~**150**~200	-
Ni-base heat-resistant alloys	0.06~**0.08**~0.1	0.08~**0.12**~0.15	-	☆ 20~**30**~50	-	-	★ 20~**30**~50
Titanium Alloys	0.06~**0.08**~0.1	0.08~**0.15**~0.2	-	☆ 40~**60**~80	-	☆ 30~**50**~70	-

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation
☆ : 2nd Recommendation

· JS Chipbreaker

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)			
	Toolholder Description		MEGACOAT NANO	MEGACOAT		CVD Coated Carbide
	MEC10~ MEC19	**MEC20~MEC40 MEC032R~MEC160R**	**PR1535**	**PR1225**	**PR1210**	**CA6535**
Carbon Steel	0.06~**0.1**~0.12	0.08~**0.15**~0.18	☆ 120~**180**~250	★ 120~**180**~250	-	-
Alloy Steel	0.06~**0.08**~0.1	0.08~**0.12**~0.15	☆ 100~**160**~220	★ 100~**160**~220	-	-
Mold Steel	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	-
Stainless Steel (Austenitic related)	0.06~**0.08**~0.1	0.08~**0.1**~0.12	★ 100~**160**~200	☆ 100~**160**~200	-	-
Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 150~**200**~250	-	-	★ 180~**240**~300
Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 90~**120**~150	-	-	-
Ni-base heat-resistant alloys	0.06~**0.08**~0.1	0.08~**0.1**~0.12	☆ 20~**30**~50	-	-	★ 20~**30**~50
Titanium Alloys	0.06~**0.08**~0.1	0.08~**0.1**~0.12	★ 40~**60**~80	-	-	-

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation
☆ : 2nd Recommendation

· JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)	
		DLC Coated Carbide	Carbide
		PDL025	**GW25**
Aluminum Alloys (Si 13% or less)	0.05~0.3	200~1,000	200~800
Aluminum Alloys (Si 13% and over)	0.05~0.2	200~300	200~300

· PCD

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
		PCD
		KPD230 (KPD001)
Aluminum Alloys (Si 13% or less)	0.05~0.2	500~1,500
Aluminum Alloys (Si 13% and over)	0.05~0.15	300~1,000

⚠ Warning **Please observe below precautions fully. Failure to observe the precautions may cause serious damage to human body.**

Warning about Max. Revolution indicated on main body

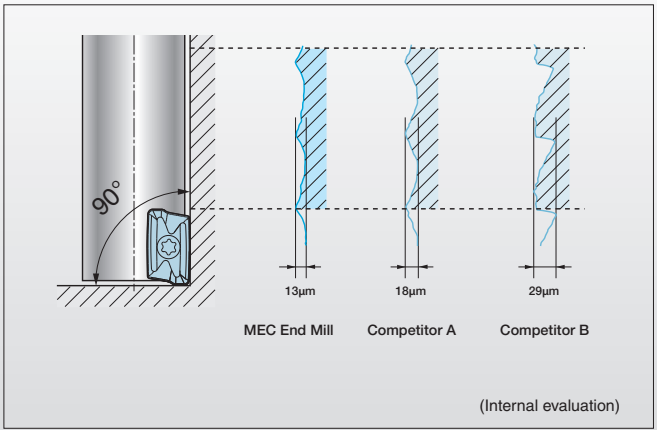
1. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter or the body may be damaged even under no load.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over 10,000min^{-1}), refer to the table to adjust the balance of MEC and suitable arbor.

Revolution (min^{-1})	Balance quality grade G ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

Features of MEC

Good squareness

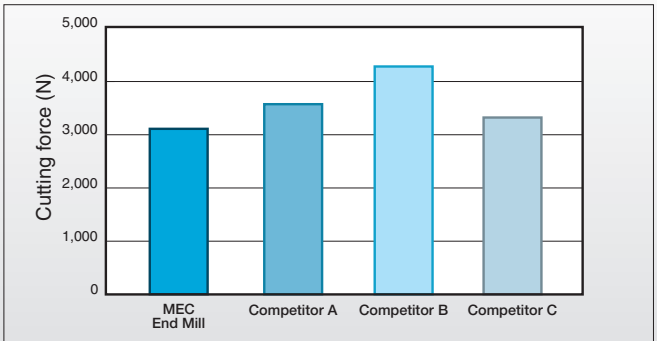
<Cutting Surface Comparison>



(Internal evaluation)

Low cutting force

<Cutting Force Comparison>

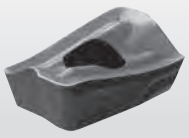


Tool Dia.ø20 S50C
Vc=100m/min Shouldering apxae=9x10mm
fz=0.2mm/t Dry

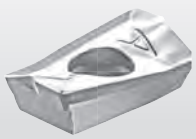
(Internal evaluation)

Chipbreaker

JT Chipbreaker (General purpose)

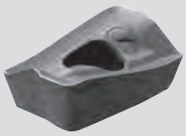


JA Chipbreaker (For Aluminum)



JS Chipbreaker (Low cutting force)

Cutting force 20% lower

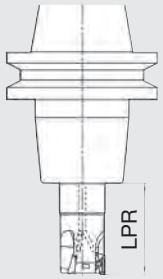


Cutting Performance of MEC End Mill

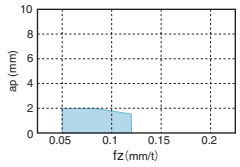
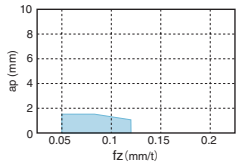
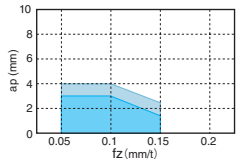
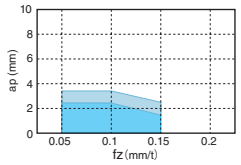
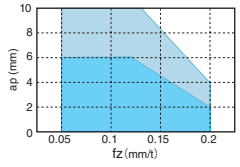
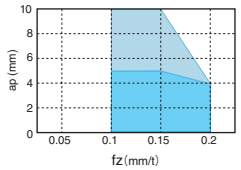
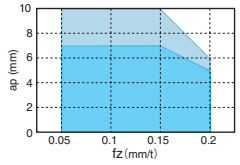
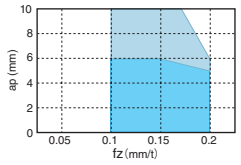
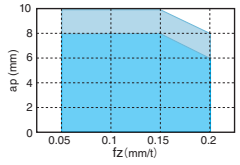
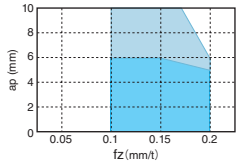
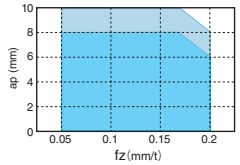
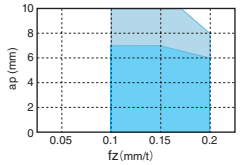
(1) Cutting edge length 10mm type
(Standard / Same Shank with JT Chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (mm)	
ø10	**MEC10-S10-11**	17	-
ø12	**MEC12-S16-11**	20	30
ø16	**MEC16-S16-11T**	30	45
ø20	**MEC20-S20-11T**	30	45
ø25	**MEC25-S25-11T**	32	48
ø32	**MEC32-S32-11T**	40	60

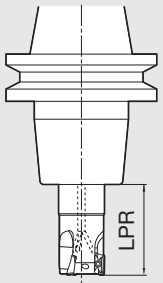
Shape



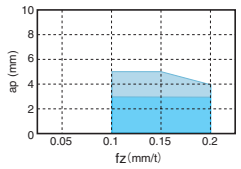
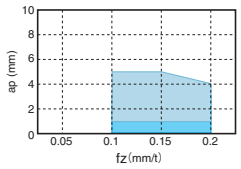
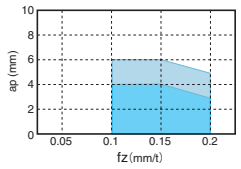
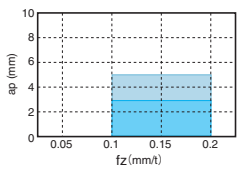
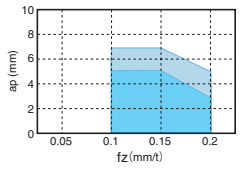
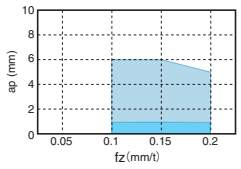
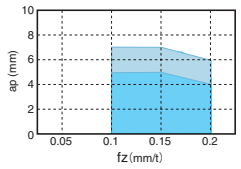
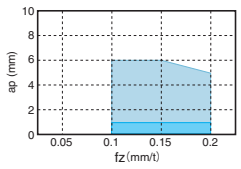
[Vc=120m/min Workpiece Material : S50C]

Description	■ Shouldering (Cutting width ae = DC/2)	■ Slotting ■ Ramping and Helical Milling
MEC10-S10-11		
MEC12-S16-11		
MEC16-S16-11T		
MEC20-S20-11T		
MEC25-S25-11T		
MEC32-S32-11T		

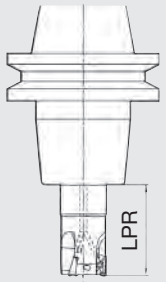
(2) Cutting edge length 10mm type (Long Shank with JT Chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (mm)		Shape
ø20 Long Shank	**MEC20-S20-140-11T**	60	90	
ø25 Long Shank	**MEC25-S25-160-11T**	60	100	
ø32 Long Shank	**MEC32-S32-200-11T**	100	130	
ø40 Long Shank	**MEC40-S32-240-11T**	100	130	

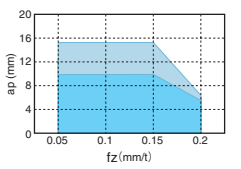
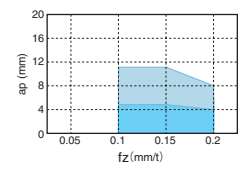
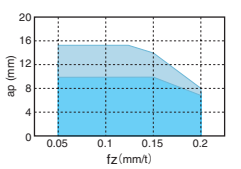
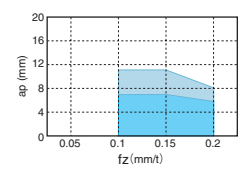
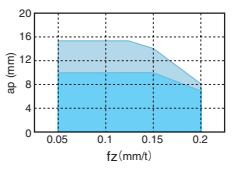
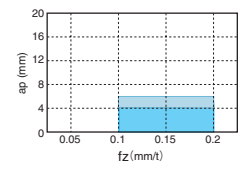
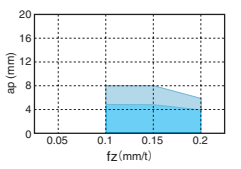
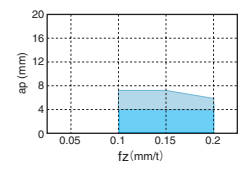
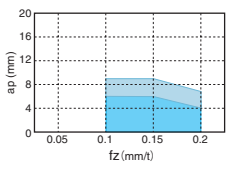
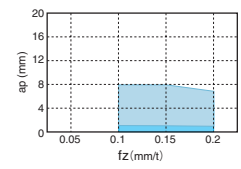
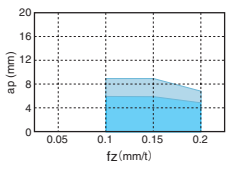
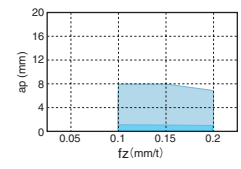
[Vc=120m/min Workpiece Material : S50C]

Description	■ Shouldering (Cutting width ae = DC/2)	■ Slotting ■ Ramping and Helical Milling
MEC20 -S20-140-11T Long Shank		
MEC25 -S25-160-11T Long Shank		
MEC32 -S32-200-11T Long Shank		
MEC40 -S32-240-11T Long Shank		

(3) Cutting edge length 15.7mm type (JT Chipbreaker)

Cutting Dia.	Description	Overhang Length LPR (mm)		Shape
ø25	**MEC25-S25-17**	36	54	
ø32	**MEC32-S32-17**	40	60	
ø40	**MEC40-S32-17**	50	75	
ø25 Long Shank	**MEC25-S25-160-17**	60	100	
ø32 Long Shank	**MEC32-S32-200-17**	100	130	
ø40 Long Shank	**MEC40-S32-240-17**	100	130	

[Vc=120m/min Workpiece Material : S50C]

Description	■ Shouldering (Cutting width ae = DC/2)	■ Slotting ■ Ramping and Helical Milling
MEC25-S25-17		
MEC32-S32-17		
MEC40-S32-17		
MEC25 -S25-160-17 Long Shank		
MEC32 -S32-200-17 Long Shank		
MEC40 -S32-240-17 Long Shank		

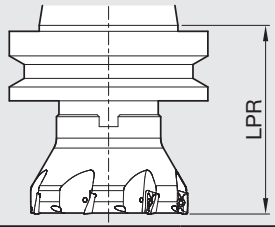
Cutting Performance of MEC Face Mill

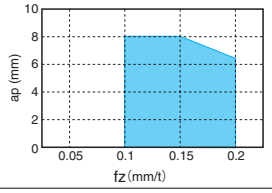
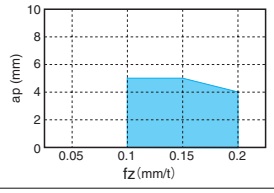
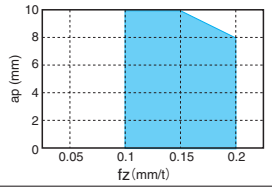
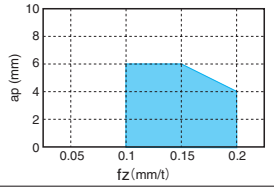
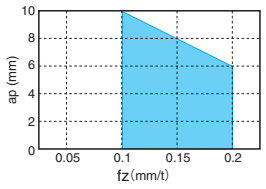
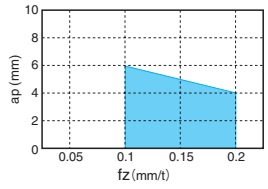
Cutting edge length 10 mm type (JT Chipbreaker)

[Vc=120m/min Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)
ø32	MEC032M-11-5T-M	110
ø40	MEC040R-11-○T-M	115
ø50	MEC050R-11-○T-M	100
ø63	MEC063R-11-○T	95
	MEC063R-11-○T-M	
ø80	MEC080R-11-○T	95
ø100	MEC100R-11-9TN	108
ø125	MEC125R-11-11T	

Shape



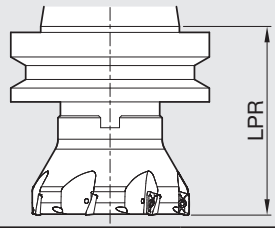
Description	■ Shouldering (Cutting width ae = DC/2)	■ Slotting
MEC040R -11-○T-M		
MEC050R -11-○T-M ~ MEC100R -11-9TN		
MEC125R -11-11T		

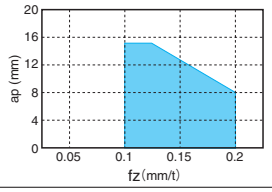
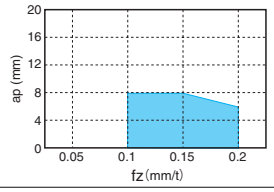
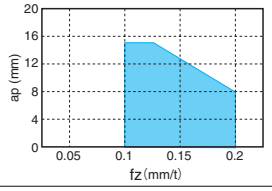
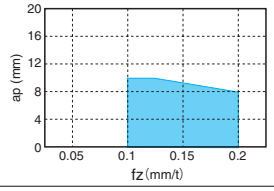
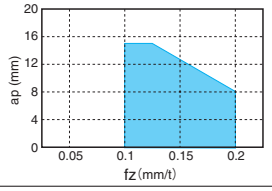
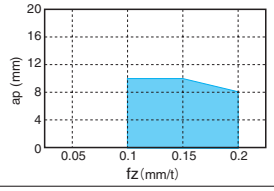
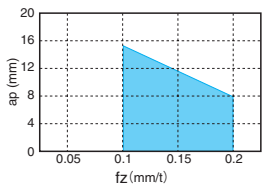
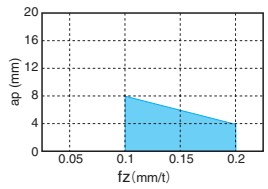
Cutting edge length 15.7mm type (JT Chipbreaker)

[Vc=120m/min Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)
ø40	MEC040R-17-4T-M	115
ø50	MEC050R-17-○T-M	100
ø63	MEC063R-17-○T	95
	MEC063R-17-○T-M	
ø80	MEC080R-17-○T	95
ø100	MEC100R-17-○TN	108
ø125	MEC125R-17-9T	

Shape

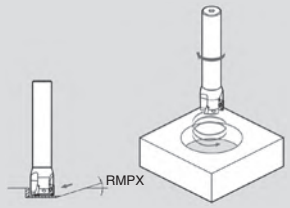


Description	■ Shouldering (Cutting width ae = DC/2)	■ Slotting
MEC040R -17-4T-M		
MEC050R -17-○T-M		
MEC063R -17-○T(-M) ~ MEC100R -17-○TN		
MEC125R -17-9T		

Ramping, Helical milling and Vertical milling (Plunging)

Ramping / Helical Milling

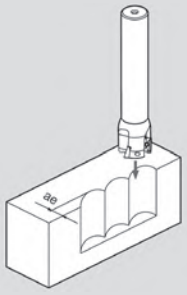
- Ramping angle is recommended under RMPX.
- Refer to each tool's cutting performance list for sinking depth per revolution when helical milling. Use compressed air when during machining.



Cutting Dia.	Applicable Inserts	Max. ramping angle (RMPX)
ø16~ø18	BDMT11T3 type BDGT11T3 type	3°
ø19~ø21		5°
ø22~ø25		2.5°
ø28~ø32		1.5°
ø40		0.7°
ø50 and over		Not recommended
ø25	BDMT1704 type BDGT1704 type	8°
ø32		5°
ø40		2.5°
ø50 and over		Not recommended

BDMT1103 type is not recommended for ramping and helical milling.

Vertical Milling (Plunging)



Cutting Dia.	Applicable Inserts	Max. Width of Cut (ae)
ø16 ~ ø19	BDMT11T3 type BDGT11T3 type	1.5mm
ø20 ~ ø160	BDMT11T3 type BDGT11T3 type	5mm
ø25 ~ ø160	BDMT1704 type BDGT1704 type	8mm

BDMT1103 type is not recommended for vertical milling (plunging).

Guidance of minimum cutting dia. by helical milling

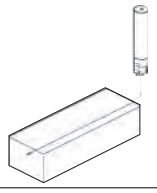
MEC	Cutting Dia.	ø16	ø18	ø20	ø22	ø25	ø28	ø30	ø32	ø40	ø50
BD_T11T3 type	Guidance of minimum cutting dia. by helical milling	ø21	ø25	ø29	ø33	ø39	ø45	ø49	ø53	ø69	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ø28	ø32	ø36	ø40	ø46	ø52	ø56	ø60	ø76	

MEC	Cutting Dia.	ø25	ø32	ø40	ø50
BD_T1704 type	Guidance of minimum cutting dia. by helical milling	ø34	ø48	ø64	Helical milling is not recommended.
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling.	ø46	ø60	ø76	

Case Studies

RC55 (Pre-hardened Tool Steel)

- Test piece (54~56HRC)
- Vc=50m/min (n=800min^{-1})
- ap x ae=2 x 14mm
- fz=0.125mm/t (Vf=300mm/min)
- Dry
- MEC20-S20-11T
- 3 flutes
- BDMT11T308ER-JT (PR830)

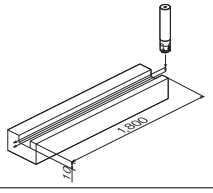


MEC	Chip Removal Amount = 71.3cm^3 (Further Machining Possible)
Competitor's End Mill A	Chip Removal Amount = 2.9cm^3 (Chipping occurred)

Competitor's End Mill A [ø25 (2 Flutes) Vc=40m/min fz=0.075mm/t apxae= 2x3mm] had chipping occurred in 10 minutes and had loud machining sound. MEC could increase the feed rate, and the cutting edge remained in extremely good condition and is still sustainable for further machining.
(User Evaluation)

SS400

- Plate
- Vc=88m/min (n=1,400min^{-1})
- ap=5mm x 2 passes
- fz=0.12mm/t (Vf=500mm/min)
- Dry
- MEC20-S20-11T
- 3 flutes
- BDMT11T308ER-JT (PR830)

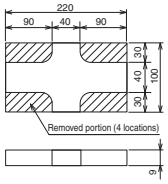


MEC	23pcs/edge
Competitor's End Mill B	10~11pcs/edge

MEC extended the tool life for more than twice.
(User Evaluation)

SUS304

- Plate
- Vc=125m/min (n =1,600min^{-1})
- ap =9.0mm
- fz =0.1mm/t (Vf=320mm/min)
- Dry
- MEC25- S25-17
- 2 flutes
- BDMT170408ER-JT (PR830)

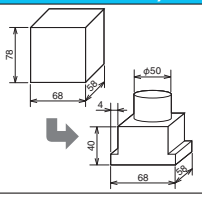


MEC	4pcs/edge or more
Competitor's End Mill C	1pc/edge or less

Competitor's End Mill C (indexable end mill) had high cutting force and had insert breakage, but MEC had no insert breakage and was still usable for further machining after machining 4 pieces (16 points).
(User Evaluation)

DAC10 (Hot Work Tool Steel)

- Mold
- Vc=130m/min (n =1,040min^{-1})
- ap x ae =(~3)x(~5) (Varies depending on machining point)
- fz =0.18mm/t(Vf=936mm/min)
- Dry (Air blow)
- MEC40- S32-11T · 5 flutes
- BDMT11T308ER-JT (PR830)

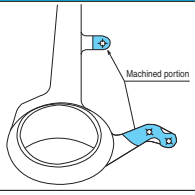


MEC	2 hours (Small Wear : Extendible)
Competitor's End Mill D	2 hours (halted due to insert breakage)

MEC had better cutting performance / insert life comparing to Competitor's End Mill D, and the insert had only small wear and was usable for further machining after used for machining of the same duration as Competitor's End Mill D. Competitor's End Mill D (6 flutes type) was used with Vf=936mm/min (fz=0.15mm/t).
(User Evaluation)

SCM420

- Knuckle Steering
- Vc=150m/min (n=1,200min^{-1})
- ap=0.5~5mm (Shouldering)
- fz=0.1mm/t (Vf=478mm/min)
- Dry
- MEC40-S32-17
- 4 flutes
- BDMT170408ER-JT (PR830)

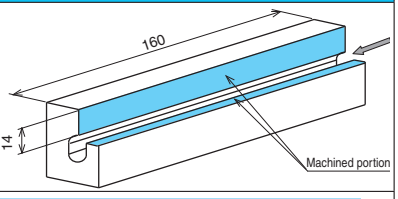


MEC	150 pcs/edge
Competitor's End Mill E	40pcs/edge

MEC had a better finished surface comparing to Competitor's End Mill E and also improved the tool life by more than 3 times.
(User Evaluation)

Ni-base heat-resistant alloys

- Turbine parts
- Vc=15m/min (n=120min^{-1})
- ap=0.5mm
- fz=0.08mm/t (Vf=38mm/min)
- Wet
- MEC040R-17-4T-M
- 4 flutes
- BDMT170408ER-JS (PR1025)



MEC	9pcs/edge
Competitor's End Mill F	1pc/edge or less

Competitor's End Mill F (Coated Carbide Insert) could not finish machining of 1 workpiece, but MEC could cut 9pcs/edge and the finished surface was good.
(User Evaluation)

MECX End Mill



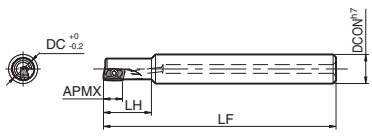


Fig. 1

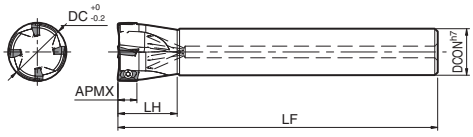


Fig. 3

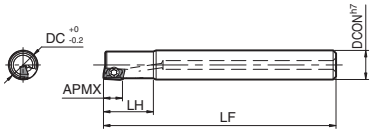


Fig. 2

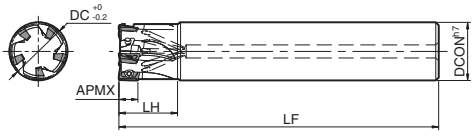


Fig. 4

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min^{-1})
					DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	
Standard Shank	Standard	MECX 08-S10-07-1T	●	1	8	10	80	16	6	11.7°	-24.0°	Yes	Fig. 1	SB-2035TRG	DTM-6	48,100
		14-S12-07-2T	●	2	14	12		18		16.3°	-12.1°		Fig. 3			44,800
		17-S16-07-3T	●	3	17	16	100	20			-11.0°			SB-2042TRG		42,400
		18-S16-07-3T	●		18						-10.9°					41,600
		20-S16-07-4T	●	4	20		110				-10.4°					40,200
		21-S20-07-4T	●		21	20					-10.1°					39,500
		25-S20-07-5T	●	5	25		120	25			-9.7°					37,000
		26-S25-07-5T	●		26	25					-9.5°					36,500
		33-S32-07-6T	●	6	33	32	130	30			-8.8°					33,100
	Fine pitch	MECX 20-S16-07-5T	●	5	20	16	110	20	6	16.3°	-10.4°	Yes	Fig. 3	SB-2042TRG	DTM-6	40,200
		25-S20-07-7T	●	7	25	20	120	25			-9.7°					37,000
Same Shank	Standard	MECX 10-S10-07-1T	●	1	10	10	80	17	6	12.8°	-18.7°	Yes	Fig. 2	SB-2035TRG	DTM-6	47,100
		12-S12-07-2T	●	2	12	12		18		14.3°	-13.7°		Fig. 4			46,200
		16-S16-07-3T	●	3	16	16	100	20		16.3°	-11.3°			SB-2042TRG		43,200
		20-S20-07-4T	●	4	20	20	110				-10.4°					40,200
		25-S25-07-5T	●	5	25	25	120	25			-9.7°					37,000
	Fine pitch	MECX 16-S16-07-4T	●	4	16	16	100	20	6	16.3°	-11.3°	Yes	Fig. 4	SB-2042TRG	DTM-6	43,200
		20-S20-07-5T	●	5	20	20	110				-10.4°					40,200
		25-S25-07-7T	●	7	25	25	120	25			-9.7°					37,000
		32-S32-07-8T	●	8	32	32	130	30			-8.9°					33,600
Long Shank	Standard	MECX 17-S16-130-07-3T	●	3	17	16	130	20	6	16.3°	-11.0°	Yes	Fig. 3	SB-2042TRG	DTM-6	42,400
		21-S20-140-07-4T	●	4	21	20	140				-10.1°					39,500
		26-S25-160-07-5T	●	5	26	25	160	25			-9.5°					36,500

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M76

Max. Revolution

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
For more details, "Warning" in the next page.

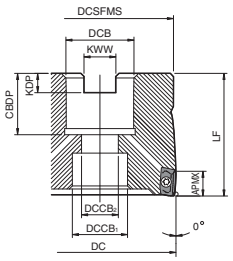
For good shoulder finishes by MECX multistage ap.

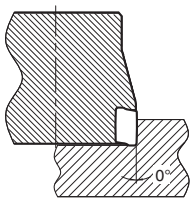
In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.

● : Std. Item

MECX Face Mill







Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Weight (kg)	Spare Parts		Max. Revolution (min^{-1})
			DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Wrench	
MECX 032R-07-8T-M	●	8	32	30	16	14	8.5	40	20	5.5	8.5	6	+7°	-8.9°	Yes	0.15	SB-2042TRG	DTM-6	33,600
040R-07-10T-M	●	10	40	38	22	18	12		22	6.3	10.4			-8.4°		0.25			30,500

Coat Anti-seize Compound(P-37) thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M76

■ **Max. Revolution**

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load. For more details, see "Warning" below.

■ **For good shoulder finishes by MECX multistage ap.**

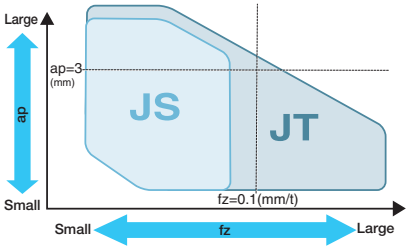
In order to obtain smooth machining wall surface by MECX multistage ap set ap within 5mm for each cut.

■ **MECX032R comes with mounting bolt (HH8X25H) and MECX040R/050R/063R comes with mounting bolt (HH10X30H).**

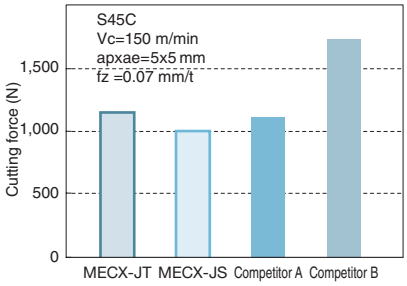
Applicable Inserts

Description	Applicable Inserts ➡ M22	
		
MECX...-07..	BDMT 0703○○ER-JT	BDMT 0703○○ER-JS

Chipbreaker selection



Cutting Force Comparison (Internal evaluation)



⚠ Warning Please observe below precautions fully. Failure to observe the precautions may cause serious damage to human body.

Warning about Max. Revolution indicated on main body

1. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter or the body may be damaged even under no load.
2. For actual practical revolution, please set within recommended cutting condition.
3. When using at a higher revolution (over 10,000min^{-1}), refer to the table to adjust the balance of MECX and suitable arbor.

Revolution (min^{-1})	Balance quality grade G ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

● : Std. Item

Recommended Cutting Conditions

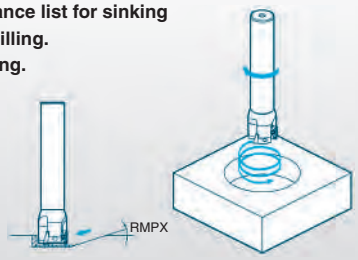
Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc: m/min)			
	JS Chipbreaker	JT Chipbreaker	MEGACOAT NANO	MEGACOAT		CVD Coated Carbide
			PR1535	**PR1225**	**PR1210**	**CA6535**
Carbon Steel	0.04~0.08~0.1	0.06~0.1~0.12	☆ 120~180~250	★ 120~180~250	-	-
Alloy Steel	0.04~0.06~0.08	0.06~0.08~0.1	☆ 100~160~220	★ 100~160~220	-	-
Mold Steel	0.04~0.06~0.08	0.06~0.08~0.1	☆ 80~140~180	★ 80~140~180	-	-
Stainless Steel (Austenitic related)	0.03~0.04~0.05	0.05~0.06~0.07	★ 100~160~200	☆ 100~160~200	-	-
Stainless Steel (Martensitic related)	0.03~0.04~0.05	0.05~0.06~0.1	☆ 150~200~250	-	-	★ 180~240~300
Stainless Steel (Precipitation Hardening)	0.03~0.04~0.05	0.05~0.06~0.1	★ 90~120~150	-	-	-
Gray Cast Iron	0.04~0.08~0.1	0.08~0.1~0.15	-	-	★ 120~180~250	-
Nodular Cast Iron	0.04~0.06~0.08	0.08~0.1~0.12	-	-	★ 100~150~200	-
Ni-base heat-resistant alloys	0.03~0.04~0.05	0.05~0.06~0.07	☆ 20~30~50	-	-	★ 20~30~50
Titanium Alloys	0.04~0.06~0.08	0.08~0.1~0.12	★ 40~60~80	-	☆ 30~50~70	-

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation ☆ : 2nd Recommendation

Ramping / Helical Milling

- **Ramping angle is recommended under RMPX.**
- **Refer to each tool's cutting performance list for sinking depth per revolution when helical milling.**
- **Use compressed air during machining.**



Cutting Dia.	Applicable Inserts	Max. ramping angle (RMPX)
ø8	**BDMT0703** type	Not recommended
ø10		1.5°
ø12,ø14		2°
ø16		3°
ø17,ø18		1.5°
ø20		2°
ø21		1.8°
ø25		1.3°
ø26		1.2°
ø32		0.8°
ø33		0.5°

Guidance of minimum cutting dia. by helical milling

MECX	Cutting Dia.	ø8	ø10	ø12	ø14	ø16	ø17	ø18	ø20
BDMT0703 type	Guidance of minimum cutting dia. by helical milling	Helical milling is not recommended	ø14	ø18	ø22	ø26	ø28	ø30	ø34
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling		ø17	ø21	ø25	ø29	ø31	ø33	ø37

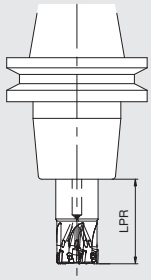
MECX	Cutting Dia.	ø21	ø25	ø26	ø32	ø33
BDMT0703 type	Guidance of minimum cutting dia. by helical milling	ø36	ø44	ø46	ø58	ø60
	Guidance of minimum cutting dia. in case of flatting bottom after helical milling	ø39	ø47	ø49	ø61	ø63

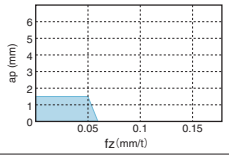
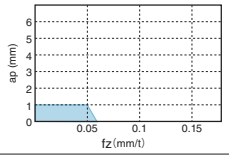
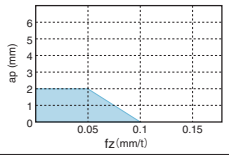
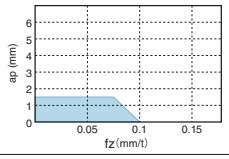
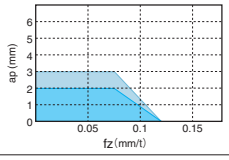
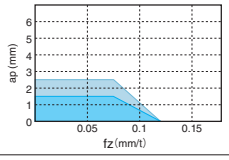
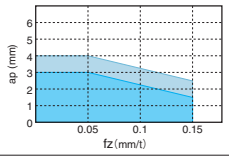
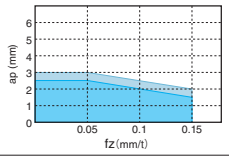
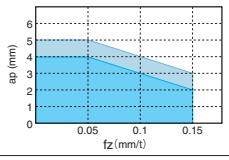
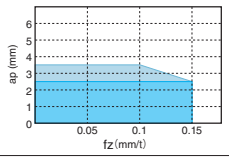
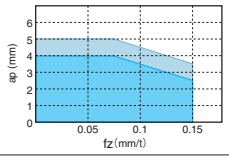
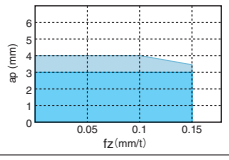
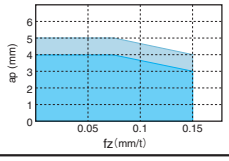
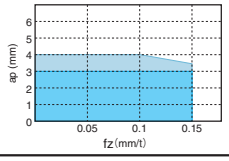
Cutting Performance of MECX End Mill

[Vc=150m/min Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)	
ø8	MECX08-S10-07-1T	16	-
ø10	MECX10-S10-07-1T	17	-
ø12	MECX12-S12-07-2T	18	30
ø16	MECX16-S16-07-3T	20	40
ø20	MECX20-S20-07-4T	20	40
ø25	MECX25-S25-07-5T	25	50
ø32	MECX32-S32-07-6T	30	50

Shape



Description	■ Shouldering (Cutting width ae = DC/2)	■ Slotting ■ Ramping and Helical Milling
MECX08-S10-07-1T		
MECX10-S10-07-1T		
MECX12-S12-07-2T		
MECX16-S16-07-3T		
MECX20-S20-07-4T		
MECX25-S25-07-5T		
MECX32-S32-07-6T		

* Machining with extended overhang length is not recommended for ø8 and ø10.
* The cutting performance list shows applicable range of JT Chipbreaker with Standard flute-number type.

  For Multi-Edge type, use with 70% or less of ap.

*** Cutting conditions of JS Chipbreaker**

(1) For MECX08~MECX12
Decrease the feed rate by 25% according to cutting capability list.

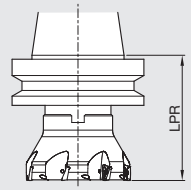
(2) For MECX16 and over
Decrease the feed rate and ap by 30% according to cutting capability list.

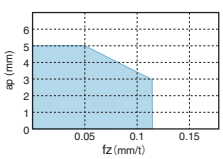
Cutting Performance of MECX Face Mill

[Vc=150m/min Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)
ø32	MECX032R-07-8T-M	100
ø40	MECX040R-07-10T-M	

Shape



Description	■ Shouldering (Cutting width ae = DC/2)
MECX032R-07-8T-M MECX040R-07-10T-M	

* Use JT Chipbreaker
* Slotting is not recommended.

High Performance Milling

MEV

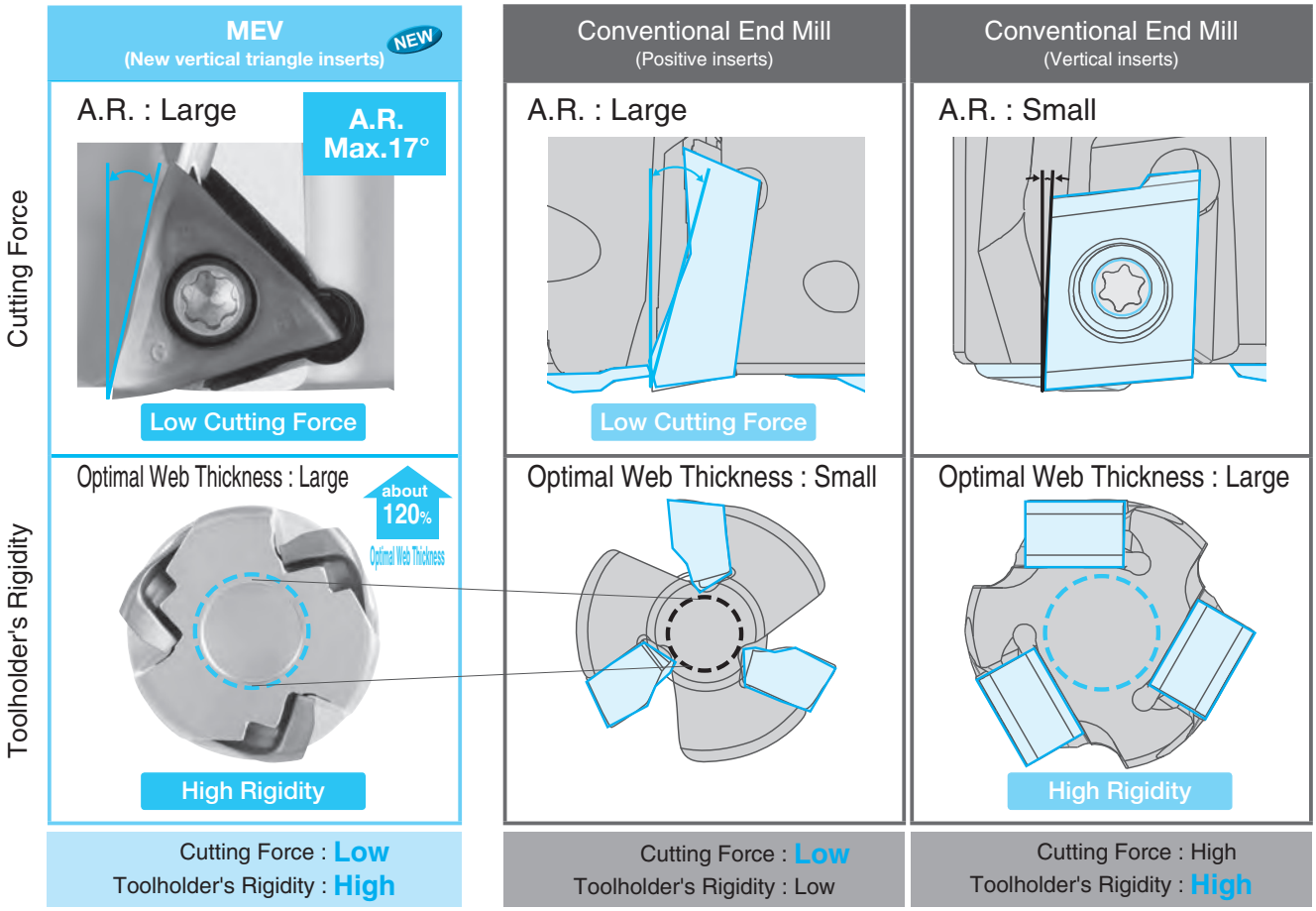
Newly Developed Triangular Inserts for Provide Low Cutting Forces and Increased Rigidity

High Performance, Economical, and Multi-functional Milling Solutions

1 High Performance : Low Cutting Force and High Rigidity

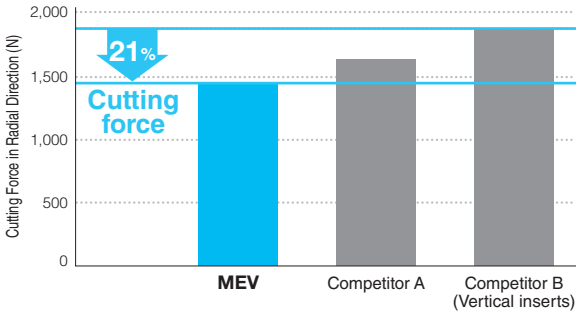
Newly developed vertical triangle inserts with 3 cutting edges. Achieve stable machining with reduced chattering.

MEV vs Competitor



Keeping A.R. max. at 17°, provides lower cutting force than the positive insert types of competitors

Cuttting Force Comparison (Internal evaluation)

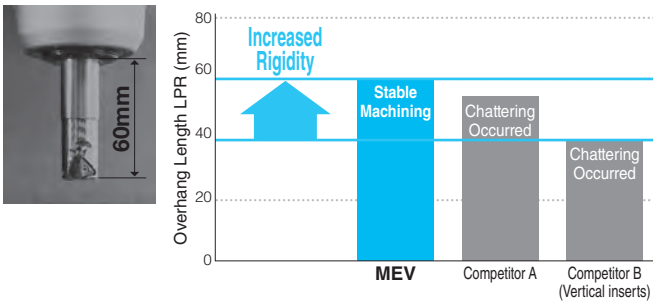


Cutting Conditions : Vc = 200 m/min, ap × ae = 3 × 18 mm, fz = 0.10 mm/t, ø20 (3 flutes), Dry Workpiece Material : SCM440Ⓗ

Low cutting force and large optimal web thickness provides excellent chattering resistance

Chattering Resistance Comparison (Internal evaluation)

Shouldering



Cutting Conditions : Vc = 200 m/min, ap × ae = 3 × 18 mm, fz = 0.10 mm/t, ø20 (3 flutes), Dry Workpiece Material : SCM440Ⓗ

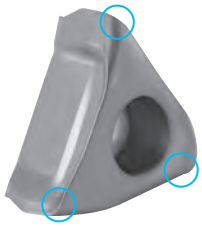
Slotting



Cutting Conditions : Vc = 220 m/min, ap = 3 mm (Slotting), fz = 0.10 mm/t, ø20 (3 flutes), Dry Workpiece Material : SCM440Ⓗ

2 The Economical Choice : Lengthened Insert Life with 3 Usable Cutting Edges

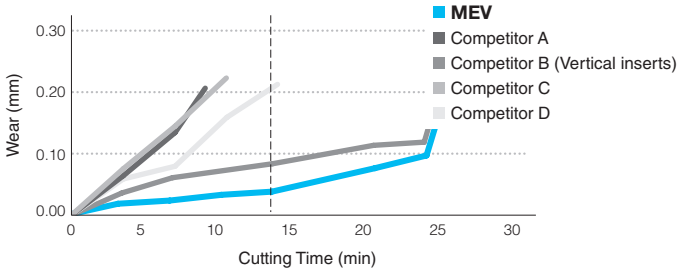
Insert



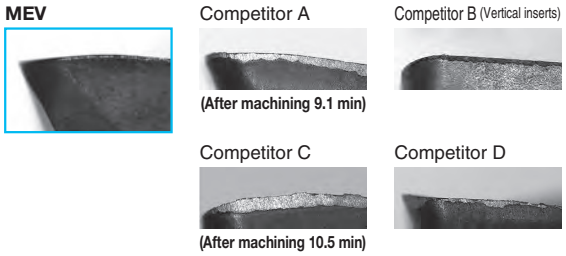
Unique triangle inserts with 3 cutting edges
PR15 series utilizes excellent MEGACOAT NANO coating technology with wear and adhesion resistance

Long Tool Life with Excellent Wear Resistance

Wear Resistance Comparison (Internal evaluation)



Cutting Edge (After machining 14 min)

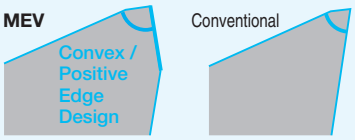


Cutting Conditions : Vc = 180 m/min, ap × ae = 3 × 10 mm, fz = 0.1 mm/t, ø20, Dry Workpiece Material : SKD11 (30～35HS)

Improved Stability with Superior Fracture Resistance

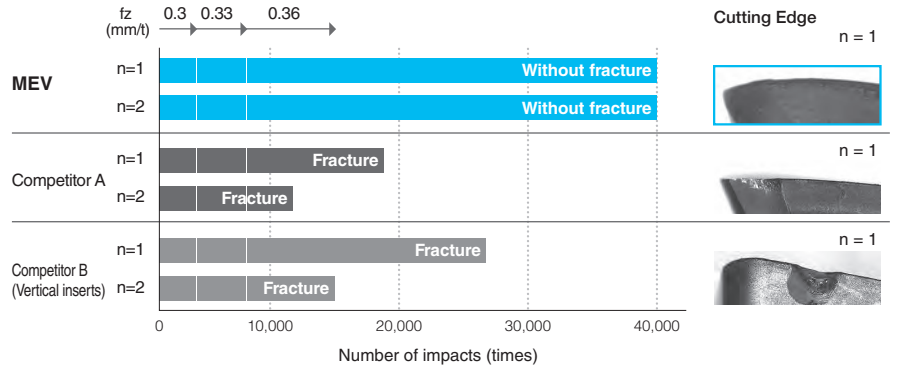


Cutting edge cross-section



The MEV features a larger cutting edge to increase strength

Fracture Resistance Comparison (Internal evaluation)



Cutting Conditions : Vc = 120 m/min, ap × ae = 2 × 10 mm, fz = 0.3 - 0.36 mm/t, ø20 (single insert), Dry Workpiece Material : SCM440Ⓗ (37～39HS)

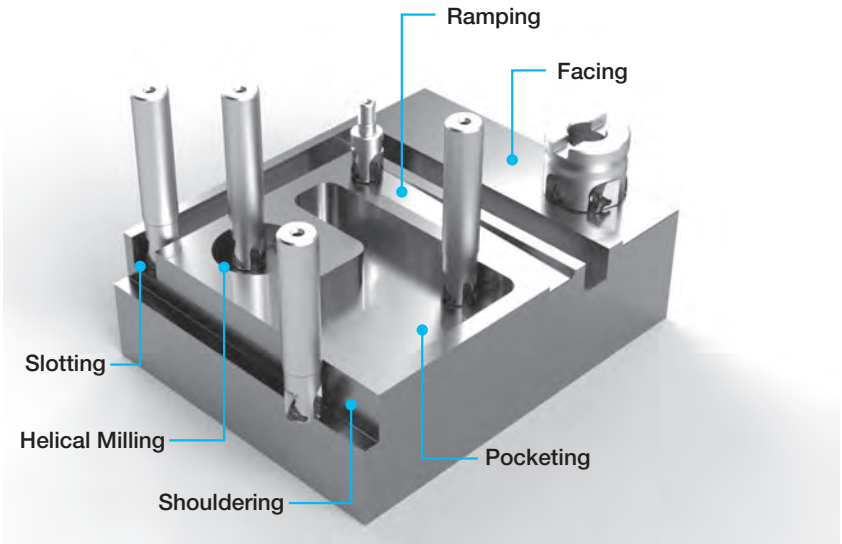
3 Multi-functional : The MEV can perform a wide variety of machining processes

Great performance in shouldering, slotting, and ramping applications
(D.O.C. 6 mm or less)

Chip Example (Slotting)



Cutting Conditions : Vc = 150 m/min, ap = 6mm (Slotting)
fz = 0.2 mm/t, ø20 (3 flutes), Dry Workpiece Material : SS400



MEV End Mill



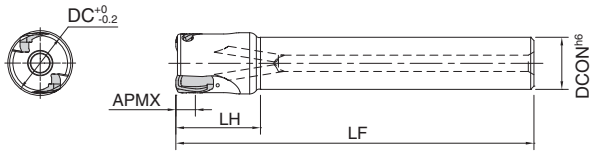


Fig.1

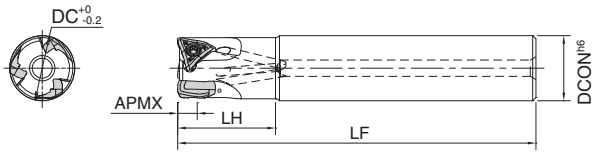


Fig.2

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Weight (kg)	Drawing	Max. Revolution (min^{-1})
					DC	DCON	LF	LH	APMX	A.R.(MAX.)	R.R.				
Cylindrical	Standard Shank	MEV 20-S16-06-2T	●	2	20	16	110	26	6	+17°	-38°	Yes	0.2	Fig.1	32,000
		22-S20-06-3T	●	3	22	20					-37°				29,000
		25-S20-06-3T	●		25		120	29					0.3		25,000
		28-S25-06-3T	●		28	25					-36°		0.4		23,000
		30-S25-06-4T	●	4	30		130	32					0.5		21,500
		32-S25-06-4T	●		32						-36°				20,000
		40-S32-06-5T	●	5	40	32	150	50					1.0		16,000
		50-S32-06-5T	●		50		120	40		+16°	-36°		0.9		13,000
	Same Shank	MEV 20-S20-06-2T	●	2	20	20	110	30	6	+17°	-38°	Yes	0.2	Fig.2	32,000
		20-S20-06-3T	●	3											
		25-S25-06-2T	●	2	25	25	120	32			-37°		0.4		25,000
		25-S25-06-3T	●	3											
		32-S32-06-3T	●		32	32	130	40			-36°		0.7		20,000
		32-S32-06-4T	●	4											
	Long Shank	MEV 20-S18-06-150-2T	●	2	20	18	150	30	6	+17°	-38°	Yes	0.3	Fig.1	32,000
		20-S20-06-150-2T	●			20		40						Fig.2	
		25-S25-06-170-2T	●		25	25	170	50			-37°		0.6		25,000
		32-S32-06-200-2T	●		32	32	200	65			-36°		1.1		20,000

■ Max. Revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M84**

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

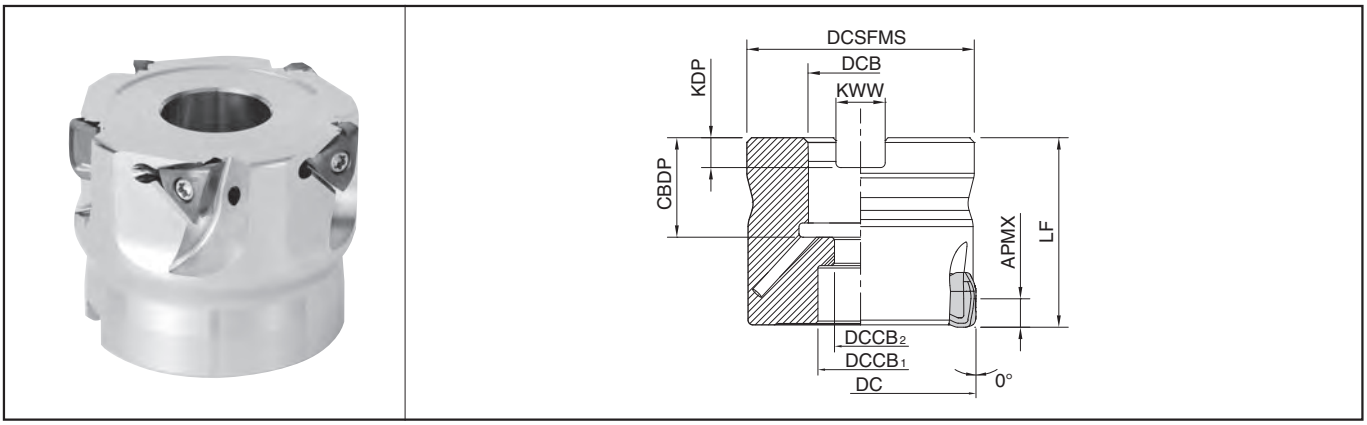
Spare Parts

Description			Spare Parts			
			Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
						
End Mill	MEV	...-06-...T	SB-3076TRP	DTPM-10	P-37	–
Face Mill	MEV	032R-06-4T-M				HH8X25
		040R-06-5T-M				
		050R-06-5T-M				HH10X30
Modular	MEV	20-M10-06-2T				–
		20-M10-06-3T				–
		25-M12-06-3T				–
		32-M16-06-4T				–

Recommended tightening torque for Insert Clamp 2.0 N·m

● : Std. Item

MEV Face Mill



Toolholder Dimensions

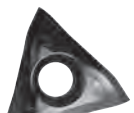
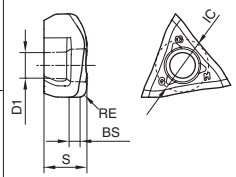
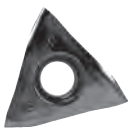
Description		Stock	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Weight (kg)	Max. Revolution (min^{-1})
				DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R. (MAX.)	R.R.			
MEV	032R-06-4T-M	●	4	32	30	16	13.5	9	35	19	5.6	8.4	6	+17°	-36°	Yes	0.1	20,000
	040R-06-5T-M	●	5	40	38		15		40								0.2	16,000
	050R-06-5T-M	●	5	50	48	22	18	11		21	6.3	10.4		+16°			0.4	13,000

■ Max. Revolution
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M84**
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts

Classification of usage						
	P	Carbon Steel / Alloy Steel	☆	★		
		Mold Steel	☆	★		
	M	Stainless Steel (Austenitic related)	★	☆		
		Stainless Steel (Martensitic related)	☆			★
		Stainless Steel (Precipitation Hardening)	★			
	K	Gray Cast Iron		☆	★	
		Nodular Cast Iron		☆	★	
	N	Non-ferrous Metals				
	S	Heat-resistant Alloys	☆			★
		Titanium Alloys	★		☆	
	H	Hard Materials		□		

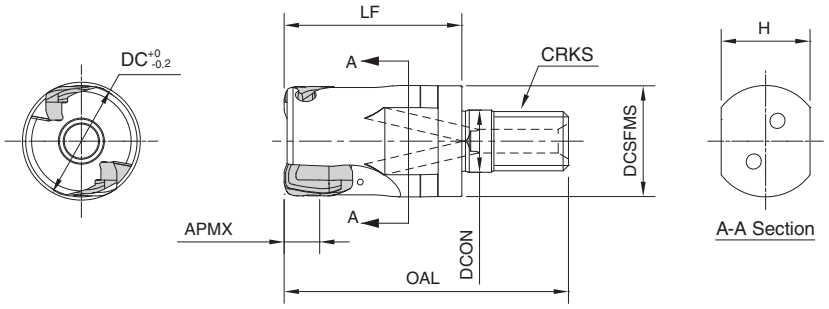
★ : Roughing / 1st Choice
☆ : Roughing / 2nd Choice
■ : Finishing / 1st Choice
□ : Finishing / 2nd Choice
(In case hardness is 45HRC or under)

Insert		Description	Dimension (mm)					MEGACOAT NANO			CVD Coated Carbide
			IC	S	D1	BS	RE	PR1535	PR1525	PR1510	CA6535
 General purpose		TOMT 060504ER-GM	7.2	5.7	3.4	1.9	0.4	●	●	●	●
		060508ER-GM				1.5	0.8	●	●	●	●
 Low cutting force		TOMT 060508ER-SM	7.2	5.7	3.4	1.5	0.8	●	●		●

● : Std. Item

MEV Head (Modular type)





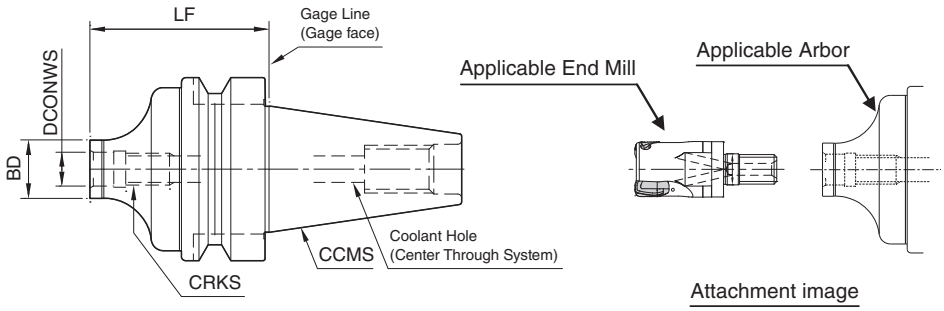
Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	Rake Angle A.R. (MAX.)	R.R.	Coolant Hole	Max. Revolution (min^{-1})	Applicable Inserts ➡ M20, M81
MEV	20-M10-06-2T	●	2	20	18.7	10.5	48	30	M10×P1.5	15	6	+17°	-38°	Yes	32,000	TOMT06...-GM TOMT06...-SM
	20-M10-06-3T	●	3													
	25-M12-06-3T	●		25	23	12.5	56	35	M12×P1.75	19			-37°		25,000	
	32-M16-06-4T	●	4	32	30	17	62	40	M16×P2.0	24			-36°		20,000	

■ Max. Revolution
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M84**
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

BT Arbor (for exchangeable head / double-face clamping spindle)



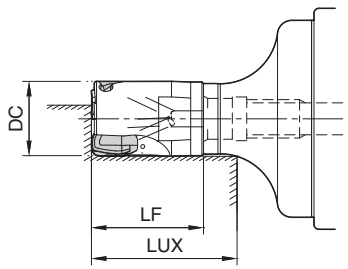


Dimension

Description		Stock	Dimension (mm) LF	BD	DCONWS	CRKS	Coolant Hole	Arbor (Double-face clamping) CCMS	Applicable End Mill
BT30K-	M10-45	●	45	18.7	10.5	M10×P1.5	Yes	BT30	MEV20-M10··
	M12-45	●		23	12.5	M12×P1.75			MEV25-M12··
BT40K-	M10-60	●	60	18.7	10.5	M10×P1.5	Yes	BT40	MEV20-M10··
	M12-55	●	55	23	12.5	M12×P1.75			MEV25-M12··
	M16-65	●	65	30	17	M16×P2.0			MEV32-M16··

· When MEV is not used, see page **M60**.

Actual End Mill depth



Arbor Description		Applicable End Mill Description	Cutting Dia. DC	Dimension LF	Actual End Mill depth (mm) LUX
BT30K-	M10-45	MEV20-M10··	20	30	36.8
	M12-45	MEV25-M12··	25	35	42.8
BT40K-	M10-60	MEV20-M10··	20	30	38.7
	M12-55	MEV25-M12··	25	35	44.6
	M16-65	MEV32-M16··	32	40	51.2

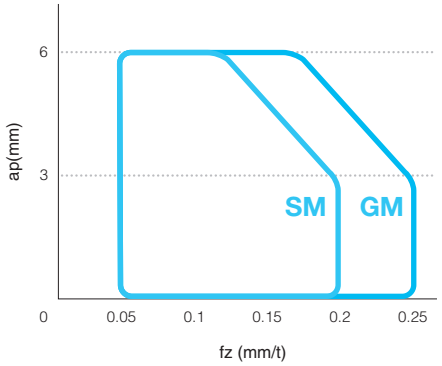
● : Std. Item

Recommended Chipbreaker Range

GM type for General Purpose : Edge Shape Optimized for Various Machining Applications

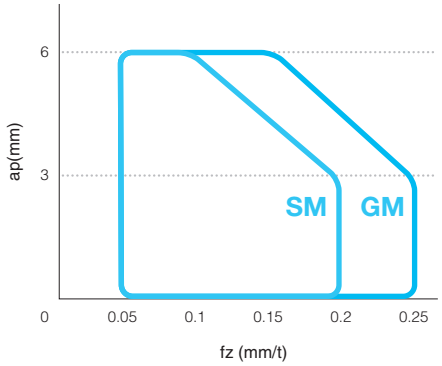
SM type with Low Cutting Force Design : Sharp Cutting and Large Rake Angle

Shouldering



Cutting Conditions : Vc = 150 m/min, ae = DC/2 mm, Workpiece Material : S50C

Slotting



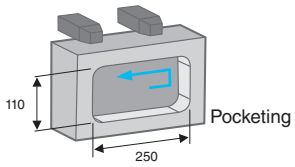
Cutting Conditions : Vc = 150 m/min, ae = DC mm, Workpiece Material : S50C

Case Studies

Parts for machinary SUS420

Vc = 180 m/min
ap × ae = 1 × ~50 mm
fz = 0.1 mm/t Dry
MEV50-S32-06-5T (5 flutes)
TOMT060508ER-GM PR1535

Not clamped firmly



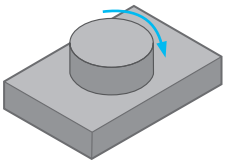
Machining efficiency

MEV	Vf=575 mm/min	Machining efficiency x1.6
Competitor E	Vf=350 mm/min	

Quiet machining even when cutting speed increased.
The MEV shows 1.6 times machining efficiency and good bottom surface finish.
(User Evaluation)

Plate SS400

Vc = 180 m/min
ap = 3 mm
fz = 0.14 mm/t Dry
MEV22-S20-06-3T (ø22-3 flutes)
TOMT060508ER-GM PR1525



Tool life

MEV	160 pcs/edge	Tool life x2.4
Competitor F	65 pcs/edge	

The MEV achieved 2.4 times longer tool life than competitor F.
Quieter machining with excellent surface finish.
(User Evaluation)

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)			
			MEGACOAT NANO			CVD Coated Carbide
			PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel	0.08 – **0.15** – 0.25	☆ 120 – **180** – 250	★ 120 – **180** – 250	-	-
	Alloy Steel	0.08 – **0.15** – 0.2	☆ 100 – **160** – 220	★ 100 – **160** – 220	-	-
	Mold Steel	0.08 – **0.12** – 0.2	☆ 80 – **140** – 180	★ 80 – **140** – 180	-	-
	Stainless Steel (Austenitic related)	0.08 – **0.12** – 0.15	☆ 100 – **160** – 200	☆ 100 – **160** – 200	-	-
	Stainless Steel (Martensitic related)	0.08 – **0.12** – 0.2	☆ 150 – **200** – 250	-	-	★ 180 – **240** – 300
	Stainless Steel (Precipitation Hardening)	0.08 – **0.12** – 0.2	★ 90 – **120** – 150	-	-	-
	Gray Cast Iron	0.08 – **0.18** – 0.25	-	☆ 120 – **180** – 250	★ 120 – **180** – 250	-
	Nodular Cast Iron	0.08 – **0.15** – 0.2	-	☆ 100 – **150** – 200	★ 100 – **150** – 200	-
	Ni-base heat-resistant alloys	0.08 – **0.12** – 0.15	☆ 20 – **30** – 50	-	-	★ 20 – **30** – 50
	Titanium Alloys	0.08 – **0.15** – 0.2	☆ 40 – **60** – 80	-	☆ 30 – **50** – 70	-
SM	Carbon Steel	0.08 – **0.15** – 0.2	☆ 120 – **180** – 250	★ 120 – **180** – 250	-	-
	Alloy Steel	0.08 – **0.12** – 0.18	☆ 100 – **160** – 220	★ 100 – **160** – 220	-	-
	Mold Steel	0.08 – **0.1** – 0.15	☆ 80 – **140** – 180	★ 80 – **140** – 180	-	-
	Stainless Steel (Austenitic related)	0.08 – **0.1** – 0.15	★ 100 – **160** – 200	☆ 100 – **160** – 200	-	-
	Stainless Steel (Martensitic related)	0.08 – **0.1** – 0.15	☆ 150 – **200** – 250	-	-	★ 180 – **240** – 300
	Stainless Steel (Precipitation Hardening)	0.08 – **0.1** – 0.15	☆ 90 – **120** – 150	-	-	-
	Ni-base heat-resistant alloys	0.08 – **0.1** – 0.12	☆ 20 – **30** – 50	-	-	★ 20 – **30** – 50
	Titanium Alloys	0.08 – **0.12** – 0.15	★ 40 – **60** – 80	-	-	-

★ : 1st Recommendation ☆ : 2nd Recommendation

The bold-faced number indicates a center value of recommended cutting condition.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
Cutting with coolant is recommended for finishing.



Reference data for Ramping

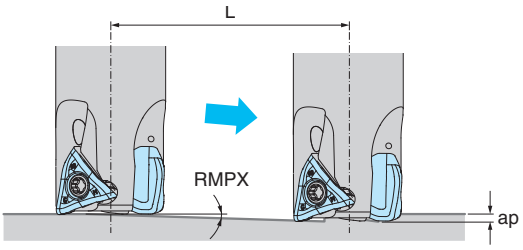
Description	Cutter Dia. DC (mm)	20	22	25	28	30	32	40	50
MEV··· -06- ···	Max. Ramping Angle RMPX	1.00°	0.80°	0.65°	0.60°	0.55°	0.50°	0.40°	0.30°
	tan RMPX	0.017	0.014	0.011	0.010	0.010	0.009	0.007	0.005

Decrease ramping angle if chips become excessively long.

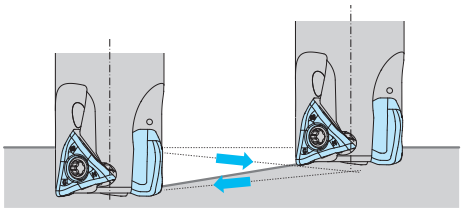
Guide for Ramping (Slant Milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle $L = \frac{ap}{\tan RMPX}$



For two-way ramping, the ramping angle should be half of RMPX.

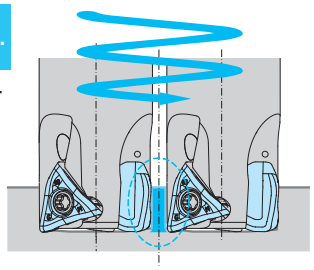


Guide for Helical milling

For helical milling, use between Min. cutting dia. and Max. cutting dia.

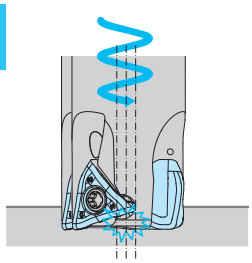
⃠ Exceeding Max. Cutting Dia.

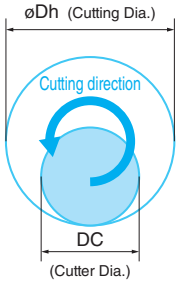
Center core part remains after machining



⃠ Under Min. Cutting Dia.

Center core part interferes with toolholder



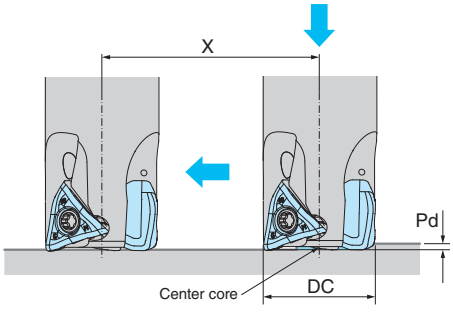


Unit : mm

Description	Min. Cutting Dia.	Max. Cutting Dia.
MEV··· -06- ···	2×DC−5	2×DC−2

For helical milling, use between Min. cutting dia. and Max. cutting dia.
Keep machine depth (h) per rotation less than max. ap (S) in the cutter dimensions chart
Use caution to eliminate incidences caused by producing long chips

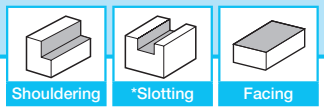
Guide for Drilling



Unit : mm

Description	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MEV··· -06- ···	0.25	DC−3

It is recommended to reduce feed by 25% of recommendation until the center core is removed when traversing after drilling
Axial feed rate recommendation per revolution is f < 0.1mm/rev

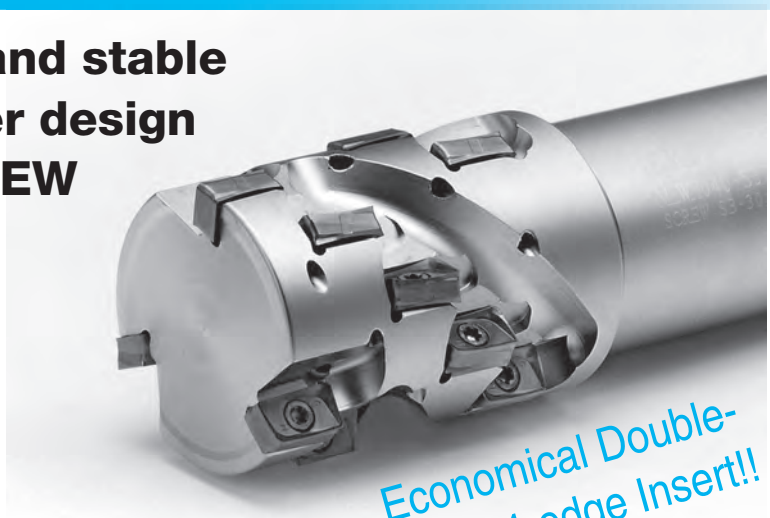


* Only for 2 flute type

High quality and stable machining with heavy milling

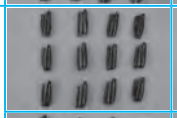
Helical End Mill MEWH

Excellent surface finish and stable machining with toolholder design utilizing advantages of MEW



Economical Double-sided 4-edge Insert!!

Chip Evacuation

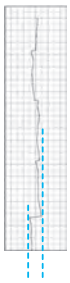
	Chipbreaker	Workpiece Material	fz=0.15mm/t	fz=0.2mm/t
	**GM**	SCM435		
	GM	SS400		
	SM			

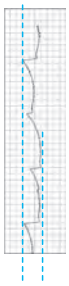
Vc=120m/min
apxae=20x15mm
Dry

Chips are evacuated constantly to the opposite direction of cutter feed without causing clogging

Surface Finish Comparison (Internal evaluation)

MEWH	Competitor A
	



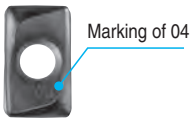


SCM435
Vc=120m/min
apxae=45x5mm
fz=0.1mm/t
Dry

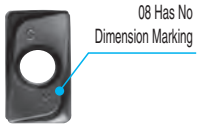


Better surface quality than competitor A

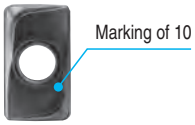
Corner-R(RE) 0.4, 1.0, 1.2, 1.6 and 2.0 added to GM chipbreaker lineup



LOMU100404ER-GM
LOMU150504ER-GM



LOMU100408ER-GM
LOMU150508ER-GM



LOMU150510ER-GM



LOMU100412ER-GM
LOMU150512ER-GM

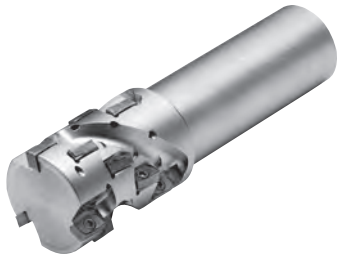


LOMU100416ER-GM
LOMU150516ER-GM



LOMU100420ER-GM
LOMU150520ER-GM

MEWH End Mill (with coolant hole for bottom insert)



Rake Angle	A.R. (MAX.)	R.R.
	+13°	-20°

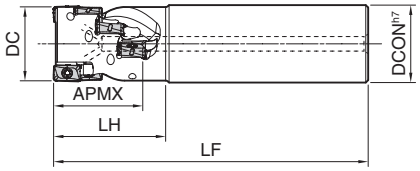


Fig. 1

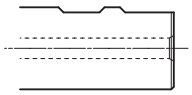


Fig. 3

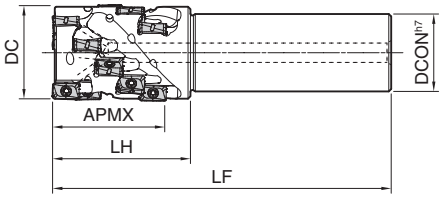


Fig. 2

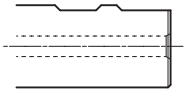


Fig. 4

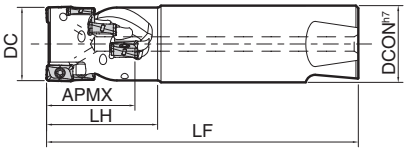


Fig. 5

(X-Treme Shank)

Toolholder Dimensions

Description		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) DC	DCON	LF	LH	APMX	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ⇒M16
MEWH	025-S25-10-3-2T	●	2	3	6	25	25	120	37	28	Yes	Fig. 1	SB-3065TRP	DTPM-8	P-37	LOMU1004..
	032-S32-10-4-2T	●		4	8	32	32	130	46	37						
	040-S32-10-5-2T	●		5	10	40		140	57	46		Fig. 2	Recommended tightening torque for Insert Clamp 1.2N·m			
	040-S32-10-5-3T	●	3		15											
MEWH	040-S32-15-4-2T	●	2	4	8	40	32	160	63	53	Yes	Fig. 2	SB-4090TRP	DTPM-15	P-37	LOMU1505..
	050-S42-15-4-2T	●				50	42						Recommended tightening torque for Insert Clamp 3.5N·m			
	050-S42-15-4-3T	●	3		12											
MEWH	025-W25-10-3-2T	●	2	3	6	25	25	95	37	28	Yes	Fig. 3	SB-3065TRP	DTPM-8	P-37	LOMU1004..
	032-W32-10-4-2T	●		4	8	32	32	108	46	37						
	040-W32-10-5-2T	●		5	10	40		119	57	46		Fig. 4	Recommended tightening torque for Insert Clamp 1.2N·m			
	040-W32-10-5-3T	●	3		15											
MEWH	040-W32-15-4-2T	●	2	4	8	40	32	125	63	53	Yes	Fig. 4	SB-4090TRP	DTPM-15	P-37	LOMU1505..
	050-W40-15-4-2T	●				50	40	135					Recommended tightening torque for Insert Clamp 3.5N·m			
	050-W40-15-4-3T	●	3		12											
MEWH	025S25-10-3-2TXT	●	2	3	6	25	25	118	37	28	Yes	Fig. 5	SB-3065TRP	DTPM-8	P-37	LOMU1004..
	032S32-10-4-2TXT	●		4	8	32	32	133	46	37			Recommended tightening torque for Insert Clamp 1.2N·m			

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

MEWH...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck.

Recommended Cutting Conditions ⇒M89
Applicable chuck for MEWH...XT ⇒M90

● : Std. Item

MEWH Shell Mill (without coolant hole)



Rake Angle	A.R. (MAX.)	R.R.
	+13°	-20°

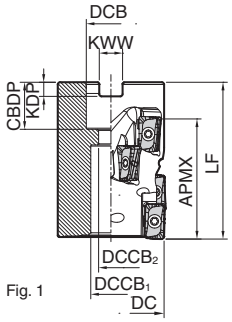


Fig. 1

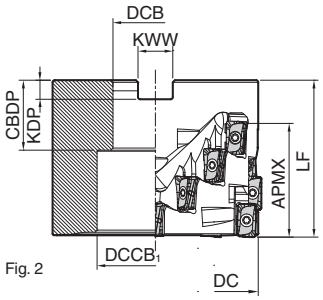


Fig. 2

Toolholder Dimensions

Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) DC	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt	Applicable Inserts ➡ M16
MEWH 040R-10-4-3T-M	●	3	4	12	40	16	15	9	53	19	5.6	8.4	37	Fig. 1	SB-3065TRP	DTPM-8	P-37	HH8X25	LOMU1004..
050R-10-5-3T-M	●		5	15	50	22	18	11	64	21	6.3	10.4	46		Recommended tightening torque for Insert Clamp 1.2N·m			HH10X30	
MEWH 050R-15-4-3T-M	●	3	4	12	50	22	18	11	70	21	6.3	10.4	53	Fig. 1	SB-4090TRP	DTPM-15	P-37	HH10X30	LOMU1505..
063R-15-3-3T-M	●		3	9	63	27	20	13	58	24	7	12.4	41		Recommended tightening torque for Insert Clamp 3.5N·m			HH12X35	
080R-15-4-4T-M	●	4	4	16	80	32	26	18	70	28	8	14.4	53					HH16X45	
100R-15-4-5T-M	●	5		20	100	40	55	-	74	33	9	16.4		Fig. 2				-	

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➡ M89

Applicable Inserts

Description	Applicable Inserts ➡ M16			
	 General purpose	 Low cutting force	 Tough Edge (For Heavy Milling)	 Non-ferrous Metals
MEWH...-10-...	LOMU1004..ER-GM	LOMU100408ER-SM	LOMU100408ER-GH	LOGT100408FR-AM
MEWH...-15-...	LOMU1505..ER-GM	LOMU150508ER-SM	LOMU150508ER-GH	LOGT150508FR-AM

Recommended Cutting Conditions ➡ M89

Guidance of applicable inserts for MEWH

Insert Location Indication	Toolholder Description										
	MEWH...10...					MEWH...15...					
	Corner-R(RE)(mm)					Corner-R(RE)(mm)					
Bottom inserts	0.4	0.8	1.2	1.6	2.0	0.4	0.8	1.0	1.2	1.6	2.0
*Middle inserts	0.4/0.8	0.4/0.8	0.4/0.8	0.4	0.4	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6	0.4~1.6

* For Middle inserts, it is not recommended to use the insert with larger corner-R(RE) than shown in the table, because it will make finished surface uneven.

● : Std. Item

Recommended Cutting Conditions

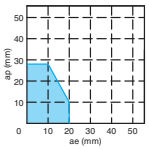
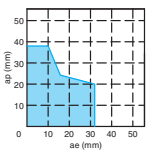
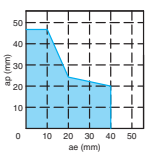
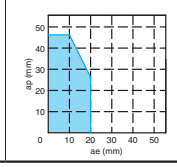
Chipbreaker	Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)					
		Toolholder Description	MEGACOAT NANO			CVD Coated Carbide	DLC Coated Carbide	Carbide
		MEWH025~MEWH050 (Helical End Mill)	PR1535	PR1525	PR1510	CA6535	PDL025	GW25
GM	Carbon Steel	0.06~**0.1**~0.2	☆ 120~**180**~250	★ 120~**180**~250	-	-	-	-
	Alloy Steel	0.06~**0.1**~0.14	☆ 100~**160**~220	★ 100~**160**~220	-	-	-	-
	Mold Steel	0.06~**0.08**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	☆ 150~**200**~250	-	-	★ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	★ 90~**120**~150	-	-	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.17	-	-	★ 120~**180**~250	-	-	-
	Nodular Cast Iron	0.06~**0.08**~0.12	-	-	★ 100~**150**~200	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	☆ 20~**30**~50	-	-	★ 20~**30**~50	-	-
	Titanium Alloys	0.06~**0.08**~0.12	☆ 40~**60**~80	-	☆ 30~**50**~70	-	-	-
SM	Carbon Steel	0.06~**0.1**~0.17	☆ 120~**180**~250	★ 120~**180**~250	-	-	-	-
	Alloy Steel	0.06~**0.08**~0.12	☆ 100~**160**~220	★ 100~**160**~220	-	-	-	-
	Mold Steel	0.06~**0.08**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	★ 100~**160**~200	☆ 100~**160**~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	☆ 150~**200**~250	-	-	★ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	☆ 90~**120**~150	-	-	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	☆ 20~**30**~50	-	-	★ 20~**30**~50	-	-
	Titanium Alloys	0.06~**0.08**~0.12	★ 40~**60**~80	-	☆ 30~**50**~70	-	-	-
GH	Carbon Steel	0.06~**0.1**~0.2	☆ 120~**180**~250	★ 120~**180**~250	-	-	-	-
	Alloy Steel	0.06~**0.1**~0.14	☆ 100~**160**~220	★ 100~**160**~220	-	-	-	-
	Mold Steel	0.06~**0.08**~0.12	☆ 80~**140**~180	★ 80~**140**~180	-	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.08**~0.12	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.08**~0.1	☆ 150~**200**~250	-	-	☆ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.06~**0.08**~0.1	☆ 90~**120**~150	-	-	-	-	-
	Gray Cast Iron	0.06~**0.1**~0.2	-	-	☆ 120~**180**~250	-	-	-
	Nodular Cast Iron	0.06~**0.08**~0.15	-	-	☆ 100~**150**~200	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.1	☆ 20~**30**~50	-	-	☆ 20~**30**~50	-	-
	Titanium Alloys	0.06~**0.08**~0.12	☆ 40~**60**~80	-	☆ 30~**50**~70	-	-	-
AM	Aluminum Alloys	0.06~**0.1**~0.2	-	-	-	-	★ 200~**600**~900	☆ 200~**500**~800

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Stainless Steel, Ni-base heat-resistant alloys and titanium alloys with MEWH.

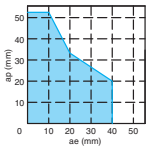
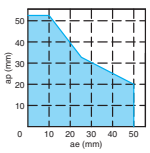
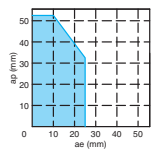
★ : 1st Recommendation
☆ : 2nd Recommendation

Cutting Performance

● LOMU1004 type

Cutting Dia.	Description	2 Flute ap x ae	Description	3 Flute ap x ae
ø25	MEWH025 -S25-10-3-2T		-	-
ø32	MEWH032 -S32-10-4-2T		-	-
ø40	MEWH040 -S32-10-5-2T		MEWH040 -S32-10-5-3T	

● LOMU1505 type

Cutting Dia.	Description	2 Flute ap x ae	Description	3 Flute ap x ae
ø40	MEWH040 -S32-15-4-2T		-	-
ø50	MEWH050 -S42-15-4-2T		MEWH050 -S42-15-4-3T	

<Cutting Conditions>
· Vc=120m/min
· fz=0.08~0.12mm/t
· GM Chipbreaker
· Workpiece Material : SCM435
· Overhang Length
End mill : Overhang length is "LH" of the dimension list

Shouldering | *Slotting | Facing
* Only for 2 flute type

MECH End Mill (with coolant hole for bottom insert)



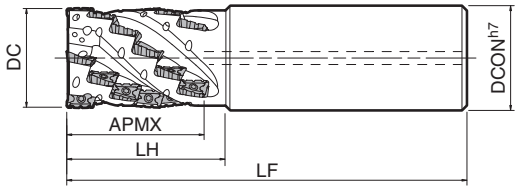


Fig. 1

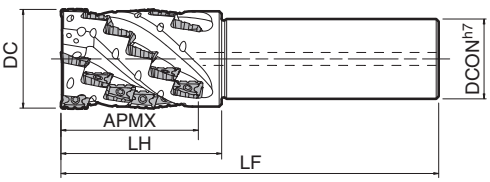


Fig. 2

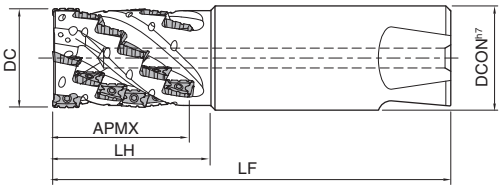


Fig. 3

(X-Treme Shank)

Toolholder Dimensions

Description		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm) DC	DCON	LF	LH	APMX	Rake Angle A.R. (MAX.)	R.R.	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ➔ M23
MECH	025-S25-11-4-2T	●	2	4	8	25	25	120	46	37	+21°	-10°	Fig. 1	SB-2555TRG	DTM-8	P-37	BDMT11T308ER-N2 + BDMT11T308ER-N3
	032-S32-11-5-2T	●		5	10	32	32	140	55	46	+23°	-9°					
	032-S32-11-5-4T	●	4		20												
	040-S32-11-6-4T	●		6	24	40		150	64	55		-8°	Fig. 2				
	040-S42-11-6-4T	●					42	160					Fig. 1				
	050-S42-11-7-4T	●		7	28	50		172	75	64		-7°	Fig. 2				
	050-S42-11-7-6T	●	6		42												
MECH	040-S32-17-4-2T	●	2	4	8	40	32	160	73	59	+19°	-7°	Fig. 2	SB-4070TRN	DTM-15	P-37	BDMT170408ER-N3 + BDMT170408ER-N4
	040-S42-17-4-2T	●					42	170					Fig. 1				
	050-S42-17-5-4T	●	4	5	20	50		185	88	74		-6°	Fig. 2				
MECH	025S25-11-4-2TXT	●	2	4	8	25	25	127	46	37	+21°	-10°	Fig. 3	SB-2555TRG	DTM-8	P-37	BDMT11T308ER-N2 + BDMT11T308ER-N3
	032S32-11-5-2TXT	●	2	5	10	32	32	142	55	46	+23°	-9°					
	032S32-11-5-4TXT	●	4	5	20	32	32	142	55	46							

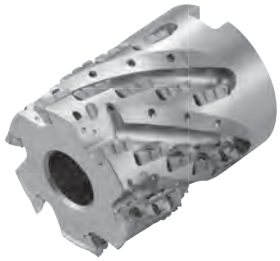
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
MECH...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck.

X-Treme Chuck [NIKKEN]

Description		See Page	Shank Dia. (DCON)	X-Treme Chuck: BT: BT40	BT: BT50	HSK: HSK63A	HSK: HSK100A
4TFR	120-260-R○○-XT	L21	12.0	NBT40-C12EX-86	NBT50-C12EX-96	HSK63A-C12EX-96	HSK100A-C12EX-96
	160-350-R○○-XT		16.0	NBT40-C16EX-96	NBT50-C16EX-106	HSK63A-C16EX-101	HSK100A-C16EX-106
	200-450-R○○-XT		20.0	NBT40-C20EX-96	NBT50-C20EX-116	HSK63A-C20EX-106	HSK100A-C20EX-116
4JER	120-260-R○○-XT	L29	12.0	NBT40-C12EX-86	NBT50-C12EX-96	HSK63A-C12EX-96	HSK100A-C12EX-96
	160-350-R○○-XT		16.0	NBT40-C16EX-96	NBT50-C16EX-106	HSK63A-C16EX-101	HSK100A-C16EX-106
	200-450-R○○-XT		20.0	NBT40-C20EX-96	NBT50-C20EX-116	HSK63A-C20EX-106	HSK100A-C20EX-116
MEWH	025S25-10-3-2TXT	M87	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
	032S32-10-4-2TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121
MECH	025S25-11-4-2TXT	M90	25.0	-	NBT50-C25EX-116	-	HSK100A-C25EX-116
	032S32-11-5-○TXT		32.0	-	NBT50-C32EX-121	-	HSK100A-C32EX-121

● : Std. Item

MECH Shell Mill (without coolant hole)



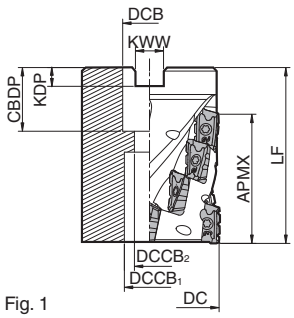


Fig. 1

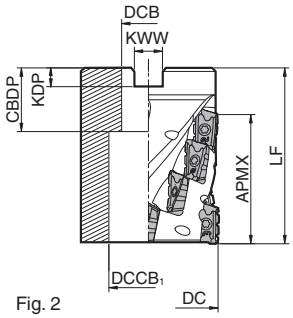


Fig. 2

Rake Angle		
Description	A.R. (MAX.)	R.R.
MECH...-11-	+23°	-8°
MECH...-17-	+19°	-7°

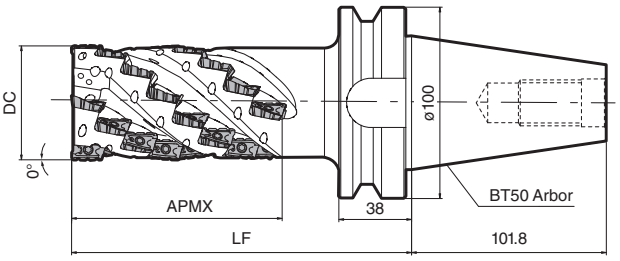
Toolholder Dimensions

Description		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)									Drawing	Spare Parts				Applicable Inserts ➔ M23
						DC	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt	
MECH	**040R-11-4-4T-M**	●	4	4	16	40	16	15	9	50	19	5.6	8.4	37	Fig. 1	SB-2555TRG	DTM-8	P-37	HH8X25	BDMT11T308ER-N2 + BDMT11T308ER-N3
	050R-11-5-6T-M	●	6	5	30	50	22	18	11	63	21	6.3	10.4	46					HH10X30	
MECH	**050R-17-2-4T-M**	●	4	2	8	50	22	18	11	52	21	6.3	10.4	30		SB-4070TRN	DTM-15	P-37	HH10X30	BDMT170408ER-N3 + BDMT170408ER-N4
	050R-17-4-4T-M	●		4	16					78				59					HH10X40	
	063R-17-3-4T-M	●	4	3	12	63	27	20	14	70	24	7	12.4	45					HH12X35	
	080R-17-4-6T-M	●	6	4	24	80	32	26	18	85	28	8	14.4	59					HH16X45	
	100R-17-4-6T-M	●	6	4	24	100	40	56	-	85	30	9	16.4	59	Fig. 2				-	
MECH	**063R-17-3-4T**	●	4	3	12	63	25.4	20	14	70	26	6	9.5	45	Fig. 1	SB-4070TRN	DTM-15	P-37	HH12X35	
	080R-17-4-6T	●	6	4	24	80	31.75	26	18	85	32	8	12.7	59					HH16X45	
	100R-17-4-6T	●	6	4	24	100	38.1	56	-	85	38	10	15.9	59	Fig. 2				-	

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

MECH-BT50 (Integral Arbor type, without coolant hole)





Rake Angle		
Description	A.R. (MAX.)	R.R.
MECH...-11-	+23°	-7°
MECH...-17-	+19°	-7°

Toolholder Dimensions

Description		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)			Weight (kg)	Spare Parts			Applicable Inserts ➔ M23
						DC	LF	APMX		Clamp Screw	Wrench	Anti-seize Compound	
MECH	**050R11-8-4T-BT50**	●	4	8	32	50	143	73	4.8	SB-2555TRG	DTM-8	P-37	BDMT11T308ER-N2 + BDMT11T308ER-N3
MECH	**050R17-7-4T-BT50**	●	4	7	28	50	173	104	4.9	SB-4070TRN	DTM-15	P-37	BDMT170408ER-N3 + BDMT170408ER-N4
	063R17-7-4T-BT50	●				63			5.9				
	080R17-7-4T-BT50	●				80			7.8				
	100R17-7-6T-BT50	●	6		42	100			10.2				

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts

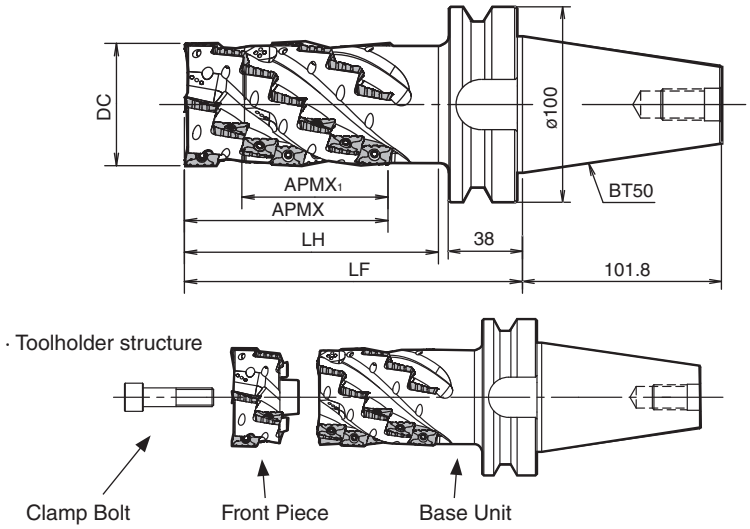
Description	Applicable Inserts ➔ M23					
	2-Notched	+	3-Notched	3-Notched	+	4-Notched
MECH...-11-	**BDMT 11T308ER-N2**	+	**BDMT 11T308ER-N3**	-		
MECH...-17-	-			**BDMT 170408ER-N3**	+	**BDMT 170408ER-N4**

● : Std. Item

Recommended Cutting Conditions ➔ M95

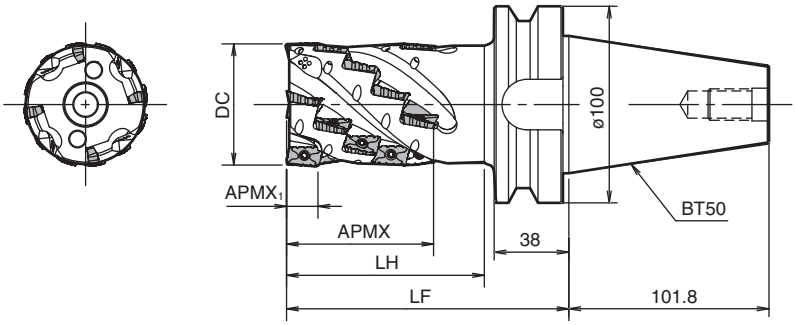
MECH-BT50SA (without coolant hole) Arbor Integral Type (Base Unit + 1 Front Piece + Clamp Bolt)





MECH-BT50-A (without coolant hole) Base Unit





Toolholder Dimensions

Description			Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)					Rake Angle		Weight (kg)
							DC	LF	LH	APMX	APMX1	A.R.	R.R.	
Arbor Integral Type	MECH	050R11-4T-BT50SA	MTO	4	8	32	50	143	99	73	55	+23°	-7°	4.8
		063R17-4T-BT50SA	MTO		7	28	63	173	130	104	75	+19°	-7°	5.8
		080R17-4T-BT50SA	MTO				80							7.6
		100R17-6T-BT50SA	MTO	6	7	42	100							9.8
Base Unit	MECH	050R11-4T-BT50-A	MTO	4	6	24	50	125	81	55	10	+23°	-7°	4.6
		063R17-4T-BT50-A	MTO		5	20	63	143	100	75	16	+19°	-7°	5.4
		080R17-4T-BT50-A	MTO				80							6.8
		100R17-6T-BT50-A	MTO	6	5	30	100							8.5

Recommended Cutting Conditions ➔ M95

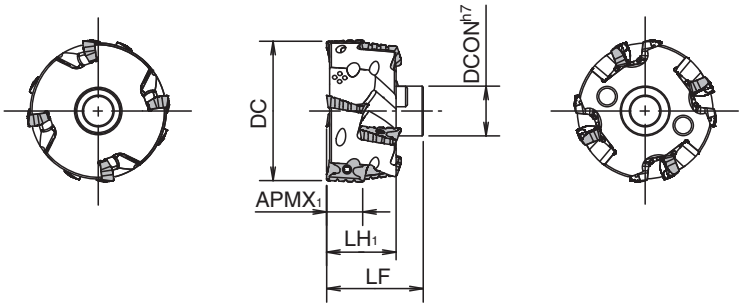
Toolholder structure

End Mill		=	Base Unit ➔ M92	+	Front Piece (1pc) ➔ M93	+	Clamp Bolt
MECH	050R11-4T-BT50SA		MECH050R11-4T-BT50-A		MECH050R11-4T-F		HH12X35
	063R17-4T-BT50SA		MECH063R17-4T-BT50-A		MECH063R17-4T-F		HH12X40
	080R17-4T-BT50SA		MECH080R17-4T-BT50-A		MECH080R17-4T-F		HH16X40
	100R17-6T-BT50SA		MECH100R17-6T-BT50-A		MECH100R17-6T-F		HH20X40

MTO : Made to order

MECH-F (without coolant hole) Front Piece





Toolholder Dimensions

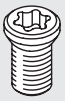
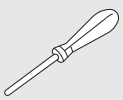
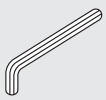
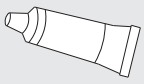
Description		Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)					Rake Angle		Weight (kg)
						DC	DCON	LF	LH_1	$APMX_1$	A.R.	R.R.	
MECH	050R11-4T-F	●	4	2	8	50	22	44	30	16	+23°	-7°	0.2
	063R17-4T-F	●				63	22				+19°		0.4
	080R17-4T-F	●				80	32						0.8
	100R17-6T-F	●	6	2	12	100	45						1.3

Applicable Inserts

End Mill		Base Unit ⇒ M92	Front Piece ⇒ M93	Applicable Inserts ⇒ M23
MECH	050R11-4T-BT50SA	MECH050R11-4T-BT50-A	MECH050R11-4T-F	BDMT11T308ER-N2 + BDMT11T308ER-N3
	063R17-4T-BT50SA	MECH063R17-4T-BT50-A	MECH063R17-4T-F	BDMT170408ER-N3 + BDMT170408ER-N4
	080R17-4T-BT50SA	MECH080R17-4T-BT50-A	MECH080R17-4T-F	
	100R17-6T-BT50SA	MECH100R17-6T-BT50-A	MECH100R17-6T-F	

· For installation of notched insert, see page ⇒ M95.

Spare Parts

Description			Spare Parts				
			Clamp Screw	Wrench (for Clamp Screw)	Clamp Bolt	Wrench (for Clamp Bolt)	Anti-seize Compound
							
Arbor Integral Type (Set)	MECH	050R11-4T-BT50SA	SB-2555TRG	DTM-8	HH12X35	LW-10	P-37
		063R17-4T-BT50SA	SB-4070TRN	DTM-15	HH12X40	LW-10	
		080R17-4T-BT50SA			HH16X40	LW-14	
		100R17-6T-BT50SA			HH20X40	LW-17	
Base Unit	MECH	050R11-4T-BT50-A	SB-2555TRG	DTM-8	HH12X35	LW-10	
		063R17-4T-BT50-A	SB-4070TRN	DTM-15	HH12X40	LW-10	
		080R17-4T-BT50-A			HH16X40	LW-14	
		100R17-6T-BT50-A			HH20X40	LW-17	
Front Piece	MECH	050R11-4T-F	SB-2555TRG	-	-	-	
		063R17-4T-F	SB-4070TRN				
		080R17-4T-F					
		100R17-6T-F					

· If you purchased the front piece only, wrench (for clamp screw) / clamp bolt and wrench (for clamp bolt) is not included.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Smooth Chip Evacuation

Smooth Chip Evacuation

Notched insert breaks chips into small pieces

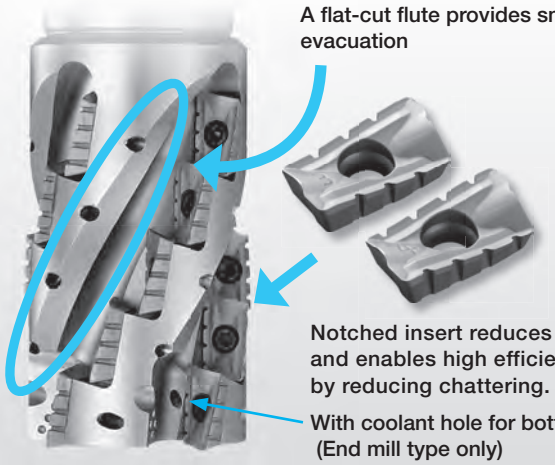


MECH



Competitor A

Workpiece Material : SS400
Vc = 120m/min
apxae = 40mmx10mm
fz = 0.12mm/t
MECH032-S32-11-5-4T



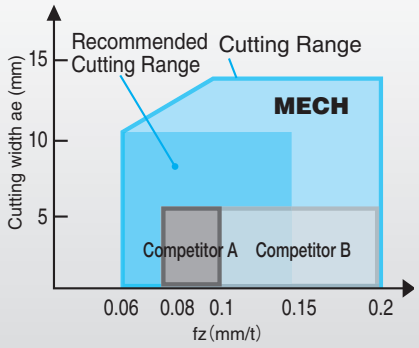
A flat-cut flute provides smooth chip evacuation

Notched insert reduces cutting force, and enables high efficiency machining by reducing chattering.

With coolant hole for bottom insert (End mill type only)

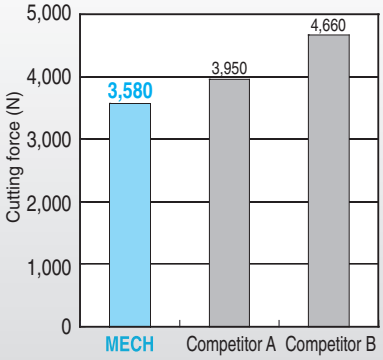
Low Cutting Force

Low Cutting Force due to Notched Inserts



Workpiece Material : S50C
Vc = 120m/min
apxae = 40 mmx5~13mm
fz = 0.06 ~ 0.2mm/t
MECH032-S32-11-5-4T

Cutting Force Comparison (principal force)



Workpiece Material : S50C
Vc = 120m/min
apxae = 40mmx10mm
fz = 0.1mm/t
MECH032-S32-11-5-4T

(Internal evaluation)

Number of Inserts Installed

Description	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 025-S25-11-4-2T	2	8	4	4	-	-
032-S32-11-5-2T		10	5	5		
032-S32-11-5-4T	4	20	10	10		
040-S32-11-6-4T		24	12	12		
040-S42-11-6-4T						
050-S42-11-7-4T		28	14	14		
050-S42-11-7-6T	6	42	21	21		
MECH 040-S32-17-4-2T	2	8	-	-	4	4
040-S42-17-4-2T						
050-S42-17-5-4T	4	20			10	10
MECH 040R-11-4-4T-M	4	16	8	8	-	-
050R-11-5-6T-M	6	30	15	15		
MECH 050R-17-2-4T-M	4	8	-	-	4	4
050R-17-4-4T-M		16			8	8
063R-17-3-4T-M		12			6	6
080R-17-4-6T-M	6	24			12	12
100R-17-4-6T-M						
MECH 063R-17-3-4T	4	12			6	6
080R-17-4-6T	6	24			12	12
100R-17-4-6T						

Description	No. of Flutes	No. of Inserts	No. of Inserts			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 050R11-8-4T-BT50	4	32	16	16	-	-
050R17-7-4T-BT50		28	-	-	14	14
063R17-7-4T-BT50						
080R17-7-4T-BT50						
100R17-7-6T-BT50	6	42			21	21
MECH 050R11-4T-BT50SA	4	32	16	16	-	-
063R17-4T-BT50SA	4	28	-	-	14	14
080R17-4T-BT50SA						
100R17-6T-BT50SA	6	42	-	-	21	21
MECH 050R11-4T-BT50-A	4	24	12	12	-	-
063R17-4T-BT50-A	4	20	-	-	10	10
080R17-4T-BT50-A						
100R17-6T-BT50-A	6	30	-	-	15	15
MECH 050R11-4T-F	4	8	4	4	-	-
063R17-4T-F	4	8	-	-	4	4
080R17-4T-F						
100R17-6T-F	6	12	-	-	6	6

Caution when installing Notched Insert

1. Install notched inserts by cutting the insert with the number of marks on the toolholder body.

<Insert Number and Toolholder Marks>

Insert Size	11 type		17 type	
Insert No.	2	3	3	4
Marks				

* Using the cutter with the inserts installed incorrectly will damage the toolholder.

2. When installing notched inserts in flute line, ensure that the number on the insert is the same as the insert in first stage. (Ref. to Fig. 1, 2 and 3)

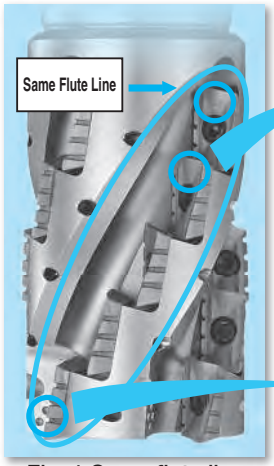


Fig. 1 Same flute line



Fig. 2 Insert No.



Fig. 3 Marks

Recommended Cutting Conditions (When using a notched insert)

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)			
		MEGACOAT NANO	MEGACOAT		
		PR1535	PR1225	PR1230	PR1210
Carbon Steel	0.08~0.1~0.15	☆ 120~180~250	☆ 120~180~250	★ 120~180~220	-
Alloy Steel	0.08~0.1~0.15	☆ 100~160~220	☆ 100~160~220	★ 100~160~200	-
Mold Steel	0.08~0.1~0.15	☆ 80~140~180	☆ 80~140~180	★ 80~140~160	-
Gray Cast Iron	0.08~0.15~0.18	-	-	-	★ 120~180~250
Nodular Cast Iron	0.08~0.15~0.18	-	-	-	★ 100~150~220
*Titanium Alloys	0.08~0.1~0.15	★ 40~60~80	-	-	☆ 30~50~70

★ : 1st Recommendation ☆ : 2nd Recommendation

* Machining with coolant is recommended for titanium alloys.

1. The recommended cutting conditions above are for notched inserts.
2. If using an insert without notch, the cutting depth (ap) and width (ae) should be 60% or less of those of a notched insert.

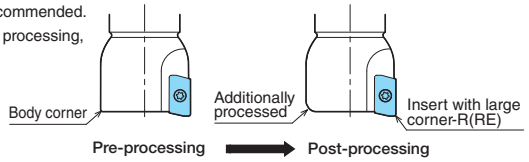
· JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)
		Carbide
		GW25
Aluminum Alloys (Si 13% or less)	0.05~0.3	200~800
Aluminum Alloys (Si 13% and over)	0.05~0.2	200~300

■ When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary. Ref. to the chart below for the recommended modifications. (Additional grind off is not necessary when corner-R(RE) is 1.2mm or less.)

Insert Corner-R(RE) (mm)	Additional Processing Dimension to Body Corner (mm)
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

* Round- shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.

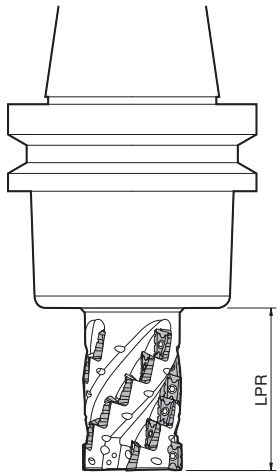


Cutting Performance (Used Machine: Machining center equivalent to AC15 / 18.5kW)

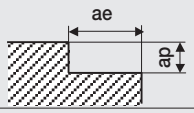
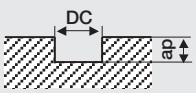
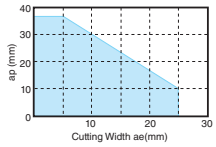
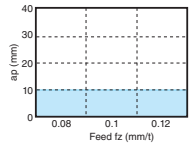
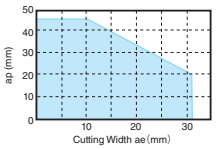
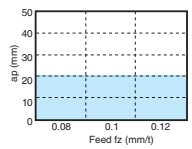
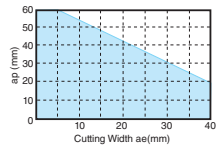
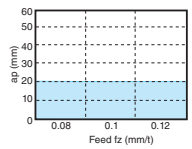
MECH End Mill

Cutting Dia.	Description	Overhang Length LPR (mm)
ø25	**MECH025-S25-11-4-2T**	48
ø32	**MECH032-S32-11-5-2T**	57
	MECH032-S32-11-5-4T	
ø40	**MECH040-S32-11-6-4T**	65
	MECH040-S42-11-6-4T	
ø50	**MECH050-S42-11-7-4T**	76
	MECH050-S42-11-7-6T	
ø40	**MECH040-S32-17-4-2T**	74
	MECH040-S42-17-4-2T	
ø50	**MECH050-S42-17-5-4T**	89

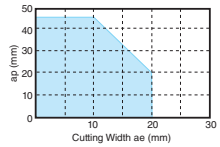
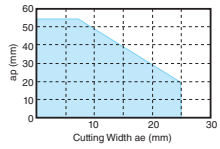
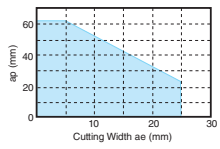
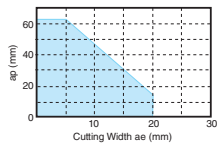
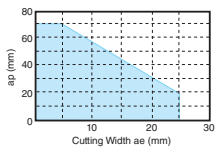
Shape



2 Flute Type (Workpiece Material : S50C)

Description	Shouldering	Slotting
		
	Cutting Speed : Vc=100~180m/min Feed : fz=0.08~0.15mm/t	Cutting Speed : Vc=100~120m/min Feed : fz=0.08~0.12mm/t
MECH025-S25-11-4-2T		
MECH032-S32-11-5-2T		
MECH040-S32-17-4-2T **MECH040-S42-17-4-2T**		

4 Flute / 6 Flute Type

MECH032-S32-11-5-4T	
MECH040-S32-11-6-4T **MECH040-S42-11-6-4T**	
MECH050-S42-11-7-4T	
MECH050-S42-11-7-6T	
MECH050-S42-17-5-4T	

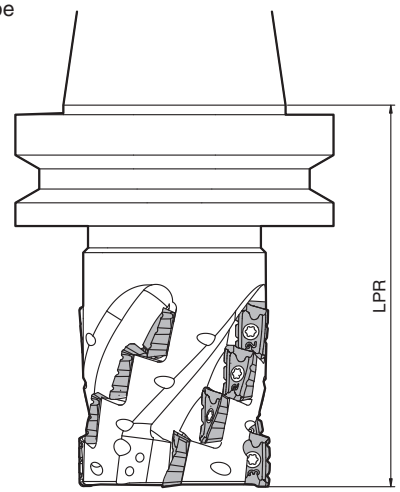
4 Flute / 6 Flute Type are not recommended for Slotting.

MECH Shell Mill

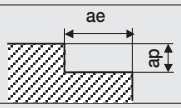
(Workpiece Material : S50C)

Cutting Dia.	Description	Overhang Length LPR (mm)
ø40	**MECH040R-11-4-4T-M**	125
ø50	**MECH050R-11-5-6T-M**	123
	MECH050R-17-2-4T-M	112
	MECH050R-17-4-4T-M	138
ø63	**MECH063R-17-3-4T-□**	115
ø80	**MECH080R-17-4-6T-□**	130
ø100	**MECH100R-17-4-6T-□**	130

Shape

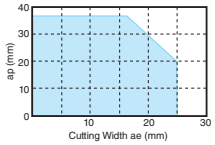


■ Shouldering

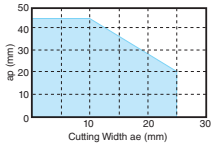


Cutting Speed : Vc=100~180m/min
Feed : fz=0.08~0.15mm/t

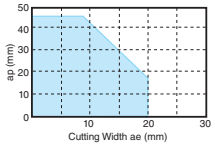
MECH040R -11-4-4T-M



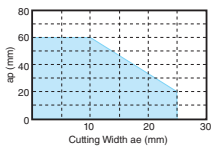
MECH063R -17-3-4T-□



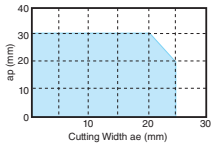
MECH050R -11-5-6T-M



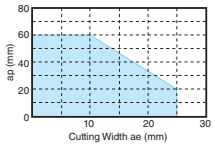
MECH080R -17-4-6T-□



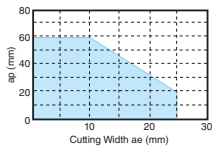
MECH050R -17-2-4T-M



MECH100R -17-4-6T-□



MECH050R -17-4-4T-M



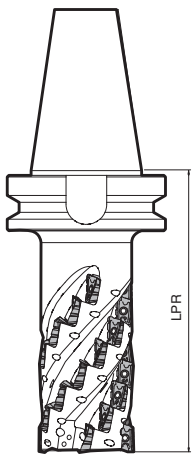
Slotting is not recommended.

MECH-BT50 (Integral Arbor Type)
MECH-BT50SA (Head exchangeable type / Integral Arbor type)

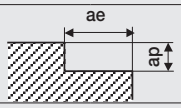
(Workpiece Material : S50C)

Cutting Dia.	Description	Overhang Length LPR (mm)
ø50	**MECH050R11-8-4T-BT50** **MECH050R11-4T-BT50SA**	143
	MECH050R17-7-4T-BT50	173
ø63	**MECH063R17-7-4T-BT50** **MECH063R17-4T-BT50SA**	
ø80	**MECH080R17-7-4T-BT50** **MECH080R17-4T-BT50SA**	
ø100	**MECH100R17-7-6T-BT50** **MECH100R17-6T-BT50SA**	

Shape

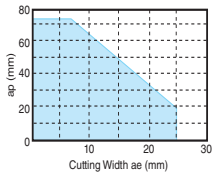


■ Shouldering

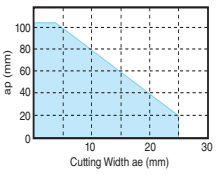


Cutting Speed : Vc=100~180m/min
Feed : fz=0.08~0.15mm/t

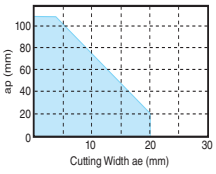
MECH050R11 -8-4T-BT50
MECH050R11 -4T-BT50SA



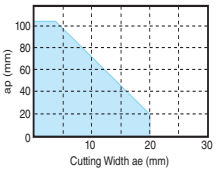
MECH080R17 -7-4T-BT50
MECH080R17 -4T-BT50SA



MECH050R17 -7-4T-BT50

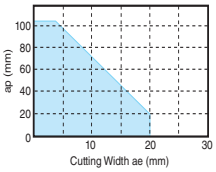


MECH100R17 -7-6T-BT50
MECH100R17 -6T-BT50SA



Slotting is not recommended.

MECH063R17 -7-4T-BT50
MECH063R17 -4T-BT50SA



Helical End Mill for Titanium Alloy Machining

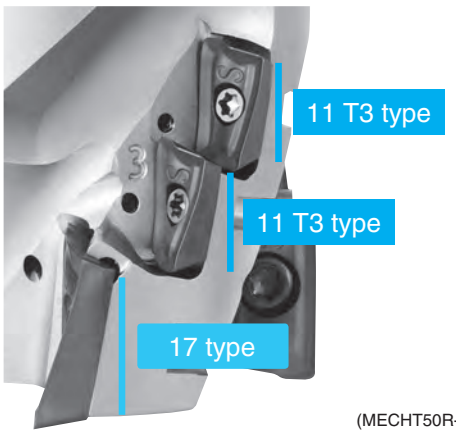
MECHT

Insert Size Combination Improves Roughing Capabilities
Maintains Stable Machining and Long Tool Life

1 Developed to Reduce Chattering and Chip Recutting Issues

Unique Insert Combination

The larger bottom inserts are positioned to handle larger cutting forces (excluding ø32)
Stable machining with improved fracture resistance



(MECHT50R-1711 type)

New Design for Higher Reliability

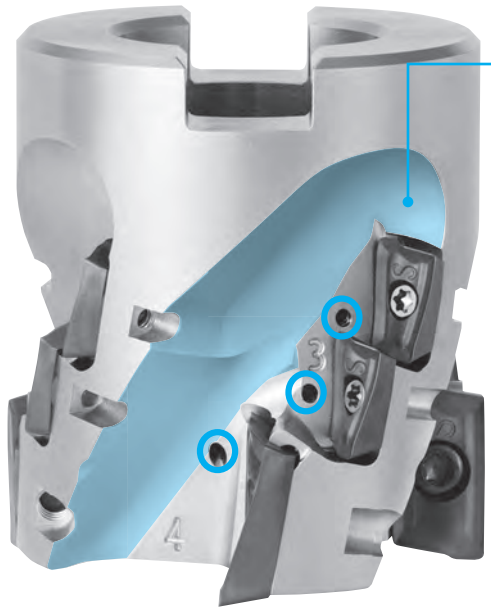
Bottom inserts are held in place by double-faced contacts



Bore Dia.
Larger bore diameter improves fastening power and reduces chattering
ø50mm Cutter with a ø27mm Bore (Conventional Bore : ø22mm)

Toolholder Hardness Hardened 15% more than conventional holders

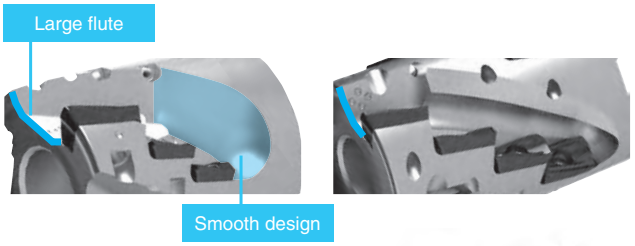
Toolholder Spec Custom ordering available (Custom number of inserts and stages)



Excellent Chip Evacuation

New flute design
Large, smooth flutes prevent chip clogging

MECHT (ø50-4T 3 Stages) Conventional (ø50-4T 4 Stages)



All inserts have coolant holes
Optimized hole diameter controls flow amount and pressure

Smooth chip evacuation as well as superior cooling of the cutting edge



Chips Example

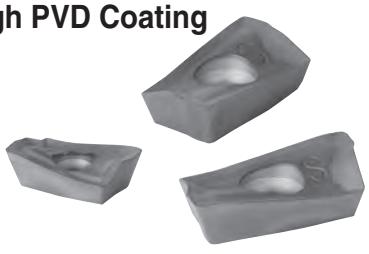
2 Longer Tool Life with Low-resistance JS Chipbreaker and Tough PVD Coating

Low Cutting Force JS Chipbreaker

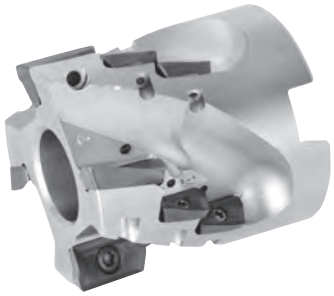
Heat at the cutting edge is suppressed due to sharp cutting performance
Long tool life

Greater Toughness PR1535

Fracture resistant with a tough substrate and high heat-resistant MEGACOAT NANO coating technology



MECHT



End Mill

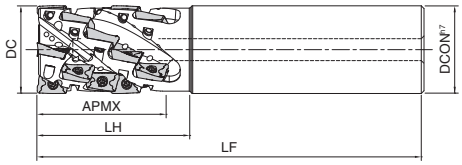


Fig.1

Shell Mill

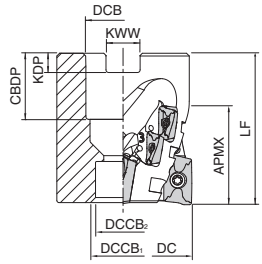


Fig.2

Rake Angle			
Description		A.R. (MAX.)	R.R.
MECHT32...-11-		+23°	-9°
MECHT50...-1711-	1st Stage	+19°	-7°
	2nd Stage or Higher	+23°	-6°
MECHT63...-17-		+19°	-7°
MECHT80...-17-			

Toolholder Dimensions (End Mill)

Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)					Drawing	Spare Parts		Applicable Inserts	
					DC	DCON	LF	LH	APMX		Clamp Screw	Wrench	1st Stage	2nd Stage or Higher
MECHT 32-S32-11-5-4T	●	4	5	20	32	32	140	55	46	Fig.1	SB-2555TRG	DTM-8	BDMT11T3...	*1 BDMT11T308...

Toolholder Dimensions (Shell Mill)

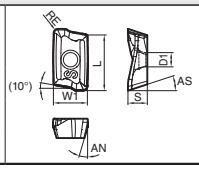
Description	Stock	No. of Flutes	No. of Stages	No. of Inserts	Dimension (mm)									Drawing	Spare Parts			Applicable Inserts	
					DC	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX		Clamp Screw	Wrench	Mounting bolt	1st Stage	2nd Stage or Higher
MECHT50R-1711-3-4T-M	●	4	3	12	50	27	20	14	55	24	7	12.4	34	Fig.2	SB-2555TRG	DTM-8	HH12X40	BDMT1704...	*1 BDMT11T308...
50R-1711-4-5T-M	●	5	4	20					65				43		SB-4070TRN	DTM-15	HH12X50		
MECHT63R-17-4-5T-M	●	5	4	20	63	27	20	14	80	24	7	12.4	60		SB-4070TRN	DTM-15	HH12X65		*1 BDMT170408...
80R-17-4-6T-M	●	6	4	24	80	32	26	17		28	8	14.4					HH16X65		

*1. Use inserts with Corner R of 0.8 or less for the 2nd or higher stages

Machining with coolant is recommended (Internal coolant pressure 1.5 MPa or higher)

Coat Anti-seize Compound (P-37) thinly on portion of taper and thread when insert is fixed.

Applicable Inserts

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)					Angle		MEGACOAT NANO
				W1	S	D1	L	RE	AS	AN	PR1535
 Low cutting force		BDMT	11T302ER-JS	6.7	3.8	2.8	11.0	0.2	18°	13°	●
			11T304ER-JS					0.4			●
			11T308ER-JS					0.8			●
		BDMT	170404ER-JS	9.6	4.9	4.4	17.0	0.4	18°	13°	●
			170408ER-JS					0.8			●

General JT chipbreaker and notched insert (only if holder has an even number of inserts) can also be used. For more information, please contact your Kyocera sales representative.

When using inserts with corner-R(RE) 1.6 or larger, additional modifications of the cutter body will be necessary. (Ref. to **M95**)

Recommended Cutting Conditions

Workpiece Material	Applications	Depth of Cut (mm)		fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)
		ap	ae		MEGACOAT NANO PR1535
Titanium Alloys	Shouldering	~Length of Cut (APMX)	~0.5DC	0.1 ~ **0.12** ~ 0.16	30 ~ **40** ~ 60
	Slotting	~0.5DC	1DC	0.05 ~ **0.07** ~ 0.09	30 ~ **40** ~ 50

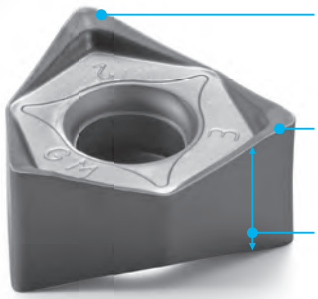
● : Std. Item



MFWN

Double-Sided, 6-edge insert, 90°Cutters
Low cutting force and reduced chattering

6 Advantages



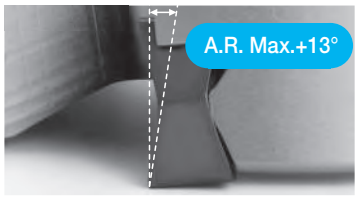
"Large slant edge" Design

Economical Double-sided 6-edge Insert

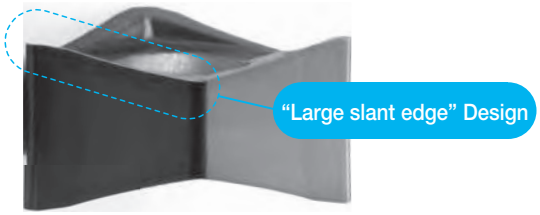
Tough Cutting Edge with Thick Edge Design

Advantage 1 Sharp cutting with low cutting force

● Sharp cutting by large rake angle



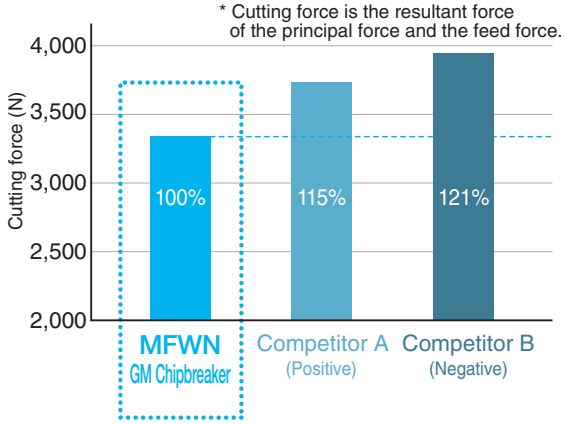
● "Large slant edge" Design reduces shock when cutting edge enters the workpiece



● Cutting Force Comparison (Internal evaluation)

<Cutting Conditions>
Vc = 180m/min
ap×ae = 7×110mm
fz = 0.2mm/t
Workpiece Material : S50C
ø125mm Cutter

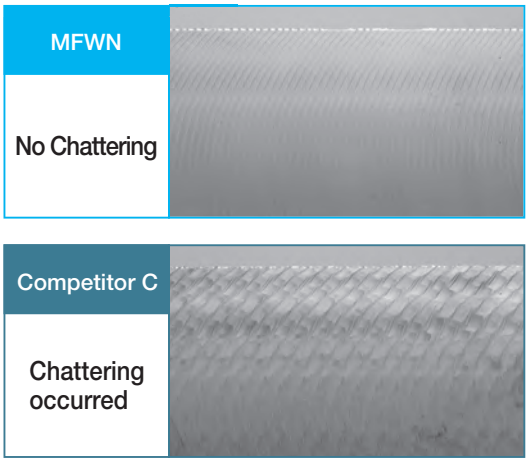
* Cutting force is the resultant force of the principal force and the feed force.



Advantage 2 Reduced chattering

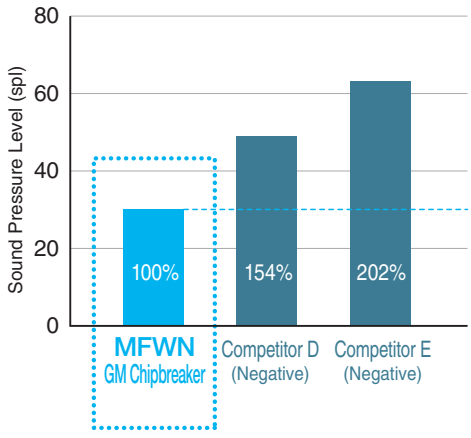
Applicable to long overhang

● Surface Finish Comparison (Internal evaluation)



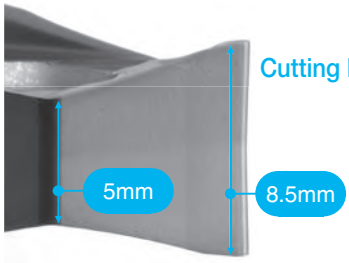
● Machining Noise Comparison (Internal evaluation)

<Cutting Conditions>
Vc = 200m/min
ap×ae = 3×15mm
fz = 0.1mm/t
Workpiece Material : S50C
ø80mm Cutter (7 Flutes)

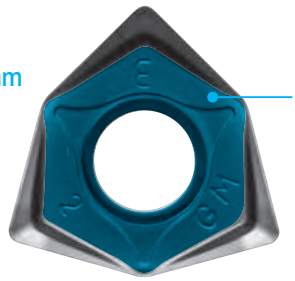




Advantage 3 Superior Fracture Resistance with Thick Edge Design



Cutting Edge Thickness 8.5 ~ 5mm

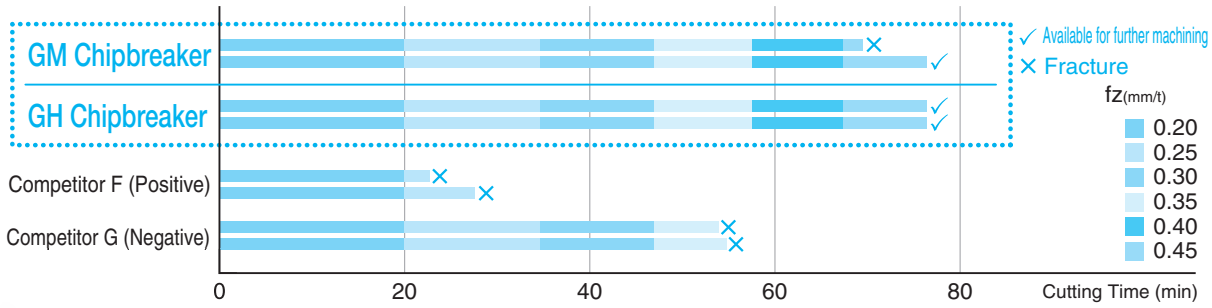


Stable Clamping with the Optimum Insert Face Design

● Fracture Resistance Comparison (Internal evaluation)

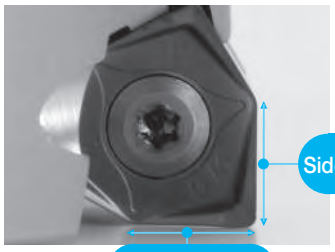
<Cutting Conditions>

Workpiece Material : SCM440H(38~42HS) Interruption with a slot on the workpiece
Vc = 100m/min ap×ae = 2×100mm fz = 0.2~0.45 mm/t Dry



Advantage 4 Neutral

For Vertical Machining as well as Facing
Neutral Inserts are applicable to left-hand cutters (custom order).



Applicable to a wide range of application

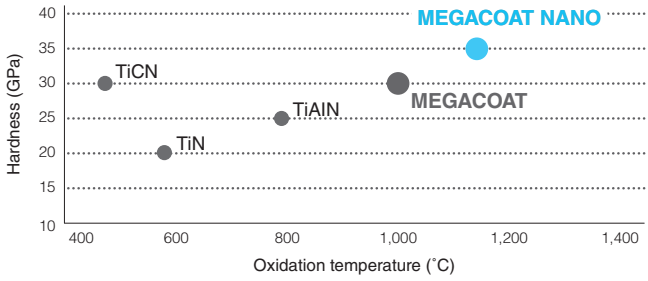
Advantage 5 Extended Tool Life by MEGACOAT NANO Technology

PR1525 for steel and stainless steel (austenitic), PR1535 for titanium alloys and stainless steel (precipitation hardening) and PR1510 for cast iron are available.

Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature : 1,150˚C)

CA6535 (CVD coated carbide) for heat-resistant alloys and stainless steel (martensitic) is available, too.

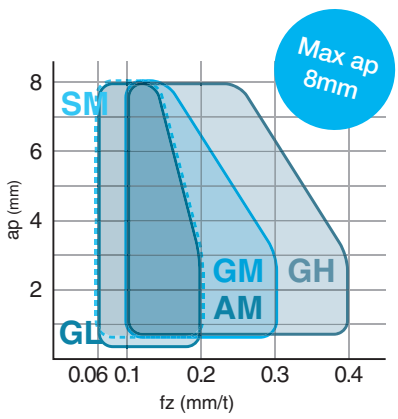
Properties of Coating



Low Oxidation resistance High

Advantage 6 5 chipbreakers for various applications

Chipbreaker	Applications	Insert
GM	General purpose	
SM	Low cutting force	
GH	For Heavy Milling	
GL	Surface-Finish Oriented	
AM	Non-ferrous Metals	



Smooth chip evacuation



Properly curled chips
(The photo was taken by a high speed camera.)

MFWN Face Mill



Rake Angle	A.R.	R.R.	
	(MAX.) +13°	DC=63 -10° DC=80 -9° DC=100 -8°	DC=125 -7.5° DC=160-250 -7°

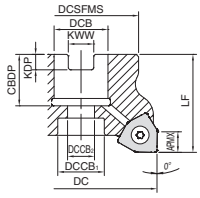


Fig. 1

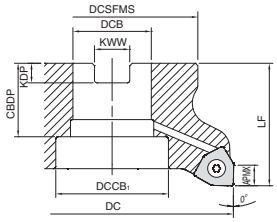


Fig. 2

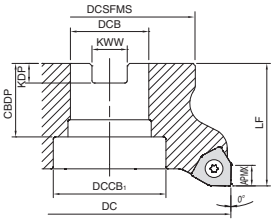


Fig. 3

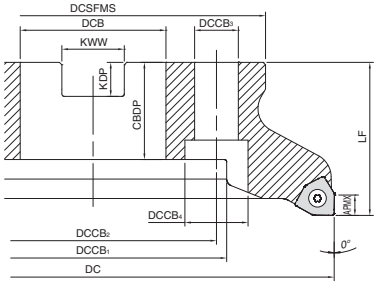


Fig. 4

Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)											Drawing	Weight (kg)	Shim	Max. Revolution (min⁻¹)	Coolant Hole
						DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	DCCB3	DCCB4					
Metric	Coarse pitch	MFWN	90063R-3T-M	●	3	63	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5		14,000	
			90080R-4T-M	●	4	80	60	27	20	13	50	24	7	12.4	-	-		1.0		12,000	Yes
			90100R-5T-M	●	5	100	70	32	46	-		30	8	14.4			Fig. 2	1.3		10,500	
			90125R-6T-M	●	6	125	87	40	55		63	33	9	16.4				2.5	Yes	9,500	
			90160R-8T-M	●	8	160	102		68	66.7		32			14	20	Fig. 4	3.8		8,000	
			90200R-10T-M	●	10	200	142	60	110	101.6		40	14	25.7	18	26		6.0		7,500	No
			90250R-12T-M	●	12	250												8.4		6,500	
	Fine pitch	MFWN	90063R-4T-M	●	4	63	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5		16,000	
			90080R-5T-M	●	5	80	60	27	20	13	50	24	7	12.4	-	-		1.0		13,500	Yes
			90100R-7T-M	●	7	100	70	32	46	-		30	8	14.4			Fig. 2	1.3		12,000	
			90125R-8T-M	●	8	125	87	40	55		63	33	9	16.4				2.6	No	10,500	
			90160R-10T-M	●	10	160	102		68	66.7		32			14	20	Fig. 4	3.9		9,000	
			90200R-12T-M	●	12	200	142	60	110	101.6		40	14	25.7	18	26		6.3		8,000	No
			90250R-14T-M	●	14	250												8.7		7,000	
	Extra fine pitch	MFWN	90063R-5T-M	●	5	63	47	22	19	11	40	21	6.3	10.4			Fig. 1	0.5		16,000	
			90080R-7T-M	●	7	80	60	27	20	13	50	24	7	12.4	-	-		1.1		10,500	Yes
			90100R-9T-M	●	9	100	70	32	46	-		30	8	14.4			Fig. 2	1.3	No	9,500	
			90125R-12T-M	●	12	125	87	40	55		63	33	9	16.4				2.6		8,000	
			90160R-14T-M	●	14	160	102		68	66.7		32			14	20	Fig. 4	3.9		7,000	No
Bore Dia. Inch spec	Coarse pitch	MFWN	90080R-4T	●	4	80	60	25.4	20	13	50	27	6	9.5			Fig. 1	1.0		12,000	
			90100R-5T	●	5	100	70	31.75	46			34	8	12.7	-	-	Fig. 2	1.3		10,500	Yes
			90125R-6T	●	6	125	87	38.1	55	-	63	38	10	15.9				2.6		9,500	
			90160R-8T	●	8	160	102	50.8	72				11	19.1			Fig. 3	3.9	Yes	8,000	
			90200R-10T	●	10	200	142	47.625	110	101.6		40	14	25.4	18	26	Fig. 4	6.3		7,500	No
			90250R-12T	●	12	250												8.7		6,500	
	Fine pitch	MFWN	90080R-5T	●	5	80	60	25.4	20	13	50	27	6	9.5			Fig. 1	1.0		13,500	
			90100R-7T	●	7	100	70	31.75	46			34	8	12.7	-	-	Fig. 2	1.4		12,000	Yes
			90125R-8T	●	8	125	87	38.1	55	-	63	38	10	15.9				2.7		10,500	
			90160R-10T	●	10	160	102	50.8	72				11	19.1			Fig. 3	4.0	No	9,000	
			90200R-12T	●	12	200	142	47.625	110	101.6		40	14	25.4	18	26	Fig. 4	6.6		8,000	No
			90250R-14T	●	14	250												8.9		7,000	
	Extra fine pitch	MFWN	90080R-7T	●	7	80	60	25.4	20	13	50	27	6	9.5			Fig. 1	1.1		10,500	
			90100R-9T	●	9	100	70	31.75	46			34	8	12.7	-	-	Fig. 2	1.3		9,500	Yes
			90125R-12T	●	12	125	87	38.1	55	-	63	38	10	15.9				2.7	No	8,000	
			90160R-14T	●	14	160	102	50.8	72				11	19.1			Fig. 3	4.1		7,000	
			90200R-16T	●	16	200	142	47.625	110	101.6		40	14	25.4	18	26	Fig. 4	6.7		6,500	No
			90250R-18T	●	18	250												9.1		5,500	

*APMX : 8mm

Applicable Inserts ➡ M21

■ **Max. Revolution**

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

● : Std. Item

Spare Parts

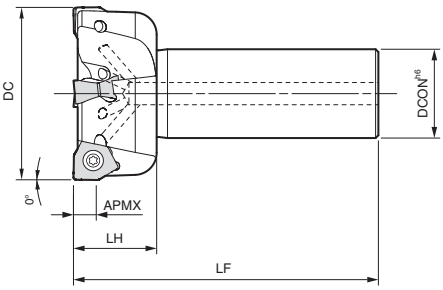
Description		Spare Parts							
		Clamp Screw	Wrench TTW	Wrench DTM	Shim	Shim Screw	Wrench	Anti-seize Compound	Mounting bolt
Coarse pitch	MFWN 90063R-3T-M	SB-50140TR	TTW-15	-	MFWN-90	SPW-7050	LW-5	P-37	HH10X30
	MFWN 90080R-4T(-M)								HH12X35
	MFWN 90100R-5T(-M) ~ 90250R-12T(-M)	Recommended tightening torque for Insert Clamp 4.2N · m			Recommended tightening torque for Shim Clamp 6.0N · m				-
Fine pitch	MFWN 90063R-4T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFWN 90080R-5T(-M)								HH12X35
	MFWN 90100R-7T(-M) ~ 90250R-14T(-M)	Recommended tightening torque for Insert Clamp 4.2N · m							-
Extra fine pitch	MFWN 90063R-5T-M	SB-50140TR	TTW-15	-	-	-	-	P-37	HH10X30
	MFWN 90080R-7T(-M)	SB-40140TRN	-	DTM-15					HH12X35
	MFWN 90100R-9T(-M) ~ 90250R-18T(-M)	Recommended tightening torque for Insert Clamp 3.5N · m							-

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions M104

MFWN with cylindrical shank (with Coolant Hole)





Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DC	DCON	LF	LH	APMX	Rake Angle A.R. (MAX.)	R.R.	Max. Revolution (min-1)	Coolant Hole	Spare Parts Clamp Screw	Wrench	Anti-seize Compound
MFWN	90050R-S32-3T	●	3	50	32	110	30	8	+13°	-12°	18,500	Yes	SB-50140TR	TTW-15	P-37
	90063R-S32-4T	●	4	63						-10°	16,000		Tightening Torque 4.2N · m		
	90080R-S32-5T	●	5	80						-9°	13,500				

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts M21

■ Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Applicable Inserts

Description	Applicable Inserts M21				
	Surface-Finish Oriented (Precision Class)	General purpose	Low cutting force	Tough Edge (For Heavy Milling)	Non-ferrous Metals
MFWN90...	WNEU 080608EN-GL	WNMU 0806..EN-GM	WNMU 080608EN-SM	WNMU 080608EN-GH	WNGT 080608FN-AM

● : Std. Item

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. After applying anti-seize compound on portion of taper and thread, attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
   Remember that the screw hole of the toolholder for Extra fine pitch is inclined to the bearing surface. (Ref. to Fig. 2 and Fig. 3)
4. Be careful not to tighten the screw with excessive torque.
   Recommended tightening torque is 4.2N·m for M5 screw (SB-50140TR) and 3.5N·m for M4 screw (SB-40140TRN).
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.
6. To change the cutting edge of the insert, turn the insert counterclockwise (Ref. to Fig. 4). The insert corner identification number is stamped on the top surface of the insert.


Fig. 1



Fig. 2

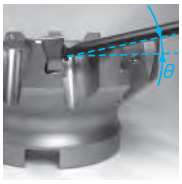


Fig. 3


Fig. 4

How to replace a shim (for coarse pitch)

1. Be sure to remove dust and chips from the insert mounting pocket.
2. The shim must be mounted in the proper direction. While aligning the surface of the shim with the mark on it to the corresponding constraint surface (Ref. to Fig. 1) and lightly pressing the shim toward the constraint surface (Ref. to Fig. 2), insert the screw into the hole of the shim and tighten (Ref. to Fig. 3). When tightening the screw, make sure that the screw is vertical to the bearing surface (Recommended tightening torque is 6.0N·m).
3. After tightening the screw, make sure that there is no clearance between the shim seat surface and the bearing surface. If there is any clearance, remove the insert and mount it again according to the above steps.



Fig. 1

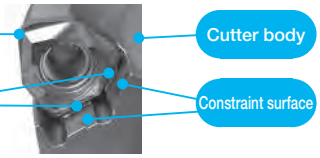


Fig. 2



Fig. 3

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t) ( ):TN620M	Recommended Insert Grades (Cutting Speed Vc : m/min)							
			Cermet	MEGACOAT (PVD Coated Carbide)				CVD Coated Carbide	DLC Coated Carbide	Carbide
			TN620M	PR1535	PR1525	PR1510	PR015S	CA6535	PDL025	GW25
GM	Carbon Steel	0.1~**0.2**~0.3 (0.06~**0.10**~0.15)	★ 200~**250**~300	☆ 120~**180**~250	★ 120~**180**~250	-	-	-	-	-
	Alloy Steel	0.1~**0.2**~0.3 (0.06~**0.10**~0.15)	★ 180~**220**~250	☆ 100~**160**~220	★ 100~**160**~220	-	-	-	-	-
	Mold Steel	0.1~**0.15**~0.25 (0.06~**0.10**~0.13)	★ 150~**180**~220	☆ 80~**140**~180	★ 80~**140**~180	-	-	-	-	-
	Stainless Steel (Austenitic related)	0.1~**0.15**~0.25	-	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-	-	-
	Stainless Steel (Martensitic related)	0.1~**0.15**~0.25	-	☆ 150~**200**~250	-	-	-	☆ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.1~**0.15**~0.25	-	★ 90~**120**~150	-	-	-	-	-	-
	Gray Cast Iron	0.1~**0.2**~0.3	-	-	-	★ 120~**180**~250	-	-	-	-
	Nodular Cast Iron	0.1~**0.15**~0.25	-	-	-	★ 100~**150**~200	-	-	-	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	-	☆ 20~**30**~50	-	-	-	★ 20~**30**~50	-	-
SM *1GL	Carbon Steel	0.06~**0.12**~0.2 (0.06~**0.08**~0.12)	★ 200~**250**~300	☆ 120~**180**~250	☆ 120~**180**~250	-	-	-	-	-
	Alloy Steel	0.06~**0.12**~0.2 (0.06~**0.08**~0.12)	★ 180~**220**~250	☆ 100~**160**~220	☆ 100~**160**~220	-	-	-	-	-
	Mold Steel	0.06~**0.08**~0.15 (0.06~**0.08**~0.10)	★ 150~**180**~220	☆ 80~**140**~180	☆ 80~**140**~180	-	-	-	-	-
	Stainless Steel (Austenitic related)	0.06~**0.12**~0.2	-	★ 100~**160**~200	☆ 100~**160**~200	-	-	-	-	-
	Stainless Steel (Martensitic related)	0.06~**0.12**~0.2	-	☆ 150~**200**~250	-	-	-	★ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.06~**0.12**~0.2	-	☆ 90~**120**~150	-	-	-	-	-	-
	Gray Cast Iron	0.06~**0.12**~0.2	-	-	-	☆ 120~**180**~250	-	-	-	-
	Nodular Cast Iron	0.06~**0.08**~0.15	-	-	-	☆ 100~**150**~200	-	-	-	-
	Ni-base heat-resistant alloys	0.06~**0.1**~0.15	-	☆ 20~**30**~50	-	-	-	☆ 20~**30**~50	-	-
	Titanium Alloys	0.06~**0.08**~0.15	-	★ 40~**60**~80	-	-	-	-	-	-
*2GH	Carbon Steel	0.2~**0.3**~0.4	-	☆ 120~**180**~250	☆ 120~**180**~250	-	-	-	-	-
	Alloy Steel	0.2~**0.3**~0.4	-	☆ 100~**160**~220	☆ 100~**160**~220	-	-	-	-	-
	Mold Steel	0.15~**0.2**~0.3	-	☆ 80~**140**~180	☆ 80~**140**~180	-	-	-	-	-
	Stainless Steel (Austenitic related)	0.2~**0.25**~0.3	-	☆ 100~**160**~200	☆ 100~**160**~200	-	-	-	-	-
	Stainless Steel (Martensitic related)	0.2~**0.25**~0.3	-	☆ 150~**200**~250	-	-	-	☆ 180~**240**~300	-	-
	Stainless Steel (Precipitation Hardening)	0.2~**0.25**~0.3	-	☆ 90~**120**~150	-	-	-	-	-	-
	Gray Cast Iron	0.2~**0.3**~0.4	-	-	-	☆ 120~**180**~250	-	-	-	-
	Nodular Cast Iron	0.15~**0.2**~0.3	-	-	-	☆ 100~**150**~200	-	-	-	-
	Ni-base heat-resistant alloys	0.15~**0.2**~0.25	-	☆ 20~**30**~50	-	-	-	☆ 20~**30**~50	-	-
	Hard Materials (60HRC or less)	0.05~**0.1**~0.2	-	-	-	-	★ 50~**80**~100	-	-	-
AM	Non-ferrous metals	0.1~**0.2**~0.3	-	-	-	-	-	-	★ 200~**600**~900	☆ 200~**500**~800

· The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
· Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

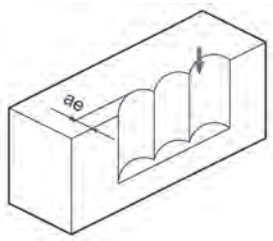
★ : 1st Recommendation
☆ : 2nd Recommendation

*1. GL Chipbreaker is recommended for Surface finish oriented milling.
*2. GH Chipbreaker : Fine pitch ⇒fz≤0.3 (mm/t)
Extra fine pitch ⇒Not recommended

Applicable chipbreaker

Cutter Type	Chipbreaker			
	GM	SM (GL)	GH	AM
Coarse pitch (with shim)	●	●	●	●
Fine pitch (without shim)	●	●	△ (Feed rate is recommended fz=0.3mm/t or under)	●
Extra fine pitch (without shim)	●	●	Not recommended	Not recommended

Vertical milling (Plunging)



Cutting Dia.	Max. Width of Cut (ae)
All items	8mm

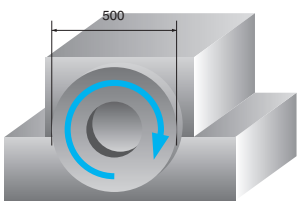
Cutter type and chipbreaker selection

Milling Purpose	Cutter Type			Chipbreaker				
	Coarse pitch	Fine pitch	Extra fine pitch	GM	SM	GH	GL	AM
General milling for steel and alloy steel		●		●				
Steel and alloy steel (at chattering due to low rigidity machine or poor clamping power)	●				●			
Productivity oriented (Running cost decrease) (ap=4mm and over, fz=0.25mm/t and over)	●					●		
Surface finish oriented	●	●					●	
General milling of stainless steel		●			●			
Stainless Steel (at chattering due to low rigidity machine or poor clamping power)	●				●			
Cast Iron (for processing efficiency improvement)			●	●				
Cast Iron (ap=4mm and over, fz=0.25mm/t and over)	●					●		
General milling of aluminum alloys		●						●
Aluminum Alloys (at chattering due to low rigidity machine or poor clamping power)	●							●

Case Studies

FC300

- Machine Part
- Vc=170m/min
- apxae=2.5x130mm
- fz=0.183mm/t (Vf=500mm/min)
- Wet
- MFWN90160R-8T (8 Flutes)
- WNMU080608EN-GM (PR1510)

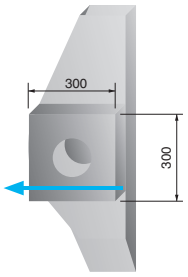


PR1510	Chip Evacuation Rate = 163cc/min
Competitor A (Positive Cutter)	Chip Evacuation Rate = 68cc/min

Competitor A proceeded machining under low cutting conditions, as the workpiece was slipping because of the unstable chucking.
With MFWN, stable machining was possible at higher cutting conditions.
(User Evaluation)

Manganese Steel

- Construction machine part
- Vc=150m/min
- apxae=1x100mm
- fz=0.2mm/t (Vf=668mm/min)
- Dry
- MFWN90100R-7T (7 Flutes)
- WNMU080608EN-GM (PR1525)



PR1525	Machining efficiency : 2 pcs/edge
Competitor B (Negative Cutter) (Vertical inserts)	1 pc/edge

Despite instability with the long overhang of the workpiece, MFWN doubled tool life, improving the efficiency by 150%.
(User Evaluation)

Low Cutting Force 90° Milling Cutter with Double-sided 6-Edge Inserts

MFWN Mini

Introducing Economical Small Diameter MFWN Series Milling Cutters
Additional Fine Pitch, Small Diameter Toolholders Available

1 MFWN Mini Uses Cost-Efficient 6-Edge Inserts

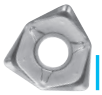
Smaller insert design technology maintains original MFWN cutting performance

Can be used up to 5mm D.O.C.

Smaller Insert Size

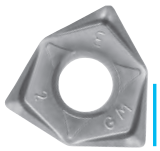
MFWN Mini
05 Size

NEW



D.O.C. ~5mm

MFWN
08 Size



D.O.C. ~8mm

Increased Versatility

Large small-diameter lineup

High-efficiency machining with fine pitch styles

1 ~ 3 additional flutes



Expanded lineup of smaller diameters

Face Mill ø50
End Mill ø25 - ø40

NEW



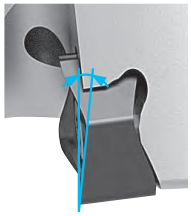
2 Inherits Previous MFWN Series Design Elements with Fracture-Resistant Inserts and Low Cutting Forces

❶ Low Cutting Force and High Chattering-Resistance

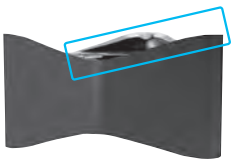
Sharp cutting by large rake angle

"Large slant edge" Design reduces shock when cutting edge enters the workpiece

A.R. Max +11°

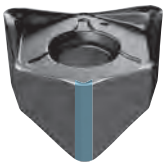


"Large slant edge" Design

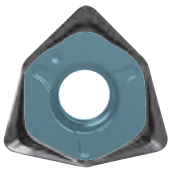


❷ Superior Fracture Resistance with Thick Edge Design

Stable Clamping Strength with Unique Insert Face Design



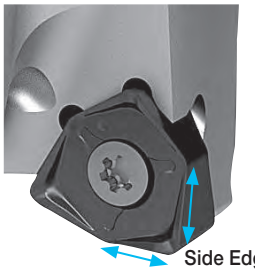
Cutting Edge Thickness : 5.2mm
(3.1mm at the thinnest point)



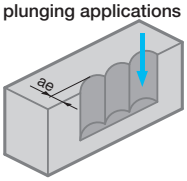
Optimized seating surface

❸ Neutral Inserts for Various Uses

Symmetrical side and bottom cutting edges provide a wide range of machining applications

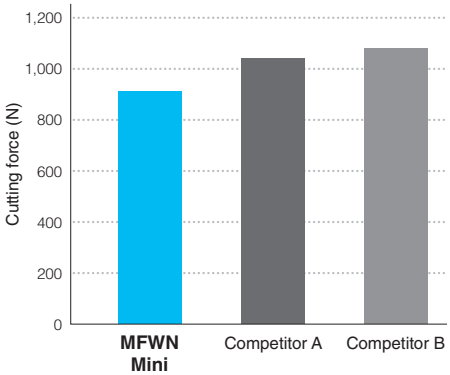


Can be used for plunging applications



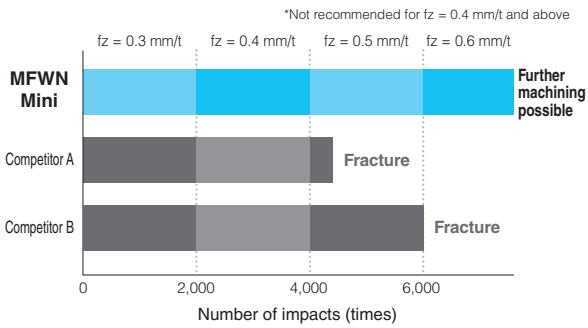
Left-handed Toolholders are also Available (Custom Order)

Cutting Force Comparison (Internal evaluation)



Cutting Conditions : Vc = 150 m/min, fz = 0.15 mm/t,
ap × ae = 1.5 ×35 mm, Dry Cutting Dia.ø63 Workpiece Material : SCM440

Fracture Resistance Comparison (Internal evaluation)



Cutting Conditions : Vc = 120 m/min, ap × ae = 1.5 × 30 mm, Dry
Cutting Dia.ø63 Workpiece Material : Mold Steel 37~43HRC

MFWN Mini Face Mill



Rake Angle	A.R.	R.R.
	(MAX.) +11°	øD = 50 -9° øD = 63 -8° øD = 80-125 -7°

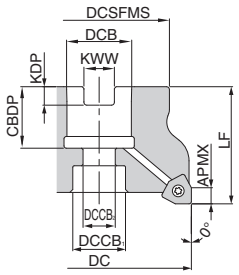


Fig.1

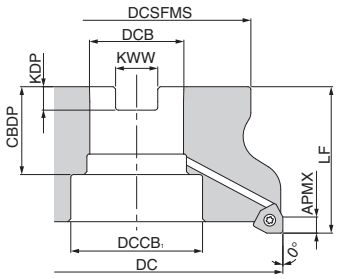


Fig.2

Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)									Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
						DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW				
Metric	Fine pitch	MFWN	90050R-05-5T-M	●	5	50	48	22	17.5	11	40	21	6.3	10.4	Yes	Fig.1	0.4	13,800
			90063R-05-6T-M	●	6	63			18								0.5	12,300
			90080R-05-7T-M	●	7	80	70	27	20	13	50	24	7	12.4			1.2	10,900
			90100R-05-8T-M	●	8	100	78	32	45	-		30	8	14.4		Fig.2	1.6	9,700
			90125R-05-11T-M	●	11	125	89	40	55		63	33	9	16.4			2.8	8,700
	Extra fine pitch	MFWN	90050R-05-6T-M	●	6	50	48	22	17.5	11	40	21	6.3	10.4		Fig.1	0.4	13,800
			90063R-05-7T-M	●	7	63			18								0.5	12,300
			90080R-05-9T-M	●	9	80	70	27	20	13	50	24	7	12.4			1.2	10,900
			90100R-05-11T-M	●	11	100	78	32	45	-		30	8	14.4		Fig.2	1.5	9,700
			90125R-05-14T-M	●	14	125	89	40	55		63	33	9	16.4			2.7	8,700
Bore Dia. Inch spec	Fine pitch	MFWN	90080R-05-7T	●	7	80	70	25.4	20	13	50	27	6	9.5		Fig.1	1.3	10,900
			90100R-05-8T	●	8	100	78	31.75	45	-		34	8	12.7		Fig.2	1.6	9,700
			90125R-05-11T	●	11	125	89	38.1	55		63	38	10	15.9			2.9	8,700
	Extra fine pitch	MFWN	90080R-05-9T	●	9	80	70	25.4	20	13	50	27	6	9.5		Fig.1	1.2	10,900
			90100R-05-11T	●	11	100	78	31.75	45	-		34	8	12.7		Fig.2	1.6	9,700
			90125R-05-14T	●	14	125	89	38.1	55		63	38	10	15.9			2.8	8,700

*APMX : 5mm

■ Max. Revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M109**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Spare Parts

Description			Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
						
Fine pitch	MFWN	90050R-05-5T-M	SB-3065TRP	DTPM-8	P-37	HH10×30
		90063R-05-6T-M				HH10×30
		90080R-05-7T(-M)	Recommended tightening torque for Insert Clamp 1.2N·m			HH12×35
		90100R-05-8T(-M)				-
		90125R-05-11T(-M)				
Extra fine pitch	MFWN	90050R-05-6T-M	SB-3065TRP	DTPM-8	P-37	HH10×30
		90063R-05-7T-M				HH10×30
		90080R-05-9T(-M)	Recommended tightening torque for Insert Clamp 1.2N·m			HH12×35
		90100R-05-11T(-M)				-
		90125R-05-14T(-M)				

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

MFWN Mini End Mill



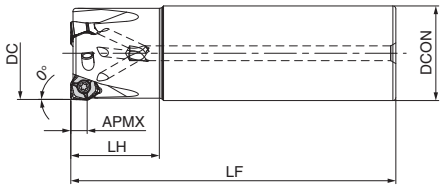


Fig.1

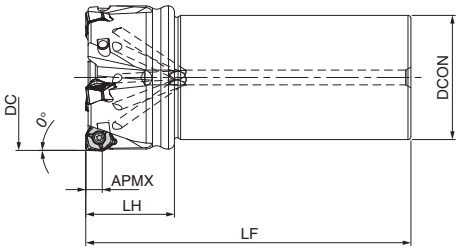


Fig.2

Toolholder Dimensions

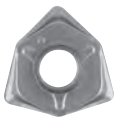
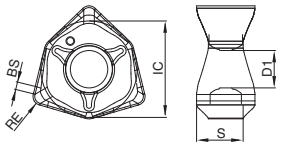
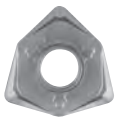
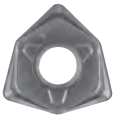
Description		Stock	No. of Inserts	Dimension (mm) DC	DCON	LF	LH	APMX	Rake Angle A.R. (MAX.)	R.R.	Coolant Hole	Drawing	Max. Revolution (min^{-1})	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound
MFWN	90025R-S25-05-2T	●	2	25	25	120	32	5	+11°	-14.5°	Yes	Fig.1	19,500	SB-3065TRP	DTPM-8	P-37
	90032R-S32-05-3T	●	3	32	32	130	40			-12°			17,200			
	90040R-S32-05-4T	●	4	40		150	50			-10°		Fig.2	15,400			
	90050R-S32-05-5T	●	5	50		110	30			-9°			13,800			
	90063R-S32-05-6T	●	6	63						-8°			12,300			
	90080R-S32-05-7T	●	7	80						-7°			10,900			

*APMX : 5mm

Max. Revolution
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M109**.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Applicable Inserts

Classification of usage						
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is 45HRC or under)	P	Carbon Steel / Alloy Steel	☆	★		
		Mold Steel	☆	★		
	M	Stainless Steel (Austenitic related)	★	☆		
		Stainless Steel (Martensitic related)	★			
		Stainless Steel (Precipitation Hardening)	★			
	K	Gray Cast Iron			★	
		Nodular Cast Iron			★	
	N	Non-ferrous Metals				
	S	Heat-resistant Alloys	★			
		Titanium Alloys	★			
	H	Hard Materials				★

Insert		Description	Dimension (mm) IC	S	D1	BS	RE	MEGACOAT (PVD Coated Carbide) PR1535	PR1525	PR1510	PR015S
 General purpose		**WNMU 050408EN-GM**	8.8	4.2	3.4	0.7	0.8	●	●	●	
 Low cutting force		**WNMU 050408EN-SM**	8.8	4.2	3.4	0.7	0.8	●	●	●	
 Tough Edge		**WNMU 050408EN-GH**	8.8	4.2	3.4	0.7	0.8	●	●	●	●

● : Std. Item

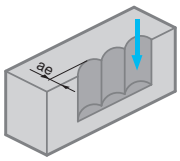
Recommended Cutting Conditions

Chipbreaker	Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)			
			MEGACOAT NANO			MEGACOAT HARD
			PR1535	PR1525	PR1510	PR015S
GM	Carbon Steel	0.1 – **0.2** – 0.25	☆ 120 – **180** – 250	★ 120 – **180** – 250	–	–
	Alloy Steel		☆ 100 – **160** – 220	★ 100 – **160** – 220	–	–
	Mold Steel	0.1 – **0.15** – 0.2	☆ 80 – **140** – 180	★ 80 – **140** – 180	–	–
	Stainless Steel (Austenitic related)	0.1 – **0.15** – 0.2	☆ 100 – **160** – 200	☆ 100 – **160** – 200	–	–
	Stainless Steel (Martensitic related)		☆ 150 – **200** – 250	–	–	–
	Stainless Steel (Precipitation Hardening)		★ 90 – **120** – 150	–	–	–
	Gray Cast Iron	0.1 – **0.2** – 0.25	–	–	★ 120 – **180** – 250	–
	Nodular Cast Iron	0.1 – **0.15** – 0.2	–	–	★ 100 – **150** – 200	–
	Ni-base heat-resistant alloys	0.1 – **0.12** – 0.16	☆ 20 – **30** – 50	–	–	–
SM	Carbon Steel	0.06 – **0.12** – 0.2	☆ 120 – **180** – 250	☆ 120 – **180** – 250	–	–
	Alloy Steel		☆ 100 – **160** – 220	☆ 100 – **160** – 220	–	–
	Mold Steel	0.06 – **0.08** – 0.15	☆ 80 – **140** – 180	☆ 80 – **140** – 180	–	–
	Stainless Steel (Austenitic related)	0.06 – **0.12** – 0.2	★ 100 – **160** – 200	☆ 100 – **160** – 200	–	–
	Stainless Steel (Martensitic related)		☆ 150 – **200** – 250	–	–	–
	Stainless Steel (Precipitation Hardening)		☆ 90 – **120** – 150	–	–	–
	Gray Cast Iron	0.06 – **0.12** – 0.2	–	–	☆ 120 – **180** – 250	–
	Nodular Cast Iron	0.06 – **0.08** – 0.15	–	–	☆ 100 – **150** – 200	–
	Ni-base heat-resistant alloys	0.06 – **0.08** – 0.15	★ 20 – **30** – 50	–	–	–
	Titanium Alloys	0.06 – **0.08** – 0.15	★ 40 – **60** – 80	–	☆ 40 – **60** – 80	–
GH	Carbon Steel	0.15 – **0.2** – 0.3	☆ 120 – **180** – 250	☆ 120 – **180** – 250	–	–
	Alloy Steel		☆ 100 – **160** – 220	☆ 120 – **160** – 220	–	–
	Mold Steel	0.15 – **0.2** – 0.25	☆ 80 – **140** – 180	☆ 80 – **140** – 180	–	–
	Stainless Steel (Austenitic related)	0.15 – **0.2** – 0.25	☆ 100 – **160** – 200	☆ 100 – **160** – 200	–	–
	Stainless Steel (Martensitic related)		☆ 150 – **200** – 250	–	–	–
	Stainless Steel (Precipitation Hardening)		☆ 90 – **120** – 150	–	–	–
	Gray Cast Iron	0.15 – **0.2** – 0.3	–	☆ 120 – **180** – 250	☆ 120 – **180** – 250	–
	Nodular Cast Iron	0.15 – **0.2** – 0.25	–	☆ 100 – **150** – 200	☆ 100 – **150** – 200	–
	Ni-base heat-resistant alloys	0.1 – **0.15** – 0.2	☆ 20 – **30** – 50	–	–	–
	Hardened Material (60 HRC or less)	0.05 – **0.08** – 0.16	–	–	–	★ 50 – **80** – 100

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
When using GH chipbreaker in fine pitch cutters, recommended feed is fz≤0.2 (mm/t).
GH chipbreaker is not recommended for extra fine pitch cutters.

★ : 1st Recommendation
☆ : 2nd Recommendation

Vertical Milling (Plunging)



Available for Vertical Milling (Plunging)

Cutting Dia.	Maximum width of cut (ae)
All Description	5 mm

Ramping and helical milling are not recommended due to interference between workpiece and flank face

Applicable chipbreaker

Cutter type	Chipbreaker		
	GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	(Feed rate is recommended fz=0.2mm/t or under)

How to mount an insert

1. Completely eliminate chips and dust from the insert mounting side.
2. Clamp Screw
   ·Apply anti-seize compound on portion of taper and thread of clamp screw.
   ·After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1)
3. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended tightening torque . . . 1.2N·m
4. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.

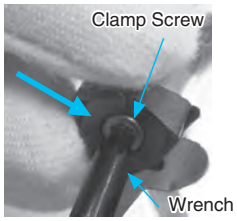


Fig. 1



Fig. 2



Fig. 3

Cutting Edge Angle 88˚, High Efficiency Cutter

MFSN88

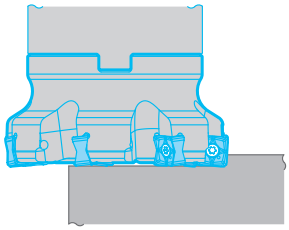
Economical Double-sided 8-edge Insert
Reduces Chattering with a Low Cutting Force Design
Suitable for Shoulder Roughing
Applicable to Various Types of Machining with Product Lineup from ø32

1 Economical Double-sided 8-edge Insert Suitable for Shoulder Roughing

Cost reduction in approximately 90˚corner cutting

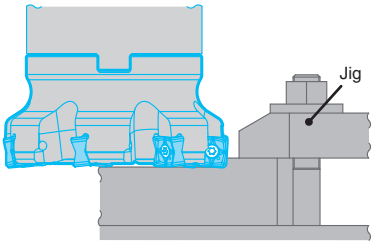
Shoulder Roughing

Cost reduction by switching from 90˚ cutter with positive inserts

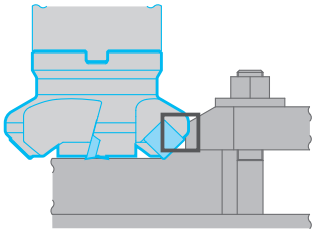


Facing Without Interfering with Fixtures

MFSN88



Conventional 45˚ Cutter

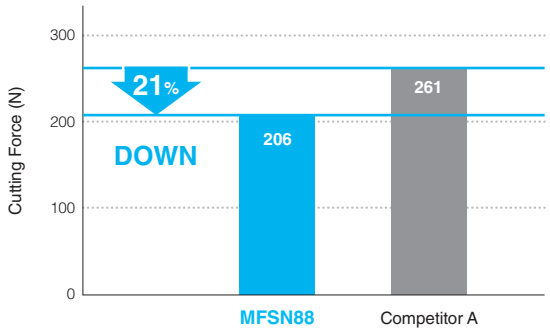


See page **M113** for unmachined corner portion

2 Reduces Chattering with Low Cutting Force Design

Chatter Resistant Medium to Roughing Machining Range

Cutting Force Comparison **(Internal evaluation)**



Cutting force is thrust force

Cutting Conditions : Vc = 200 m/min, ap = 3 mm, fz = 0.15 mm/t
Cutter Dia.ø63 Workpiece Material : S50C

3 Extended Tool Life by MEGACOAT NANO Technology Insert Lineup Also Contains Cermet Grade

Insert grade and chipbreaker lineup for various machining application



1st Recommendation
(General purpose)
GM Chipbreaker



Tough Edge

GH Chipbreaker



For Stainless Steel

SM Chipbreaker

MFSN88 Face Mill



Rake Angle	A.R.	R.R.	
	(MAX.) +10°	DC=50 : -12° DC=63 : -10° DC=80 : -9°	DC=100 : -8° DC=125 : -7.5° DC=160 : -7°

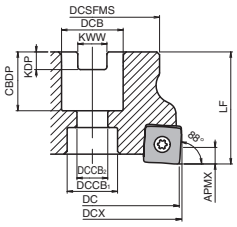


Fig. 1

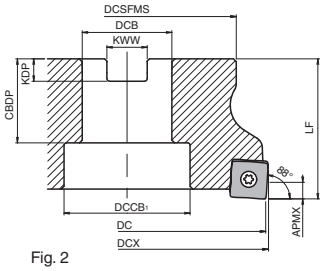


Fig. 2

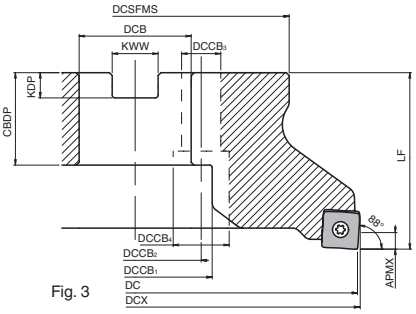


Fig. 3

Toolholder Dimensions

Description				Stock	No. of Inserts	Dimension (mm)												Drawing	Weight (kg)	Shim
						DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	$DCCB_3$	$DCCB_4$			
Metric	Fine pitch	MFSN	88050R-4T-M-G	●	4	50	52	48	22	17.5	11	40	21	6.3	10.4	-	-	Fig. 1	0.3	No
			88063R-5T-M-G	●	5	63	65			18									0.4	
			88080R-6T-M-G	●	6	80	82	70	27	20	13	50	24	7	12.4				1.1	
			88100R-7T-M-G	●	7	100	102	78	32	45	-		30	8	14.4			Fig. 2	1.4	
			88125R-9T-M-G	●	9	125	127	89	40	55		63	33	9	16.4				2.4	
			88160R-11T-M-G	●	11	160	162	110								14	20	Fig. 3	4.2	
	Extra fine pitch	MFSN	88050R-5T-M-G	●	5	50	52	48	22	17.5	11	40	21	6.3	10.4	-	-	Fig. 1	0.3	No
			88063R-7T-M-G	●	7	63	65			18									0.4	
			88080R-9T-M-G	●	9	80	82	70	27	20	13	50	24	7	12.4				1.1	
			88100R-11T-M-G	●	11	100	102	78	32	45	-		30	8	14.4			Fig. 2	1.4	
			88125R-13T-M-G	●	13	125	127	89	40	55		63	33	9	16.4				2.5	
			88160R-15T-M-G	●	15	160	162	110								14	20	Fig. 3	4.3	
Bore Dia. Inch spec	Fine pitch	MFSN	88080R-6T-G	●	6	80	82	70	25.4	20	13	50	27	6	9.5	-	-	Fig. 1	1.1	No
			88100R-7T-G	●	7	100	102	78	31.75	45	-		34	8	12.7			Fig. 2	1.5	
			88125R-9T-G	●	9	125	127	89	38.1	55		63	38	10	15.9				2.5	
			88160R-11T-G	●	11	160	162	110	50.8	70				11	19.1				4.1	
	Extra fine pitch	MFSN	88080R-9T-G	●	9	80	82	70	25.4	20	13	50	27	6	9.5	-	-	Fig. 1	1.1	No
			88100R-11T-G	●	11	100	102	78	31.75	45	-		34	8	12.7			Fig. 2	1.5	
			88125R-13T-G	●	13	125	127	89	38.1	55		63	38	10	15.9				2.6	
			88160R-15T-G	●	15	160	162	110	50.8	70				11	19.1				4.3	

*APMX : 5mm (GM (Coated Carbide), SM, GH Chipbreaker), 3mm (GM (Cermet))

Applicable Inserts ➔ M112

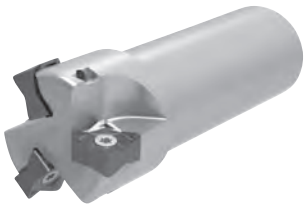
Spare Parts (common to Metric / Inch spec)

Description			Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
						
Fine pitch	MFSN	88050R-4T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		88063R-5T-M-G				HH10X30
		88080R-6T(-M)-G				HH12X35
		88100R-7T(-M)-G	Recommended tightening torque for Insert Clamp 3.5N·m			-
		88125R-9T(-M)-G				
		88160R-11T(-M)-G				
Extra fine pitch	MFSN	88050R-5T-M-G	SB-4090TRP	DTPM-15	P-37	HH10X30
		88063R-7T-M-G				HH10X30
		88080R-9T(-M)-G				HH12X35
		88100R-11T(-M)-G	Recommended tightening torque for Insert Clamp 3.5N·m			-
		88125R-13T(-M)-G				
		88160R-15T(-M)-G				

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

MFSN88 End Mill



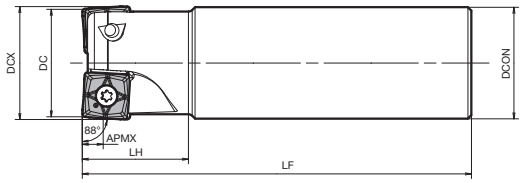


Fig. 1

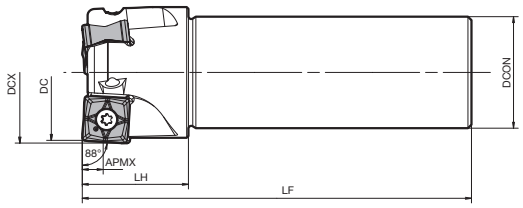


Fig. 2

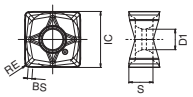
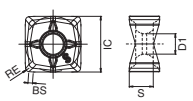
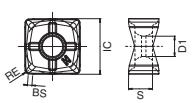
Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)						Rake Angle		Drawing	Spare Parts		
				DC	DCX	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.		Clamp Screw	Wrench	Anti-seize Compound
MFSN	88032R-S32-2T-G	●	2	32	34	32	110	30	*5	10°	-15.5°	Fig. 1	SB-4090TRP	DTPM-15	P-37
	88040R-S32-3T-G	●	3	40	42						-13°	Fig. 2	Tightening Torque 3.5N·m		

*APMX : 5mm (GM (Coated Carbide), SM, GH Chipbreaker), 3mm (GM (Cermet))

Applicable Inserts

Classification of usage							
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice	P	Carbon Steel / Alloy Steel	■	☆	★		
		Mold Steel	■	☆	★		
	M	Stainless Steel (Austenitic related)		★	☆		
		Stainless Steel (Martensitic related)		★			
		Stainless Steel (Precipitation Hardening)		★			
	K	Gray Cast Iron				★	
		Nodular Cast Iron				★	
	N	Non-ferrous Metals					
	S	Ni-base heat-resistant alloys		★			
		Titanium Alloys		★			
	H	Hard Materials					★

Insert		Description	Dimension (mm)					Cermet	MEGACOAT (PVD Coated Carbide)			
			IC	S	D1	BS	RE	TN620M	PR1535	PR1525	PR1510	PR015S
 General purpose		SNMU 130508EN-GM	13	5.51	4.7	1.0	0.8	●	●	●	●	
 Low cutting force		SNMU 130508EN-SM							●	●	●	
 Tough Edge (For Heavy Milling)		SNMU 130508EN-GH							●	●	●	●

Recommended Cutting Conditions ➡ M113

● : Std. Item

◆Recommended Cutting Conditions

●Coated Carbide

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min) MEGACOAT (PVD Coated Carbide) PR1535	PR1525	PR1510	PR015S
GM	Carbon Steel	0.1~**0.2**~0.3	☆ 120~**180**~250	★ 120~**180**~250	-	-
	Alloy Steel	0.1~**0.2**~0.3	☆ 100~**160**~220	★ 100~**160**~220	-	-
	Mold Steel	0.1~**0.15**~0.25	★ 80~**140**~180	★ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.1~**0.15**~0.25	☆ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless Steel (Martensitic related)	0.1~**0.15**~0.25	☆ 100~**150**~200	-	-	-
	Stainless Steel (Precipitation Hardening)	0.1~**0.15**~0.25	★ 90~**120**~150	-	-	-
	Gray Cast Iron	0.1~**0.2**~0.3	-	-	★ 120~**180**~250	-
	Nodular Cast Iron	0.1~**0.15**~0.25	-	-	★ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.1~**0.12**~0.2	☆ 20~**30**~50	-	-	-
SM	Carbon Steel	0.06~**0.12**~0.2	-	☆ 120~**180**~250	-	-
	Alloy Steel	0.06~**0.12**~0.2	-	☆ 100~**160**~220	-	-
	Mold Steel	0.06~**0.08**~0.15	-	☆ 80~**140**~180	-	-
	Stainless Steel (Austenitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	☆ 100~**150**~200	-	-
	Stainless Steel (Martensitic related)	0.06~**0.12**~0.2	★ 100~**150**~200	-	-	-
	Stainless Steel (Precipitation Hardening)	0.06~**0.12**~0.2	☆ 90~**120**~150	-	-	-
	Gray Cast Iron	0.06~**0.12**~0.2	-	-	☆ 120~**180**~250	-
	Nodular Cast Iron	0.06~**0.1**~0.15	-	-	☆ 100~**150**~200	-
	Ni-base heat-resistant alloys	0.06~**0.08**~0.15	★ 20~**30**~50	-	-	-
	Titanium Alloys	0.06~**0.08**~0.15	★ 40~**60**~80	-	-	-
GH	Carbon Steel	0.15~**0.25**~0.35	-	☆ 120~**180**~250	-	-
	Alloy Steel	0.15~**0.25**~0.35	-	☆ 100~**160**~220	-	-
	Mold Steel	0.1~**0.2**~0.3	-	☆ 80~**140**~180	-	-
	Gray Cast Iron	0.15~**0.25**~0.35	-	-	☆ 120~**180**~250	-
	Nodular Cast Iron	0.1~**0.2**~0.3	-	-	☆ 100~**150**~200	-
	Hard Materials (60HRC or less)	0.05~**0.1**~0.2	-	-	-	★ 50~**80**~100

* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.

★ : 1st Recommendation
☆ : 2nd Recommendation

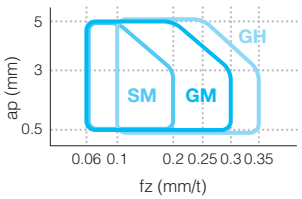
●Cermet

Chipbreaker	Workpiece Material	Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min) Cermet TN620M
GM	Carbon Steel	0.06~**0.12**~0.15	★ 200~**250**~300
	Alloy Steel	0.06~**0.12**~0.15	★ 180~**220**~250
	Mold Steel	0.06~**0.1**~0.13	★ 150~**180**~220

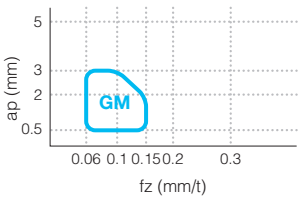
★ : 1st Recommendation

●Applicable Chipbreaker Range

Coated Carbide



Cermet



●Applicable chipbreaker

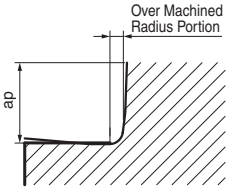
Cutter Type	Chipbreaker GM	SM	GH
Fine pitch	✓	✓	✓
Extra fine pitch	✓	✓	(Feed rate is recommended fz=0.2mm/t or under)

Not Available for vertical milling (plunging).

●Reference Data of Over Machined Radius Portion

ap	1 mm	2 mm	3 mm	4 mm	5 mm
Over Machined Radius Portion	0.12 mm	0.24 mm	0.27 mm	0.31 mm	0.34 mm

Over machined radius portion to 90°cutter



4-edge Face Mills with Vertical Inserts for Heavy Milling

MFLN

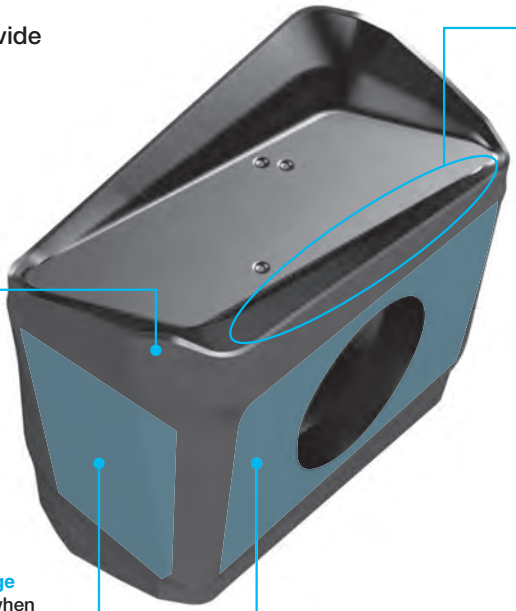
Tough 4-edge Vertical Inserts Provide High Reliability on Heavy Milling at Large Depths of Cut and High Feed Rates

Three Cutting Edge Angles (including MFLN45/MFLN70) Optimized for Various Machining Applications

1 Tough and Reliable Inserts for Stable Heavy Milling

22 mm long inserts offer increased rigidity

Tangentially mounted inserts provide
2 cutting edges on both sides

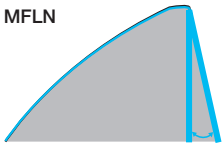


Obtuse Edge Design

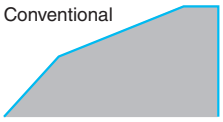
Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge (Image)

MFLN



Conventional



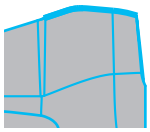
Corner Chamfer

(only available on MFLN90)

Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing





Convex cutting edge ridge
Reduced impact forces when entering the workpiece

Wide Flat Mounting Surface

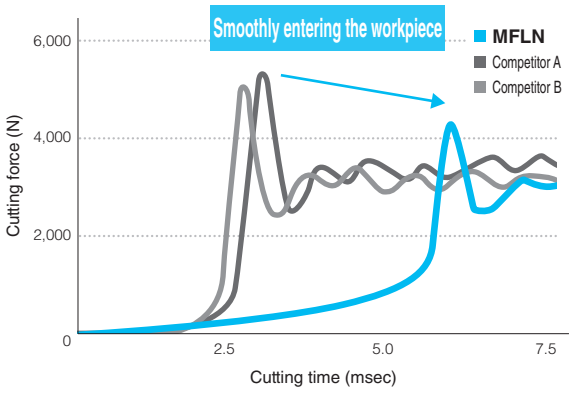
Hold an insert firmly in heavy milling

Tangentially mounted inserts increase rigidity



Cutting Forces when Entering the Workpiece (Internal evaluation)

MFLN90 (Insert : Chamfered corner type)



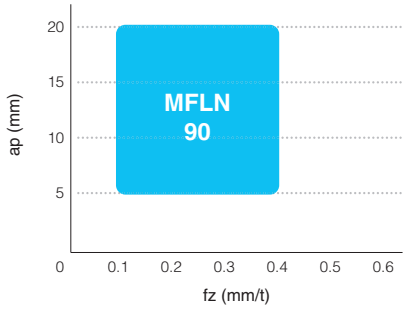
Cutting Conditions : Vc = 150 m/min, ap × ae = 5 × 75 mm, fz = 0.3 mm/t
ø125 (1 insert), Dry Workpiece Material : S50C

2 For Large Depths of Cut and High Feed Rates

MFLN90
(Cutting edge angle 90°)



Applicable Range



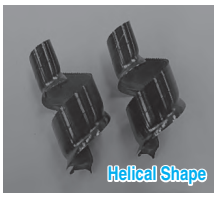
Chip Comparison (Internal evaluation)

Helix-shaped chips prevent chip recutting and provide stable machining at high feed rates.

MFLN90 Stable



fz = 0.3 mm/t



fz = 0.4 mm/t

Competitor A Unstable



fz = 0.3 mm/t



fz = 0.4 mm/t

Competitor B Unstable



fz = 0.3 mm/t



fz = 0.4 mm/t

Cutting Conditions : Vc = 150 m/min, ap × ae = 10 × 100 mm, fz = 0.3, 0.4 mm/t, ø125 (1 insert), Dry Workpiece Material : S50C

3 Stable machining and long tool life with MEGACOAT NANO

MEGACOAT NANO coating technology with high hardness (35Gpa) and excellent oxidation resistance (oxidation temperature: 1,150 °C) improves wear resistance and chipping resistance.

PR1525 : 1st recommendation for wear resistance. Great for scale removal and cast iron machining

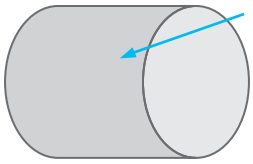
PR1535 : Defect resistant, tough substrate for stable machining



Case Studies

Roll material, Alloy steel

Vc = 120 m/min
ap = 10 mm
fz = 0.27 mm/t Dry
MFLN90200R-8T-M (ø200-8 flutes)
LOGU2216PAER-GM PR1525



Chip Evacuation Rate

MFLN90 Vf=412mm/min (Cutting Edge: Excellent)

Competitor E Vf=412mm/min

MFLN maintained good cutting edge condition and during scale removing.
(User Evaluation)



MFLN90 Cutting edge angle 90°



Rake Angle	A.R.	Max. +4.5°
	R.R.	-16.5°~-13.5°
Applicable Inserts		LOGU221616ER-GM
		LOGU2216PAER-GM

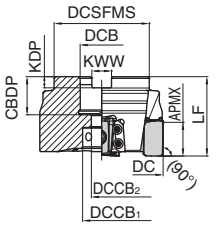


Fig.1

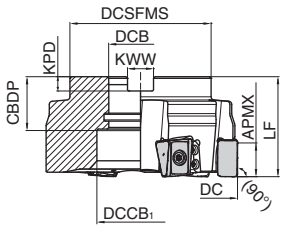


Fig.2

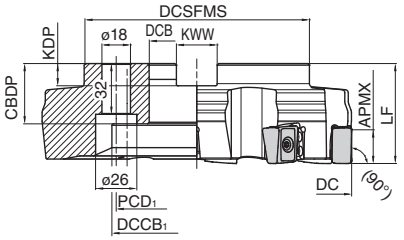


Fig.3

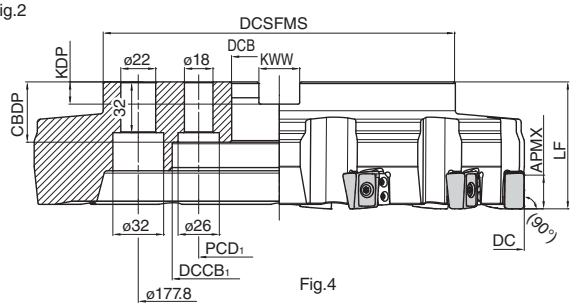


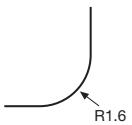
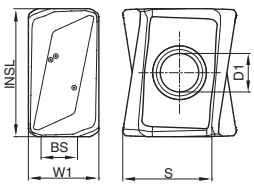
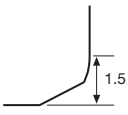
Fig.4

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)											Coolant Hole	Drawing	Weight (kg)
					DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	PCD_1			
Metric	MFLN	90080R-4T-M	●	4	80	60	27	24	13	50	24	7	12.4	20	-	Yes	Fig.1	1.0
		90100R-4T-M	●		100	70	32	45	-		30	8	14.4				Fig.2	1.5
		90125R-6T-M	●	6	125	89	40	55		63	33	9	16.4		66.7	No		2.9
		90160R-7T-M	●	7	160	110		90									Fig.3	4.5
		90200R-8T-M	●	8	200	142	60	132			38	14	25.7		101.6			6.9
		90250R-10T-M	●	10	250			172										10.3
		90315R-12T-M	MTO	12	315	222		205		80							Fig.4	20.9
Bore Dia. Inch spec	MFLN	90080R-4T	●	4	80	60	25.4	24	13	50	27	6	9.5	20	-	Yes	Fig.1	1.0
		90100R-4T	●		100	70	31.75	45	-		34	8	12.7				Fig.2	1.6
		90125R-6T	●	6	125	89	38.1	55		63	38	10	15.9					3.0
		90160R-7T	●	7	160	110	50.8	90				11	19.1			No		4.6
		90200R-8T	●	8	200	142	47.625	132				14	25.4		101.6		Fig.3	7.2
		90250R-10T	●	10	250			172										10.5
		90315R-12T	MTO	12	315	222		205		80							Fig.4	21.8

Applicable Inserts

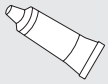
Classification of usage				
★ : 1st Recommendation ☆ : 2nd Recommendation	P	Carbon Steel / Alloy Steel	☆	★
		Mold Steel	☆	★
	K	Gray Cast Iron	☆	★
		Nodular Cast Iron	☆	★

Insert			Description	Dimension (mm)					MEGACOAT NANO		Applicable Toolholders
				W1	S	D1	INSL	BS	PR1535	PR1525	
 Corner-R	 R1.6		**LOGU 221616ER-GM**	12.5	16.6	6.8	22.8	6.3	●	●	MFLN90.. MFLN70.. MFLN45..
 Corner Chamfer	 1.5		**LOGU 2216PAER-GM**	12.5	16.9	6.8	22.8	4.8	●	●	MFLN90..

Applicable Toolholders: M40 M41 M116

● : Std. Item
MTO : Made to order

Spare Parts

Description	Spare Parts						
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
							
MFLN ○○080R-4T(-M) ○○100R-4T(-M) ~ ○○315R-12T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35 –
	Recommended tightening torque for Insert Clamp 6.0 N·m			Recommended tightening torque for Shim Clamp 3.5 N·m			

Recommended Cutting Conditions

	Workpiece Material	D.O.C. (mm)		fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)	
		Width of Cut (≤ 0.5×DC)	Width of Cut (>0.5×DC)		MEGACOAT NANO	
					PR1535	PR1525
MFLN 90	Carbon Steel	~18	~15	0.1 - **0.2** - 0.4	☆ 80 – **120** – 150	★ 100 – **150** – 180
	Alloy Steel				☆ 80 – **120** – 150	★ 100 – **150** – 180
	Mold Steel				☆ 70 – **100** – 120	★ 80 – **120** – 150
	Gray Cast Iron	~20	~18	0.1 - **0.2** - 0.4	☆ 80 – **120** – 150	★ 100 – **150** – 180
	Nodular Cast Iron				☆ 80 – **120** – 150	★ 100 – **150** – 180

The table above provides recommendations based on product specifications.Before using the product, check the machine's specifications such as power. ★ : 1st Recommendation ☆ : 2nd Recommendation
The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Dry machining is recommended.

About Applicable Insert

	LOGU221616ER-GM (Corner-R)	LOGU2216PWER-GM (Corner Chamfer)
MFLN 90	✓	✓

Max. Revolution for Each Cutting Diameter

Cutting Dia. DC (mm)	Max. Revolution (min^{-1})
ø80	5,970
ø100	4,780
ø125	3,820
ø160	2,990
ø200	2,390
ø250	1,910
ø315	1,520

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

How to mount an insert

1. Completely eliminate chips and dust from the insert mounting side.
2. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface(Fig.1,2)
3. Make sure that the identification on the top of the insert is the same in each pocket.(Fig.3)
4. Tighten the wrench (TTP-20) in while holding parallel to the clamp screw.
5. Tighten the insert clamp screw at an appropriate torque. (Recommended torque: 6.0 N·m)
6. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.

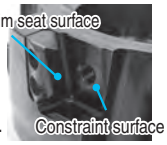


Fig.1



Fig.2


Fig.3

How to replace a shim

1. Completely eliminate chips and dust from the shim mounting side.
2. Coat medium strength screw locking adhesive on the screws.
3. Tighten the screw keeping the shim pushed against the pocket surface of toolholder.
4. After tightening both screws temporarily, tighten them with appropriate torque. (Recommended torque:3.5 N·m)
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

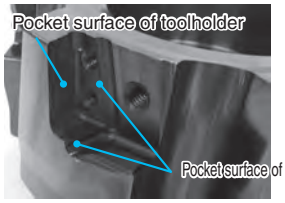


Fig.1

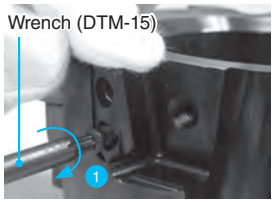


Fig.2

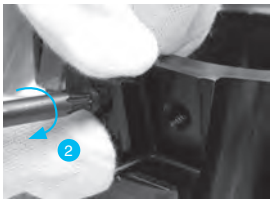


Fig.3


Fig.4

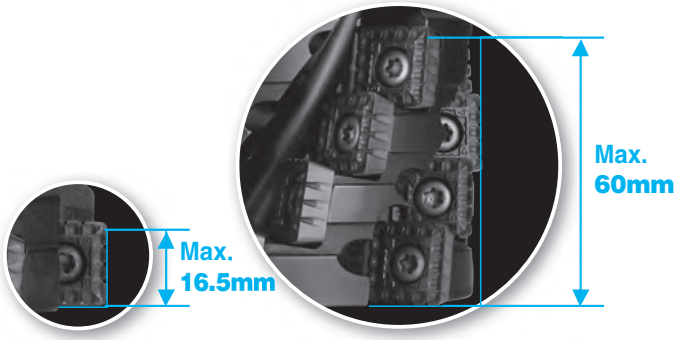
Face Mill for Heavy Milling MSRS90





Wide selection of cutting edge length according to cutting conditions

4-stage type (ø80, ø100) is added to the standard lineup as well as 1-stage and 2-stage types.

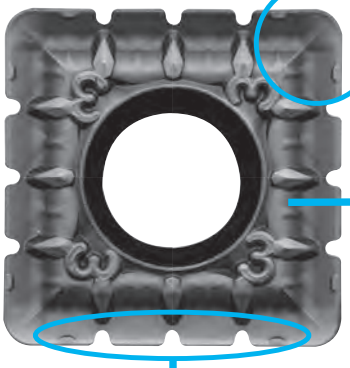


High efficiency, low cutting force and stable machining without chatter

Neutral and corner-R insert

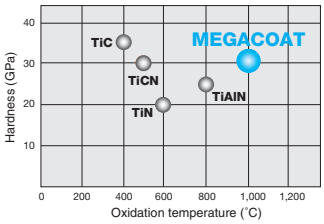
Applicable to shouldering (cutting edge angle : 90˚),
high feed milling (cutting edge angle : 30˚), plunging, and side cutter.

Custom-ordered milling cutter with high performance notched neutral inserts provides various applications



Neutral insert with corner-R is available to various applications

Long tool life : MEGACOAT

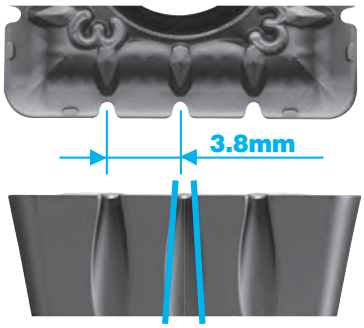


High hardness and high oxidation resistance long tool life : MEGACOAT

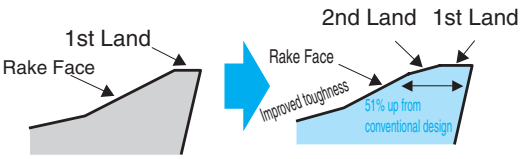
Notched insert SPMT180616EN

The notched insert breaks chips into small pieces and reduces cutting force.

The second land near the cutting edge improves edge strength.



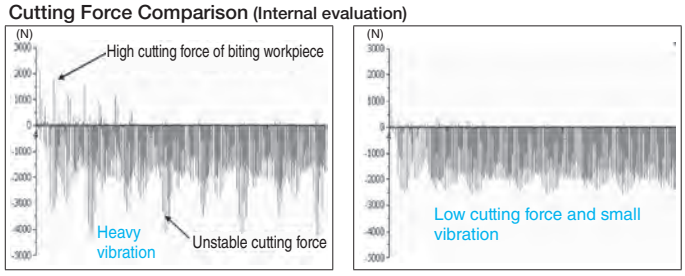
For neutral (Right / Left) hand
Applicable for various cutting edge angle.
Cutting edge length : 18mm



Edge preparation

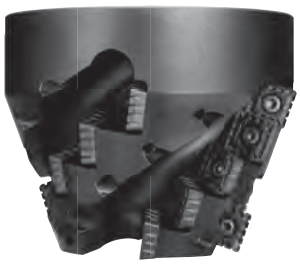
Low cutting force (Notched insert benefit)

Cutting Force Comparison (Internal evaluation)



Competitor A　　MSRS90

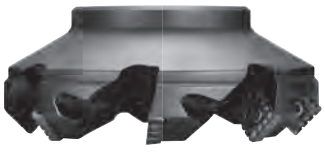
Notched insert realizes lower cutting force and smaller vibration



Tapered cutter



Vertical Milling (Plunging) cutter



45˚ Face Mill



High Feed Cutter

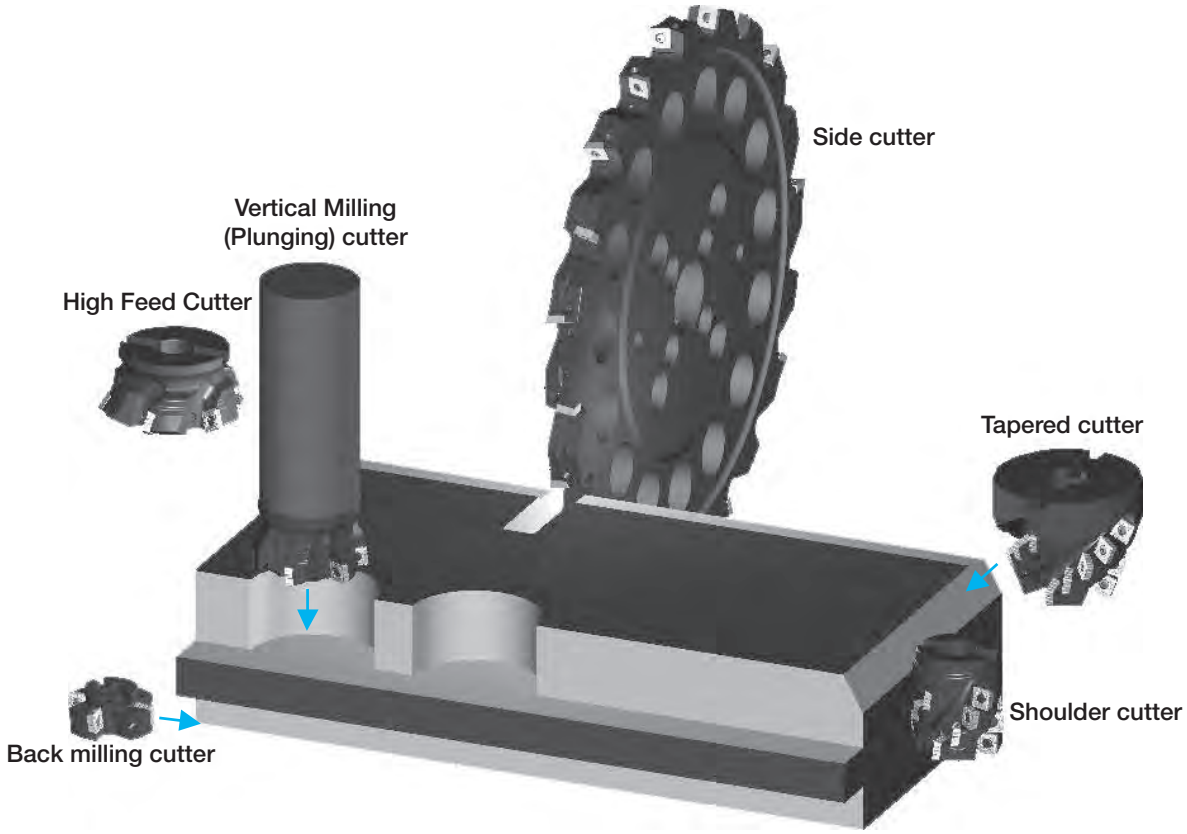


Shoulder cutter

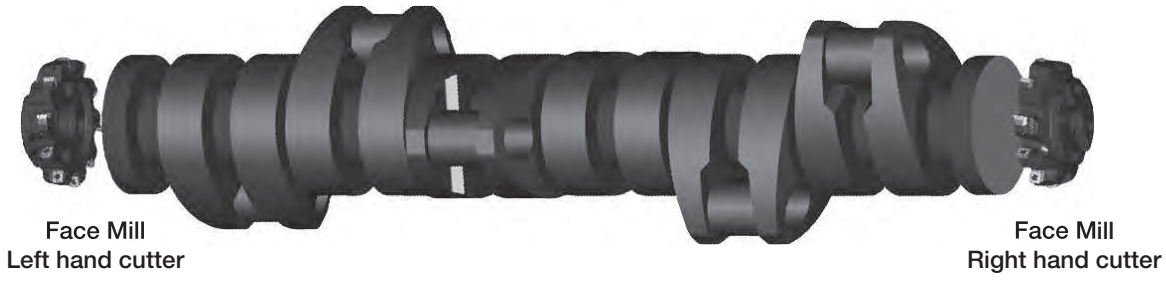
Applicable Inserts : Available for various applications

Applications	Chipbreaker selection	3-Notched	4-Notched	Without notch
General purpose	Standard	NB3 +	NB4	
Low Cutting Force	Low Cutting Force	NB3P +	NB4P	
Edge Strength Oriented	Without notch (Usable with notched inserts)	(NB3 or	NB4) +	

Various expansive possibilities (Custom-ordered and standard milling cutter)

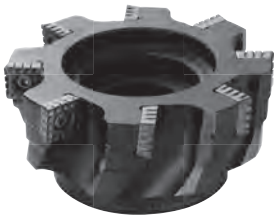


Shaft length determination



The custom-ordered milling cutter can be customized for your requirements such as diameter, cutting edge angle, number of insert stages.

MSRS90



Rake Angle	
A.R.	R.R.
+7°	-10°

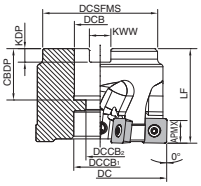


Fig. 1

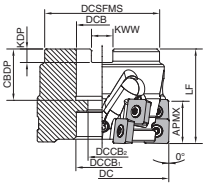


Fig. 2

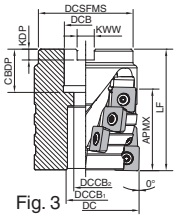


Fig. 3

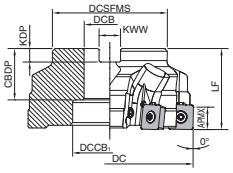


Fig. 4

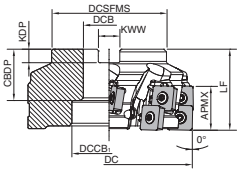


Fig. 5

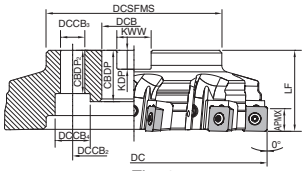


Fig. 6

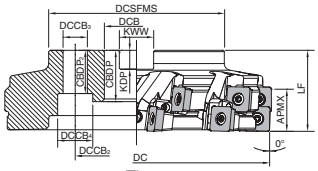


Fig. 7

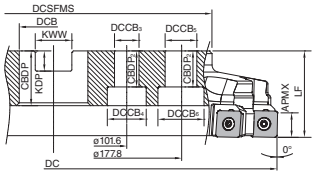


Fig. 8

Toolholder Dimensions

Description			Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm)															Drawing	Weight (kg)
							DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	DCCB3	DCCB4	DCCB5	DCCB6	CBDP2		
Metric	MSRS	90080R-1-4T-M	●	4	4	1	80	70	27	20	13	60	24	7	12.4	16.5	-	-	-	-	-	Fig. 1	1.3
		90080R-2-4T-M	●	8		2										31						Fig. 2	1.1
		90080R-4-4T-M	●	16		4						85				60						Fig. 3	1.4
		90100R-1-6T-M	●	6	6	1	100	85	32	45	-	70	30	8	14.4	16.5						Fig. 1	2.2
		90100R-2-6T-M	●	12		2										31						Fig. 2	2.0
		90100R-4-6T-M	MTO	24		4						90				60						Fig. 3	3.1
		90125R-1-8T-M	●	8	8	1	125		40	55		60	33	9	16.4	16.5						Fig. 4	2.6
		90125R-2-8T-M	MTO	16		2										31						Fig. 5	2.4
		90160R-1-8T-M	●	8	8	1	160	110			66.7					16.5	14	20	-	-	28	Fig. 6	4.2
		90160R-2-8T-M	MTO	16		2										31						Fig. 7	4.0
		90200R-1-10T-M	●	10	10	1	200	140	60	-	101.6		40	14	25.7	16.5	18	26	-	-	32	Fig. 6	6.7
		90200R-2-10T-M	MTO	20		2										31						Fig. 7	6.6
		90250R-1-12T-M	●	12	12	1	250									16.5						Fig. 6	12.6
		90250R-2-12T-M	MTO	24		2										31						Fig. 7	12.5
		90315R-1-14T-M	●	14	14	1	315	220			-					16.5	17	27	22	32	25	Fig. 8	16.1
		90315R-2-14T-M	MTO	28		2										31						-	16.0
Bore Dia. Inch spec	MSRS	90080R-1-4T	●	4	4	1	80	70	31.75	27	18	60	32	8	12.7	16.5	-	-	-	-	-	Fig. 1	1.4
		90080R-2-4T	●	8		2										31						Fig. 2	1.2
		90080R-4-4T	●	16		4						85				60						Fig. 3	1.5
		90100R-1-6T	●	6	6	1	100	85	38.1	39	21	70	38	10	15.9	16.5						Fig. 1	2.3
		90100R-2-6T	●	12		2										31						Fig. 2	2.1
		90100R-4-6T	MTO	24		4						90				60						Fig. 3	3.2
		90125R-1-8T	●	8	8	1	125			55	-	60				16.5						Fig. 4	2.6
		90125R-2-8T	MTO	16		2										31						Fig. 5	2.4
		90160R-1-8T	●	8	8	1	160	100	50.8	70				11	19.1	16.5						Fig. 4	4.3
		90160R-2-8T	MTO	16		2										31						Fig. 5	4.1
		90200R-1-10T	●	10	10	1	200	130	47.625	-	101.6			14	25.4	16.5	18	26	-	-	32	Fig. 6	6.7
		90200R-2-10T	MTO	20		2										31						Fig. 7	6.6
		90250R-1-12T	●	12	12	1	250									16.5						Fig. 6	12.6
		90250R-2-12T	MTO	24		2										31						Fig. 7	12.5
		90315R-1-14T	●	14	14	1	315	220			-					16.5	17	27	22	32	25	Fig. 8	16.1
		90315R-2-14T	MTO	28		2										31						-	16.0

● : Std. Item
MTO : Made to order

Applicable Inserts

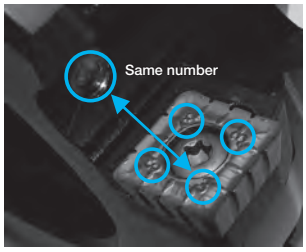
Description	Applicable Inserts → M28				
	 3-Notched	 4-Notched	 3-Notched / Low cutting force	 4-Notched / Low cutting force	 Without notch
MSRS90...	**SPMT 180616EN-NB3**	**SPMT 180616EN-NB4**	**SPMT 180616EN-NB3P**	**SPMT 180616EN-NB4P**	**SPMT 180616EN-V**

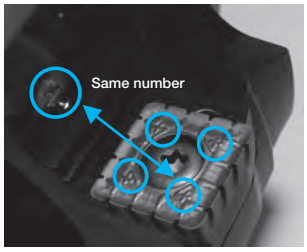
Caution when installing Notched Insert

It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body. For MSRS90, Notched Insert location indicator is marked at insert installed pocket of the cutter body.

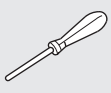
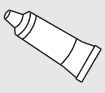
Description		No. of Inserts	No. of Flutes	No. of Stages	No. of Inserts Notched	
					NB3(P)	NB4(P)
MSRS	90100R-1-6T	6	6	1	3	3
	90100R-2-6T	12		2	6	6
	90100R-4-6T	24		4	12	12

When installing the inserts, match the number on the top surface of insert to the number of the cutter body.





Spare Parts

Description		Spare Parts							
		Clamp Screw	Wrench	Cartridge		Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt
				MAP-1806M 	MAP-1806S  (Bottom edge only)				
Without cartridge	MSRS 90080R-○-4T	SB-60120TR	TT-25L	-	-	-	-	P-37	HH16X45
	90100R-○-6T								HH20X55
	90125R-○-8T								-
With cartridge	MSRS 90160R-○-8T ~ 90315R-○-14T			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		
				Recommended tightening torque for Cartridge Clamp 3.5N·m					
Without cartridge	MSRS 90080R-○-4T-M	Recommended tightening torque for Insert Clamp 7.5N·m		-	-	-	-		HH12X35
	90100R-○-6T-M								
	90125R-○-8T-M								-
With cartridge	MSRS 90160R-○-8T-M ~ 90315R-○-14T-M			MAP-1806M*1	MAP-1806S*2	SB-40140TR	DT-15		
				Recommended tightening torque for Cartridge Clamp 3.5N·m					

Notes) *1 : MAP-1806M is only for the bottom edge (1st stage) of MSRS90..R-1.
*2 : MAP-1806S is only for the bottom edge (1st stage) of MSRS90..R-2... Use it only for the bottom edge (1st stage).

How to attach the cartridge : You need to tighten 2 clamp screws to fix the cartridge. Tighten the slant screw first and then tighten the other screw.

 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Cutting Speed Vc (m/min)	
	Standard NB3+NB4	Low Cutting Force NB3P+NB4P	MEGACOAT	
			PR1230	**PR1210**
Soft Steel	0.1~0.2~0.25	0.1~0.2~0.25	★ 120~150~220	☆ 120~150~220
Carbon Steel	0.1~0.2~0.25	0.1~0.2~0.25	★ 100~150~200	☆ 100~150~200
Alloy Steel	0.1~0.15~0.2	0.1~0.15~0.2	★ 100~150~200	☆ 100~150~200
Mold Steel	0.1~0.15~0.2	0.1~0.12~0.15	★ 100~150~180	☆ 100~150~180
Gray Cast Iron	0.1~0.2~0.3	0.1~0.2~0.25	☆ 100~180~250	★ 100~180~250
Nodular Cast Iron	0.1~0.2~0.25	0.1~0.18~0.2	☆ 100~180~220	★ 100~180~220
Stainless Steel	Not recommended			
Aluminum / Copper	Not recommended			

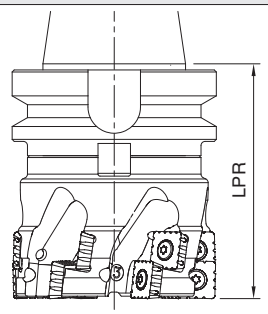
★ : 1st Recommendation ☆ : 2nd Recommendation

Cutting Conditions (Shouldering)

In case of MSRS90100R-1-6T

Workpiece Material	Overhang Length LPR(mm)	Cutting Conditions		ap × ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 120mm	180	0.2	15 × 80	826
	120~200mm	180	0.2	15 × 40	413
	201mm and over	230	0.1	15 × 40	263
Carbon Steel	Less than 120mm	150	0.2	15 × 80	689
	120~200mm	150	0.2	15 × 40	344
	201mm and over	200	0.1	15 × 40	229

Overhang Length LPR(mm)



In case of MSRS90100R-2-6T

Workpiece Material	Overhang Length LPR(mm)	Cutting Conditions		ap × ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 120mm	180	0.2	30 × 50	1,032
	120~200mm	180	0.2	30 × 30	619
	201mm and over	230	0.1	30 × 25	329
Carbon Steel	Less than 120mm	150	0.2	30 × 50	861
	120~200mm	150	0.2	30 × 30	517
	201mm and over	200	0.1	30 × 25	287

In case of MSRS90100R-4-6T

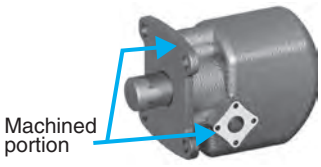
Workpiece Material	Overhang Length LPR(mm)	Cutting Conditions		ap × ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Cast Iron	Less than 140mm	180	0.2	60 × 20	826
	140~200mm	180	0.2	60 × 10	413
	201mm and over	230	0.1	60 × 10	263
Carbon Steel	Less than 140mm	150	0.2	60 × 20	689
	140~200mm	150	0.2	60 × 10	344
	201mm and over	200	0.1	60 × 10	229

Case Studies

FCD450

Industrial parts
·Vc=150m/min
·ap x ae=6 x 65mm
·fz=0.15mm/t
(Vf=430mm/min)

MSRS90100R-1-6T (ø100 ·6 flutes)
SPMT180616EN-NB3/NB4
(PR1210)



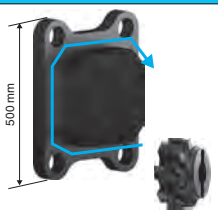
MSRS90(PR1210)	Chip Evacuation Rate = 258cc/min
Competitor B	107cc/min

· MSRS90 more than doubled the machining efficiency compared with competitor B.
· Competitor B machined with 2 passes (ap x ae=3 x 65mm).
MSRS90 machined with only 1 pass.
· Cutting time was reduced. (User Evaluation)

SCM420

Construction machine part
·Vc=200m/min
·ap x ae=10 x 50mm
·fz=0.1mm/t
(Vf=400mm/min)

MSRS90125R-1-8T (ø125 ·8 flutes)
SPMT180616EN-NB3/NB4
(PR1230)



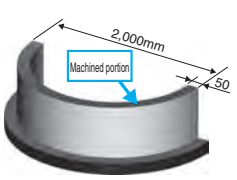
MSRS90(PR1230)	Chip Evacuation Rate = 200cc/min
Competitor C	153cc/min

· MSRS90 improved the machining efficiency to 1.3 times that of competitor C.
· Competitor C machined with ap x ae=5 x 50mm
· Tool cost is reduced to 1/3 although competitor C is expensive using 2-corner insert.
MSRS90 reduced machining cost as well as improved machining efficiency. (User Evaluation)

Mold Steel

Shipbuilding parts
·Vc=150m/min
·ap x ae=10 x 10~50mm
·fz=0.1mm/t
(Vf=240mm/min)

MSRS90160R-1-8T (ø160 ·8 flutes)
SPMT180616EN-NB3/NB4
(PR1230)



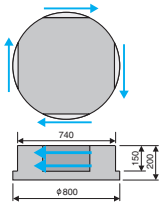
MSRS90(PR1230)	Chip Evacuation Rate = 120cc/min
Competitor D	60cc/min

· MSRS90 more than doubled the machining efficiency compared with competitor D.
· Competitor D machined with ap x ae=5 x 10~50mm
⇒ Low cutting force of MSRS90 enabled twice as large ap as that of competitor.
· It can double the ap as well as increase the cutting speed (Vc=100⇒150).
⇒ Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time). (User Evaluation)

Alloy Steel

Power generation parts
·Vc=160m/min
·ap x ae=10 x 0~20mm
·fz=0.15mm/t
(Vf=500mm/min)

MSRS90125R-1-8T(ø125 ·8 flutes)
SPMT180616EN-NB3/NB4
(PR1230)



MSRS90(PR1230)	12 surfaces/edge
Competitor E	8 surfaces/edge

· MSRS90 showed 1.5 times longer tool life than that of competitor E.
· Competitor E machined with 2 passes on a side (ap x ae=12 x 0 to 10mm).Competitor E was poor in feed rate (Vf=400mm/min). ⇒ Machining efficiency was improved by MSRS90 (by achieving reduction in cutting time).
· Although competitor E is load due to high cutting force. MSRS90 operates fairly quietly. (User Evaluation)

Heavy Milling Cutter MSR

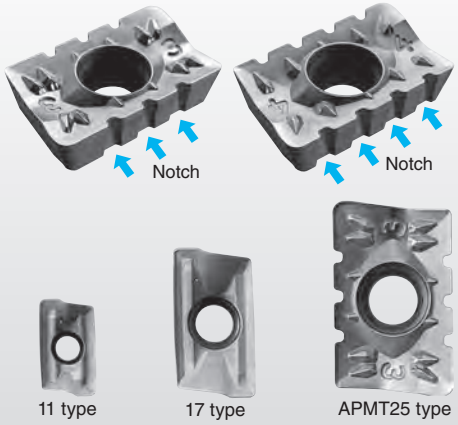


Notched insert reduces cutting force, and enables high feed rates by reducing chattering. Improved chip evacuation and low cutting force with the special chipbreaker.

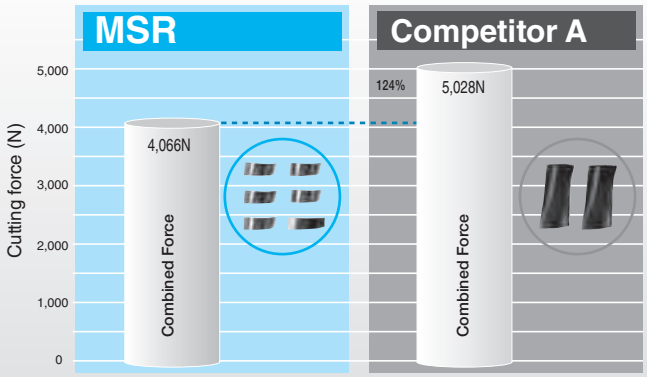
Enables heavy milling and deep cutting, and also drastically improves machining efficiency. (Reduction of cutting time)

Notched Insert

Size Comparison (Full-Scale)

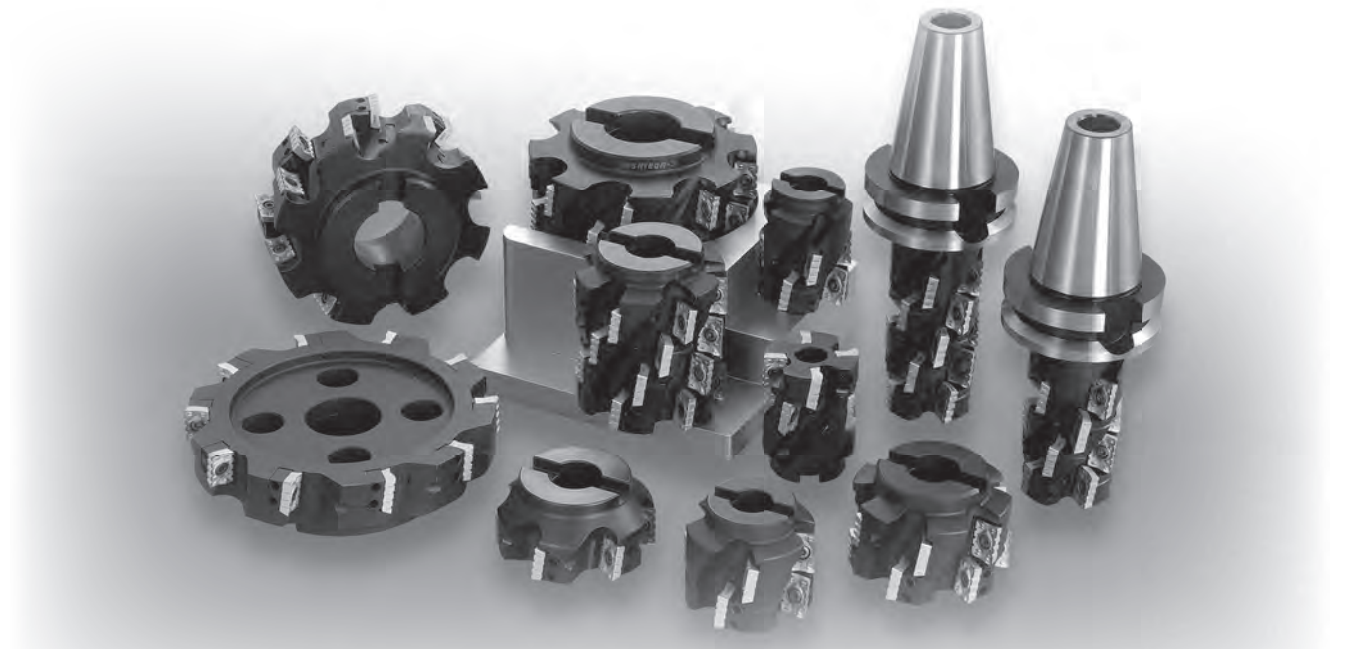


Cutting Force Comparison



* The exclusive notched chipbreaker provides low cutting force and good chip evacuation.

(Internal evaluation)

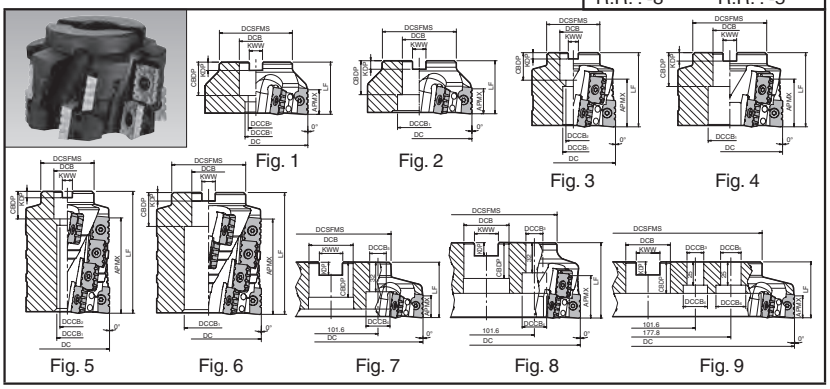


Shouldering | *Slotting | Facing

* Not recommended for 4 stages type

MSR

Rake Angle	
ø63~ø80	ø100~
A.R. : +9°	A.R. : +9°
R.R. : -8°	R.R. : -5°



Spare Parts (Bore Dia. : common to Metric type / Inch type)

Description	Spare Parts					
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-○□	SB-60120TR	TT-25L	-	-	-	P-37
MSR 080R-○□ ~ 315R-○□			MAP-2506	SB-40140TR	DT-15	
	for Insert Clamp		for Shim Clamp			

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Toolholder Dimensions (Metric)

Description	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm) DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	Drawing	Weight (kg)
MSR 063R-1M	●	4	4	1	63	50	27	20	14	65	22	7.2	12.4	23.5	-	-	-	-	Fig. 1	0.7
063R-2M	●	8		2						85				45					Fig. 3	0.9
080R-1M	●	4	4	1	80	55	27	20	14	50	22	7.2	12.4	23.5	-	-	-	-	Fig. 1	1.0
080R-2M	●	8		2						70				45					Fig. 3	1.5
080R-4M	●	16		4						115				90					Fig. 5	2.5
100R-1M	●	6	6	1	100	70	32	42	-	50	28	8	14.4	23.5	-	-	-	-	Fig. 2	1.5
100R-2M	●	12		2						70				45					Fig. 4	2.0
100R-4M	●	24		4						115				90					Fig. 6	3.2
125R-1M	●	6	6	1	125	85	40	58	-	60	30	9	16.4	23.5	-	-	-	-	Fig. 2	3.4
125R-2M	●	12		2						70				45					Fig. 4	3.7
125R-4M	●	24		4						115				90					Fig. 6	6.0
160R-1M	●	8	8	1	160	100	40	68	-	60	30	10	16.4	23.5	-	-	-	-	Fig. 2	6.1
160R-2M	●	16		2						70				45					Fig. 4	6.8
200R-1M	●	10	10	1	200	130	60	-	-	60	38	15	25.4	23.5	18	26	-	-	Fig. 7	7.0
200R-2M	●	20		2						80				45					Fig. 8	9.9
250R-1M	●	12	12	1	250	130	60	-	-	60	38	15	25.4	23.5	18	26	-	-	Fig. 7	10.3
250R-2M	●	24		2						80				45					Fig. 8	14.2
315R-1M	MTO	14	14	1	315	230	60	-	-	60	35	15	25.4	23.5	17	27	22	32	Fig. 9	15.5

· Shim is not available for MSR063R (DC=63).
· Mounting bolt (HH12X35) is included for MSR063R / MSR080R.
· It is not recommended using only top edge part (under ap=30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
· Deep slotting is not recommended for this cutter.

Toolholder Dimensions (Bore Dia. : Inch spec)

Description	Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm) DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	$DCCB_3$	$DCCB_4$	$DCCB_5$	$DCCB_6$	Drawing	Weight (kg)
MSR 063R-1	●	4	4	1	63	50	25.4	20	14	65	26	6	9.5	23.5	-	-	-	-	Fig. 1	0.8
063R-2	●	8		2						85				45					Fig. 3	1.0
080R-1	●	4	4	1	80	55	25.4	20	14	50	26	6	9.5	23.5	-	-	-	-	Fig. 1	1.1
080R-2	●	8		2						70				45					Fig. 3	1.6
080R-2-31.75	●					70	31.75	27	18		32	8	12.7						Fig. 3	1.7
080R-4	●	16	4	4		55	25.4	20	14	115	26	6	9.5	90					Fig. 5	2.6
080R-4-31.75	●					70	31.75	27	18		32	8	12.7						Fig. 5	2.7
100R-1	●	6	6	1	100	70	31.75	42	-	50	32	8	12.7	23.5	-	-	-	-	Fig. 2	1.6
100R-2	●	12		2						70				45					Fig. 4	2.2
100R-4	●	24		4						115				90					Fig. 6	3.6
125R-1	●	6	6	1	125	85	38.1	54	-	60	38	10	15.9	23.5	-	-	-	-	Fig. 2	3.5
125R-2	●	12		2						70				45					Fig. 4	3.8
125R-4	●	24		4						115				90					Fig. 6	6.1
160R-1	●	8	8	1	160	100	50.8	68	-	60	38	11	19.0	23.5	-	-	-	-	Fig. 2	5.8
160R-2	●	16		2						70				45					Fig. 4	6.4
160R-4	●	32		4						115				90					Fig. 6	10.7
200R-1	●	10	10	1	200	130	47.625	-	-	60	38	14	25.4	23.5	18	26	-	-	Fig. 7	7.5
200R-2	●	20		2						80				45					Fig. 8	10.4
250R-1	●	12	12	1	250	130	47.625	-	-	60	38	14	25.4	23.5	18	26	-	-	Fig. 7	10.9
250R-2	●	24		2						80				45					Fig. 8	14.7
315R-1	MTO	14	14	1	315	220	47.625	-	-	60	35	14	25.4	23.5	17	27	22	32	Fig. 9	16.0

· Shim is not available for MSR063R (DC=63).
· Mounting bolt (HH12X40) is included for MSR063R and MSR080R. Mounting bolt (HH16X45) is included for MSR080R-○-31.75.
· It is not recommended using only top edge part (under ap=30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
· Deep slotting is not recommended for this cutter.

● : Std. Item
MTO : Made to order

MSR-BT50



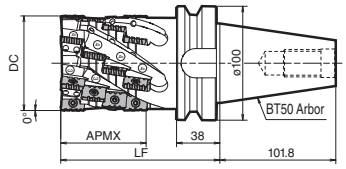


Fig. 1

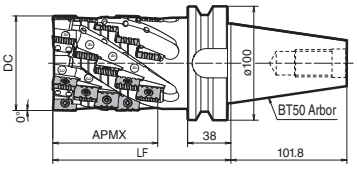


Fig. 2

Toolholder Dimensions (BT50 Integral Arbor type)

Description		Stock	No. of Inserts	No. of Flutes	No. of Stages	Dimension (mm) DC	LF	APMX	Rake Angle A.R.	R.R.	Drawing	Weight (kg)	Spare Parts: Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR	063R-BT50-4	●	16	4	4	63	160	90	+9°	-8°	Fig. 1	5.7	SB-60120TR	TT-25L	-	-	-	P-37
	063R-BT50-5	●	20		5		180	111			Fig. 2	6.2						
	080R-BT50-4	●	16	4	4	80	160	90			Fig. 1	6.9			MAP-2506	SB-40140TR	DT-15	
	080R-BT50-5	●	20		5		180	111			Fig. 2	7.4	for Insert Clamp					
	100R-BT50-4	●	24	6	4	100	160	90	+9°	-5°	Fig. 1	9.6			for Shim Clamp			
	100R-BT50-5	●	30		5		180	111			Fig. 2	10.5						

·Shim is not available for MSR063R (DC=63).
· It is not recommended using only top edge part (under ap=30mm) for 4 stages / 5 stages type. If ap is small, use previous page's 1 stage type or 2 stages type.
· Deep slotting is not recommended for this cutter.

Applicable Inserts

Description	Applicable Inserts ➔ M22 (Handed Insert shows Right-hand)			
	 3-Notched	 4-Notched	 3-Notched / Low cutting force	 4-Notched / Low cutting force
MSR… MSR…M	APMT 2506○○ER-NB3 + APMT 2506○○ER-NB4		APMT 250616ER-NB3P + APMT 250616ER-NB4P	
For custom-ordered cutter	APMT 250616EL-NB3 + APMT 250616EL-NB4		-	

Recommended Cutting Conditions ➔ M126

Caution when installing Notched Insert

It is important to install the appropriate notched insert into the correct position. If it is installed in incorrect position, the tool cannot cut the workpiece and it may damage the toolholder body.
For MSR, Notched Insert location indicator is marked at insert installed area.

Please bear the following in mind when installing inserts to toolholders.
(Indication is marked near the insert pocket for MSR.)

1. (3) is for APMT2506 ○○ ER-NB3
2. (4) is for APMT2506 ○○ ER-NB4

(No. of Inserts - Example)

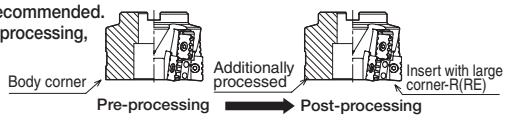
Description		No. of Inserts	No. of Flutes	No. of Inserts Notched NB3	No. of Inserts Notched NB4
MSR	100R-1	6	6	3	3
	100R-2	12		6	6
	100R-4	24		12	12

Caution when installing the Insert with Corner-R(RE) 4.0

When using inserts with corner-R(RE) 4.0mm, additional modifications of the cutter body will be necessary. Ref. to the table below for the recommended modifications.

Insert Corner-R(RE) (mm)	Additional Processing Dimension to Body Corner (mm)
4.0	R2.0

* Round- shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.



● : Std. Item

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc : m/min)	
	Low Cutting Force	General purpose	MEGACOAT	
	NB3P+NB4P	NB3+NB4	**PR1230**	**PR1210**
Carbon Steel	0.15	0.2	★ 100~**150**~200	-
Cast Iron	0.15	0.2	-	★ 100~**150**~200
Stainless Steel	Not recommended			
Aluminum / Copper	Not recommended			

* For MSR, cutting speed should be carefully adjusted depending on the length of toolholder protruding from the end of machine spindle. ★ : 1st Recommendation ☆ : 2nd Recommendation

- When the overhang length of toolholder is small, ➡ set the cutting speed to slightly higher than the recommended cutting conditions.
- When the overhang length of toolholder is long, ➡ set the cutting speed to slightly lower than the recommended cutting conditions.

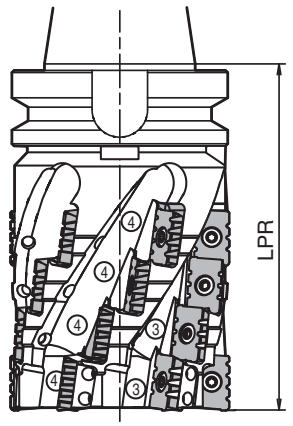
Cutting Conditions

1) Shouldering

In case of MSR100R-1

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	20 x 80	920
	100~200mm	150	0.2	20 x 40	460
	201mm and over	100	0.2	20 x 30	228
Cast Iron	Less than 100mm	180	0.2	20 x 80	1,100
	100~200mm	180	0.2	20 x 40	550
	201mm and over	120	0.2	20 x 30	276

Overhang Length LPR (mm)



In case of MSR100R-2

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	40 x 40	920
	130~230mm	150	0.2	40 x 20	460
	231mm and over	100	0.2	40 x 20	304
Cast Iron	Less than 130mm	180	0.2	40 x 40	1,100
	130~230mm	180	0.2	40 x 20	550
	231mm and over	120	0.2	40 x 20	368

In case of MSR100R-4

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 180mm	150	0.2	75 x 20	863
	180~280mm	150	0.2	75 x 10	431
	281mm and over	100	0.2	75 x 10	285
Cast Iron	Less than 180mm	180	0.2	75 x 20	1,035
	180~280mm	180	0.2	75 x 10	518
	281mm and over	120	0.2	75 x 10	345

2) Slotting

● In case of MSR100R-1

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	7 x 100	403
	100~200mm	120	0.2	4 x 100	184
	201mm and over	100	0.2	3 x 100	114
Cast Iron	Less than 100mm	180	0.2	14 x 100	966
	100~200mm	150	0.2	7 x 100	403
	201mm and over	120	0.2	4 x 100	184

● In case of MSR100R-2

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	7 x 100	403
	130~230mm	120	0.2	4 x 100	184
	231mm and over	100	0.2	3 x 100	114
Cast Iron	Less than 130mm	180	0.2	14 x 100	966
	130~230mm	150	0.2	7 x 100	403
	231mm and over	120	0.2	4 x 100	184

● In case of MSR160R-1

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 100mm	150	0.2	5 x 160	384
	100~200mm	120	0.2	3 x 160	182
	201mm and over	100	0.2	2 x 160	102
Cast Iron	Less than 100mm	180	0.2	10 x 160	928
	100~200mm	150	0.2	5 x 160	384
	201mm and over	120	0.2	4 x 160	243

● In case of MSR160R-2

Workpiece Material	Overhang Length LPR (mm)	Cutting Conditions		ap x ae (mm)	Chip Evacuation Rate (cc/min)
		Cutting Speed Vc (m/min)	Feed fz (mm/t)		
Carbon Steel	Less than 130mm	150	0.2	5 x 160	384
	130~230mm	120	0.2	3 x 160	182
	231mm and over	100	0.2	2 x 160	102
Cast Iron	Less than 130mm	180	0.2	10 x 160	928
	130~230mm	150	0.2	5 x 160	384
	231mm and over	120	0.2	4 x 160	243

Notes) MSR...-4 (No. of stage)
Slotting is not recommended.

Q&A

Q-1 What cutting conditions are recommended in most cases for MSR?

A-1 Vc=150m/min,fz=0.2mm/t,
larger cutting depth and smaller cutting width

In case of MSR100R-2

e.g.) Load meter 120%

1st Pass	ap x ae : 15x75mm
2nd Pass	
3rd Pass	

e.g.) Load meter 90%

3rd Pass	2nd Pass	1st Pass
ap x ae : 45x25mm		

Q-2 Required equipment for MSR?

A-2 Max. spindle revolution is 4,000min^{-1} or under. BT50 or larger.
* MSR is not only for Double column machining center. The reason why not recommended for high RPM spindle machine is its less torque.
* Although MSR works with BT40 shank, maximum available fz is about 0.1mm/tooth.

Q-3 What are the points to remember in case of less power machine?

A-3 Do not use large size cutters. ⇒ ø63 or ø80 is recommended.
Please increase cutting speed and decrease feed rate.
Set up conditions to get the largest available torque by checking torque curve of the machine.
Tried under condition of Vc=150m/min, enough torque was not gained because of high gear.
In this case, it has to be prioritized using Vc which can exert enough torque as Vc=120m/min.
* Machine torque curve will be prioritized.

Q-4 In case of unstable workpiece.

A-4 Decrease feed ratio at the start machining the workpiece.

* Almost all cases of moving workpiece happens when start machining.

◎ Effective for increasing cutting speed and decrease feed rate.
Vc=150m/min,fz=0.2mm/t
↓
Vc=200m/min,fz=0.15mm/t

Q-5 What is the tool life?

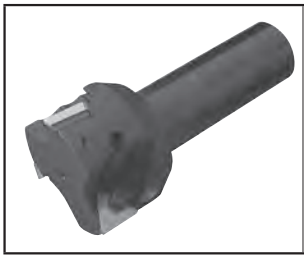
A-5 Chip weight : 700kg/Corner (Result by PR660)
Cutting time : 90min (calculated value)
Cutting distance : 65m (calculated value)
How great 1,000cc/min? ⇒ About 7.8kg chips removed per minute
Tool life time=700kg (Chip weight)÷7.8kg (Chip evacuation amount per 1min)=90min
Cutting distance=90min (Time by the end of tool life)x717mm/min (Table feed ratio per 1min)=65m
* In case of cutting Vc=150m/min, apxae : 20x70mm, Vf=717mm/min.
* Tool : MSR100R-2 (6 flutes)

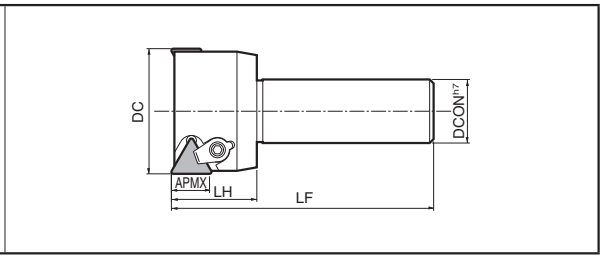
Q-6 How to reduce chattering.

A-6 **In chattering occurs, then the following conditions are recommended.**
⇒ Reduce cutting speed and increase feed rate.

In case of Steel	In case of Cast Iron
· Vc = 80m/min	· Vc = 80m/min
· fz = 0.25mm/t	· fz = 0.35mm/t

MTP90 with cylindrical shank

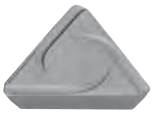




Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)					Rake Angle		Spare Parts				
			DC	DCON	LF	LH	APMX	A.R.	R.R.	Clamp	Clamp screw	Wrench	Shim	Shim Screw
MTP 9050	▲	3	50	32	130	43	18	+8°	0°	CP-8W	W8X18	LW-4	KPT-42	SP3X8
9063	▲	3	63											

Applicable Inserts

Description	Applicable Inserts ➔ M14		
			
MTP 90...	TPMR 2204PDER-H	TPKR 2204PDER-S	TPKN 2204PDTR 2204PDFR

Recommended Cutting Conditions

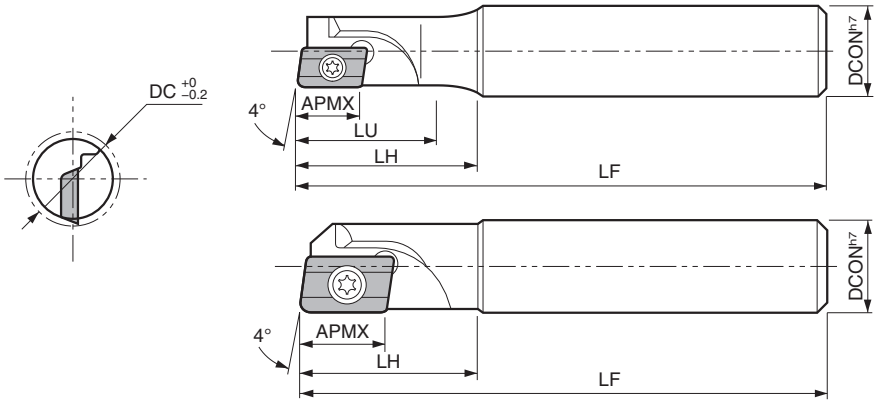
Workpiece Material	Feed fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)			
		Cermet	MEGACOAT		Carbide
		TN100M	**PR1225**	**PR1210**	**KW10**
Carbon Steel	~0.25	★ 120~200	★ 120~250	-	-
Alloy Steel	~0.25	★ 100~180	★ 100~220	-	-
Mold Steel	~0.20	★ 100~180	★ 80~180	-	-
Stainless Steel	~0.20	☆ 120~200	★ 120~220	-	-
Cast Iron	~0.25	-	-	★ 100~220	☆ 80~150
Non-ferrous Metals	~0.20	-	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

▲ : To be replaced by a new product

DMC End Mill





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Rake Angle		Drawing	Spare Parts		
			DC	DCON	LF	LH	LU	APMX	A.R.	R.R.		Clamp Screw	Wrench	
DMC 810-S16	●	1	10	16	90	27	16	8.5	+3°	-11°	Fig. 1	SB-2545TR	FT-8	
811-S16	●		11							-10°				
812-S16	●		12			31	20		+5°					
814-S16	●		14		100	33.5	25		+6°	-8°				
815-S16	●		15											
816-S16	●	2	16			31				-4°				
820-S20	●	3	20	20	120	36	30		+8°	-6°				
DMC 810	●	1	10	10	70	20	-	8.5	+3°	-6°	Fig. 2	SB-2545TR	FT-8	
812	●		12	12	80	25				-5°				
DMC 020	●	2	20	20	110	30	-	11.0	+5°	0°	Fig. 2	SB-3060TR	FT-10	

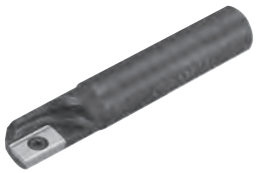
Applicable Inserts

Description	Applicable Inserts ➔ M24	
		
DMC8○○(-S○○)	NDCT 090204TR 090204FR	NDMM 090204ER-SP
DMC020	NDCT 120208TR 120208FR	NDMM 120204ER-SP 120208ER-SP

Recommended Cutting Conditions ➔ M131

● : Std. Item

DMC-SX End Mill





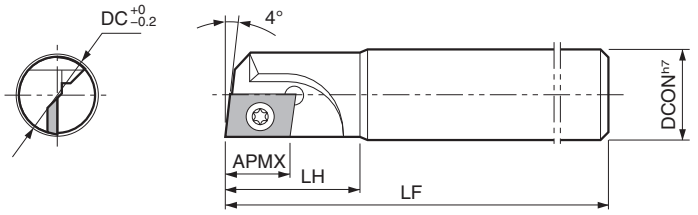


Fig. 1

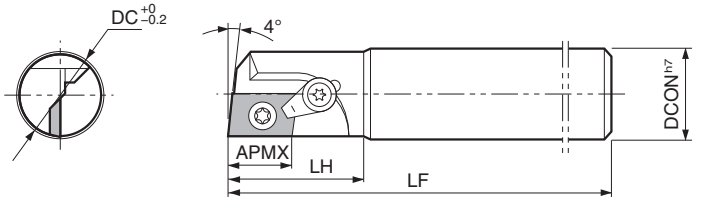


Fig. 2

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DC	DCON	LF	LH	APMX	Rake Angle A.R.	R.R.	Drawing	Spare Parts: Clamp Set	Clamp Screw	Wrench
DMC 316SXT	●	1	16	16	90	30	14.0	+3°	-3°	Fig. 1	-	SB-4060TR	FT-15
320SX	●	1	20	20	110	30	14.0	+3°	-3°	Fig. 1	-	SB-4060TR	FT-15
325SX	●	2	25	25	120	40	14.0	+3°	-2°	Fig. 2	CPS-2TR	SB-4065TR	FT-15
332SX	●	2	32	32	130	40	14.0	+3°	0°	Fig. 2	CPS-2TR	SB-4065TR	FT-15
340SX	●	2	40	32	150	40	14.0	+3°	0°	Fig. 2	CPS-2TR	SB-4065TR	FT-15
DMC 320SX-200	●	1	20	20	200	50	14.0	+3°	-3°	Fig. 1	-	SB-4065TR	FT-15
325SX-220	●	2	25	25	220	60	14.0	+3°	-2°	Fig. 1	-	SB-4065TR	FT-15
332SX-250	●	2	32	32	250	80	14.0	+3°	0°	Fig. 1	-	SB-4065TR	FT-15

Applicable Inserts

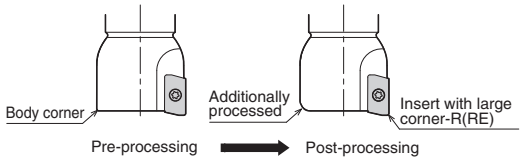
Description	Applicable Inserts ⇒ M24		
DMC 316SXT	NDCW 150302TR	NDCT 150308TR	NDMM 150304ER-SP
320SX	150304TR	150308FR	150308ER-SP
325SX	150308TR	(NDCT 150308TRX)	
332SX	150320TR		
340SX	150330TR		
DMC 320SX-200	150340TR		
325SX-220	(NDCW 150308TRX)		
332SX-250	(NDCW 150308FRX)		

( ) insert is also attachable, however toolholder will be out from insert bottom. (Ref. to lower section of **M133**)

■ When using inserts with corner-R(RE) 2.0 or larger, additional modifications of the cutter body will be necessary. Additional modifications for the body will be necessary. Ref. to the chart below for the recommended modifications.
(Additional grind off is not necessary when corner-R(RE) is 0.8mm or less.)

Insert Corner-R(RE) (mm)	Additional Processing Dimension to Body Corner (mm)
2.0	R1.0
3.0	R1.6
4.0	R2.0

* Round- shaped additional processing is recommended.
When applying chamfer shaped additional processing, do not cut away too much.



DMC / DMC-SX Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min) Cermet TN100M	Carbide KW10	Max. ap (mm) Cutting Dia. (DC)	Slotting (ap)	Shouldering (apxae)
Carbon Steel	~0.2	★ 120~200		~ø12	2	6x2
				ø14~	3	9x3
Alloy Steel	~0.2	★ 100~180		~ø12	2	6x2
				ø14~	3	9x3
Mold Steel	~0.15	★ 100~180		~ø12	2	6x2
				ø14~	3	9x3
Stainless Steel	~0.15	☆ 120~200		~ø12	1.5	4x2
				ø14~	2	6x2
Cast Iron	~0.2		★ 80~150	~ø12	2	6x2
				ø14~	3	9x3
Non-ferrous Metals	~0.2		★ 100~300	~ø12	2	6x2
				ø14~	3	9x3

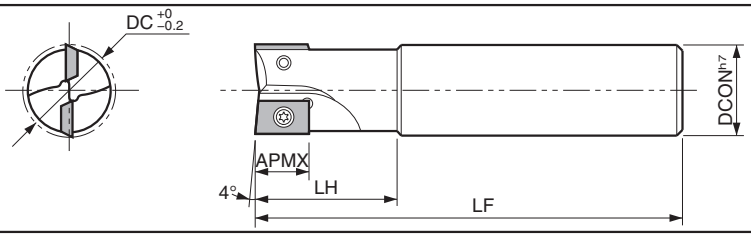
·Use DMC8○○with ap=6mm MAX. for shouldering.

★ : 1st Recommendation ☆ : 2nd Recommendation

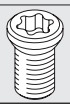
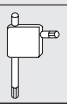
● : Std. Item

DMC-H End Mill (High Rake)





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Rake Angle		Drawing	Spare Parts		
			DC	DCON	LF	LH	APMX		A.R.	R.R.		Clamp Screw	Wrench	
														
DMC 316H	●	1	16	16	90	30	14.0		+5°	-3.5°	-	SB-4060TR	FT-15	
320H	●		20	20	110				+6°	-2°				
325H	●	2	25	25	120	40			+8°	0°		SB-4065TR		
332H	●		32	32	130									
340H	●		40		150									

Applicable Inserts

Description	Applicable Inserts ➡ M24			Applicable Inserts ➡ M29
				
DMC 316H **320H** **325H** **332H** **340H**	NDMM 150304ER-SP 150308ER-SP	NDCT 150308TRX	NDCW 150308TRX 150308FRX	NDCW 150302FRX-NE 150302FRX (PCD)

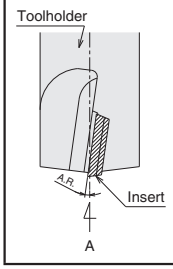
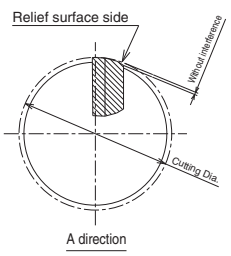
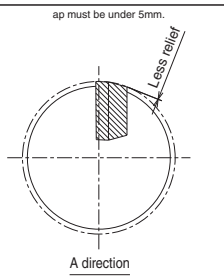
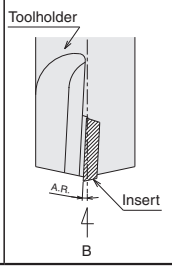
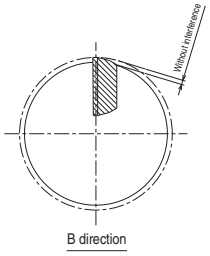
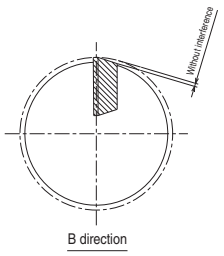
● : Std. Item

◆ DMC-H Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc: m/min)				Max. ap (mm)		
		Cermet	Carbide	PCD				
		TN100M	KW10	KPD230 (KPD001)	KPD010	Cutting Dia. (DC)	Slotting (ap)	Shouldering (apxae)
Carbon Steel	~0.2	★ 120~200				~ø20	4	8x4
						ø25~	8	14x6
Alloy Steel	~0.2	★ 100~180				~ø20	4	8x4
						ø25~	8	13x6
Mold Steel	~0.15	★ 100~180				~ø20	3	5x2
						ø25~	6	10x3
Stainless Steel	~0.15	☆ 120~200				~ø20	3	6x2
						ø25~	6	13x3
Cast Iron	~0.2		★ 80~150			~ø20	4	8x4
						ø25~	6	14x6
Non-ferrous Metals	~0.2		★ 100~300	★ 300~500	☆ 300~500	~ø20	4	8x4
						ø25~	6	14x6

★ : 1st Recommendation ☆ : 2nd Recommendation

· Above inserts are also applicable to DMC○○○SX, but the conventional NDCW1503○○TR insert is not applicable for this end mill.

Insert Description / Toolholder Description	NDCT...TRX NDCW...(T / F)RX	NDCW...TR NDCT...(T / F)R	Insert Description / Toolholder Description	NDCT...TRX NDCW...(T / F)RX	NDCW...TR NDCT...(T / F)R
DMC-H	No interference of relief surface	Less relief	DMC-SX	No interference of relief surface	No interference of relief surface
					

High Efficiency Milling Cutter for Finishing Aluminum Alloys

MFAH

Low Cutting Force Minimizes Burrs and Chipping for High Quality Machining

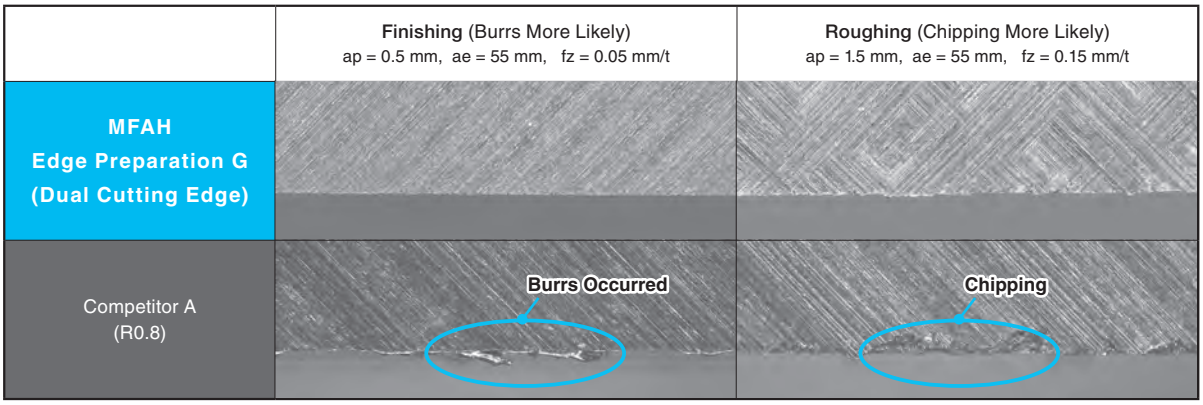
Easily Adjust Blade Runout

2 Body Types and 3 Inserts for a Variety of Milling Applications

1 Low Cutting Force Minimizes Burrs for High Quality Machining

Large True Rake Angle and Dual Cutting Edge Insert Designs

Burr and Chipping Comparison (Internal evaluation)

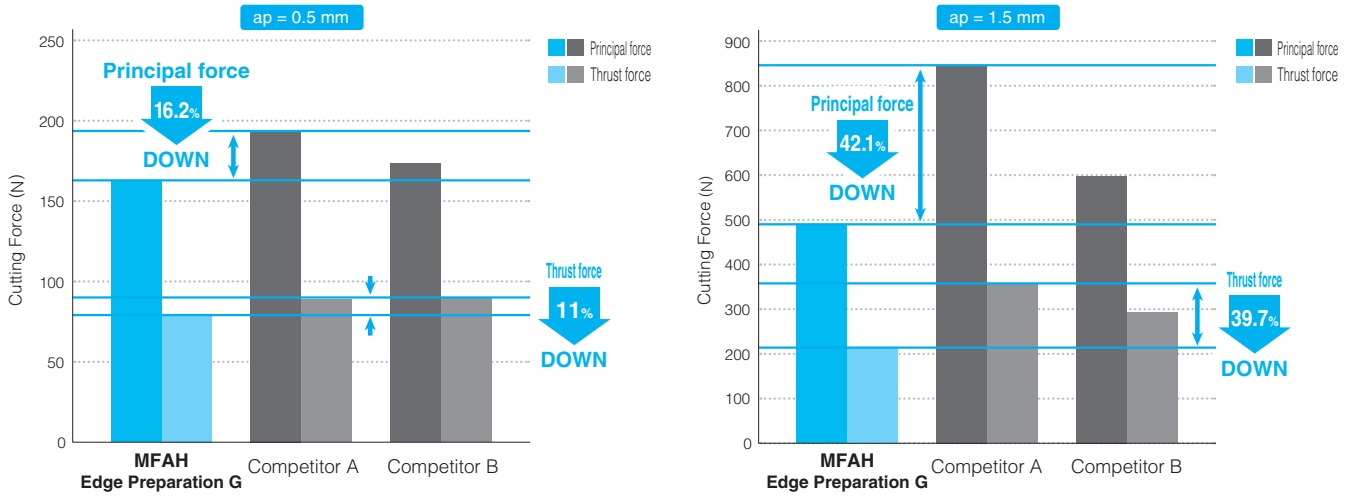


Cutting Conditions : Vc = 2,500 m/min, Wet, Cutter Dia. ø80
MFAH080RS-10T-SF, ENET0905PAER-G KPD001
Workpiece Material : ADC12

2 Low Cutting Force Design

Low Cutting Force, Reduced Chattering and High Efficiency Machining

Cutting Force Comparison (Internal evaluation)



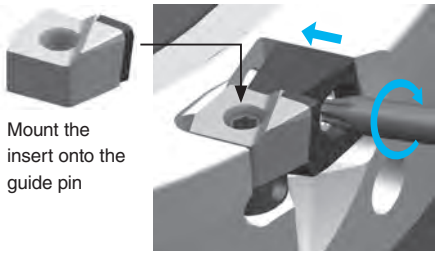
Cutting Conditions : Vc = 2,500 m/min, ae = 55 mm, fz = 0.1 mm/t, Wet, Cutter Dia. ø80
MFAH080RS-10T-SF ENET0905PAER-G KPD001 Workpiece Material : ADC12

3 Adjustable Blade Runout

■ Easily Install Inserts and Adjust Blade Runout

Easy Insert Installment

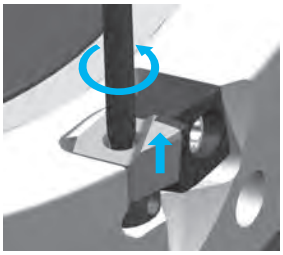
Guide Pin Allows for Easier Positioning



Mount the insert onto the guide pin

Easily Adjust Blade Runout

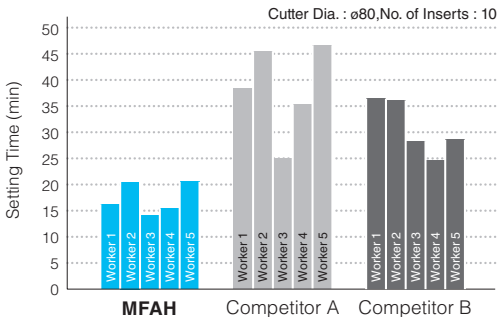
Adjustable from Both the Front and Outer Periphery



Unique Design for Easily Adjusting from the Front

Blade Runout Setting Time Comparison (Internal evaluation)

* Operation Time of 5 Workers Comparison



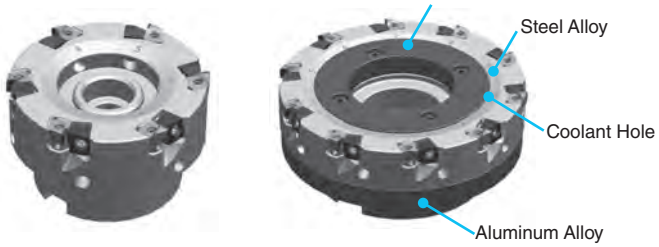
The MFAH can drastically shorten the setting time

4 Large Tooling Lineup

Steel Body and Light-weight Hybrid Body with Internal Coolant Available

3 Different Edge Designs Offer a Variety of Machining Applications

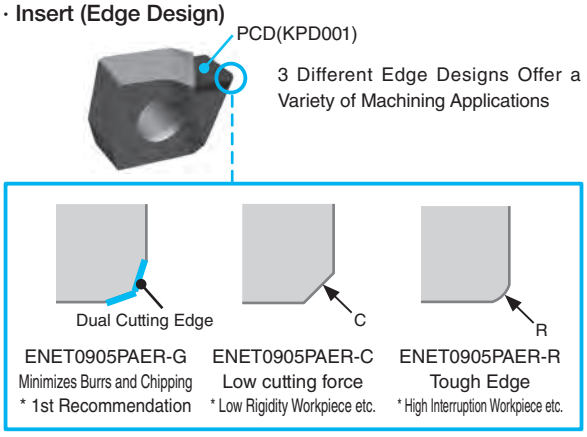
· Cutter Body



Steel Body
ø50~ø125

Light-weight Hybrid Body
ø80~ø315

· Insert (Edge Design)

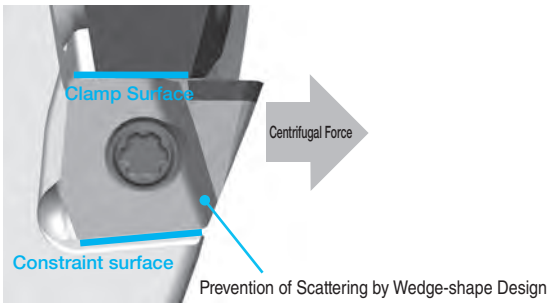


ENET0905PAER-G	ENET0905PAER-C	ENET0905PAER-R
Minimizes Burrs and Chipping * 1st Recommendation	Low cutting force * Low Rigidity Workpiece etc.	Tough Edge * High Interruption Workpiece etc.

5 Safety Enhancements during High-speed Revolution

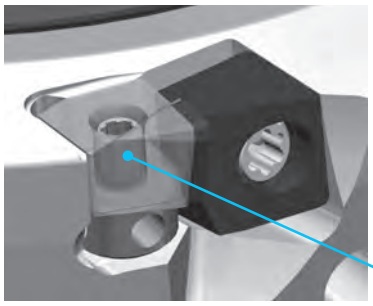
■ Scattering Prevention Mechanism

1 Prevention of Scattering by Wedge-shape Design
New wedge-shape feature holds insert firmly in place and reduces chattering



Prevention of Scattering by Wedge-shape Design

2 Prevention of Scattering with Guide Pin
Guide pins improve safety during high-speed rotation



Prevention of Scattering with Guide Pin

MFAH (Light-weight Hybrid Body)



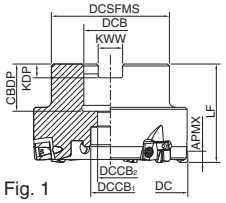


Fig. 1

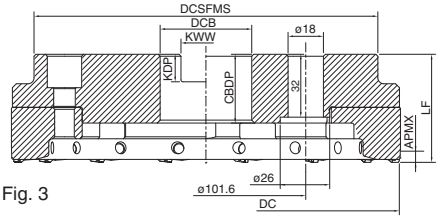


Fig. 3

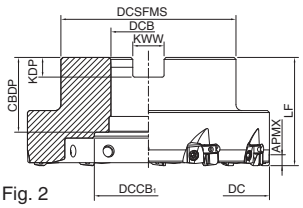


Fig. 2

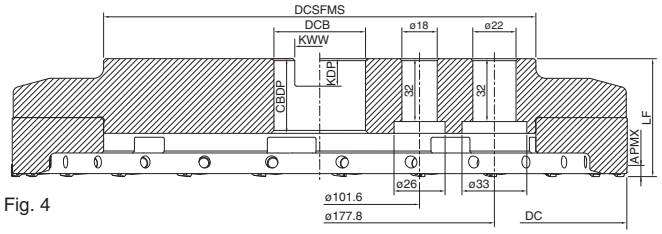


Fig. 4

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)										Coolant Hole	Drawing	Max. Revolution (min^{-1})	Weight (kg)	Arbor Bolt (Attachment)	Coolant Cover (Attachment)	Coolant Cover (sold separately)
					DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX							
Metric	MFAH	080RA-6T-M-SF	●	6	80	62	27	20	13	50	27	7.0	12.4	4.6	Yes	Fig. 1	14,600	0.82	HH12X35HC	-	-
		080RA-10T-M-SF	●	10														0.78			
		100RA-8T-M27-SF	●	8	100	62	27	20	13		24						13,000	1.20	HH12X35HC	-	-
		100RA-12T-M27-SF	●	12														1.15			
		100RA-8T-M-SF	●	8		85	32	42	-		30	8.0	14.4			Fig. 2		1.32	HF16X48HC	-	-
		100RA-12T-M-SF	●	12														1.27			
		125RA-10T-M27-SF	●	10	125	60	27	20	13		24	7.0	12.4			Fig. 1	11,400	1.80	HH12X35H	CC-125-MFAH	-
		125RA-16T-M27-SF	●	16														1.73			
		125RA-10T-M-SF	●	10		94	40	55		55	33	9.0	16.4			Fig. 2		2.1	HF20X53HA		
		125RA-16T-M-SF	●	16														2.1			
		160RA-12T-M-SF	●	12	160	125	40	57									8,000	3.5		CC-160-MFAH	-
		160RA-20T-M-SF	●	20														3.4			
		200RA-16T-M-SF	MTO	16	200	175	60	126	-		35	14.0	25.7			Fig. 3	5,600	4.7	-	-	CC-200-MFAH
		200RA-24T-M-SF	MTO	24														4.6			
		250RA-20T-M-SF	MTO	20	250	140		165									4,500	6.9	-	-	CC-250-MFAH
		250RA-32T-M-SF	MTO	32														6.8			
		315RA-24T-M-SF	MTO	24	315	220		220		60	38					Fig. 4	3,500	11.7	-	-	CC-315-MFAH
		315RA-40T-M-SF	MTO	40														11.5			
Bore Dia. Inch spec	MFAH	080RA-6T-SF	●	6	80	62	25.4	20	13	50	27	6.0	9.5	4.6	Yes	Fig. 1	14,600	0.83	HH12X35HC	-	-
		080RA-10T-SF	●	10														0.78			
		100RA-8T-254-SF	●	8	100	62	25.4	20	13		24						13,000	1.21	HH12X35HC	-	-
		100RA-12T-254-SF	●	12														1.16			
		100RA-8T-SF	●	8		85	31.75	42	-		34	8.0	12.7			Fig. 2		1.33	HF16X44HC	-	
		100RA-12T-SF	●	12														1.29			
		125RA-10T-254-SF	●	10	125	60	25.4	20	13		24	6.0	9.5			Fig. 1	11,400	1.80	HH12X35H	CC-125-MFAH	-
		125RA-16T-254-SF	●	16														1.74			
		125RA-10T-SF	●	10		89	38.1	55		55	38	10.0	15.9			Fig. 2		2.00	HF20X53HA		
		125RA-16T-SF	●	16														1.95			
		160RA-12T-SF	●	12	160	130	50.8	70				11.0	19.1				8,000	3.4	HF24X60HA	CC-160-MFAH	-
		160RA-20T-SF	●	20														3.3			
		200RA-16T-SF	MTO	16	200	175	47.625	126	-		35	14.0	25.4			Fig. 3	5,600	4.9	-	-	CC-200-MFAH
		200RA-24T-SF	MTO	24														4.8			
		250RA-20T-SF	MTO	20	250	140		165									4,500	7.0	-	-	CC-250-MFAH
		250RA-32T-SF	MTO	32														6.9			
		315RA-24T-SF	MTO	24	315	220		220		60	38					Fig. 4	3,500	11.7	-	-	CC-315-MFAH
		315RA-40T-SF	MTO	40														11.5			

Confirm the total weight of the cutter and the arbor is within the machine's acceptable range

Applicable Inserts ⓜ M138

● : Std. Item
MTO : Made to order

MFAH (Steel Body)



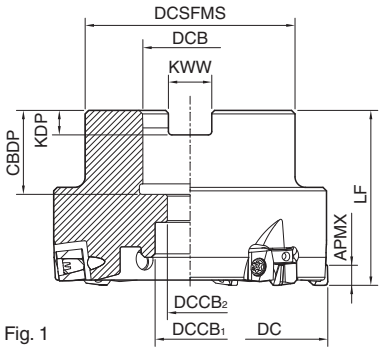


Fig. 1

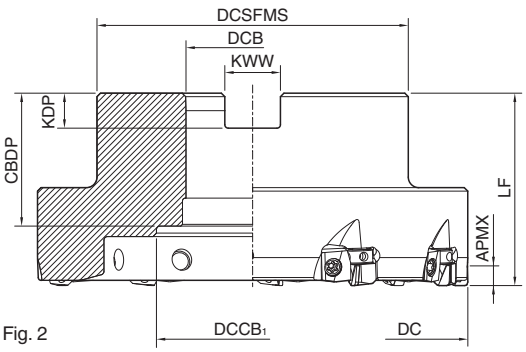


Fig. 2

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)										Coolant Hole	Drawing	Max. Revolution (min^{-1})	Weight (kg)	Mounting bolt (Attachment)
					DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX					
Metric	MFAH	050RS-4T-M-SF	●	4	50	48	16	13.6	9	40	19	5.6	8.4	4.6	No	Fig. 1	19,200	0.44	HH8X25
		050RS-5T-M-SF	●	5														0.43	
		063RS-5T-M-SF	●	5	63	61	22	23	11		21	6.3	10.4				16,800	0.69	HH10X30
		063RS-6T-M-SF	●	6														0.68	
		080RS-6T-M-SF	●	6	80	60	27	20	13	50	24	7.0	12.4				14,600	1.16	HH12X35
		080RS-10T-M-SF	●	10														1.11	
		100RS-8T-M-SF	●	8	100	70	32	45	-		30	8.0	14.4			Fig. 2	13,000	1.56	-
		100RS-12T-M-SF	●	12														1.51	
		125RS-10T-M-SF	●	10	125	89	40	55		55	33	9.0	16.4				11,400	2.6	-
		125RS-16T-M-SF	●	16														2.5	
Bore Dia. Inch spec	MFAH	080RS-6T-SF	●	6	80	50	25.4	20	13	50	27	6.0	9.5	4.6		Fig. 1	14,600	1.02	HH12X35
		080RS-10T-SF	●	10														0.98	
		100RS-8T-SF	●	8	100	70	31.75	45	-		34	8.0	12.7			Fig. 2	13,000	1.59	-
		100RS-12T-SF	●	12														1.55	
		125RS-10T-SF	●	10	125	89	38.1	55		55	38	10.0	15.9				11,400	2.63	-
		125RS-16T-SF	●	16														2.56	

Spare Parts

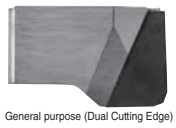
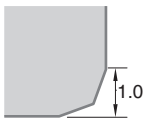
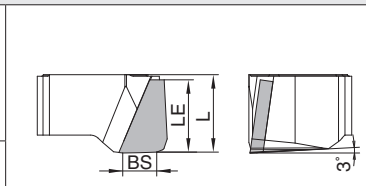
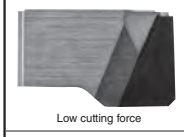
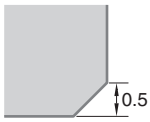
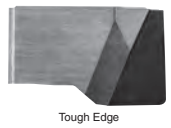
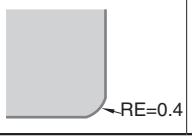
Description		Wedge	Wedge Screw	Wrench	Adjust Screw	Wrench	Adjust Screw	Anti-seize Compound	Applicable Inserts M138
Light-weight Hybrid Body	MFAH080RA- … ~ MFAH315RA- …	C08R	W5X13L	TTW-15	AJ-4170	DTPM-8	HS6X4	P-37	ENET0905…
Steel Body	MFAH050RS- … ~ MFAH125RS- …								

Recommended Cutting Conditions M138

● : Std. Item

High Efficiency Milling Cutter for Finishing Aluminum MFAH

Applicable Inserts

Insert				Description	Dimension (mm)					PCD
					W1	S	L	BS	LE	KPD001
 General purpose (Dual Cutting Edge)	 1.0			**ENET 0905PAER-G**	9.61	7.9	6.02	2.6	5.6	●
 Low cutting force	 0.5			**ENET 0905PAER-C**	9.61	7.9	6.02	3.0	5.6	●
 Tough Edge	 RE=0.4			**ENET 0905PAER-R**	9.61	7.9	6.02	3.1	5.6	●

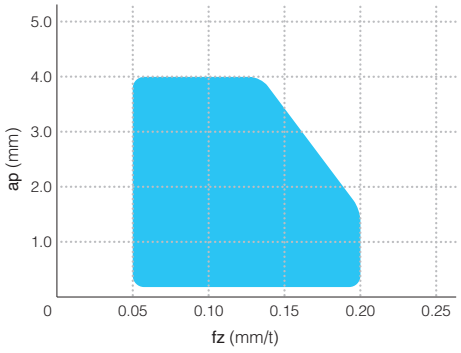
Recommended Cutting Conditions

Workpiece Material	Property	Cutting Speed Vc (m/min)	Feed fz (mm/t)	Recommended Insert Grades
Aluminum Alloys	Si Ratio 12.5% or less	1,000 - **2,500** - 3,000	0.05 - **0.10** - 0.20	KPD001
	Si Ratio 12.5% and over	400 - **600** - 800	0.05 - **0.10** - 0.20	

Recommended cutting conditions are reference values. Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity.
Do not use the cutter at speeds exceeding the maximum cutting speed limit.

Cutting Performance

BT50 M/C (Machine Power 30kw)



Cutting Conditions : Vc = 2,500 m/min, ae = 55 mm, Wet, Cutter Dia.ø80
MFAH080RS-10T-SF ENET0905PAER-G KPD001 Workpiece Material : ADC12

● : Std. Item

Cautions

While in Use

⚠Caution

Please use within recommended cutting conditions

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body

Inserts or cutter body may be damaged due to the centrifugal force and cutting load
the centrifugal force may cause inserts and parts to scatter even under no load.

Please do not use under the following conditions :

When cutter is not fully loaded with inserts
If the body and/or clamp is damaged
If a clamp or clamp screw is removed
If inserts that have different regrind amounts are mounted

Please wear protective equipment such as protective glove when changing inserts or adjusting edge fluctuation

Injury can occur when touching the cutting edge

Dynamic Balance

Balance adjustment on the cutter is completed before shipping
Balance adjustment has been made with special high precision inserts to be ISO balance quality grade (ISO 1940-1) G2.5

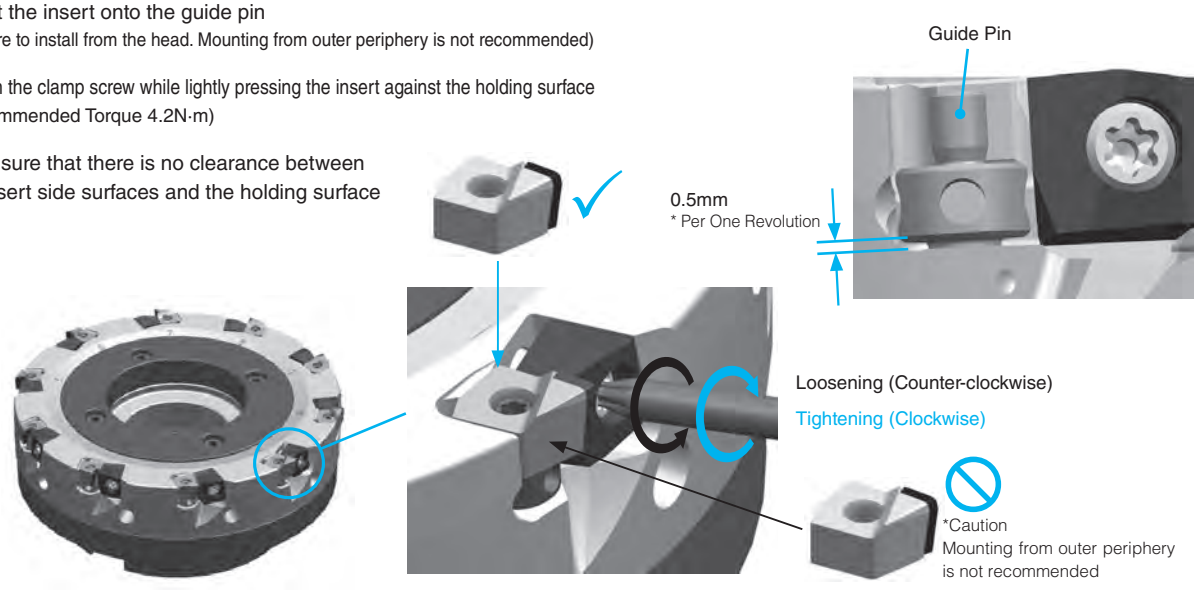
Do not operate the balance adjustment screw at the outer periphery of cutter
⇒ This could lead to improper dynamic balance

Do not completely remove clamp and clamp screw from cutter
⇒ This requires additional balance adjustment



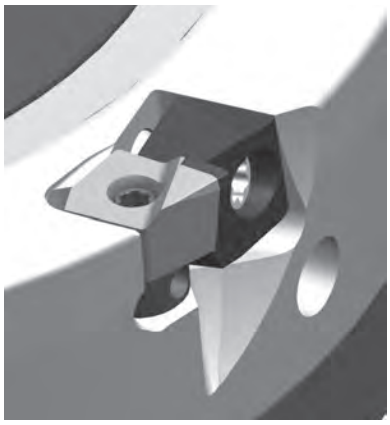
How to Mount Insert

1. Adjust the clearance between adjustment screw for cutting edge and the surface of insert to be 0.5mm
2. Mount the insert onto the guide pin
   (Be sure to install from the head. Mounting from outer periphery is not recommended)
3. Tighten the clamp screw while lightly pressing the insert against the holding surface
   (Recommended Torque 4.2N·m)
4. Make sure that there is no clearance between the insert side surfaces and the holding surface



How to Adjust Blade Runout

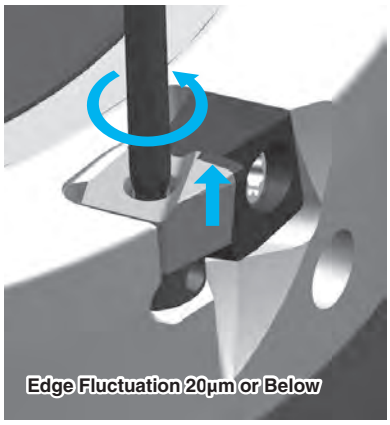
1 Install an Insert



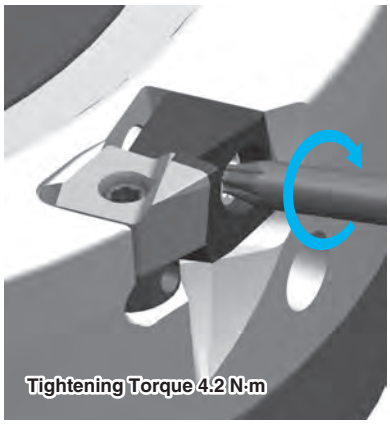
2 Partially Tighten



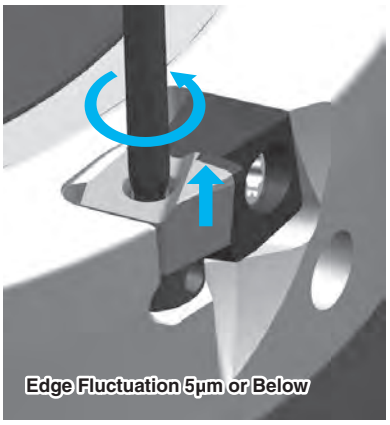
3 Adjustable Blade Runout

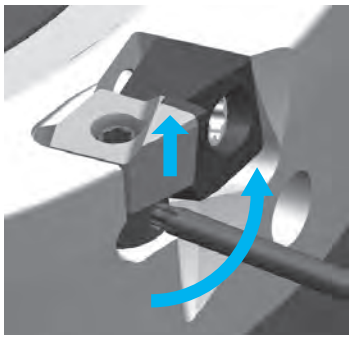


4 Fully Tighten



5 Adjustable Blade Runout





Adjustment edge fluctuation from outer periphery is workable

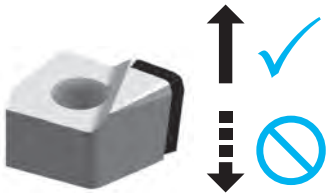
1 Install inserts into all pockets

2 Partially tighten the clamp screw (Recommended Torque 2.0N·m)

3 Turn the screw with the wrench to adjust and make sure that all screw heights are within 20μm of each other (Recommended)

4 Fully tighten the clamp screw with tightening torque 4.2 N·m

5 Slightly adjust position of cutting edge (Recommended Position Difference: 5μm or Below)
* All inserts should be fine-tuned



* Caution
Do not adjust cutting edge to lower position

Precaution for Changing Clamp

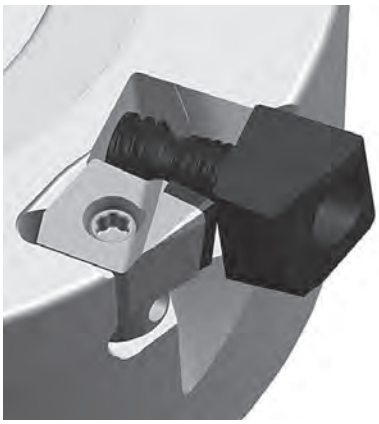
How to mount a clamp on a holder

1 Attach clamp screw into clamp first



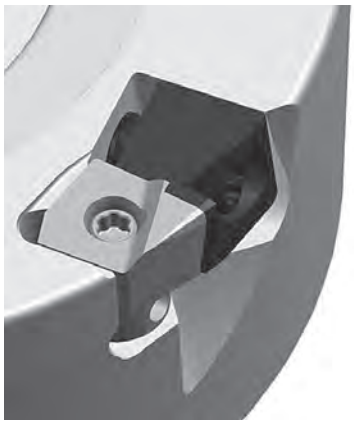
Attaching Clamp screw into clamp
(about 1 revolution)

2 Mounting



Mount it to the holder

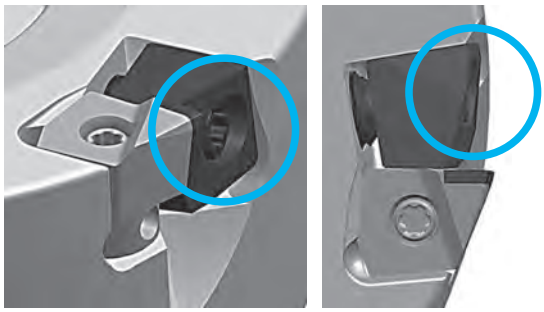
3 Fastening



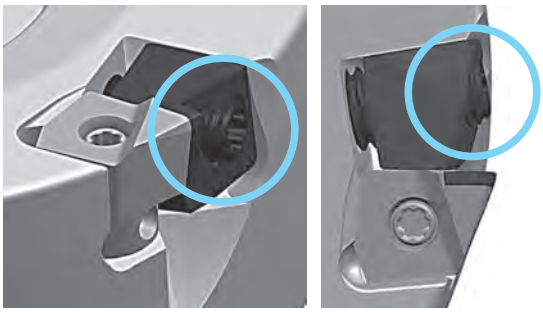
Fasten with recommended torque
(Completed)

Mount position of clamp screw

✓ **Right position**
(Screw head does not come out)



⊘ **Wrong position**
(Screw head comes out)



Confirm if clamp screw is not coming out after fastening clamp screw with recommended torque
Re-mount if the clamp screw is coming out
Adjust the balance is needed after mounting in case removing a clamp screw completely such as clamp change

For Aluminum Alloys High Efficiency End Mill

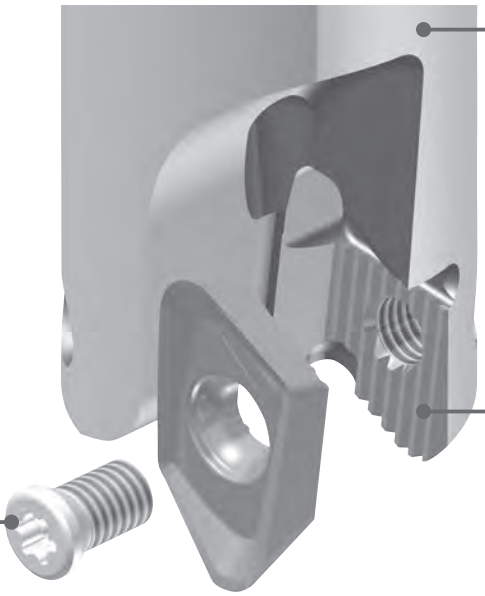
MEAS

Excellent Scatter Prevention to Ensure Stable, High Speed Aluminum Machining

Large Ramping Angle Delivers a Wide Range of Machining Applications

1 High Reliability and High Efficiency Machining

Grooved Connection Between the Insert and Holder
Provides High Speed Aluminum Machining (ø32: Recommended Max. Cutting Speed Vc = 3,000m/min)



Balance Quality Grade G6.3

Prevents Vibration during High Speed Machining (ISO1940/1)

M4 Clamp Screw

Unique Grooved Contact Surface

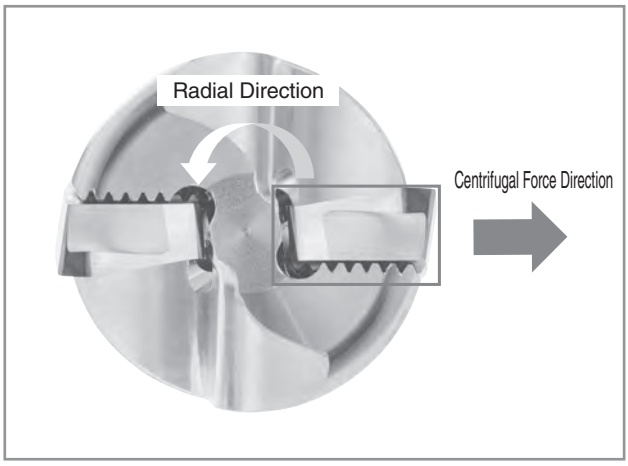
Prevents Insert Screw Breakage and Ensures Greater Safety

Back of the Insert

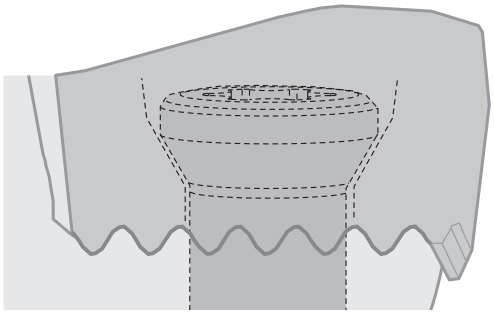


Grooved Insert Pocket

Centrifugal force is applied across the grooved surface to reduce pressure on the insert screw
Prevents insert screw breakage and safely secures the insert during high-speed revolutions



Grooved Contact Surface

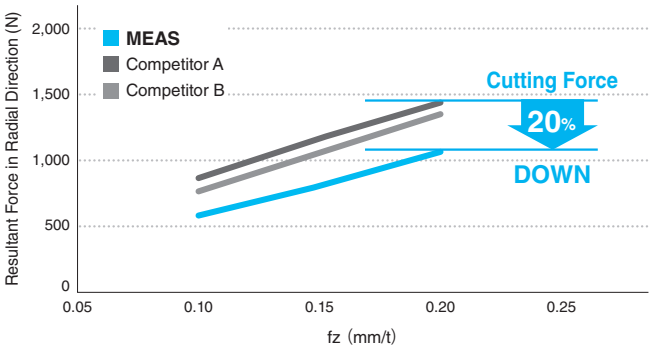


2 Low Cutting Force with Sharp Cutting Edge

True Rake Angle Max. 20˚
Low Cutting Force and High Chattering-Resistance



Cutting Force Comparison (Internal evaluation)

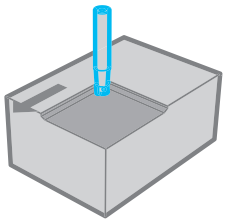


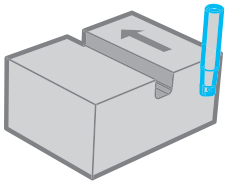
Cutting Conditions : Vc = 390 m/min, ap × ae = 8 × 5 mm, Dry
Cutter Dia. ø25 mm (2 Flutes) Workpiece Material : A7075

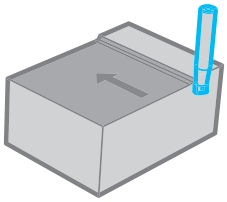
3 Applicable to a wide range of application

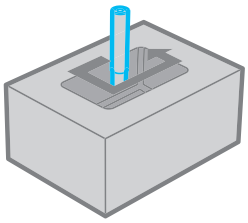
Max. Ramping Angle 20˚ (ø25)
The MEAS can be used for shouldering, slotting, ramping, and helical milling applications

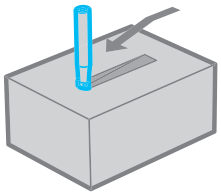


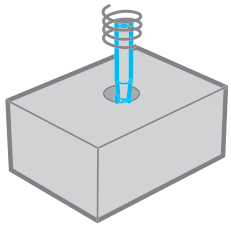

Facing, Shouldering

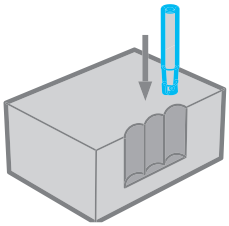

Slotting


Contouring


Pocketing


Ramping

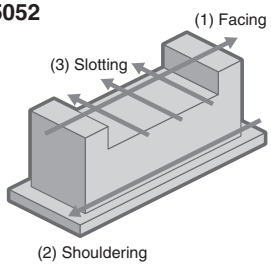

Helical Milling


Vertical Milling (Plunging)

Case Studies

Industrial Machine Parts A5052

Vc = 1,500 m/min (n = 9,550 min^{-1})
① ap x ae = 3 x 40 mm
fz = 0.2 mm/t (Vf = 7,640 mm/min)
② ap x ae = 8 x 5 mm
fz = 0.2 mm/t (Vf = 7,640 mm/min)
③ ap x ae = 2 x ~ 50 mm
fz = 0.15 mm/t (Vf = 5,730 mm/min)
Wet
MEAS050R-13-4T-M
KCGT130504FR-AL PDL025



Cutting Time

MEAS ø50-4T **190** sec

Cutting Time 50%

Competitor C ø50-3T **430** sec

MEAS showed 50% faster cycle time or more compared to competitor C
(User Evaluation)

MEAS End Mill



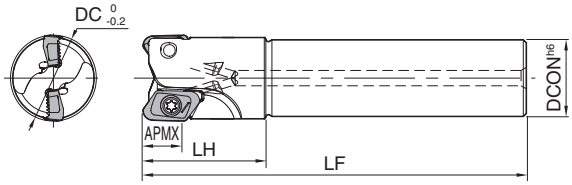


Fig. 1

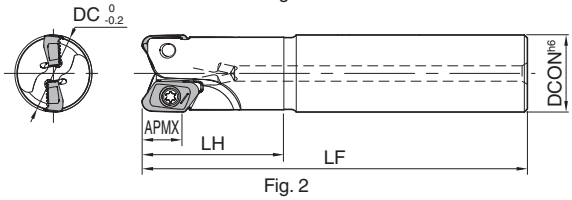


Fig. 2

Toolholder Dimensions

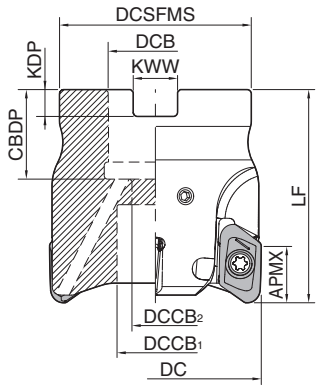
Description			Stock	No. of Inserts	Dimension (mm)					Rake Angle		Coolant Hole	Weight (kg)	Drawing	Spare Parts			Max. Revolution (min⁻¹)
					DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.				Clamp Screw	Wrench	Anti-seize Compound	
Cylindrical	Standard Shank	MEAS 28-S25-13-2T	●	2	28	25	125	40	12	+10°	-13°	Yes	0.4	Fig. 1	SB-4090TRP	DTPM-15	P-37	54,000
		35-S32-13-2T	●		35	32	150	50					0.9					46,000
		40-S32-13-3T	●	3	40						-12°							42,000
	Same Shank	MEAS 25-S25-13-2T	●	2	25	25	125	49	12	+10°	-14°	Yes	0.4	Fig. 2	SB-4075TRP			59,000
		32-S32-13-2T	●		32	32	150	69			-13°		0.8		SB-4090TRP			49,000
	Long Shank	MEAS 25-S25-13-2T-170	●	2	25	25	170	89	12	+10°	-14°	Yes	0.5	Fig. 2	SB-4075TRP			49,000
		32-S32-13-2T-200	●		32	32	200	119			-13°		1.1		SB-4090TRP			39,000

Recommended tightening torque for Insert Clamp 3.5N·m

When using inserts with a corner-R(RE) of 3.2 or larger, additional modifications (R3.5 mm or larger) on the corner of cutter body is necessary.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

MEAS Face Mill





Toolholder Dimensions

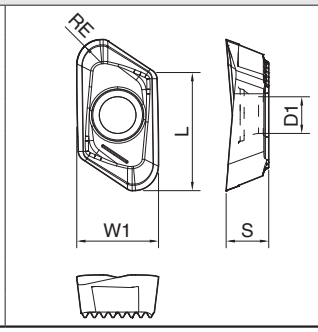
Description	Stock	No. of Inserts	Dimension (mm)										Rake Angle		Coolant Hole	Weight (kg)	Spare Parts				Max. Revolution (min⁻¹)
			DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R. (MAX.)	R.R.			Clamp Screw	Mounting bolt	Wrench	Anti-seize Compound	
MEAS 050R-13-4T-M	●	4	50	45	22	18	11	50	21	6.3	10.4	12	+10°	-11°	Yes	0.4	SB-4090TRP	HH10X30H	DTPM-15	P-37	36,000

Recommended tightening torque for Insert Clamp 3.5N·m

When using inserts with a corner-R (RE) of 3.2 or larger, additional modifications (R3.5 mm or larger) on the corner of cutter body is necessary.
Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Insert Description

Insert		Description		Dimension (mm)					DLC Coated Carbide
				W1	S	D1	L	RE	PDL025
		KCGT	130504FR-AL	9.9	5.1	4.4	14.1	0.4	●
			130508FR-AL				13.9	0.8	●
			130512FR-AL				13.8	1.2	●
			130516FR-AL				13.3	1.6	●
			130520FR-AL					2.0	●
			130524FR-AL					2.4	●
			130530FR-AL					3.0	●
			130532FR-AL				12.8	3.2	●
			130540FR-AL					4.0	●
			130550FR-AL					5.0	●

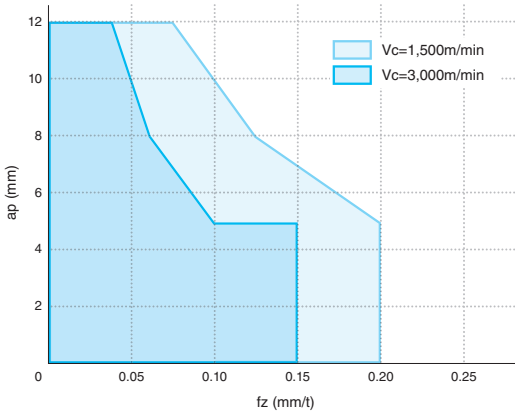
Recommended Cutting Conditions

Workpiece Material	Property	Cutting Speed Vc(m/min)	Feed fz(mm/t)
Aluminum Alloys	Si Ratio 12.5% or less	200~**1,000**~3,000	0.05~**0.15**~0.25
	Si Ratio 12.5% and over	200~**300**~400	0.05~**0.1**~0.2

- Recommended cutting conditions are reference values. Please adjust cutting speed and feed rate according to actual machining conditions taking into account machine and workpiece rigidity
- Do not use the cutter at speeds exceeding the maximum cutting speed limit (See page **M147**)
- Regularly changing the insert clamp screw is recommended
  Use appropriate safety covers to protect from tool breakage and chip scattering
- When using at a higher revolution (10,000min^{-1} or over), refer to the table below to adjust the balance of MEAS and arbor

MEAS Cutting Performance

ø50 (4 Flutes) Shouldering ae = 25mm Workpiece Material : A7075



- Reduce the feed rate when machining at high speeds

Revolution (min^{-1})	ISO balance quality grade ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

Max. Revolution for Each Cutting Diameter

Cutting Dia. øD(mm)	Max. Revolution (min^{-1})
ø25	59,000 (Long Shank : 49,000)
ø28	54,000
ø32	49,000
ø35	46,000 (Long Shank : 39,000)
ø40	42,000
ø50	36,000

● : Std. Item

Reference data for Ramping

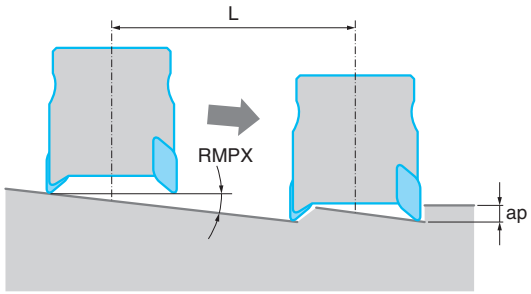
Cutter Dia. DC(mm)	25	28	32	35	40	50
Max. ramping angle RMPX	20°	16°	12.5°	11°	8.5°	6°
tan RMPX	0.363	0.287	0.221	0.194	0.149	0.105

Guide for Ramping (Slant Milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Reduce recommended feed rate by 50%

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$



Vertical Milling (Plunging)

* For vertical milling (plunging), reduce feed rate to fz=0.1mm/t or less.

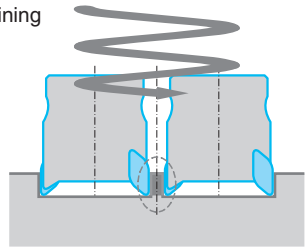
Insert Description	Max. Width of Cut (ae)
KCGT13 type	8mm

Guide for Helical milling

For helical milling, use between Min. cutting dia. and Max. cutting dia.

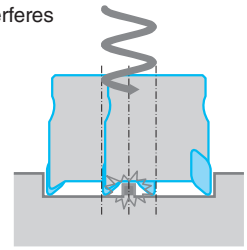
⃠ Over Max. Cutting Dia.

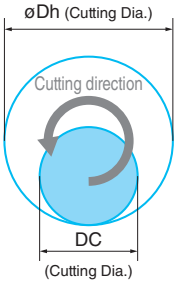
Center core part remains after machining



⃠ Under Min. Cutting Dia.

Center core part interferes with toolholder



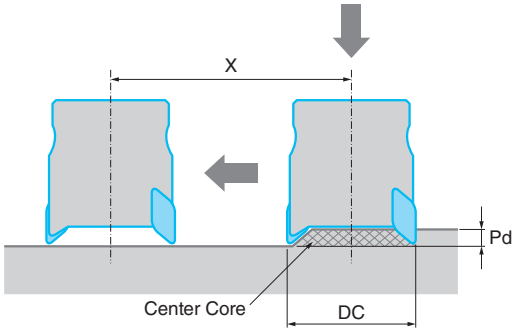


Description	Min. Cutting Dia.	Max. Cutting Dia.	Maximum ramping depth per cycle
MEAS…13…	2×DC-16	2×DC-3	3.5

Unit : mm

· Down-cut milling is recommended (refer to the figure above)
· Feed rate should be under 50% of the recommended cutting conditions
· Use caution to eliminate incidences caused by producing long chips

Guide for Drilling



[Drilling depth]

Please refer to Pd (Max. drilling depth) in the chart.

[When Traversing after Drilling]

(1) It is recommended to reduce feed by fz = 0.15 (mm/t) or less until the center core is removed.
(2) When drilling, reduce feed rate per revolution to f=0.1mm/rev or under.

Description	Max. Cutting Depth Pd	Min. cutting length X for flat bottom surface
MEAS…-13-…	3.5	DC-16

Unit : mm

How to Mount Inserts

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Insert Screw
   · Coat Anti-seize Compound thinly on portion of taper and thread.
   · Attach screw to the magnetized wrench tip and tighten while gently pressing the outside edge of the insert toward the insert pocket surface (grooved surface) (see the picture on the right) (Recommended Torque 3.5N·m)

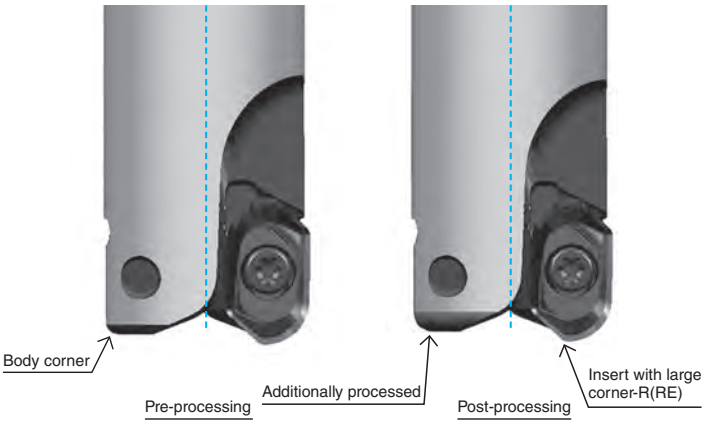


When using inserts with a corner-R(RE) of 3.2 or larger

When using inserts with corner-R(RE) 3.2 or larger, additional modifications of the cutter body will be necessary.
Additional modifications for the body will be necessary. Ref. to the chart below for the recommended modifications.
(If corner-R is 3.0 mm or smaller, additional modifications are not needed)

Insert Corner-R(RE)(mm)	Additional Processing Dimension to Body Corner (mm)
3.2	R2.0
4.0	R2.5
5.0	R3.0

* Round- shaped additional processing is recommended. When applying chamfer shaped additional processing, do not cut away too much.



Cautions

While in Use

⚠Caution

Please use within recommended cutting conditions

Do not run the cutter at revolutions exceeding the printed maximum revolution limit of the cutter body
Do not use the end mill at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Please do not use under the following conditions :
When cutter is not fully loaded with inserts
If the body is damaged

Please wear protective equipment such as protective glove when changing inserts
Injury can occur when touching the cutting edge

Dynamic Balance

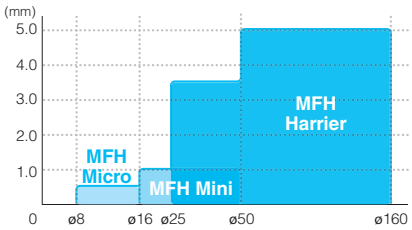
Balance adjustment on the cutter is completed before shipping

Balance adjustment to be ISO balance quality grade (ISO 1940-1) G6.3
When using at a higher revolution (10,000min^{-1} or over), refer to the table below to adjust the balance of MEAS and arbor

Do not operate the balance adjustment screw on the outer periphery of the cutter. This could lead to improper dynamic balance

Revolution (min^{-1})	ISO balance quality grade ISO 1940-1/8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

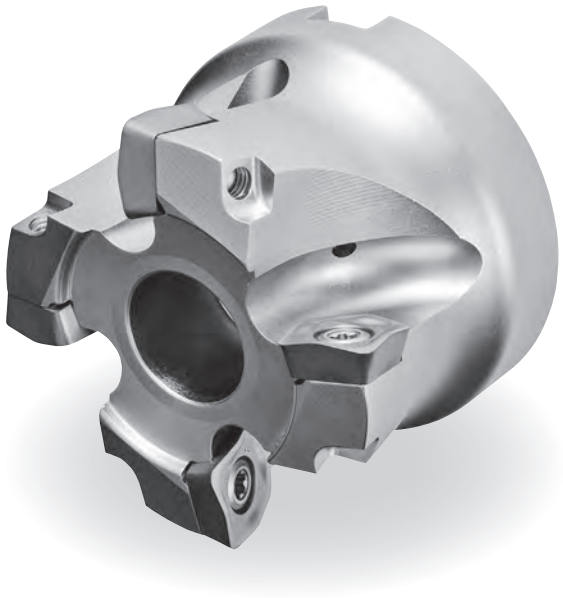
MFH Harrier



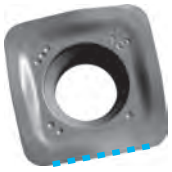
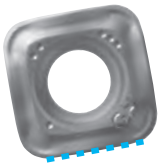
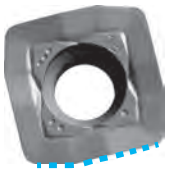
Anti chattering

Applicable to various applications with 4 types of inserts

Increased chip evacuation and shortened cutting time



POINT.1 Large Chipbreaker Lineup for Various Machining Applications

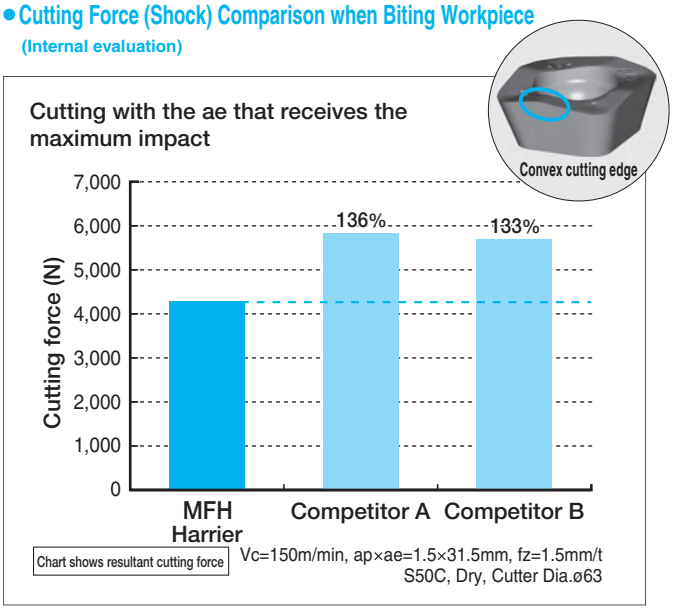
	GM type (General purpose)	GH type (Tough Edge) NEW	LD type (Large D.O.C.)	FL type (Low Cutting Force)
Shape				
Applications	1st recommendation for general purpose →Available for Facing, Ramping and Helical Milling	Excellent Fracture Resistance →Available for Facing, Ramping and Helical Milling	Max. ap=5mm →Applicable for scale removal at high efficiency	Wiper Edge with Low Cutting Forces →Applicable for both roughing and finishing, for small machining center

4 types of inserts according to your application
Applicable to a wide range of application

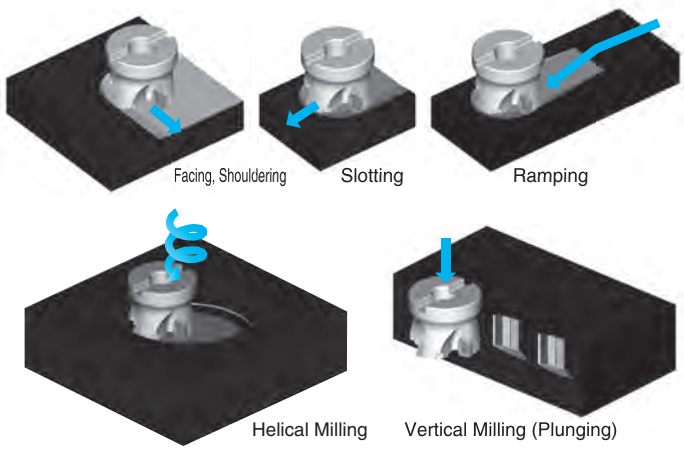
· For inclination angle at contouring, refer to the table above **M156**

POINT.2 3D convex cutting edge reduces shock of biting workpiece

● Cutting Force (Shock) Comparison when Biting Workpiece
(Internal evaluation)



POINT.3 Multi-functional cutter for ramping, helical milling, etc.

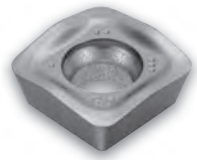


* GM and GH chipbreakers are available for all the applications.
* LD type and FL type are not applicable for Helical Milling, Plunging and Contouring of rising wall (Please refer to **M156**)

POINT.4 Applicable for Variety of Workpieces from Steel to Heat-resistant Alloys

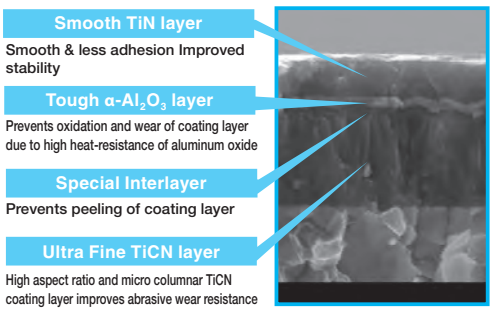
Difficult-to-cut material which controls sudden fracture and realizes stable machining

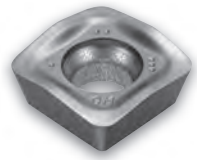




CA6535

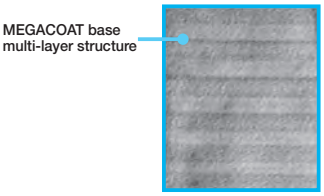
For Martensitic stainless steel and Ni-base heat-resistant alloys
High heat resistance and wear resistance with CVD coating
Improved stability due to thin layer coating technology





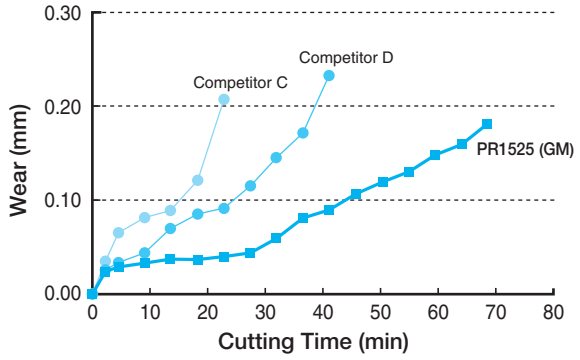
PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable and longer tool life by special nano coating layer "MEGACOAT NANO"



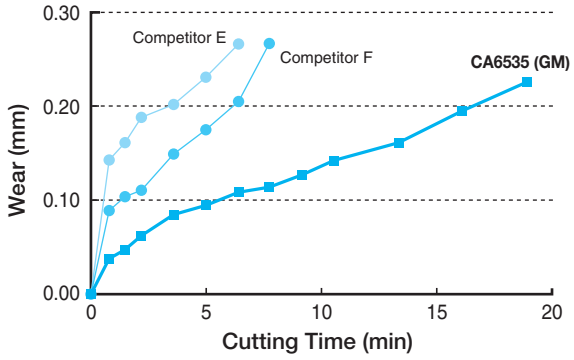
Wear Resistance Comparison (Internal evaluation)

SKD11



<Cutting Conditions> Vc=150m/min, apxae=1.0x16mm, fz=1.5mm/t, Dry

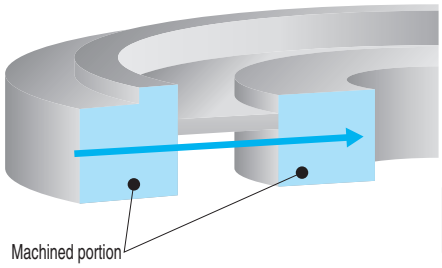
Ni-base heat-resistant alloys



<Cutting Conditions>Vc=30m/min, apxae=1.0x40mm, fz=0.8mm/t, Wet

Case Studies

SFVAF22B (Forged alloy steel)

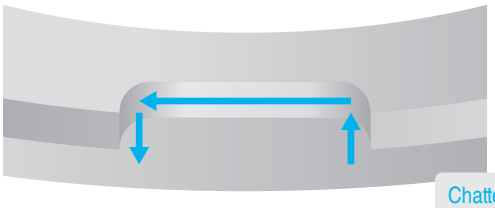


·Turbine parts ·Vc=160m/min ·apxae=1.5xmax.160mm
·fz=1.17mm/t ·Dry
·MFH160R-14-8T(8 Flutes) ·SOMT140520ER-GM (PR1525)

PR1525	Chip Evacuation Rate = 720cc/min
Competitor G	Chip Evacuation Rate = 240cc/min

·Small machining noise even at 3 times higher feed rate
·Good edge condition without chipping and stable machining
(User Evaluation)

SUS304F



·Clutch ·Vc=120m/min ·apxae=1.0x20mm
·fz=1.2mm/t ·Dry
·MFH32-S32-10-2T(2 Flutes) ·SOMT100420ER-GM (PR1535)

PR1535	Chip Evacuation Rate = 58cc/min
Competitor H	Chip Evacuation Rate = 36cc/min

·Competitor H caused chattering but MFH realized stable machining
·Good edge condition and long tool life
(User Evaluation)

MFH Harrier Face Mill



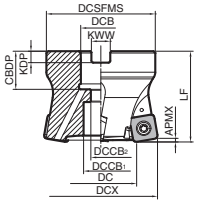


Fig. 1

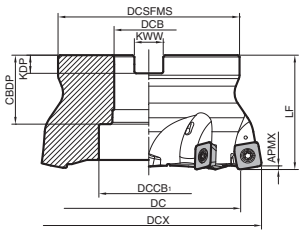


Fig. 2

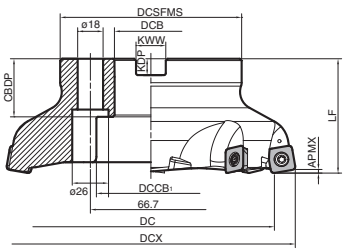


Fig. 3

Toolholder Dimensions (SOMT10 type)

Bore Dia.	Description	Stock	No. of Inserts	Dimension (mm)														Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				DCX	DC			DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	$APMX_2$*1	A.R.				
					GM/GH	LD	FL															
Metric	MFH 050R-10-4T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 *2 (3.5)	1.2	+10°	Yes	Fig. 1	0.4	10,000
	050R-10-5T-M	●	5																			
	063R-10-5T-22M	●	5	63	46	50.5	49.5	60													0.7	8,800
	063R-10-6T-22M	●	6																			
	063R-10-5T-27M	●	5						27	20	13		24	7	12.4							
	063R-10-6T-27M	●	6																			
	080R-10-7T-M	●	7	80	63	67.5	66.5	76				63									1.6	7,600
Inch spec	MFH 050R-10-4T	●	4	50	33	37.5	36.5	47	22.225	19	11	50	19	5	8.4			+10°	Yes	Fig. 1	0.4	10,000
	050R-10-5T	●	5																			
	063R-10-5T	●	5	63	46	50.5	49.5	60													0.7	8,800
	063R-10-6T	●	6																			
	080R-10-7T	●	7	80	63	67.5	66.5	76	31.75	26	17	63	32	8	12.7						1.3	7,600

*1. For $APMX_2$, refer to the figure in the next page
*2. Dimension in ( ) is when attaching LD type

Toolholder Dimensions (SOMT14 type)

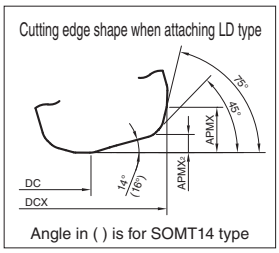
Bore Dia.	Description	Stock	No. of Inserts	Dimension (mm)														Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				DCX	DC			DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	$APMX_2$*1	A.R.				
					GM/GH	LD	FL															
Metric	MFH 050R-14-4T-M	●	4	50	27	33	32	47	22	12	-	50	21	6.3	10.4	2 *2 (5)	2	+10°	Yes	Fig. 1	0.4	8,800
	063R-14-4T-22M	●	4	63	40	46	45	60		19	11										0.6	7,400
	063R-14-5T-22M	●	5																			
	063R-14-4T-27M	●	4						27	20	13		24	7	12.4							
	063R-14-5T-27M	●	5																			
	080R-14-5T-M	●	5	80	57	63	62	76				63									1.4	6,400
	080R-14-6T-M	●	6																			
	100R-14-6T-M	●	6	100	77	83	82	96	32	26	17		28	8	14.4					Fig. 2	2.4	5,600
	100R-14-7T-M	●	7																			
	125R-14-7T-M	●	7	125	102	108	107	100	40	55	-		33	9	16.4						2.8	4,800
	160R-14-8T-M	●	8	160	137	143	142			68	-		32						No	Fig. 3	3.7	4,200
Inch spec	MFH 050R-14-4T	●	4	50	27	33	32	47	22.225	12	-	50	19	5	8.4	2 *2 (5)	2	+10°	Yes	Fig. 1	0.4	8,800
	063R-14-4T	●	4	63	40	46	45	60		19	11										0.6	7,400
	063R-14-5T	●	5																			
	080R-14-5T	●	5	80	57	63	62	76	31.75	26	17	63	32	8	12.7						1.3	6,400
	080R-14-6T	●	6																			
	100R-14-6T	●	6	100	77	83	82	96													2.4	5,600
	100R-14-7T	●	7																			
	125R-14-7T	●	7	125	102	108	107	100	38.1	55	-		38	10	15.9					Fig. 2	2.9	4,800
	160R-14-8T	●	8	160	137	143	142		50.8	72				11	19.1				No		3.9	4,200

*1. For $APMX_2$, refer to the figure in the next page
*2. Dimension in ( ) is when attaching LD type

● : Std. Item

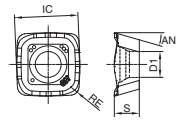
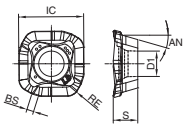
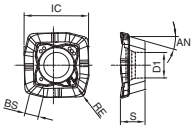
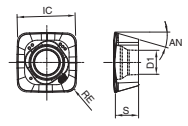
Spare Parts (Face Mill)

Description		Spare Parts					Applicable Inserts
		Clamp Screw	Wrench		Anti-seize Compound	Mounting bolt	
			DTPM	TTP			
MFH	050R-10-...	SB-4090TRPN	DTPM-15		P-37	HH10X30	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
	050R-10-...-M						
	063R-10-...						
	063R-10-...-22M						
	063R-10-...-27M					HH12X35	
	080R-10-...					HH16X40	
	080R-10-...-M					HH12X35	
		Recommended tightening torque for Insert Clamp 3.5N·m					
MFH	050R-14-...	SB-50120TRP	TTP-20		P-37	W10X31	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL
	050R-14-...-M						
	063R-14-...					HH10X30	
	063R-14-...-22M						
	063R-14-...-27M					HH12X35	
	080R-14-...					HH16X40	
	080R-14-...-M					HH12X35	
	100R-14-...					HH16X40	
	100R-14-...-M					-	
	125R-14-...					-	
	160R-14-...					-	
		Recommended tightening torque for Insert Clamp 4.5N·m					



- **Max. Revolution**
  Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Applicable Inserts M20

Insert Handed Insert shows Right-hand		Description		Dimension (mm)					Angle	CVD Coated Carbide	MEGACOAT NANO			MEGACOAT HARD
				IC	S	D1	BS	RE	AN	CA6535	PR1535	PR1525	PR1510	PR015S
 General purpose		SOMT	100420ER-GM	10.30	4.58	4.6	-	2.0	16°	●	●	●	●	
			140520ER-GM	14.14	5.56	5.8				●	●	●	●	
 Large D.O.C.		SOMT	100420ER-LD	10.45	4.58	4.6	0.9	2.0	16°	●	●	●	●	
			140520ER-LD	14.76	5.56	5.8	1.6			●	●	●	●	
 With Wiper Edge		SOMT	100420ER-FL	10.44	4.58	4.6	1.4	2.0	16°	●	●	●	●	
			140514ER-FL	14.57	5.56	5.8	3.1	1.4		●	●	●	●	
NEW  Tough Edge		SOMT	100420ER-GH	10.43	4.57	4.55	-	2.0	16°		●	●	●	●
			140520ER-GH	14.17	5.56	5.8					●	●	●	●

Recommended Cutting Conditions M155

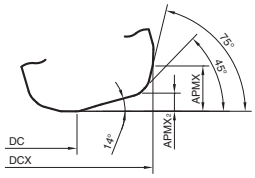
● : Std. Item

MFH Harrier End Mill (SOMT10 type)



(Cylindrical)

Cutting edge shape when attaching LD type



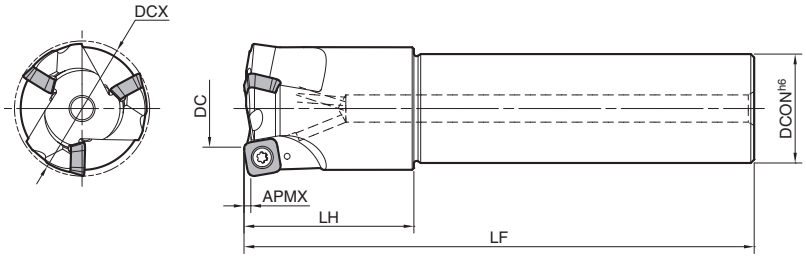


Fig. 1

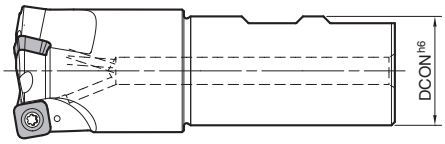


Fig. 2

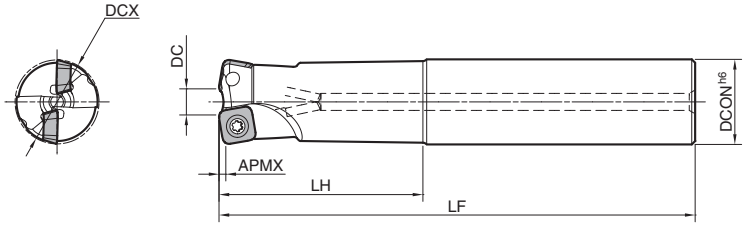


Fig. 3

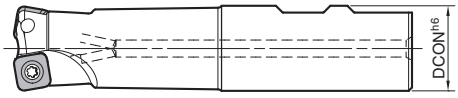


Fig. 4

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)									Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
					DCX	DC			DCON	LF	LH	APMX	$APMX_2$	A.R.				
						GM/GH	LD	FL										
Cylindrical	MFH	25-S25-10-2T	●	2	25	8	12.5	11.5	25	140	60	1.5 *(3.5)	1.2	+10°	Yes	Fig. 3	0.4	17,000
		28-S25-10-2T	●	2	28	11	15.5	14.5			40					Fig. 1	0.5	15,500
		32-S32-10-2T	●	2	32	15	19.5	18.5	32	150	70					Fig. 3	0.8	14,000
		32-S32-10-3T	●	3														
		35-S32-10-2T	●	2	35	18	22.5	21.5			50					Fig. 1		13,000
		35-S32-10-3T	●	3														
		40-S32-10-3T	●	3	40	23	27.5	26.5									0.9	11,500
		40-S32-10-4T	●	4														
Weldon	MFH	25-W25-10-2T	●	2	25	8	12.5	11.5	25	117	60	1.5 *(3.5)	1.2	+10°	Yes	Fig. 4	0.4	17,000
		32-W32-10-3T	●	3	32	15	19.5	18.5	32	131	70							14,000
		40-W32-10-3T	●	3	40	23	27.5	26.5		112	50					Fig. 2	0.7	11,500
		40-W32-10-4T	●	4														
Long Shank	MFH	25-S25-10-2T-200	●	2	25	8	12.5	11.5	25	200	120	1.5 *(3.5)	1.2	+10°	Yes	Fig. 3	0.6	17,000
		28-S25-10-2T-200	●	2	28	11	15.5	14.5			40					Fig. 1	0.7	15,500
		32-S32-10-2T-200	●	2	32	15	19.5	18.5	32		120					Fig. 3	1.0	14,000
		35-S32-10-2T-200	●	2	35	18	22.5	21.5			50					Fig. 1	1.4	13,000
		40-S32-10-4T-250	●	4	40	23	27.5	26.5		250							1.5	11,500
Extra Long Shank	MFH	25-S25-10-2T-300	●	2	25	8	12.5	11.5	25	300	180	1.5 *(3.5)	1.2	+10°	Yes	Fig. 3	1.0	17,000
		28-S25-10-2T-300	●	2	28	11	15.5	14.5			40					Fig. 1	1.1	15,500
		32-S32-10-2T-300	●	2	32	15	19.5	18.5	32		180					Fig. 3	1.6	14,000
		35-S32-10-2T-300	●	2	35	18	22.5	21.5			50					Fig. 1	1.7	13,000
		40-S32-10-4T-300	●	4	40	23	27.5	26.5									1.8	11,500

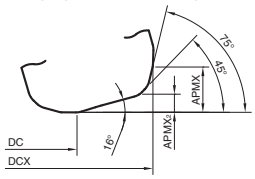
* Dimension in ( ) is when attaching LD type

● : Std. Item

MFH Harrier End Mill (SOMT14 type)



Cutting edge shape when attaching LD type



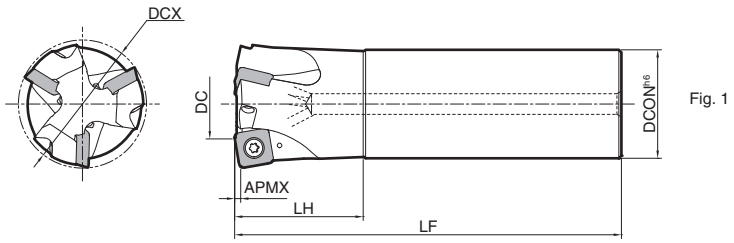


Fig. 1

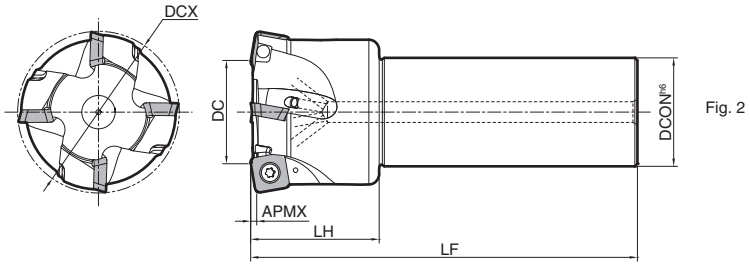


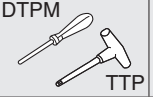
Fig. 2

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) DCX	DC GM/GH	DC LD	DC FL	DCON	LF	LH	APMX	$APMX_2$	Rake Angle A.R.	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
MFH 50-S42-14-3T	●	3	50	27	33	32	42	150	50	2 *(5)	2	+10°	Yes	Fig. 1	1.4	8,800
63-S42-14-4T	●	4	63	40	46	45								Fig. 2	1.7	7,400
80-S42-14-5T	●	5	80	57	63	62									2.3	6,400

* Dimension in ( ) is when attaching LD type

Spare Parts and Applicable Inserts

Description	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Anti-seize Compound	Applicable Inserts ➡ M20 , M151
		 DTPM TTP		
MFH ...-10-...	SB-4075TRP	DTPM-15	P-37	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL
	Recommended tightening torque for Insert Clamp 3.5N·m			
MFH ...-14-...	SB-50120TRP	TTP-20	P-37	SOMT140520ER-GM SOMT140520ER-GH SOMT140520ER-LD SOMT140514ER-FL
	Recommended tightening torque for Insert Clamp 4.5N·m			

- **Max. Revolution**
  Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

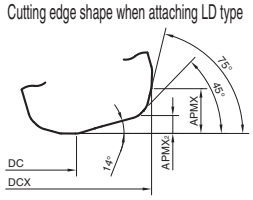
Recommended Cutting Conditions ➡ M155

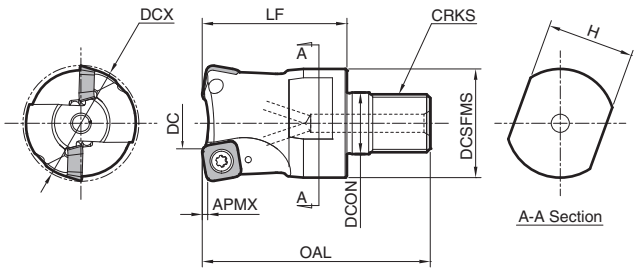
● : Std. Item

MFH Harrier Head



Cutting edge shape when attaching LD type





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle	Coolant Hole	Max. Revolution (min^{-1})
			DCX	DC			DCSFMS	DCON	OAL	LF	CRKS	H	APMX	$APMX_2$	A.R.	
				GM/GH	LD	FL										
MFH 25-M12-10-2T	●	2	25	8	12.5	11.5	23	12.5	57	35	M12xP1.75	19	1.5 *(3.5)	1.2	+10°	Yes	17,000
28-M12-10-2T	●	2	28	11	15.5	14.5											15,500
32-M16-10-2T	●	2	32	15	19.5	18.5	30	17	63	40	M16xP2.0	24					14,000
32-M16-10-3T	●	3															
35-M16-10-2T	●	2	35	18	22.5	21.5											13,000
35-M16-10-3T	●	3															
40-M16-10-3T	●	3	40	23	27.5	26.5											11,500
40-M16-10-4T	●	4															

See page ➔ **M60** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

* Dimension in ( ) is when attaching LD type

Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts ➔ **M20 , M151**
	Clamp Screw	Wrench	Anti-seize Compound	
				
MFH ...-10-...	SB-4075TRP	DTPM-15	P-37	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL
	Recommended tightening torque for Insert Clamp 3.5N·m			

- **Max. Revolution**
  Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ **M155**

● : Std. Item

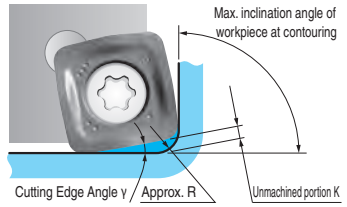
◆ Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz : mm/t)					Recommended Insert Grades (Cutting Speed Vc : m/min)				
		MFH25-...	MFH32-...	MFH40-...	MFH...R-10-...	MFH...R-14-...	MEGACOAT NANO			MEGACOAT HARD	CVD Coated Carbide
							PR1535	PR1525	PR1510	PR015S	CA6535
GM GH	Carbon Steel	0.5~**0.8**~1.0(ap≤1.0mm) 0.2~**0.4**~0.5(ap≤1.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.3~**0.7**~1.0(ap≤1.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.4~**1.0**~1.5(ap≤1.5mm)	0.5~**1.5**~2.0		☆ 120~**180**~250	★ 120~**180**~250	-	-	-
	Alloy Steel	0.5~**0.8**~1.0(ap≤1.0mm) 0.2~**0.4**~0.5(ap≤1.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.3~**0.7**~1.0(ap≤1.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.4~**1.0**~1.5(ap≤1.5mm)	0.5~**1.5**~2.0		☆ 100~**160**~220	★ 100~**160**~220	-	-	-
	Mold Steel (~ 40HRC)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		☆ 80~**140**~180	☆ 80~**140**~180	-	GH★ 80~**140**~180	-
	Mold Steel (40 ~ 50HRC)	0.15~**0.3**~0.5(ap≤1.0mm) 0.15~**0.2**~0.25(ap≤1.5mm)	0.2~**0.5**~0.8(ap≤1.0mm) 0.2~**0.3**~0.45(ap≤1.5mm)	0.2~**0.6**~0.9(ap≤1.0mm) 0.2~**0.5**~0.7(ap≤1.5mm)	0.2~**0.7**~1.0		-	☆ 60~**100**~130	-	GH★ 60~**100**~130	-
	Mold Steel (50 ~ 55HRC)	0.15~**0.25**~0.4(ap≤1.0mm)	0.15~**0.35**~0.6(ap≤1.0mm)	0.15~**0.4**~0.7(ap≤1.0mm)	0.2~**0.5**~0.8		-	☆ 50~**70**~100	-	GH★ 50~**70**~100	-
	Mold Steel (55 ~ 60HRC)	0.03~**0.06**~0.1(ap≤1.0mm)(* Recommended only for GH chipbreaker)					-	-	-	GH☆ 50~**60**~70	-
	Stainless Steel (Austenitic related)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		GM☆ 100~**160**~200	GM☆ 100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		☆ 150~**200**~250	-	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		★ 90~**120**~150	-	-	-	-
	Gray Cast Iron	0.5~**0.8**~1.0(ap≤1.0mm) 0.2~**0.4**~0.5(ap≤1.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.3~**0.7**~1.0(ap≤1.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.4~**1.0**~1.5(ap≤1.5mm)	0.5~**1.5**~2.0		-	-	★ 120~**180**~250	-	-
	Nodular Cast Iron	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		-	-	★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.4**~0.6(ap≤1.0mm) 0.15~**0.2**~0.3(ap≤1.5mm)	0.2~**0.5**~0.9(ap≤1.0mm) 0.2~**0.4**~0.6(ap≤1.5mm)	0.2~**0.6**~1.0(ap≤1.0mm) 0.2~**0.5**~0.8(ap≤1.5mm)	0.2~**0.8**~1.2		☆ 20~**30**~50	-	-	-	★ 20~**30**~50
	Titanium Alloys	0.2~**0.4**~0.6(ap≤1.0mm) 0.15~**0.2**~0.3(ap≤1.5mm)	0.2~**0.5**~0.9(ap≤1.0mm) 0.2~**0.4**~0.6(ap≤1.5mm)	0.2~**0.6**~1.0(ap≤1.0mm) 0.2~**0.5**~0.8(ap≤1.5mm)	0.2~**0.8**~1.2		GM★ 40~**60**~80	-	GM☆ 30~**50**~70	-	-
LD	Carbon Steel	0.5~**0.8**~1.0(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.06~**0.15**~0.3(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.2**~0.3(ap≤3.5mm)	0.5~**1.5**~2.0(ap≤1.0mm) 0.06~**0.2**~0.3(ap≤3.5mm)	0.5~**1.5**~2.0(ap≤2.0mm) 0.06~**0.2**~0.4(ap≤5.0mm)	☆ 120~**180**~250	★ 120~**180**~250	-	-	-
	Alloy Steel	0.5~**0.8**~1.0(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.06~**0.15**~0.3(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.2**~0.3(ap≤3.5mm)	0.5~**1.5**~2.0(ap≤1.0mm) 0.06~**0.2**~0.3(ap≤3.5mm)	0.5~**1.5**~2.0(ap≤2.0mm) 0.06~**0.2**~0.4(ap≤5.0mm)	☆ 100~**160**~220	★ 100~**160**~220	-	-	-
	Mold Steel (~ 40HRC)	0.5~**0.7**~0.8(ap≤1.0mm) 0.06~**0.08**~0.15(ap≤3.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤2.0mm) 0.06~**0.15**~0.3(ap≤5.0mm)	☆ 80~**140**~180	★ 80~**140**~180	-	-	-
	Mold Steel (40 ~ 50HRC)	0.2~**0.3**~0.5(ap≤1.0mm) 0.03~**0.05**~0.1(ap≤3.5mm)	0.2~**0.5**~0.8(ap≤1.0mm) 0.03~**0.08**~0.15(ap≤3.5mm)	0.2~**0.6**~0.9(ap≤1.0mm) 0.03~**0.1**~0.15(ap≤3.5mm)	0.2~**0.7**~1.0(ap≤1.0mm) 0.03~**0.1**~0.15(ap≤3.5mm)	0.2~**0.7**~1.0(ap≤2.0mm) 0.03~**0.1**~0.2(ap≤5.0mm)	☆ 60~**100**~130	★ 60~**100**~130	-	-	-
	Stainless Steel (Austenitic related)	0.5~**0.7**~0.8(ap≤1.0mm) 0.06~**0.08**~0.15(ap≤3.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤2.0mm) 0.06~**0.15**~0.3(ap≤5.0mm)	★ 100~**160**~200	☆ 100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.5~**0.7**~0.8(ap≤1.0mm) 0.06~**0.08**~0.15(ap≤3.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤2.0mm) 0.06~**0.15**~0.3(ap≤5.0mm)	☆ 150~**200**~250	-	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.5~**0.7**~0.8(ap≤1.0mm) 0.06~**0.08**~0.15(ap≤3.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤2.0mm) 0.06~**0.15**~0.3(ap≤5.0mm)	★ 90~**120**~150	-	-	-	-
	Gray Cast Iron	0.5~**0.8**~1.0(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.06~**0.15**~0.3(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.2**~0.3(ap≤3.5mm)	0.5~**1.5**~2.0(ap≤1.0mm) 0.06~**0.2**~0.3(ap≤3.5mm)	0.5~**1.5**~2.0(ap≤2.0mm) 0.06~**0.2**~0.4(ap≤5.0mm)	-	-	★ 120~**180**~250	-	-
	Nodular Cast Iron	0.5~**0.7**~0.8(ap≤1.0mm) 0.06~**0.08**~0.15(ap≤3.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.06~**0.1**~0.2(ap≤3.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.06~**0.15**~0.2(ap≤3.5mm)	0.5~**1.2**~1.8(ap≤2.0mm) 0.06~**0.15**~0.3(ap≤5.0mm)	-	-	★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.4**~0.6(ap≤1.0mm) 0.03~**0.05**~0.1(ap≤3.5mm)	0.2~**0.5**~0.9(ap≤1.0mm) 0.03~**0.08**~0.15(ap≤3.5mm)	0.2~**0.6**~1.0(ap≤1.0mm) 0.03~**0.1**~0.15(ap≤3.5mm)	0.2~**0.8**~1.2(ap≤1.0mm) 0.03~**0.1**~0.15(ap≤3.5mm)	0.2~**0.8**~1.2(ap≤2.0mm) 0.03~**0.1**~0.2(ap≤5.0mm)	☆ 20~**30**~50	-	-	-	★ 20~**30**~50
	Titanium Alloys	0.2~**0.4**~0.6(ap≤1.0mm) 0.03~**0.05**~0.1(ap≤3.5mm)	0.2~**0.5**~0.9(ap≤1.0mm) 0.03~**0.08**~0.15(ap≤3.5mm)	0.2~**0.6**~1.0(ap≤1.0mm) 0.03~**0.1**~0.15(ap≤3.5mm)	0.2~**0.8**~1.2(ap≤1.0mm) 0.03~**0.1**~0.15(ap≤3.5mm)	0.2~**0.8**~1.2(ap≤2.0mm) 0.03~**0.1**~0.2(ap≤5.0mm)	★ 40~**60**~80	-	☆ 30~**50**~70	-	-
FL	Carbon Steel	0.5~**0.8**~1.0(ap≤1.0mm) 0.2~**0.4**~0.5(ap≤1.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.3~**0.7**~1.0(ap≤1.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.4~**1.0**~1.5(ap≤1.5mm)	0.5~**1.5**~2.0		☆ 120~**180**~250	★ 120~**180**~250	-	-	-
	Alloy Steel	0.5~**0.8**~1.0(ap≤1.0mm) 0.2~**0.4**~0.5(ap≤1.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.3~**0.7**~1.0(ap≤1.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.4~**1.0**~1.5(ap≤1.5mm)	0.5~**1.5**~2.0		☆ 100~**160**~220	★ 100~**160**~220	-	-	-
	Mold Steel (~ 40HRC)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		☆ 80~**140**~180	★ 80~**140**~180	-	-	-
	Mold Steel (40 ~ 50HRC)	0.15~**0.3**~0.5(ap≤1.0mm) 0.15~**0.2**~0.25(ap≤1.5mm)	0.2~**0.5**~0.8(ap≤1.0mm) 0.2~**0.3**~0.45(ap≤1.5mm)	0.2~**0.6**~0.9(ap≤1.0mm) 0.2~**0.5**~0.7(ap≤1.5mm)	0.2~**0.7**~1.0		☆ 60~**100**~130	★ 60~**100**~130	-	-	-
	Stainless Steel (Austenitic related)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		★ 100~**160**~200	☆ 100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		☆ 150~**200**~250	-	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		★ 90~**120**~150	-	-	-	-
	Gray Cast Iron	0.5~**0.8**~1.0(ap≤1.0mm) 0.2~**0.4**~0.5(ap≤1.5mm)	0.5~**1.0**~1.5(ap≤1.0mm) 0.3~**0.7**~1.0(ap≤1.5mm)	0.5~**1.2**~1.8(ap≤1.0mm) 0.4~**1.0**~1.5(ap≤1.5mm)	0.5~**1.5**~2.0		-	-	★ 120~**180**~250	-	-
	Nodular Cast Iron	0.5~**0.7**~0.8(ap≤1.0mm) 0.2~**0.3**~0.4(ap≤1.5mm)	0.5~**0.8**~1.2(ap≤1.0mm) 0.3~**0.6**~0.8(ap≤1.5mm)	0.5~**1.0**~1.6(ap≤1.0mm) 0.4~**0.8**~1.2(ap≤1.5mm)	0.5~**1.2**~1.8		-	-	★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.4**~0.6(ap≤1.0mm) 0.15~**0.2**~0.3(ap≤1.5mm)	0.2~**0.5**~0.9(ap≤1.0mm) 0.2~**0.4**~0.6(ap≤1.5mm)	0.2~**0.6**~1.0(ap≤1.0mm) 0.2~**0.5**~0.8(ap≤1.5mm)	0.2~**0.8**~1.2		☆ 20~**30**~50	-	-	-	★ 20~**30**~50
	Titanium Alloys	0.2~**0.4**~0.6(ap≤1.0mm) 0.15~**0.2**~0.3(ap≤1.5mm)	0.2~**0.5**~0.9(ap≤1.0mm) 0.2~**0.4**~0.6(ap≤1.5mm)	0.2~**0.6**~1.0(ap≤1.0mm) 0.2~**0.5**~0.8(ap≤1.5mm)	0.2~**0.8**~1.2		★ 40~**60**~80	-	☆ 30~**50**~70	-	-

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. ★ : 1st Recommendation ☆ : 2nd Recommendation
* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
When finishing with LD type and FL type inserts, recommended feed rate for SOMT14 LD type : f=1.5(mm/rev) or less / for SOMT10 LD type : f=0.9(mm/rev) or less
for SOMT14 FL type : f=3.0(mm/rev) or less / for SOMT10 FL type : f=1.4(mm/rev) or less
* For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.
* For slotting, internal coolant is recommended.

MFH High Feed Cutter

Note for Machining Program (Approx. R)

Shape	Description	Insert Type	Cutting Edge Angle γ	Approx. R (mm)	Unmachined portion K (mm)	Max. inclination angle of workpiece at contouring
	MFH...-10-...	GM/GH	10°	3.0	0.85	90°
		FL	14°	3.0	0.89	80°
		LD	14°	3.5	0.69	65°
	MFH...-14-...	GM/GH	10°	3.5	1.37	90°
		FL	13°	3.0	1.36	80°
		LD	16°	5.0	1.06	65°

Reference data for Ramping

MFH...-10-...

Cutter Dia. DCX (mm)	25	28	32	35	40	50	63	80
Max. ramping angle RMPX	5°	4.5°	4°	3.5°	3°	2.5°	2°	1°
tan RMPX	0.087	0.078	0.070	0.061	0.052	0.043	0.035	0.017

MFH...-14-...

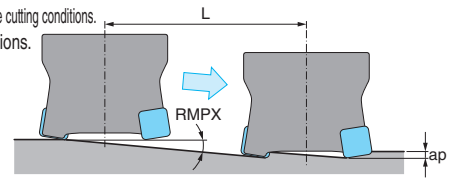
Cutter Dia. DCX (mm)	50	63	80	100	125	160
Max. ramping angle RMPX	2°	1.8°	1°	0.5°	0.4°	0.2°
tan RMPX	0.035	0.031	0.017	0.009	0.007	0.003

Guide for Ramping (Slant Milling)

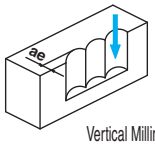
·Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
·Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$



Vertical Milling (Plunging)



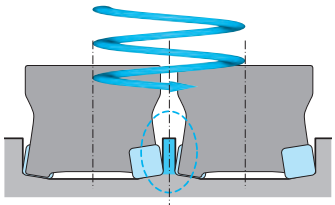
Insert Description	Max. Width of Cut (ae)
SOMT10	8mm
SOMT14	11.5mm

Vertical Milling (Plunging) is available only with GM/ GH type inserts. (LD type and FL type are not applicable)
·For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

Guide for Helical milling

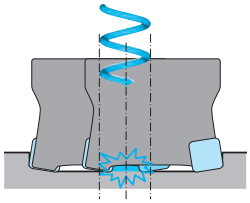
For helical milling, use between Min. cutting dia. and Max. cutting dia.

⃠ Over Max. Cutting Dia.



Center core part remains after machining

⃠ Under Min. Cutting Dia.

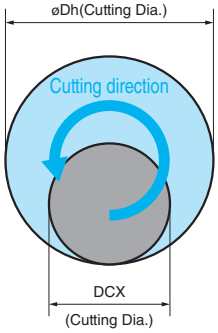


Center core part interferes with toolholder

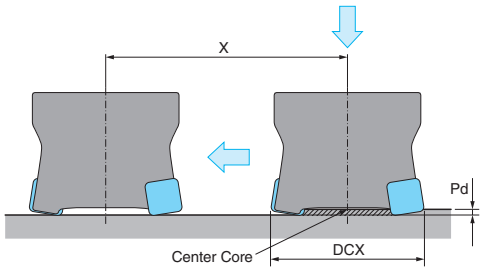
Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH...-10-...	2×DCX-18	2×DCX-2
MFH...-14-...	2×DCX-25	2×DCX-2

Unit : mm

·Sinking depth (h) at helical milling should be under Max. depth of cut (APMX) in the cutter dimension chart.
·Down-cut milling is recommended. (Ref. to the right figure)
·Feed rate should be under 50% of the recommended cutting conditions.
·Use caution to eliminate incidences caused by producing long chips.



Guide for Drilling



3D machining

Insert Type	Ramping	Contouring (rising wall angle)	Vertical	Helical Milling	Pocketing
GM/GH	✓	✓ (90°)	✓	✓	✓
LD	✓	△ (65°)	×	×	×
FL	✓	△ (80°)	×	×	×

·Some applications are not available depending on insert type.
·For FL and LD type, there is a limit of rising wall angle at contouring.

Description	GM type / GH type		LD type		FL type	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH...-10-...	1.5	DCX-18	1.5	DCX-14	1.5	DCX-15
MFH...-14-...	2	DCX-24	2	DCX-18	2	DCX-19

Unit : mm

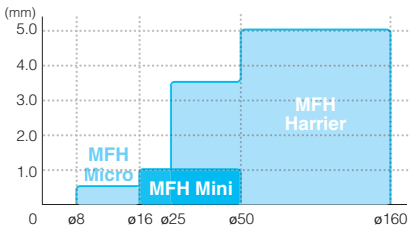
[Drilling depth] Please refer to Pd (Max. drilling depth) in the chart.
[When Traversing after Drilling]
(1) Reduce feed rate 25% or less of the recommended conditions until the center core part (unmachined part) is removed.
(2) When drilling, reduce feed rate per revolution to f=0.2mm/rev or under.

MFH Mini

Cutter Dia. : ø16~ø50

NEW GH Chipbreaker Now Available

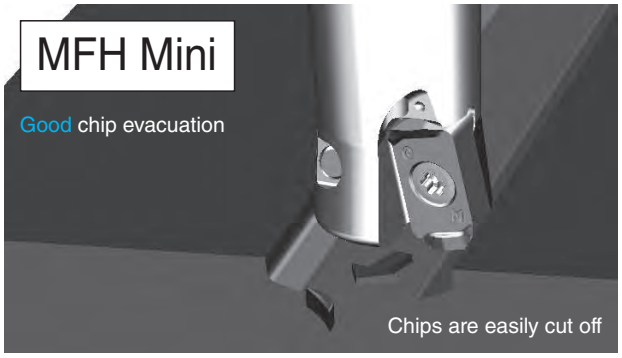


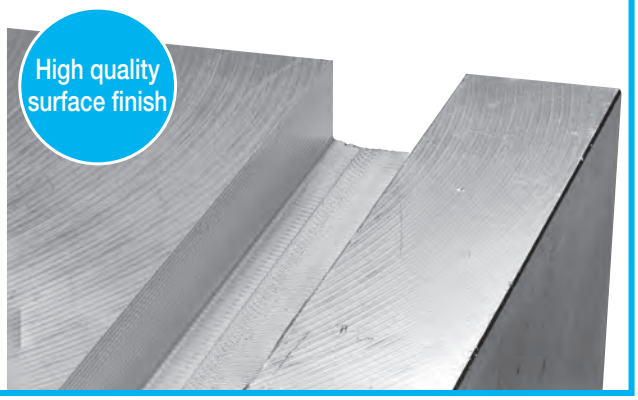


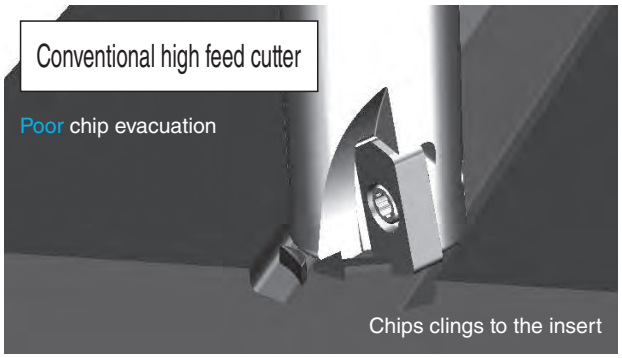
- Economical Double-sided 4-edge Insert
- High efficiency and high feed machining at small dia. machining and small machining center

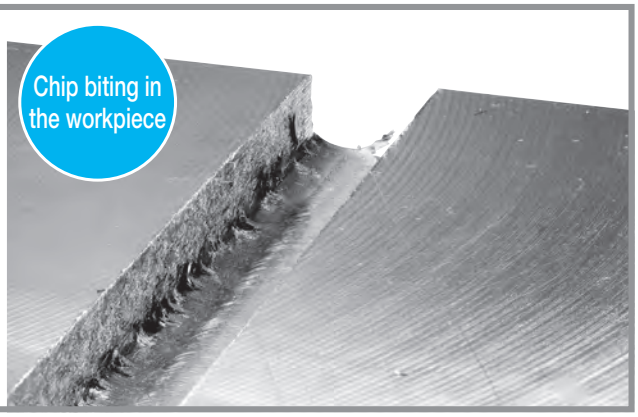
POINT.1 Excellent chip evacuation

(Internal evaluation)









MFH Mini controls chip biting with 3D convex cutting edge



Cutting Conditions : Workpiece Material SS400 Cutter Dia. ø16 Vc=150m/min apxae=10mm(0.5mmx20 passes)x16mm fz=0.6mm/t Dry

POINT.2 Multi edge design enables high efficiency machining

· Cutter Dia. ø25

MFH Mini



5 flutes

MFH25-S25-03-5T

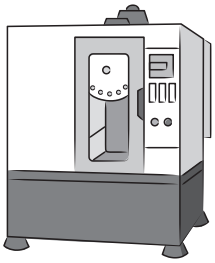
MFH Harrier



2 flutes

MFH25-S25-10-2T

POINT.3 High efficiency and high feed machining at small machining center (BT30/BT40)



Suitable for roughing of mold

MFH Mini End Mill



(Cylindrical)

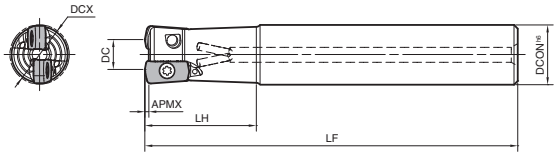


Fig. 1

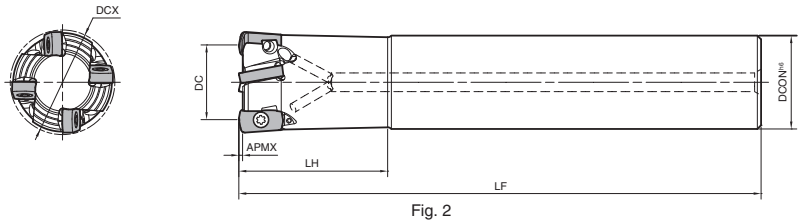


Fig. 2

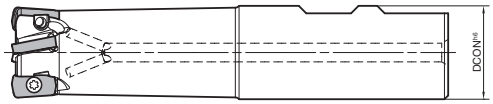


Fig. 3

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)						Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
					DCX	DC	DCON	LF	LH	APMX	A.R.				
Standard Shank	MFH	16-S16-03-2T	●	2	16	8	16	100	30	1	-10°	Yes	Fig. 1	0.1	18,800
		20-S20-03-3T	●	3	20	12	20	130	50					0.3	15,700
		20-S20-03-4T	●	4											
		25-S25-03-4T	●		25	17	25	140	60					0.5	13,400
		25-S25-03-5T	●	5											
		32-S32-03-5T	●		32	24	32	150	70					0.8	11,400
		32-S32-03-6T	●	6											
Over Size (Straight)	MFH	17-S16-03-2T	●	2	17	9	16	100	20				Fig. 2	0.1	17,900
		18-S16-03-2T	●		18	10									17,000
		22-S20-03-3T	●	3	22	14	20	130	30					0.3	14,700
		22-S20-03-4T	●	4											
		28-S25-03-4T	●		28	20	25	140	40					0.5	12,400
		28-S25-03-5T	●	5											
Weldon	MFH	16-W16-03-2T	●	2	16	8	16	79	30				Fig. 3	0.1	18,800
		20-W20-03-3T	●	3	20	12	20	101	50					0.2	15,700
		20-W20-03-4T	●	4											
		25-W25-03-4T	●		25	17	25	117	60					0.4	13,400
		25-W25-03-5T	●	5											
		32-W32-03-5T	●		32	24	32	131	70					0.7	11,400
		32-W32-03-6T	●	6											
Long Shank	MFH	16-S16-03-2T-150	●	2	16	8	16	150	50				Fig. 1	0.2	18,800
		20-S20-03-3T-160	●	3	20	12	20	160	80					0.3	15,700
		25-S25-03-4T-180	●	4	25	17	25	180	100					0.6	13,400
		32-S32-03-5T-200	●	5	32	24	32	200	120					1.1	11,400

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Recommended Cutting Conditions ➔ M160

■ **Max. Revolution**

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

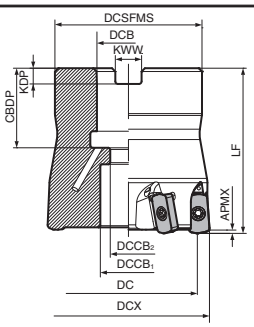
Spare Parts

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
			
MFH ...-03-...	SB-3065TRP	DTPM-8	P-37
	Recommended tightening torque for Insert Clamp 1.2N·m		

● : Std. Item

MFH Mini Face Mill



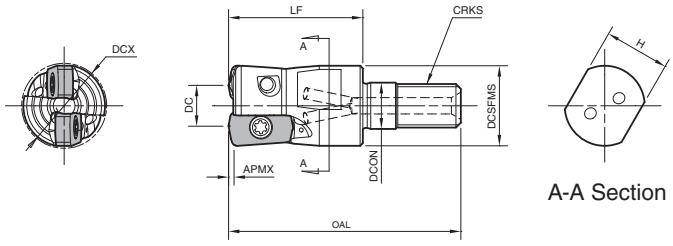


Toolholder Dimensions

Bore Dia.	Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle	Coolant Hole	Weight (kg)	Max. Revolution (min^{-1})
				DCX	DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R.			
Metric	MFH 040R-03-5T-M	●	5	40	32	38	16	15	9	40	19	5.6	8.4	1	-10°	Yes	0.2	9,900
	040R-03-6T-M	●	6															
	050R-03-8T-M	●	8	50	42	47	22	19	11	50	21	6.3	10.4				0.5	8,600

MFH Mini Head





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)									Rake Angle	Coolant Hole	Max. Revolution (min^{-1})
			DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R.		
MFH 16-M08-03-2T	●	2	16	8	14.7	8.5	42	25	M8xP1.25	12	1	-10°	Yes	18,880
17-M08-03-2T	●		17	9										17,900
18-M08-03-2T	●		18	10										17,000
MFH 20-M10-03-3T	●	3	20	12	18.7	10.5	48	30	M10xP1.5	15				15,700
20-M10-03-4T	●	4												
22-M10-03-3T	●	3	22	14										14,700
22-M10-03-4T	●	4												
MFH 25-M12-03-4T	●		25	17	23	12.5	56	35	M12xP1.75	19				13,400
25-M12-03-5T	●	5												
28-M12-03-4T	●	4	28	20	23									12,400
28-M12-03-5T	●	5												
MFH 32-M16-03-5T	●		32	24	30	17	62	40	M16xP2.0	24				11,400
32-M16-03-6T	●	6												

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

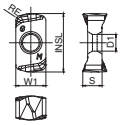
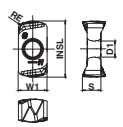
Recommended Cutting Conditions ➔ M160

■ Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

See page ➔ M60 for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

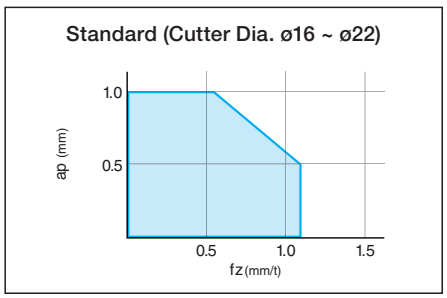
Applicable Inserts ➔ M15

Insert		Description	Dimension (mm)					MEGACOAT NANO			MEGACOAT HARD	CVD Coated Carbide
			W1	S	D1	INSL	RE	PR1535	PR1525	PR1510	PR015S	CA6535
 General purpose		LOGU 030310ER-GM	6.2	3.96	3.45	11.9	1.0	●	●	●		●
NEW  Tough Edge		LOGU 030310ER-GH	6.2	3.96	3.45	11.9	1.0	●	●	●	●	

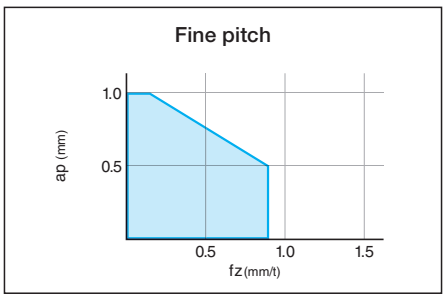
● : Std. Item

MFH High Feed Cutter

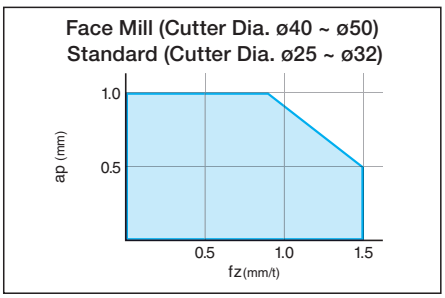
Cutting Performance



MFH16-...-2T, MFH17-...-2T, MFH18-...-2T
MFH20-...-3T, MFH22-...-3T



MFH20-...-4T, MFH22-...-4T, MFH25-...-5T
MFH28-...-5T, MFH32-...-6T



MFH25-...-4T, MFH28-...-4T, MFH32-...-5T
MFH040R-..., MFH050R-...

When using fine pitch type, reduce the cutting conditions compared with standard type.

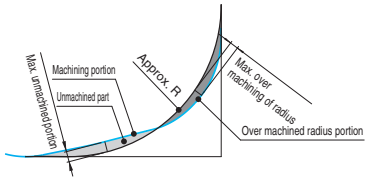
Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz : mm/t) * Recommended feed rate (Reference value) : ap=0.5mm								Recommended Insert Grades (Cutting Speed Vc: m/min)				
		MFH16 -...-2T	MFH20 -...-3T	MFH20 -...-4T	MFH25 -...-4T	MFH25 -...-5T	MFH32 -...-5T	MFH32 -...-6T	MFH -...-R-03	MEGACOAT NANO			MEGACOAT HARD	CVD Coated Carbide
										PR1535	PR1525	PR1510	PR015S	CA6535
GM GH	Carbon Steel	0.2~**0.7**~1.2		0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	☆ 120~**180**~250	★ 120~**180**~250	-	-	-
	Alloy Steel									☆ 100~**160**~220	★ 100~**160**~220	-	-	-
	Mold Steel (~40HRC)	0.2~**0.5**~0.9		0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	☆ 80~**140**~180	☆ 80~**140**~180	-	GH★ 80~**140**~180	-
	Mold Steel (40~50HRC)	0.2~**0.3**~0.5		0.2~**0.25**~0.3	0.2~**0.3**~0.6	0.2~**0.25**~0.3	0.2~**0.3**~0.6	0.2~**0.25**~0.3	0.2~**0.3**~0.6	-	☆ 60~**100**~130	-	GH★ 60~**100**~130	-
	Mold Steel (50~55HRC)	0.1~**0.3**~0.5		0.1~**0.2**~0.3	0.1~**0.3**~0.5	0.1~**0.2**~0.3	0.1~**0.3**~0.5	0.1~**0.2**~0.3	0.1~**0.3**~0.5	-	☆ 50~**70**~100	-	GH★ 50~**70**~100	-
	Mold Steel (55~60HRC)	0.03~**0.06**~0.1(* Recommended only for GH chipbreaker)								-	-	-	GH☆ 50~**60**~70	-
	Stainless Steel (Austenitic related)	0.2~**0.5**~0.9		0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	GM★ 100~**160**~200	GM☆ 100~**160**~200	-	-	-
	Stainless Steel (Martensitic related)									☆ 150~**200**~250	-	-	-	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)									★ 90~**120**~150	-	-	-	-
	Gray Cast Iron	0.2~**0.7**~1.2		0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	0.2~**0.5**~0.8	0.2~**0.8**~1.5	-	-	★ 120~**180**~250	-	-
	Nodular Cast Iron	0.2~**0.5**~0.9		0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	0.2~**0.4**~0.6	0.2~**0.6**~1.2	-	-	★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.3**~0.6		0.2~**0.25**~0.4	0.2~**0.4**~0.8	0.2~**0.25**~0.4	0.2~**0.4**~0.8	0.2~**0.25**~0.4	0.2~**0.4**~0.8	☆ 20~**30**~50	-	-	-	★ 20~**30**~50
	Titanium Alloys									GM★ 40~**60**~80	-	GM☆ 30~**50**~70	-	-

Standard Fine pitch ★ : 1st Recommendation ☆ : 2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
For machining center equivalent to BT30, reduce feed rate to 25% or less of the recommended condition.
For slotting, internal coolant or center through coolant is recommended.
Slotting and pocketing are not recommended for face mill type.

Note for Machining Program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined portion (mm)
	R1.0	0	0.51
	R1.5	0	0.41
	R1.6 (Recommended)	0	0.39
	R2.0	0.09	0.31

Cutting Edge Angle : 12°

Reference data for Ramping

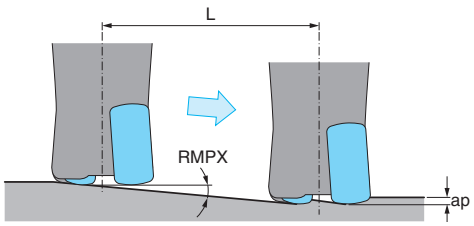
Description	Cutter Dia. DCX (mm)	16	17	18	20	22	25	28	32	40	50
MFH ...-03-...	Max. ramping angle RMPX	2.8°	2.5°	2.1°	1.7°	1.4°	1.2°	1°	0.8°	0.5°	0.4°
	tan RMPX	0.049	0.042	0.037	0.03	0.024	0.021	0.017	0.014	0.009	0.007

Guide for Ramping (Slant Milling)

· Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
· Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$

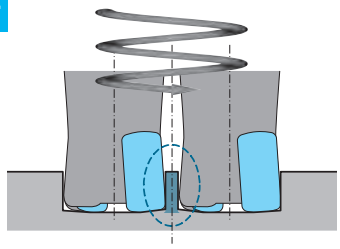


Guide for Helical milling

· For helical milling, use between Min. cutting dia. and Max. cutting dia.

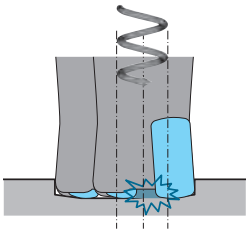
Over Max. Cutting Dia.

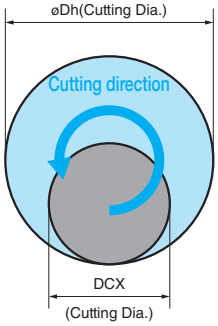
Center core part remains after machining



Under Min. Cutting Dia.

Center core part interferes with toolholder



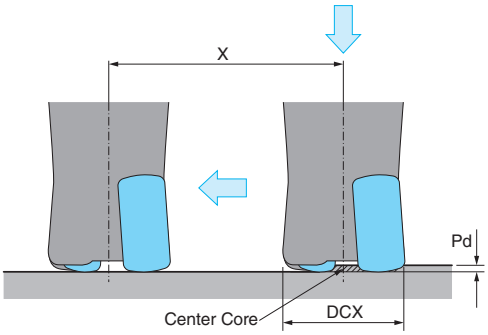


Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH...-03-...	2×DCX-8	2×DCX-2

Unit : mm

· Sinking depth at helical milling should be Max. ap (1mm) or under.
· Down-cut milling is recommended. (refer to the figure above)
· Feed rate should be under 50% of the recommended cutting conditions.
· Be careful to machine in a safe environment to avoid accident caused by long chips.

Guide for Drilling



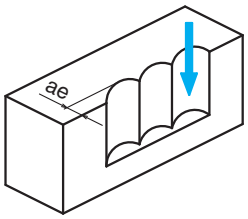
Description	GM type / GH type	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH...-03-...	1.0	DCX-9

Unit : mm

* When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
* When drilling, reduce feed rate per revolution to f=0.2mm/rev or under.

Vertical milling (Plunging)

Vertical milling (Plunging)



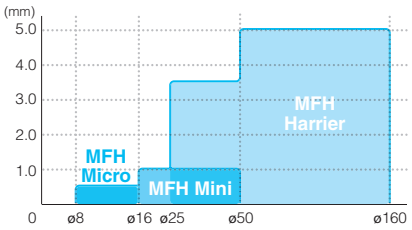
· Available for vertical milling (plunging).

Insert Description	Max. Width of Cut (ae)
LOGU03 type	3.5mm

· For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

MFH Micro

Cutter Dia. : ø8~ø16



- **High Efficiency Machining with Low Cutting Force and Reduced Chattering**
- **Max. ap 0.5 mm. Stable High Feed Machining on a Wide Range of Applications**

3D convex cutting edge

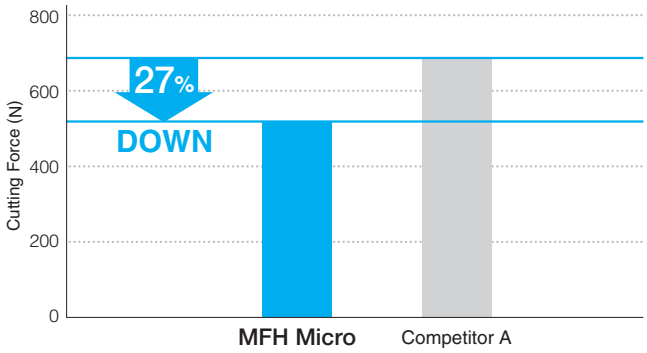


High Precision G Class Insert

POINT.1 Stable Machining with Chattering Resistance

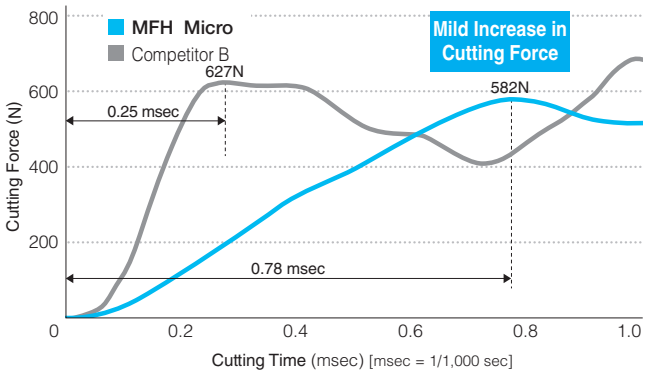
3D Convex Cutting Edge Controls Initial Impact when Entering the Workpiece

Cutting Force Comparison (Internal evaluation)



Cutting Conditions : Vc = 120 m/min, ap = 0.4 mm, fz = 0.6 mm/t
Cutter Dia. ø10 mm, Slotting, Dry Workpiece Material : S50C

Increase in Cutting Force when Entering Workpiece (Internal evaluation)



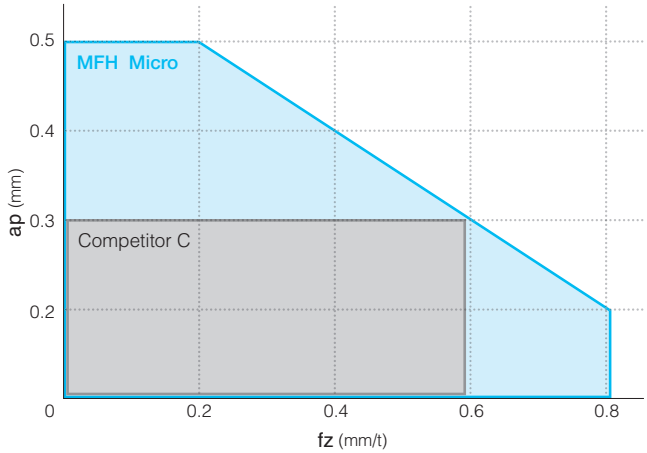
Cutting Conditions : Vc = 120 m/min, ap × ae = 0.4 × 5 mm, fz = 0.6 mm/t
Cutter Dia. ø10 mm, Dry Workpiece Material : S50C

POINT.2 Wide Range of Machining Applications

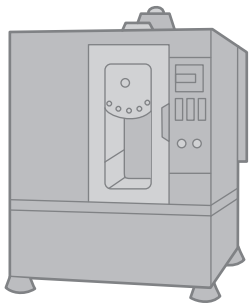
Wide Range of Machining Applications at a Maximum Depth of Cut of 0.5 mm

Stable Machining Even with Small Machining Centers

Cutting Performance Map (Cutter Dia. ø10 mm)



(Internal evaluation)

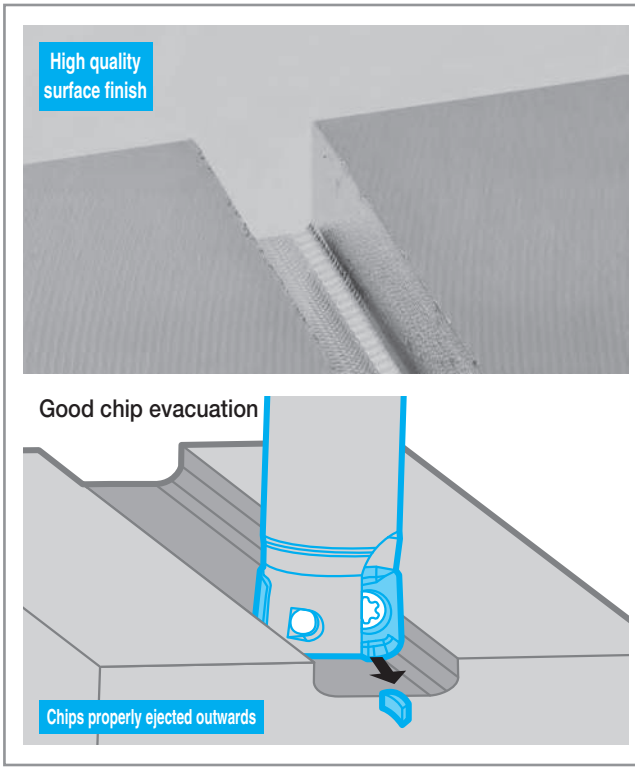


Applicable for BT30/ BT40

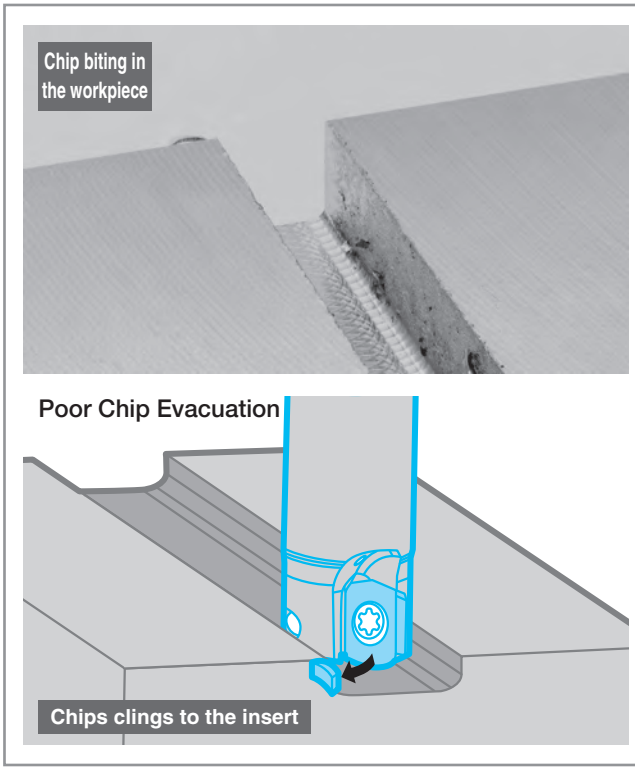
POINT.3 Excellent chip evacuation

Controls Chip Biting with Convex Cutting Edge

MFH Micro



Competitor F



Cutting Conditions : Cutter Dia. DCX = ø10 mm, Vc = 120 m/min, ap = 0.4 mm (25pass), fz = 0.6 mm/t Total 10 mm, Dry Workpiece Material : SS400 (Internal evaluation)

POINT.4 Replaces Solid End Mills to Reduce Machining Costs

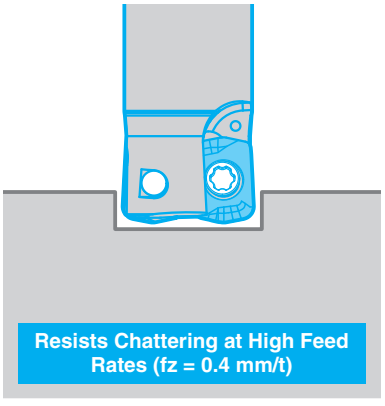
Suppresses Chattering and Increases Milling Efficiency

MFH Micro Compared to Solid End Mills

MFH Micro Q = 15.3 cc/min

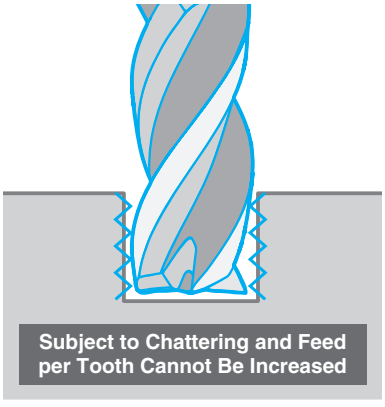
Vc = 150 m/min, fz = 0.4 mm/t
ap × ae = 0.4 × 10 mm, Dry
MFH10-S10-01-2T (2 Flutes)
LPGT010210ER-GM (PR1525)

1.25 times
Machining efficiency

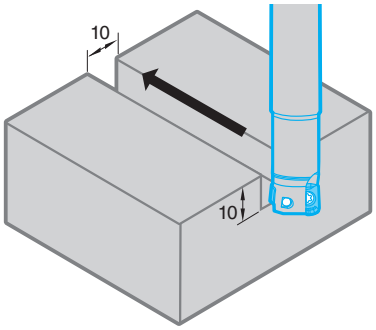


Solid End Mill Q = 12.2 cc/min

Vc = 80 m/min, fz = 0.04 mm/t
ap × ae = 3 × 10 mm, Dry
ø10 (4 Flutes)



Machine Part Slotting
Workpiece Material : S50C



(User Evaluation)

MFH Micro End Mill



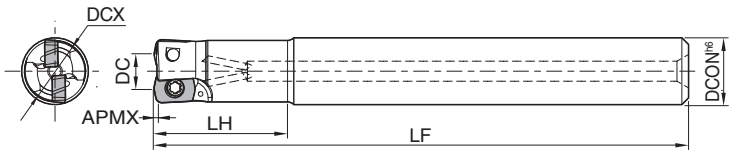


Fig. 1

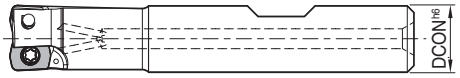


Fig. 2

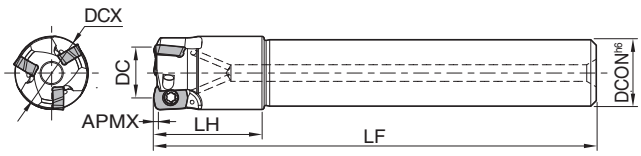


Fig. 3

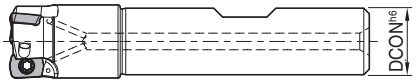


Fig. 4

Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)						Max. ramping angle	A.R.	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				DCX	DC	DCON	LF	LH	APMX						
Standard Shank	MFH 08-S10-01-1T	●	1	8	4.2	10	75	16	0.5	4°	+5°	Yes	Fig. 1	0.04	20,000
	10-S10-01-2T	●	2	10	6.2	10	80	20		3°				0.04	16,200
	12-S12-01-3T	●	3	12	8.2	12	80	20		2°				0.06	14,000
	16-S16-01-4T	●	4	16	12.2	16	90	25		1.2°				0.12	11,400
Over Size (Straight)	MFH 14-S12-01-3T	●	3	14	10.2	12	80	20	0.5	1.5°	+5°	Yes	Fig. 3	0.07	12,500
Weldon	MFH 08-W10-01-1T	●	1	8	4.2	10	58	16	0.5	4°	+5°	Yes	Fig. 2	0.03	20,000
	10-W10-01-2T	●	2	10	6.2	10	60	20		3°				0.03	16,200
	12-W12-01-3T	●	3	12	8.2	12	65	20		2°				0.05	14,000
	16-W16-01-4T	●	4	16	12.2	16	73	25		1.2°				0.1	11,400
Over Size (Weldon)	MFH 14-W12-01-3T	●	3	14	10.2	12	65	20	0.5	1.5°	+5°	Yes	Fig. 4	0.05	12,500

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

■ **Max. Revolution**

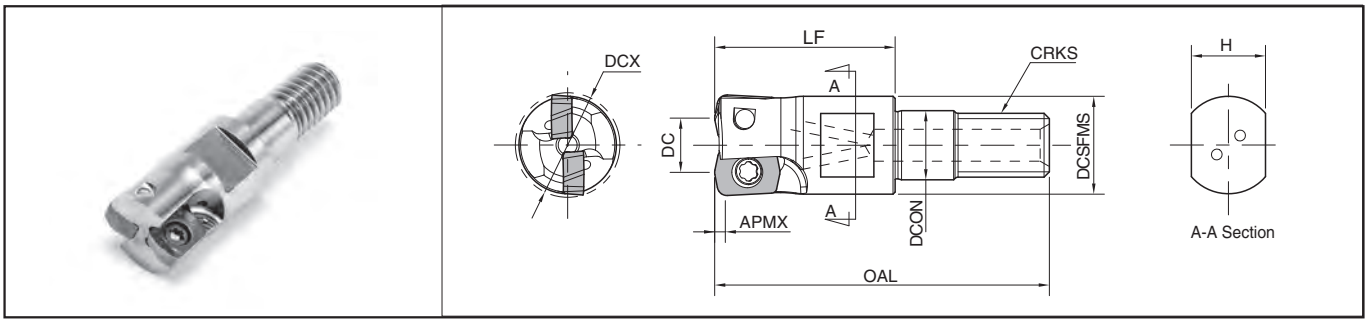
Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Spare Parts

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
			
MFH...-01-...	SB-1840TRP	FTP-6	P-37
	Recommended tightening torque for Insert Clamp 0.5N·m		

● : Std. Item

MFH Micro Head



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)									Max. ramping angle	Rake Angle	Coolant Hole	Max. Revolution (min^{-1})
			DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX		A.R.		
MFH 08-M06-01-1T	●	1	8	4.2	9.2	6.5	30.5	17	M6xP1.0	7	0.5	4°	+5°	Yes	20,000
10-M06-01-2T	●	2	10	6.2								3°			16,200
12-M06-01-3T	●	3	12	8.2	11.2							2°			14,000
14-M06-01-3T	●	3	14	10.2								1.5°			12,500
MFH 16-M08-01-4T	●	4	16	12.2	14.7	8.5	39	22	M8xP1.25	12		1.2°			11,400

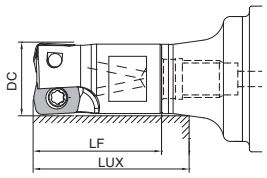
Please use commercial shanks for cutting diameter from ø8 to ø14 (Screw size : M6 x P1.0)

Check screw specifications for the shank in use

Spare Parts

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
			
MFH...-01-...	SB-1840TRP	FTP-6	P-37
	Recommended tightening torque for Insert Clamp 0.5N·m		

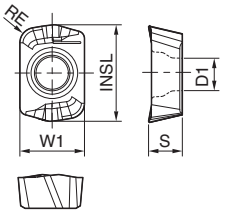
Actual End Mill depth (MFH16-M08-01-4T)



Arbor Description	Applicable End Mill (Head)			Actual End Mill depth (mm)
	Description	Cutting Dia.	Dimension	
		DC	LF	LUX
BT30K-M08-45	MFH16-M08-01-4T	16	22	28.8
BT40K-M08-55	MFH16-M08-01-4T	16	22	28.7

See page **M60** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Applicable Inserts M16

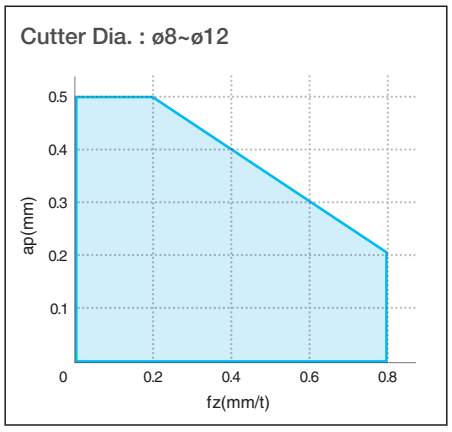
Insert		Description	Dimension (mm)					MEGACOAT NANO		CVD Coated Carbide
			W1	S	D1	INSL	RE	PR1535	PR1525	CA6535
 General purpose		LPGT 010210ER-GM	4.19	2.19	2.1	6.26	1.0	●	●	●

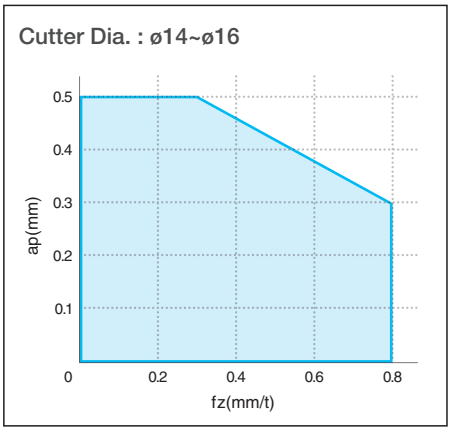
Recommended Cutting Conditions **M166**

● : Std. Item

MFH Micro Dia. Cutter for High Feed Machining

Cutting Performance





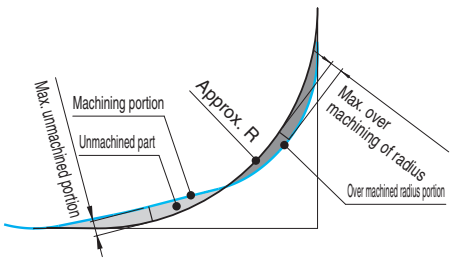
Recommended Cutting Conditions

Insert Type	Workpiece Material	Toolholder Description and Feed Rate (fz : mm/t) Recommended feed rate (fz : mm/t) : ap=0.3mm (Reference value)					Recommended Insert Grades (Cutting Speed Vc: m/min)		
		MFH08-...-1T	MFH10-...-2T	MFH12-...-3T	MFH14-...-3T	MFH16-...-4T	MEGACOAT NANO		CVD Coated Carbide
							PR1525	PR1535	CA6535
GM	Carbon Steel	0.2~**0.4**~0.6			0.2~**0.5**~0.8		★ 120~**180**~250	☆ 120~**180**~250	-
	Alloy Steel						★ 100~**160**~220	☆ 100~**160**~220	-
	Mold Steel (~40HRC)	0.2~**0.3**~0.5			0.2~**0.4**~0.6		★ 80~**140**~180	☆ 80~**140**~180	-
	Mold Steel (40~50HRC)	0.2~**0.25**~0.3			0.2~**0.25**~0.4		★ 60~**100**~130	☆ 60~**100**~130	-
	Stainless Steel (Austenitic related)	0.2~**0.3**~0.5			0.2~**0.4**~0.6		☆ 100~**160**~200	★ 100~**160**~200	-
	Stainless Steel (Martensitic related)						-	☆ 150~**200**~250	★ 180~**240**~300
	Stainless Steel (Precipitation Hardening)						-	★ 90~**120**~150	-
	Gray Cast Iron	0.2~**0.4**~0.6			0.2~**0.5**~0.8		★ 120~**180**~250	-	-
	Nodular Cast Iron	0.2~**0.3**~0.5			0.2~**0.4**~0.6		★ 100~**150**~200	-	-
	Ni-base heat-resistant alloys	0.2~**0.25**~0.3			0.2~**0.25**~0.4		-	☆ 20~**30**~50	★ 20~**30**~50
	Titanium Alloys						-	★ 40~**60**~80	-

★ : 1st Recommendation ☆ : 2nd Recommendation

Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
The bold-faced number indicates a center value of recommended cutting condition.
Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Internal coolant is recommended for slotting.

Note for Machining Program (Approx. R)

Shape	Approx. R (mm)	Max. over machining of radius (mm)	Max. unmachined portion (mm)
	R1.0	0	0.21
	R1.2 (Recommended)	0	0.17
	R1.5	0.08	0.1
	R2.0	0.28	0.01

Cutting Edge Angle : 12°

Reference data for Ramping

Description	Cutter Dia. DCX (mm)	8	10	12	14	16
MFH...-01-...	Max. ramping angle RMPX	4.0°	3.0°	2.0°	1.5°	1.2°
	tan RMPX	0.070	0.052	0.035	0.026	0.021

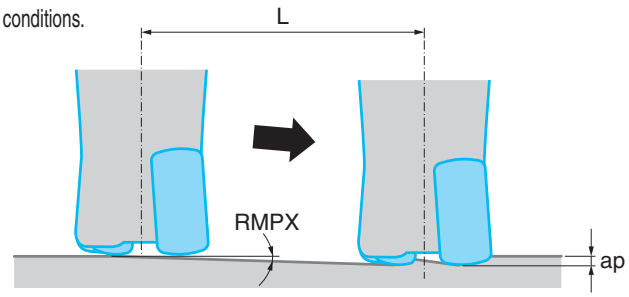
Decrease ramping angle if chips become excessively long.

Guide for Ramping (Slant Milling)

Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

$$L = \frac{ap}{\tan RMPX}$$

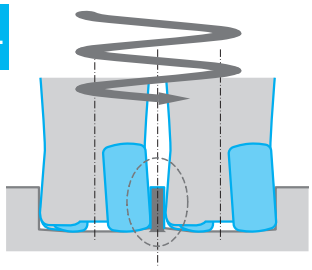


Guide for Helical milling

For helical milling, use between Min. cutting dia. and Max. cutting dia.

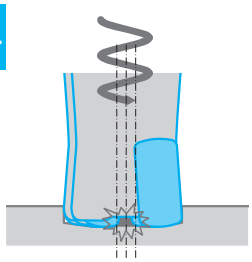
⃠ Exceeding Max. Cutting Dia.

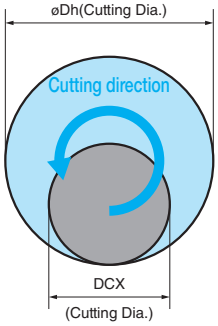
Center core part remains after machining



⃠ Under Min. Cutting Dia.

Center core part interferes with toolholder



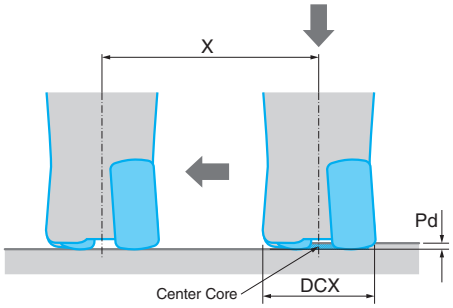


Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH...-01-...	2×DCX-3.5	2×DCX-2

Unit : mm

- Sinking depth at helical milling should be Max. ap (0.5mm) or under.
- Down-cut milling is recommended (refer to the figure above).
- Feed rate should be under 50% of the recommended cutting conditions.
- Be careful to machine in a safe environment to avoid accident caused by long chips.

Guide for Drilling



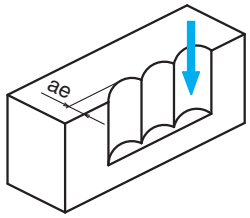
Description	GM type	
	Max. Cutting Depth Pd	Min. cutting length X for flat bottom surface
MFH...-01-...	0.5	DCX-3.5

Unit : mm

* When traversing directly after drilling, set the table feed at up to 25% of the recommended cutting conditions.
* When drilling, reduce feed rate per revolution to under f=0.2mm/rev.

Vertical milling (Plunging)

Vertical milling (Plunging)



- Available for vertical milling (plunging).

Insert Description	Max. Width of Cut (ae)
LOGT01 type	1.7mm

·For vertical milling (plunging), reduce feed rate to fz=0.2mm/t or less.

High-Precision Cutter for Finishing Applications

MFF

Cutter Body Design Provides Excellent Reliability

Molded Wiper Inserts Increases Machining Efficiency

1 Our Solution for Finish Machining

MFF was made to solve the problems in machining.

Designed with a unique insert combination of semi-finishing and finishing, the MFF drastically improves productivity by reducing quality issues.



Semi-finishing Insert

To flatten ruggedness when roughing

Finishing Insert

Provides excellent surface finish

Adjustable cutting edge and a single insert eliminates runout

SOLUTION

Increase feed to f = 5.0 mm/rev

Achieved 0.8 µm Ra surface finish

No grinding required

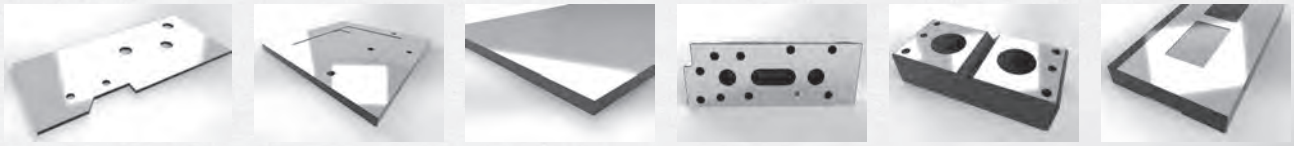
Achieved 5 µm flatness

The above is the result of a field test. Actual results will depend on machining environment, workpiece rigidity, machine, etc.
For more details, see case studies on page **M171**.

MFF Machining Solutions

Can be used on a wide variety or parts and workpieces

Part Name	Workpiece Material	Industry
Plate / Frame / Case	Rolled Steel for General Structure /	
Cylinder Pump / Rail	Gray Cast Iron / Spheroidal Graphite Cast Iron	**Industrial Machining / Machine Tools**
Turbine Housing	**Ni-resist Cast Iron**	**Shipbuilding / Automotive**
Casing / Mold Base	**Mold Steel**	**Construction Machinery / Molds**
	Carburized and hardened steel (60 HRC)	



2 Molded Wiper Insert for High-Quality Surface Finish



Utilizes Kyocera's unique molded insert technology for high feed rates and excellent surface finish



Low cutting force with special edge preparation

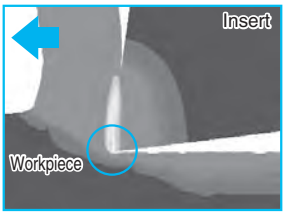
Micro-honing
Good sharpness

Wiper edge

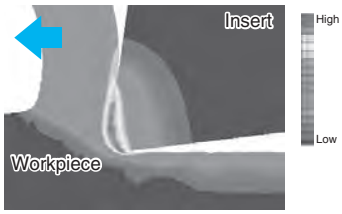
Large S-curve shape developed for higher feed rates

Edge Temperature Simulation Comparison (Internal evaluation)

MFF

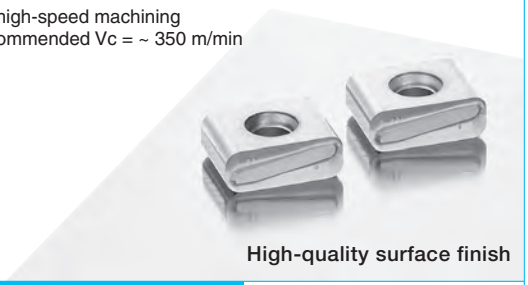


Conventional tool **After 2 sec machining**



MEGACOAT NANO Cermet PV60M

For high-speed machining
Recommended Vc = ~ 350 m/min



High-quality surface finish

Molded TT Chipbreaker

Reduces chip clogging
High feed machining

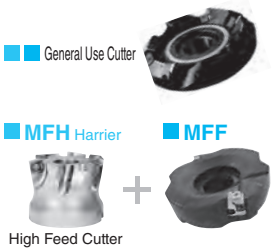


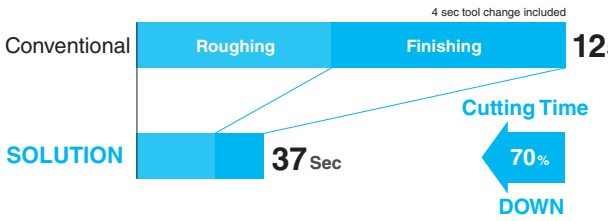


Comprehensive Machining Solutions

From Roughing to Finishing Machining Improvements (Internal evaluation)

Combine with Kyocera's MFH high feed cutter to improve quality and efficiency



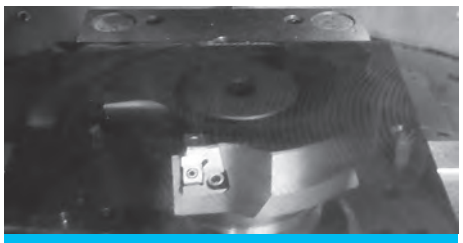


Cutting Conditions
Conventional ø200 (6 inserts)
Vc = 200 m/min
Roughing : Vf = 286 mm/min (fz = 0.15 mm/t), ap = 1.2 mm
Finishing : Vf = 230 mm/min (fz = 0.12 mm/t), ap = 0.3 mm

SOLUTION
Roughing : MFH Harrier ø63 (6 inserts)
Vc = 200 m/min
Vf = 7,300 mm/min (fz = 1.2 mm/t), ap = 0.7 mm
Finishing : MFF ø200 (2 inserts)
Vc = 300 m/min
Vf = 2,400 mm/min (f = 5.0 mm/rev), ap = 0.1 mm

Surface Finish Quality after Machining

SOLUTION



Excellent Surface Finish (0.27 µm Ra)

Conventional Machining



Cloudy Surface Finish (1.01 µm Ra)

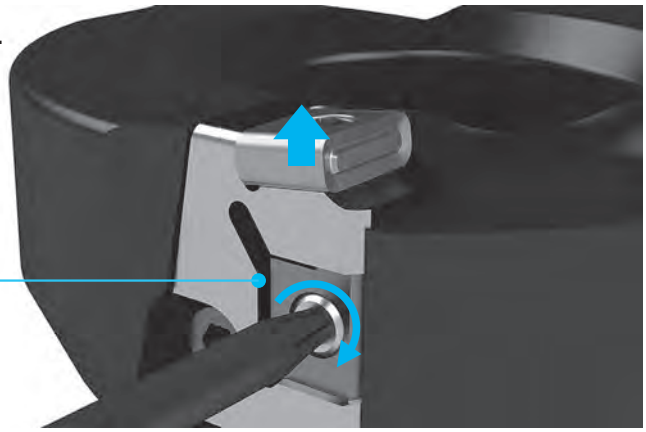
3 Adjustable cutting edge for increased usability

Cartridge height comes pre-adjusted and should not be necessary.

Adjustment is not required after replacing insert.

Easy-to-adjust Cutting Edge

Cutting edge height can be adjusted easily with one screw



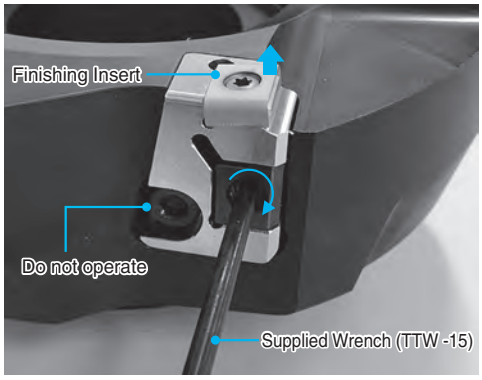
Included adjustment wrench

Edge Adjustment

If D.O.C. is ap 0.1 ~ 0.2 mm, no adjustment is necessary (Pre-adjusted before holder is shipped).

Cutting edge adjustment is NOT required when replacing inserts.

If D.O.C. is less than 0.1 mm or if you prefer a different edge height, use the following method:



Adjusting the Cutting Edge

Use the supplied TTW-15 wrench to rotate the screw and easily adjust the cutting edge position.

Procedure

To adjust, start with the screw turned counterclockwise about two rotations (lowering the cutting edge).
Tighten the screw clockwise (raising the cutting edge) to adjust the amount of protrusion.
*Use a dial gauge to measure protrusion amount.

Precautions

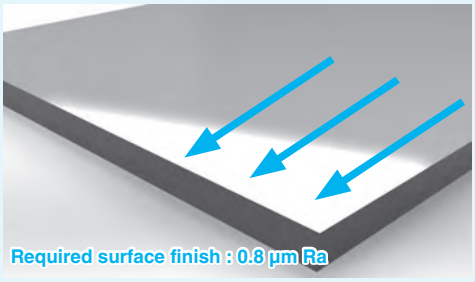
Make sure to lower the cutting edge below the desired height first (turning screw counterclockwise) and then raise the edge up to the final height (turning screw clockwise).
If cutting edge is simply lowered to the final edge height, chattering or loosening of the screw may occur due to backlash.
Make sure the measurement position of the cutting edge is the same machining diameter.

Standard Cutting Edge Height

ap = 0.05 mm → protrusion against rough edge : 0.03 mm
ap = 0.10 mm ~ → protrusion against rough edge : 0.06 mm *Pre-adjusted before shipment

SOLUTION ❶ 1.7 times increase in efficiency at f = 5.0 mm/rev with a 0.8 µm Ra surface finish

Plate (SS400)



SOLUTION
MFF
ø200 2 inserts



1.7 times Machining Efficiency
Vf=2,600mm/min
Vc = 330 m/min, f = 5.0 mm/rev, ap = 0.1 mm, Dry

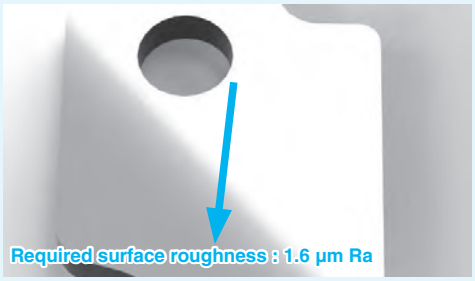


Conventional
Competitor A
ø200 2 inserts
Vf=1,500mm/min
Vc = 220 m/min, f = 4.3 mm/rev, ap = 0.1 mm, Dry

The conventional cutter was not able to feed faster than f = 4.3 mm/rev as surface finish deteriorated.
The MFF showed good surface finish of 0.8 µm Ra or less even at f = 5.0 mm/rev.
Increasing the cutting speed increased machining efficiency by 1.7 times.

SOLUTION ❷ Surface finish 0.5 µm Ra. No grinding required (Fewer Processes)

Valve (FCD450)



SOLUTION
MFF
ø160 2 inserts



No grinding required
127 sec



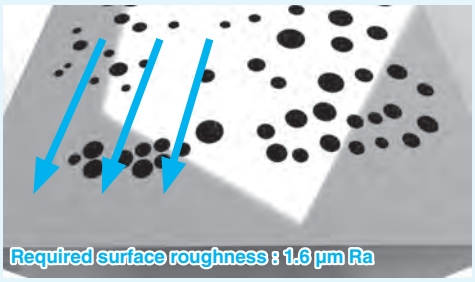
Vc = 300 m/min, Vf = 250 mm/min (f = 0.4 mm/rev) ap = 0.1 mm, Wet

Conventional
Competitor B
ø200 10 inserts
Machining 32 sec + Grinding 10 min
Vc = 300 m/min, Vf = 800 mm/min (f = 1.6 mm/rev) ap = 0.1 mm, Wet

Conventional tool showed cloudy finished surface,
MFF provided 0.5 µm Ra with a glossy finish.
Reduced grinding process and cycle time by 80%.

SOLUTION ❸ Improved flatness and machining efficiency tripled in interrupted mold steel

Mold (SKD61 equivalent)



SOLUTION
MFF
ø200 2 inserts



Machining Efficiency x 3
Vf=380mm/min 6 Pass
Vc = 120 m/min, f = 2.0 mm/rev, ap = 0.05 mm, Dry

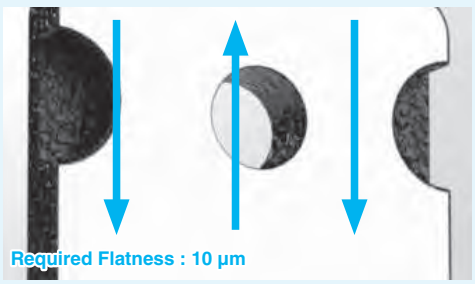


Conventional
Competitor C
ø125 5 inserts
Vf=210mm/min 10 Pass
Vc = 120 m/min, f = 0.65 mm/rev, ap = 0.05 mm, Dry

The MFF left a good finished surface with no gaps among tool path seams.
Larger cutter diameter reduced the number of passes to six and improved productivity.
Desirable chip shape and size were achieved.

SOLUTION ❹ Flatness of 5 µm was achieved. Showed good surface finish with reduced chattering on the thin part

Case (FC250)



SOLUTION
MFF
ø100 2 inserts



Machining Quality Improvement
Reduced Chattering and Good Finish
Vc = 330 m/min, Vf = 1,600 mm/min (f = 1.5 mm/rev) ap = 0.1 mm, Dry



Conventional
Competitor D
ø100 8 inserts (CBN)
Chattering occurred in thin wall
Vc = 1,200 m/min, Vf = 2,450 mm/min (f = 0.64 mm/rev) ap = 0.1 mm, Dry

Conventional cutter needed adjustment due to chattering on the thin portion.
MFF prevent chattering. Finished surface is good and there is no gap in the tool path seams.
Flatness of 5 µm achieved.

MFF



Rake Angle	
A.R.	R.R.
-8°	Medium-Finishing Insert : -9° Finishing Insert : -20°

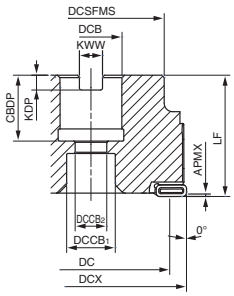


Fig.1

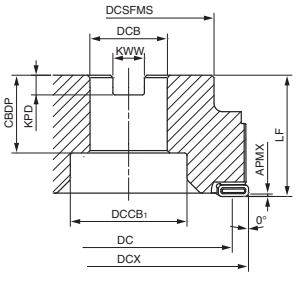


Fig.2

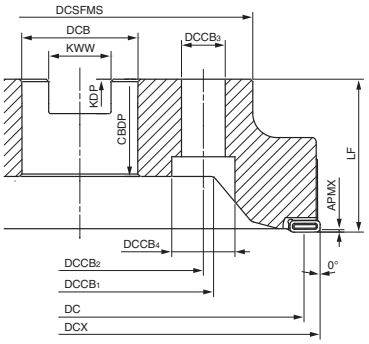


Fig.3

Toolholder Dimensions

	Description	Stock	No. of Inserts	Dimension (mm) DCX	DC	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	LF	CBDP	KDP	KWW	APMX	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min-1)
Metric	**MFF080R-M-SF**	MTO	2	80	67.3	60	27	20	13	-	-	50	24	7	12.4	0.3	No	Fig.1	1.3	2,000
	MFF100R-M-SF	MTO		100	87.3	70	32	48	-	-	-	50	32	8	14.4			Fig.2	1.8	1,600
	MFF125R-M-SF	MTO		125	112.3	87	40	55	-	-	-	63	33	9	16.4				3.5	1,300
	MFF160R-M-SF	MTO		160	147.3	102		72	-	-	-								5.9	1,000
	MFF200R-M-SF	MTO		200	187.3	142	60	110	101.6	26	18		40	14	25.7			Fig.3	7.7	800
	MFF250R-M-SF	MTO		250	237.3														10.5*	800
Bore Dia. Inch spec	**MFF080R-SF**	MTO	2	80	67.3	60	25.4	20	13	-	-	50	27	6	9.5	0.3	No	Fig.1	1.3	2,000
	MFF100R-SF	MTO		100	87.3	70	31.75	48	-	-	-	50	32	8	12.7			Fig.2	1.8	1,600
	MFF125R-SF	MTO		125	112.3	87	38.1	58	-	-	-	63	38	10	15.9				3.5	1,300
	MFF160R-SF	MTO		160	147.3	102	50.8	72	-	-	-			11	19.1				5.9	1,000
	MFF200R-SF	MTO		200	187.3	142	47.625	110	101.6	26	18		40	14	25.4			Fig.3	8.1	800
	MFF250R-SF	MTO		250	237.3														10.8*	800

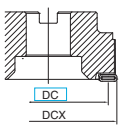
*ø250 sizes have holes for lighter weight.

Max. Revolution

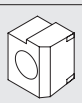
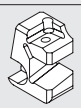
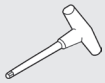
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page **M173**.
Do not use the end mill or cutter at the maximum revolution or higher since
the centrifugal force may cause inserts and parts to scatter even under no load.

Surface Finish

The surface will be finished flat within the range of DC shown on the right.



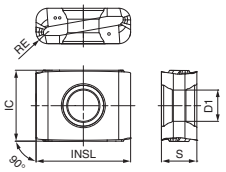
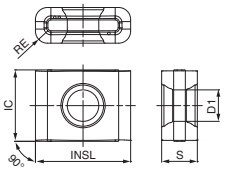
Spare Parts

Spare Parts							
Clamp Screw	Wrench	Wedge	Cartridge	Cartridge Clamp Screw	Wrench	Adjustment Screw	Anti-seize Compound
							
SB-3592TR	DTM-10	AD-MFF	CR-MFF	HH5X15L	TTW-15	W6X18N	P-37

Recommended tightening torque for Insert Clamp 1.2N·m

MTO : Made to order

Applicable Inserts

Insert		Description	Dimension (mm)					MEGACOAT NANO Cermet	MEGACOAT NANO
			IC	S	D1	INSL	RE	PV60M	PR1525
 For steel and stainless steel (Low cutting force)		**LNGX 120916R-TT**	9.525	6.35	4.2	12.7	1.6	MTO	MTO
 For Cast Iron		**LNGX 120916**	9.525	6.35	4.2	12.7	1.6	MTO	MTO

Recommended Cutting Conditions

Chipbreaker	Workpiece Material	f (mm/rev)	ap (mm)	Recommended Insert Grades (Cutting speed Vc : m/min)	
				PV60M	PR1525
TT	Structural Steel	1.5 – **4.0** – 5.0	0.03 – **0.1** – 0.3	★ 230 – **280** – 350	☆ 230 – **280** – 350
	Carbon Steel	1.0 – **4.0** – 5.0		★ 200 – **250** – 350	☆ 200 – **250** – 350
	Alloy Steel	1.0 – **4.0** – 5.0		★ 200 – **250** – 350	☆ 200 – **250** – 350
	Mold Steel	1.0 – **2.0** – 4.0	0.03 – **0.1** – 0.2	☆ 120 – **200** – 250	★ 120 – **200** – 250
	Mold Steel (50HRC~)	0.6 – **1.0** – 1.2	0.03 – **0.05** – 0.1	–	★ 50 – **70** – 80
	Stainless Steel (Austenitic related)*	1.0 – **2.0** – 4.0	0.03 – **0.1** – 0.2	☆ 120 – **200** – 250	★ 120 – **200** – 250
	Stainless Steel (Martensitic related) *	1.0 – **3.0** – 4.0		☆ 150 – **200** – 300	★ 150 – **200** – 300
Standard	Gray Cast Iron	1.0 – **2.0** – 4.0	0.03 – **0.1** – 0.3	☆ 200 – **250** – 350	★ 200 – **250** – 350
	Nodular Cast Iron	1.5 – **2.0** – 4.0		☆ 150 – **250** – 300	★ 150 – **250** – 300

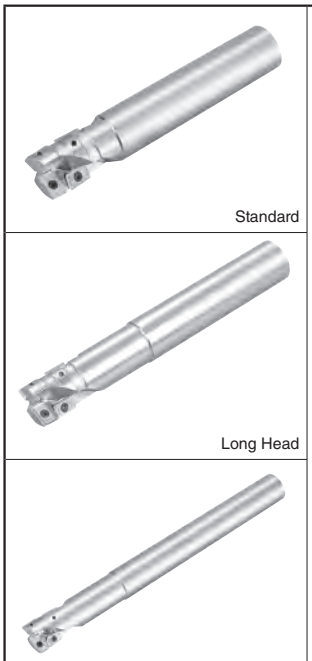
*Machining with coolant is recommended for stainless steel

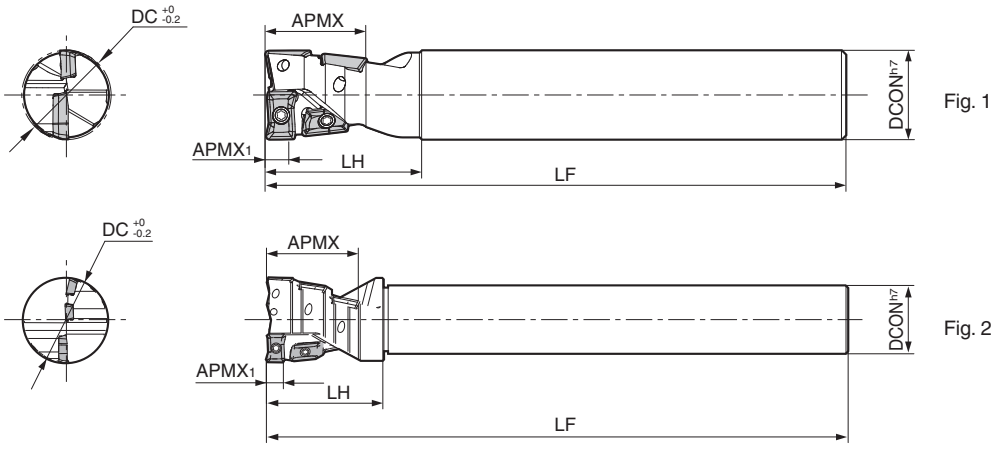
★1st Recommendation ☆2nd Recommendation

The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.

MTO : Made to order

MEY





Toolholder Dimensions

Description			Stock	No. of Inserts	No. of Flutes	Dimension (mm)						Rake Angle		Drawing	Spare Parts		
						DC	DCON	LF	LH	APMX	APMX1	A.R.	R.R.		Clamp Screw	Wrench	Anti-seize Compound
Standard	MEY	16-S16	●	4	2	16	16	120	31	19	4.5	+11°	-11°	Fig. 1	SB-2040TRG	DTM-6	P-37
		17-S16	●			17											
		20-S20	●			20	20	130	35	22	6	+13°	- 9°		SB-2555TRG	DT-8	
		21-S20	●			21											
		25-S25	●			25	25	140	40	28	7.5		-11°		SB-3070TRG	DT-10	
		26-S25	●			26											
		32-S32	●			32	32	150	50	36	9.5		- 9°		SB-4070TRG	DT-15	
		33-S32	●			33											
		40-S32	●	7		40		160	55	42	7.5		-11°	Fig. 2	SB-3070TRG	DT-10	
		50-S42	●			50	42	170	70	54	9.5		- 9°		SB-4070TRG	DT-15	
Long Head	MEY	16-S16-140H	●	4	2	16	16	140	51	19	4.5	+11°	-11°	Fig. 1	SB-2040TRG	DTM-6	P-37
		20-S20-150H	●			20	20	150	53	22	6	+13°	- 9°		SB-2555TRG	DT-8	
		25-S25-170H	●			25	25	170	70	28	7.5		-11°		SB-3070TRG	DT-10	
		32-S32-180H	●			32	32	180	80	36	9.5		- 9°		SB-4070TRG	DT-15	
Long Shank	MEY	16-S16-190	●	4	2	16	16	190	61	19	4.5	+11°	-11°	Fig. 1	SB-2040TRG	DTM-6	P-37
		17-S16-190	●			17			31								
		20-S20-200	●			20	20	200	63	22	6	+13°	- 9°		SB-2555TRG	DT-8	
		21-S20-200	●			21			35								
		25-S25-220	●			25	25	220	80	28	7.5		-11°		SB-3070TRG	DT-10	
		26-S25-220	●			26			40								
		32-S32-230	●			32	32	230	90	36	9.5		- 9°		SB-4070TRG	DT-15	
		33-S32-230	●			33			50								
		40-S32-240	●	7		40		240	55	42	7.5		-11°	Fig. 2	SB-3070TRG	DT-10	
		50-S42-250	●			50	42	250	70	54	9.5		- 9°		SB-4070TRG	DT-15	

·APMX1 shows the edge length of the complete 2-insert part.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Applicable Inserts

Description		Applicable Inserts ⓜ M23			
					
		Side Edge	No. of Inserts	Center Edge	No. of Inserts
MEY	16-S16(-...)	JOMT08T208ER-D	3	GOMT08T208ER-D	1
	17-S16(-...)				
	20-S20(-...)	JOMT100308ER-D		GOMT100308ER-D	
	21-S20(-...)				
	25-S25(-...)	JOMT13T308ER-D		GOMT13T308ER-D	
	26-S25(-...)				
	32-S32(-...)	JOMT160408ER-D		GOMT160408ER-D	
	33-S32(-...)				
	40-S32(-...)	JOMT13T308ER-D	6	GOMT13T308ER-D	
	50-S42(-...)	JOMT160408ER-D		GOMT160408ER-D	

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc : m/min) MEGACOAT	
	Drilling	Shouldering, Slotting	PR1225	PR1210
Carbon Steel	0.08~0.15	0.05~0.25	★ 120~250	-
Alloy Steel	0.08~0.15	0.05~0.25	★ 100~220	-
Mold Steel	0.08~0.12	0.05~0.15	★ 80~180	-
Stainless Steel	0.08~0.12	0.05~0.15	★ 120~220	-
Cast Iron	0.05~0.20	0.05~0.25	-	★ 100~220

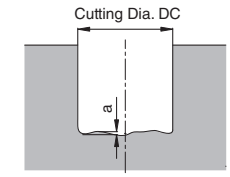
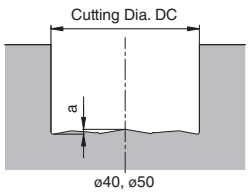
★ : 1st Recommendation ☆ : 2nd Recommendation

Caution of drilling

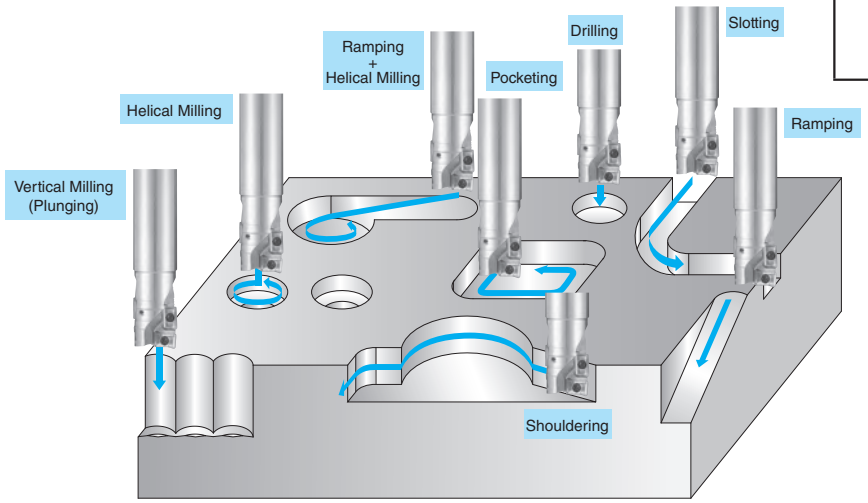
(1) Drilling conditions should be calculated as one flute line.
(2) Use compressed air during drilling.
(3) Carbon steel other than low carbon steel can be drilled to a depth of 0.5D without step feeding. For soft steel or sticky material such as stainless steel, step feed drilling (0.5 ~ 1.0mm) is recommended.
(4) For stainless steel drilling, coolant is recommended.
(5) Please refer to right list for maximum hole depth.

Cutting Dia.(DC)	Max. hole depth (mm)
ø16	13
ø17	13
ø20	17
ø21	17
ø25	22
ø26	22
ø32	29
ø33	29
ø40	36
ø50	40

Shape of the bottom of the drilled hole

Cutting Dia.	a (mm)	Shape of the bottom
ø16,ø17	0.5	
ø20,ø21	0.64	
ø25,ø26	0.85	
ø32,ø33	1.12	
ø40	1.54	
ø50	1.65	

Examples of MEY Multi-function Machining



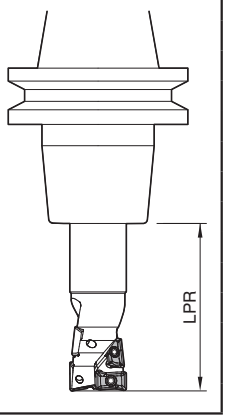
Multi-Function Machining End Mill MEY

Cutting Performance of MEY

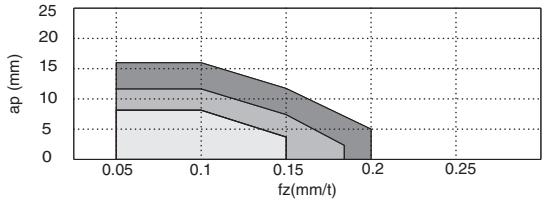
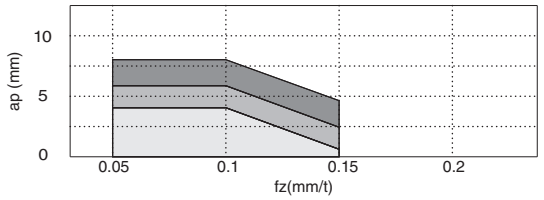
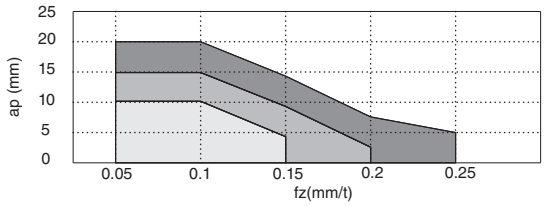
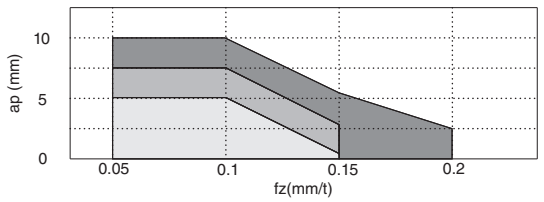
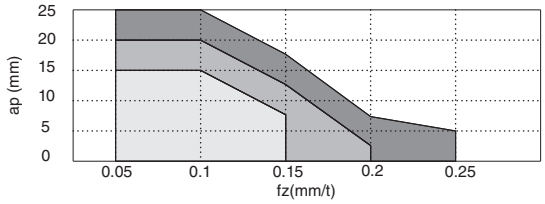
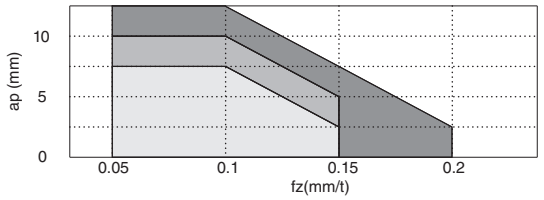
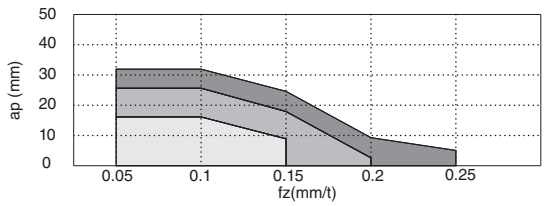
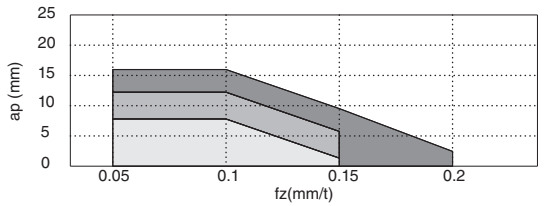
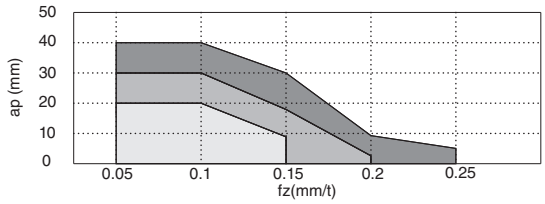
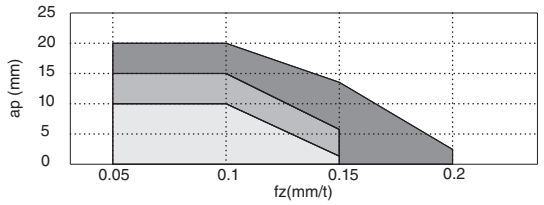
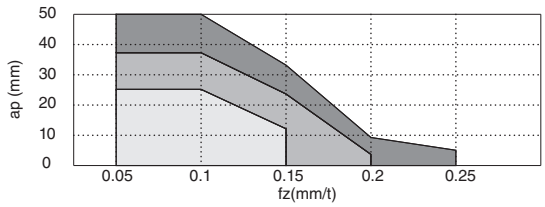
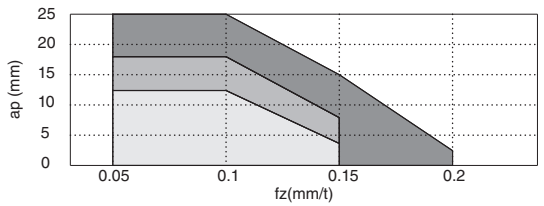
[Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)		
ø16	**MEY16-S16**	31	[~61]	(Not Recommended)
	MEY16-S16-140H	-	~61	[~91]
	MEY16-S16-190	-	61	~91
ø17	**MEY17-S16**	31	[~61]	(Not Recommended)
	MEY17-S16-190	31	~61	~91
ø20	**MEY20-S20**	35	[~65]	(Not Recommended)
	MEY20-S20-150H	-	~65	[~95]
	MEY20-S20-200	-	65	~95
ø21	**MEY21-S20**	35	[~65]	(Not Recommended)
	MEY21-S20-200	35	~65	~95
ø25	**MEY25-S25**	40	[~70]	(Not Recommended)
	MEY25-S25-170H	-	70	[~100]
	MEY25-S25-220	-	~80	~100
ø26	**MEY26-S25**	40	[~70]	(Not Recommended)
	MEY26-S25-220	40	~70	~100
ø32	**MEY32-S32**	50	[~80]	(Not Recommended)
	MEY32-S32-180H	-	~80	[~110]
	MEY32-S32-230	-	90	~110
ø33	**MEY33-S32**	50	[~80]	(Not Recommended)
	MEY33-S32-230	50	~80	~110
ø40	**MEY40-S32**	55	[~85]	[~115]
	MEY40-S32-240	55	~85	~115
ø50	**MEY50-S42**	70	[~100]	[~130]
	MEY50-S42-250	70	~100	~130

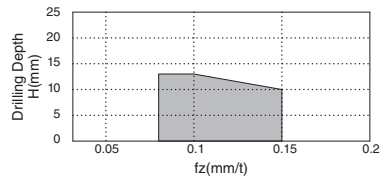
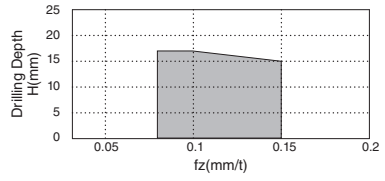
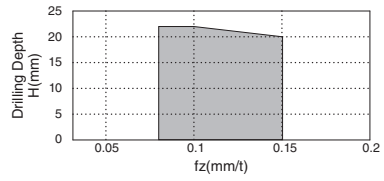
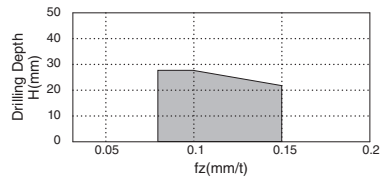
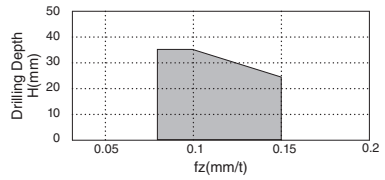
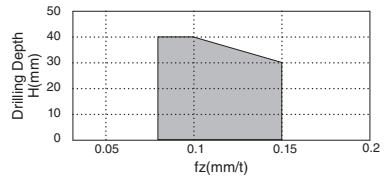
Shape



When using in [ ] dimension,
be careful that the chucking length to the shank may get too short.

Description	■ Shouldering (Cutting width ae = DC/2) Note) ▭ Part ae = DC/4	■ Slotting ■ Ramping and Helical Milling
MEY16-S16 **MEY17-S16**		
MEY20-S20 **MEY21-S20**		
MEY25-S25 **MEY26-S25**		
MEY32-S32 **MEY33-S32**		
MEY40-S32		
MEY50-S42		

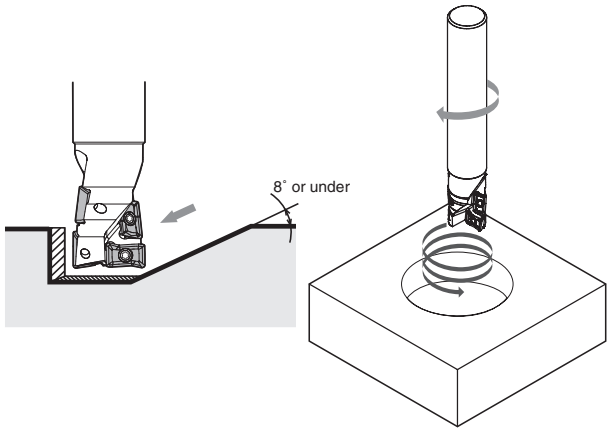
Drilling (Standard / Long Head / Long Shank : S50C)

MEY16-S16 MEY17-S16	MEY20-S20 MEY21-S20	MEY25-S25 MEY26-S25
		
MEY32-S32 MEY33-S32	**MEY40-S32**	**MEY50-S42**
		

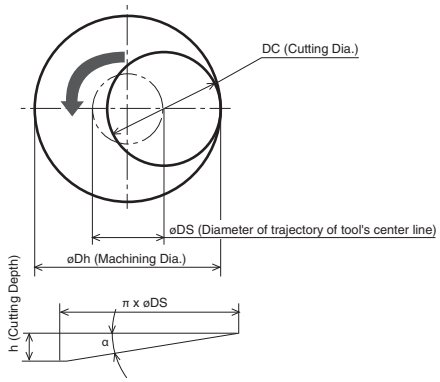
How to Use MEY Effectively

Ramping / Helical Milling

· Ramping angle is recommended to be 8˚ or under.
· Sinking depth per revolution when helical milling should be 1/2DC or under.
Use compressed air during machining.



Helical Milling Factors



øDS (How to find diameter of trajectory of tool's center line)
øDS = øDh - DC

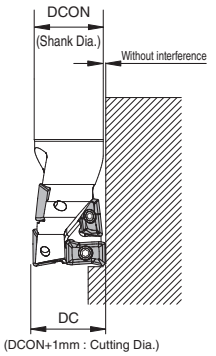
h How to find "h"
h = π X øDS X tan α
(α should be 8˚ or under)

Shouldering

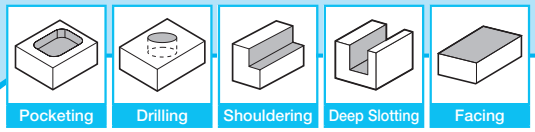
· Tools with 1mm larger cutting diameter than shank diameter are available.
High wall shouldering is possible.
· Lineup

(mm)

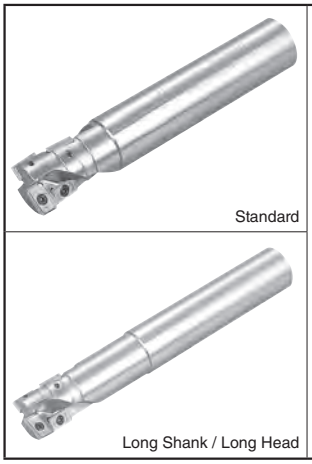
Description	DC	DCON
MEY17-S16	17	16
MEY21-S20	21	20
MEY26-S25	26	25
MEY33-S32	33	32
MEY17-S16-190	17	16
MEY21-S20-200	21	20
MEY26-S25-220	26	25
MEY33-S32-230	33	32



Multi-Function Machining End Mill MEZ-G



MEZ-G (Will be switched to MEY ➡ M174)



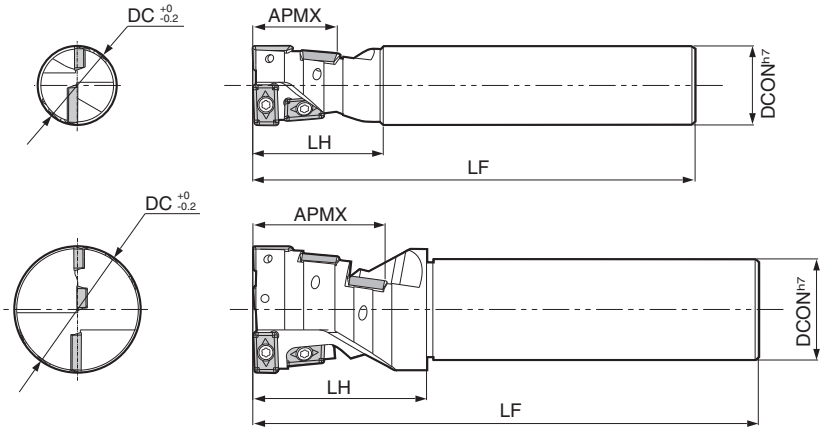


Fig. 1

Fig. 2

Toolholder Dimensions

	Description	Stock	No. of Inserts	No. of Flutes	Dimension (mm) DC	DCON	LF	LH	APMX	Rake Angle A.R.	R.R.	Drawing	Spare Parts Clamp Screw	Wrench	See Page for Applicable Inserts ➡ M24
Standard	MEZ 16-S16G	▲	4	2	16	16	120	31	16	+9°	-5°	Fig. 1	SB-2040TRG	DTM-6	NDMT080208ER-D□
	20-S20G	▲			20	20	130	33	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D□
	25-S25G	▲			25	25	140	40	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D□
	32-S32G	▲			32	32	150	50	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
	40-S32G	▲	7		39	32	160	55	39		-3°	Fig. 2	SB-3070TRG	DT-10	NEMT120308ER-D□
	50-S42G	▲			49	42	170	70	51		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
Long Head	MEZ 16-S16-140HG	▲	4		16	16	140	51	16	+9°	-5°	Fig. 1	SB-2040TRG	DTM-6	NDMT080208ER-D□
	20-S20-150HG	▲			20	20	150	53	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D□
	25-S25-170HG	▲			25	25	170	70	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D□
	32-S32-180HG	▲			32	32	180	80	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
Long Shank	MEZ 16-S16-190G	▲	4		16	16	190	61	16	+9°	-5°	Fig. 1	SB-2040TRG	DTM-6	NDMT080208ER-D□
	20-S20-200G	▲			20	20	200	63	21		-4°		SB-2555TRG	DT-8	NDMT10T208ER-D□
	25-S25-220G	▲			25	25	220	80	25		-5°		SB-3070TRG	DT-10	NEMT120308ER-D□
	32-S32-230G	▲			32	32	230	90	33		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□
	40-S32-240G	▲	7		39	32	240	55	39		-3°	Fig. 2	SB-3070TRG	DT-10	NEMT120308ER-D□
	50-S42-250G	▲			49	42	250	70	51		-2°		SB-4070TRG	DT-15	NEMT16T308ER-D□

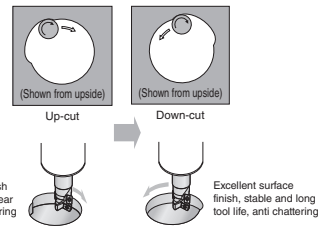
Recommended Cutting Conditions

Workpiece Material	fz (mm/t) Drilling	Shouldering, Slotting	Recommended Insert Grades (Cutting Speed Vc : m/min) Cermet TN100M	MEGACOAT PR1225	MEGACOAT PR1210	Carbide KW10
Carbon Steel	0.05~0.2	0.05~0.2	★ 120~200	★ 120~250	-	-
Alloy Steel	0.05~0.2	0.05~0.2	★ 100~180	★ 100~220	-	-
Mold Steel	0.05~0.12	0.05~0.15	★ 100~180	★ 80~180	-	-
Stainless Steel	0.05~0.12	0.05~0.15	☆ 120~200	★ 120~220	-	-
Cast Iron	0.05~0.2	0.05~0.2	-	-	★ 100~220	☆ 80~150
Non-ferrous Metals	0.05~0.2	0.05~0.2	-	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

- Drilling conditions should be calculated as one flute line. Step feed (0.5 ~ 0.1mm) is recommended.
- Coolant is recommended when drilling stainless steel / cast iron.

- Down-cut milling is recommended for the improvement of tool life and surface finish.
- Compressed air is recommended.

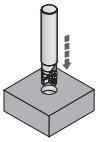


How to Use MEZ-G Effectively

Drilling

- Step feeding is recommended for good chip control. (Depth approx. 1mm)
- Drill depth should be 0.5DC or under. (DC : Drilling Dia.)

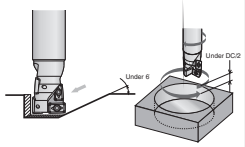
Use compressed air during machining.



Ramping / Helical Milling

- Ramping angle is recommended to be 6° or under.
- Sinking depth per revolution when helical milling should be 1/2DC or under.

Use compressed air during machining.



End Milling

- Tough edge insert is recommended for high load end milling. (High feed rate, large D.O.C.)

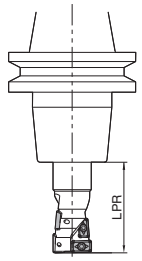
Use a low cutting force insert to prevent chattering.



▲ :To be replaced by a new product

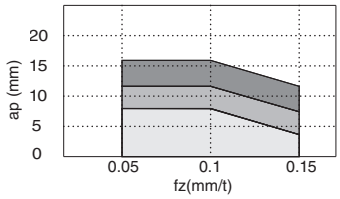
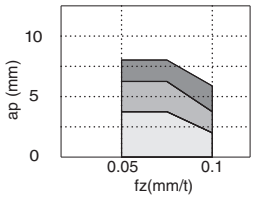
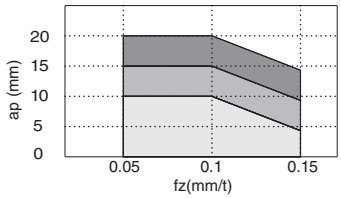
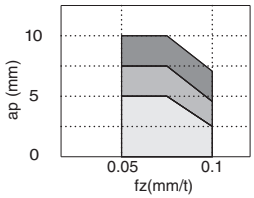
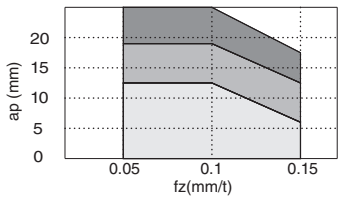
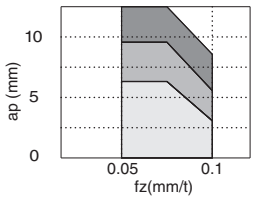
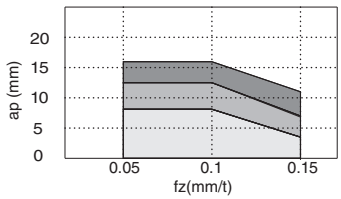
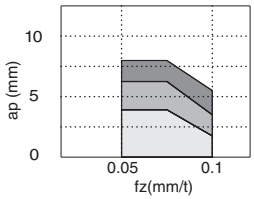
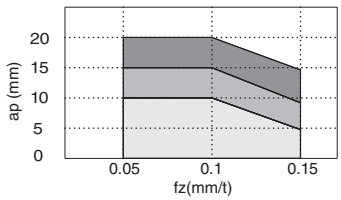
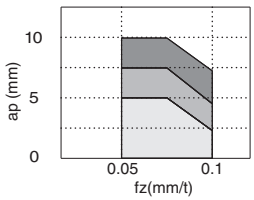
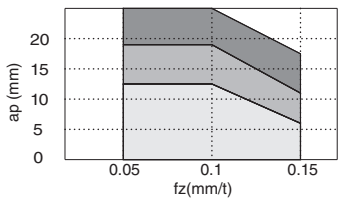
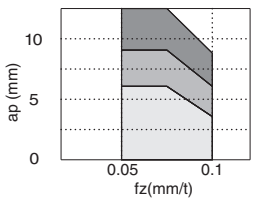
Cutting Performance of MEZ-G

[Workpiece Material : S50C]

Cutting Dia.	Description	Overhang Length LPR (mm)			Cutting Dia.	Description	Overhang Length LPR (mm)			Shape
ø16	**MEZ16-S16G**	31	[~61]	(Not Recommended)	ø32	**MEZ32-S32G**	50	[~80]	(Not Recommended)	
	MEZ16-S16-140HG	-	~61	[~91]		**MEZ32-S32-180HG**	-	80	[~110]	
	MEZ16-S16-190G	-	61	~91		**MEZ32-S32-230G**	-	90	~110	
ø20	**MEZ20-S20G**	33	[~63]	(Not Recommended)	ø39	**MEZ40-S32G**	55	[~85]	[~115]	
	MEZ20-S20-150HG	-	~63	[~93]		-	-	-	-	
	MEZ20-S20-200G	-	63	~93		**MEZ40-S32-240G**	55	~85	~115	
ø25	**MEZ25-S25G**	40	[~70]	(Not Recommended)	ø49	**MEZ50-S42G**	70	[~100]	[~130]	
	MEZ25-S25-170HG	-	70	[~100]		-	-	-	-	
	MEZ25-S25-220G	-	80	~100		**MEZ50-S42-250G**	70	~100	~130	

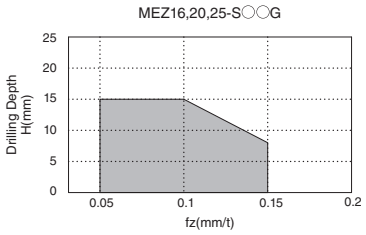
When using in [ ] dimension, be careful that the chucking length to the shank may get too short.

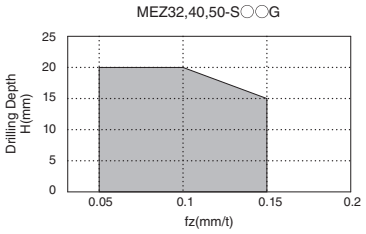
Shouldering / Slotting

Description	■ Shouldering (Cutting width ae = DC/2) Note) ▭ Part ae = DC/4	■ Slotting ■ Ramping and Helical Milling
MEZ16-S16G		
MEZ20-S20G		
MEZ25-S25G		
MEZ32-S32G		
MEZ40-S32G		
MEZ50-S42G		

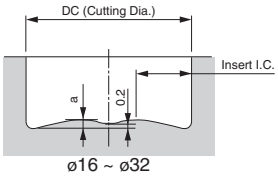
Drilling

■ Drilling
(Standard / Long Head / Long Shank)



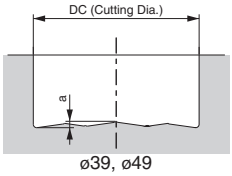


Shape of the bottom of the drilled hole
(ø16 ~ ø49)



ø16 ~ ø32

Cutting Dia.	ø16	ø20	ø25	ø32
a (mm)	0.30	0.33	0.38	0.45



ø39, ø49

Cutting Dia.	ø39	ø49
a (mm)	0.68	0.74

Slot Mill MST



Full range from 1.6mm to 23.3mm in 3 types

Full lineup of MST Series Slot Mills

Type	Applicable Inserts	Features	Slot width (mm)												
			1.6	2.2 (2.25)	3.05	4.05	6	8	10	13	14	16	18	20	22	24
MSTA	SLT..	1.6 ~ 4.05mm fixed	●	●	●	●										
MSTB	LNEU12..	6 ~ 13mm Semi-Adjustable					←				→					
MSTC	SP..10T3..	14 ~ 18mm Full-Adjustable									←		→			
	SD..1204...	18 ~ 23.3mm Full-Adjustable												←		→

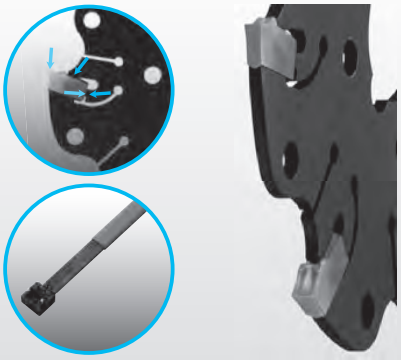
* Adjustable in 0.5mm increments between 6mm and 13mm with the combination of inserts

* Adjustable between 14mm and 18mm

* Adjustable between 18mm and 23.3mm

Slot Mill MSTA (Slot width 1.6, 2.2(2.25), 3.05, 4.05mm)

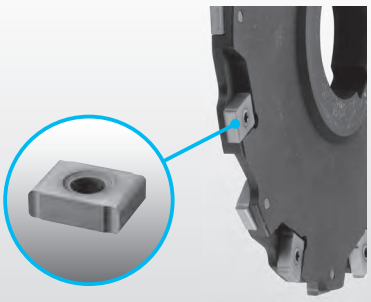
- **Self-clamping type Slot Mill**
  MSTA Slot Mills have simple self-clamping system to allow for easy attachment by just installing the insert.
- **High Rigidity Clamping System**
  Owing to the high rigidity clamping system - with an end - stopper, the toolholder enable high operability and stable slotting by maintaining an accurate edge position.
- **Double-Prism Clamping System**
  High replacement precision with the double-prism clamping system
- **Easy replacement**
  The replacement of inserts is easy and quick by using special wrench.



Wrench is not attached. Please purchase it separately.

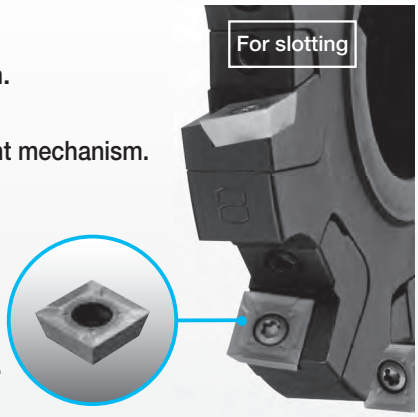
Slot Mill MSTB (Slot width 6.0 ~ 13.0mm)

- **Up-right type / semi-adjustable slot width**
- **Easy and secure screw holding**
  Inserts can be attached to the MSTB Slot Mills very easily by using clamp screws.
- **Economical Inserts with 4 Cutting Edges**
- **Applicable to a variety of slotting by choosing different inserts**
  By changing the thickness of inserts, it's a applicable to various slotting widths up to max 13mm in 0.5mm increments.

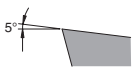
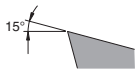
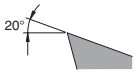


Slot Mill MSTC (Slot width 14.0 ~ 23.3mm)

- Lay-down type / full-adjustable slot width
- Applicable to various slotting needs. Slotting widths : 14.0mm to 23.3mm.
  Cutter Dia. : from 100mm to 160mm
- Smooth slotting width adjustment is possible owing to unique cam style adjustment mechanism.
- Economical 4-edge Insert
- A wide range of corner-R is suitable for various work.
- Owing to the wiper edge insert, an excellent surface finish can be expected.
- Owing to numerous insert geometries and grades, they are applicable for various types of workpiece machining.



Features of Insert Grades

Insert Shape			
Symbol	SB	SD	SE
Rake Angle			
Shape			

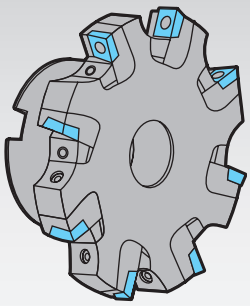
CA0835
- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Nodular Cast Iron.
- For middle to high speed machining.

PR0725
- TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron.
- For middle speed machining.

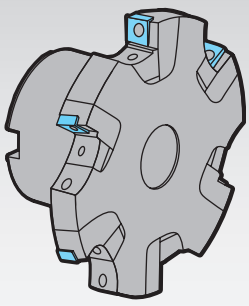
PR0110
- TiB_2 based PVD Coated Carbide
- For Non-ferrous Metals such as Aluminum Alloys (Si<10%) and Titanium Alloys.
- For high speed machining.

With Boss

Right-hand



Left-hand





Slot Mill MSTA (Self-clamping type)

Slotting | Slotting | Cut-off

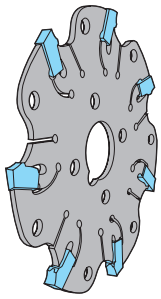
Identification System

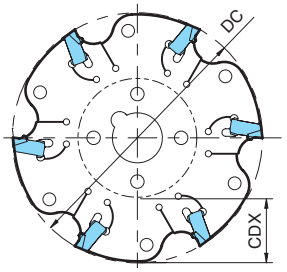
MSTA Slot Mill

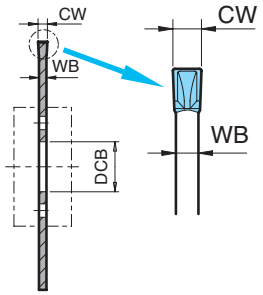
MSTA ○○○ N ○○○-○○ T

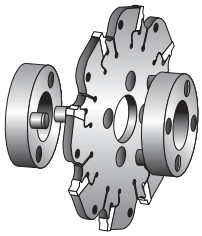
- MSTA: Self-clamping type Slot Mill
- ○○○: Cutting Dia.
- N: Neutral
- ○○○: Edge Width
- ○○: No. of Inserts
- T

MSTA (Metric)









Drive Ring (sold separately) Assembly Example

Toolholder Dimensions

Description		Stock	Edge Width CW (mm)	Slot Depth CDX (mm)	No. of Inserts	Dimension (mm) DC	DCB (H7)	WB	Weight (kg)	Applicable Inserts ➡M184	Max. Revolution (min⁻¹)	Spare Parts Wrench	Recommended Cutting Conditions
MSTA	63N16-5T	●	1.6	15	5	63	16	1.3	0.03	SLT16…	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately) · How to use Wrench →M185	M185
	80N16-7T	●		21	7	80			0.04		4,000		
	100N16-9T	●		27	9	100	22		0.07		3,200		
	125N16-11T	●		35	11	125	32		0.1		2,600		
MSTA	63N22-5T	●	2.2 (2.25)	15	5	63	16	1.8	0.03	SLT22…	5,100		
	80N22-7T	●		21	7	80			0.05		4,000		
	100N22-9T	●		27	9	100	22		0.08		3,200		
	125N22-11T	●		35	11	125	32		0.12		2,600		
	160N22-14T	●		40	14	160	40		0.3		2,000		
MSTA	63N30-4T	●	3.05	15	4	63	16	2.4	0.05	SLT30…	5,100		
	80N30-6T	●		21	6	80			0.08		4,000		
	100N30-9T	●		27	9	100	22		0.13		3,200		
	125N30-11T	●		35	11	125	32		0.2		2,600		
	160N30-14T	●		40	14	160	40		0.35		2,000		
MSTA	63N40-4T	●	4.05	15	4	63	16	3.4	0.06	SLT40…	5,100		
	80N40-6T	●		21	6	80			0.1		4,000		
	100N40-9T	●		27	9	100	22		0.15		3,200		
	125N40-11T	●		35	11	125	32		0.25		2,600		
	160N40-14T	●		40	14	160	40		0.4		2,000		

Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singularly. Please purchase two drive rings per one MSTA slot mill.
2. Do not exceed the max. revolution.
3. Do not operate cutting on reverse revolution.
4. Wrench (MS-FRW1) is not attached. Please purchase it separately.

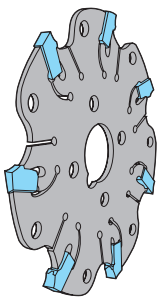
Drive Ring (For Metric)

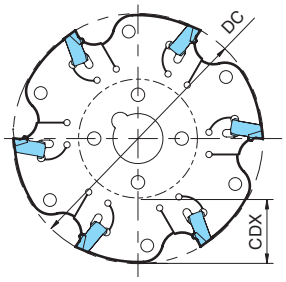
Shape	Description	Stock	Dimension (mm) DCB	DIOUT	WB	KWW	DCON	Drawing	Applicable Toolholders
Fig. 1	DR16-32A	●	16	32	8	4.1	3	Fig. 2	MSTA 63N16-5T, 63N22-5T
Fig. 2	DR16-32B	●					4	Fig. 1	MSTA 63N30-4T, 63N40-4T
Fig. 3	DR16-38	●		38				Fig. 3	MSTA 80N○○-○T
	DR22-46	●	22	46	10	6.1	5		MSTA 100N○○-○T
	DR32-55	●	32	55		8.1	6		MSTA 125N○○-○○T
	DR40-80	●	40	80	12	10.1	12		MSTA 160N○○-○○T

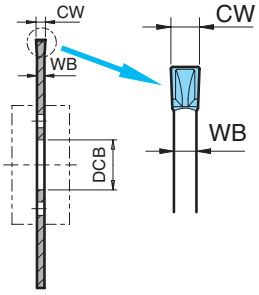
Wrenches and drive rings are sold in 1 piece boxes

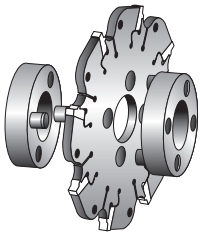
● : Std. Item

MSTA (inch spec)









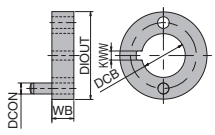
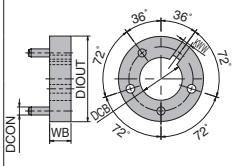
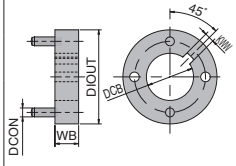
Drive Ring (sold separately) Assembly Example

Toolholder Dimensions

Description		Stock	Edge Width CW (inch)	Slot Depth CDX (inch)	No. of Inserts	Dimension (inch) DC	DCB (H7)	WB	Weight (kg)	Applicable Inserts ➡ M184	Max. Revolution (min^{-1})	Spare Parts Wrench	Recommended Cutting Conditions
MSTA	02N063-5T	○	.063 (1.6mm)	.625 (15.875mm)	5	2.500 (63.5mm)	.625 (15.875mm)	.051 (1.3mm)	0.03	SLT16…	5,100	MS-FRW1 (Wrench is not attached. Please purchase it separately) · How to use Wrench →M185	M185
	03N063-7T	○		.875 (22.225mm)	7	3.000 (76.2mm)			0.04		4,000		
	04N063-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.07		3,200		
	05N063-11T	○		1.375 (34.925mm)	11	5.000 (127mm)	1.250 (31.75mm)		0.1		2,600		
MSTA	03N089-7T	○	.089 (2.2mm) (2.25mm)	.875 (22.225mm)	7	3.000 (76.2mm)	.625 (15.875mm)	.071 (1.8mm)	0.05	SLT22…	4,000		
	04N089-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.08		3,200		
	06N089-14T	○		1.438 (36.525mm)	14	6.000 (152.4mm)	1.250 (31.75mm)		0.3		2,000		
MSTA	02N126-4T	○	.120 (3.05mm)	.625 (15.875mm)	4	2.500 (63.5mm)	.625 (15.875mm)	.095 (2.4mm)	0.05	SLT30…	5,100		
	03N126-6T	○		.875 (22.225mm)	6	3.000 (76.2mm)			0.08		4,000		
	04N126-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.13		3,200		
	05N126-11T	○		1.375 (34.925mm)	11	5.000 (127mm)	1.250 (31.75mm)		0.2		2,600		
	06N126-14T	○		1.438 (36.525mm)	14	6.000 (152.4mm)			0.35		2,000		
MSTA	03N164-6T	○	.160 (4.05mm)	.875 (22.225mm)	6	3.000 (76.2mm)	.625 (15.875mm)	.134 (3.4mm)	0.1	SLT40…	4,000		
	04N164-9T	○		1.063 (27.000mm)	9	4.000 (101.6mm)	1.000 (25.4mm)		0.15		3,200		
	05N164-11T	○		1.375 (34.925mm)	11	5.000 (127mm)	1.250 (31.75mm)		0.25		2,600		

Note) 1. Attach the drive ring (sold separately) to MSTA slot mill to use. Drive ring is sold singularly.
Please purchase two drive rings per one MSTA slot mill.
2. Do not exceed the max. revolution.
3. Do not operate cutting on reverse revolution.
4. Wrench (MS-FRW1) is not attached. Please purchase it separately.

Drive Ring (for Inch spec)

Shape	Description	Stock	Dimension (inch) DCB	DIOUT	WB	KWW	DCON	Drawing	Applicable Toolholders
 Fig. 1	DR0625-1250A	○	.625 (15.875mm)	1.250 (31.75mm)	.315 (8mm)	.130 (3.3mm)	.158 (4mm)	Fig. 1	MSTA 02N126-4T
 Fig. 2	DR0625-1250B	○					.120 (3mm)	Fig. 2	MSTA 02N063-5T
 Fig. 3	DR0625-1250C	○						Fig. 3	MSTA 03N○○○-○T
	DR1000-1875	○	1.000 (25.4mm)	1.875 (47.625mm)	.394 (10mm)	.256 (6.5mm)	.200 (5mm)		MSTA 04N○○○-○T
	DR1250-2250	○	1.250 (31.75mm)	2.250 (57.15mm)		.319 (8.1mm)	.240 (6mm)		MSTA 05N○○○-○T
	DR1250-3125	○	1.250 (31.75mm)	3.125 (79.375mm)	.472 (12mm)	.319 (8.1mm)	.472 (12mm)		MSTA 06N○○○-○T

○ : Check Availability

Wrenches and drive rings are sold in 1 piece boxes

Slot Mill SLT type Insert

Inserts Identification System

S L T	16	-	15	S	KB
(1)	(2)		(3)	(4)	(5)

(1) Insert Symbol

(2) Edge Width

Symbol	Edge Width
16	1.6mm
22	2.2(2.25)mm
30	3.05mm
40	4.05mm

(3) Corner-R(RE)

Symbol	Corner-R(RE)
15	0.15mm
20	0.2mm

(4) Edge Preparation

Symbol	Cutting Edge Spec.
S	Chamfered + R-honed

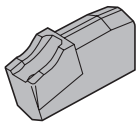
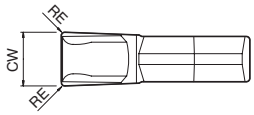
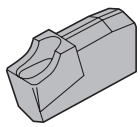
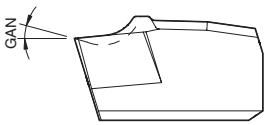
(5) Chipbreaker Symbol

Symbol	Rake Angle
KB	5°
KD	15°

SLT

Classification of usage			CVD Coated Carbide	PVD Coated Carbide
● : 1st Choice ○ : 2nd Choice	P	Carbon Steel / Alloy Steel	●	○
	M	Stainless Steel	○	●
	K	Cast Iron	○	
	N	Non-ferrous Metals		
	S	Heat-resistant Alloys		●
		Titanium Alloys		

Applicable Inserts

Insert	Description		Dimension (mm) CW	RE	Rake Angle GAN	CVD Coated Carbide CA0835	PVD Coated Carbide PR0735	See Page for Applicable Toolholders
	SLT	16-15SKB	1.6 $^{+0}_{-0.1}$	0.15	5°	●	●	M182 M183
		22-20SKB	2.2 $^{+0.08}_{-0.05}$	0.2		●	●	
		30-20SKB	3.05 $^{+0.15}_{-0}$			●	●	
		40-20SKB	4.05 $^{+0.15}_{-0}$			●	●	
	SLT	16-15SKD	1.6 $^{+0}_{-0.1}$	0.15	15°	●	●	
Low Cutting Force		22-20SKD	2.25 $^{+0.15}_{-0}$	0.2		●	●	
		30-20SKD	3.05 $^{+0.15}_{-0}$			●	●	
		40-20SKD	4.05 $^{+0.15}_{-0}$			●	●	

Selection of chipbreaker

KB Chipbreaker ··· General purpose chipbreaker for Steel and Cast Iron
KD Chipbreaker ··· Low cutting force chipbreaker for Stainless Steel

Features of Insert Grades

CA0835

· TiN+TiCN+Al_2O_3 based CVD Coated Carbide
· For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron
· For middle to high speed machining

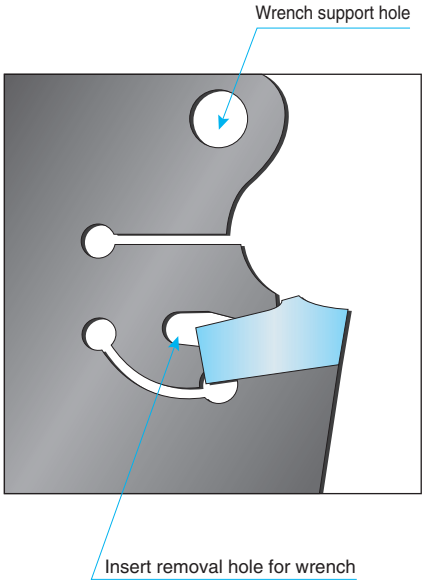
PR0735

· TiN base PVD Coated Carbide
· For Stainless Steel, Heat-resistant Alloys, etc.
· For low to middle speed machining

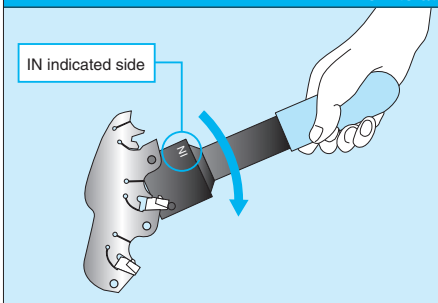
Inserts are sold in 10 piece boxes

● : Std. Item

Set up

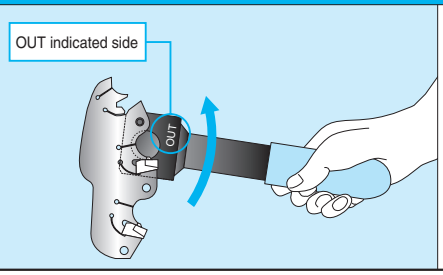


How to attach inserts



1. Put insert inside the slot mill.
2. Insert one of the pins on the wrench (on **IN** indicated side) into the wrench support hole.
3. Using the other pin, push the front relief surface of the insert.
4. Rotate the wrench until insert's back end makes contact with slot mill.

How to detach inserts



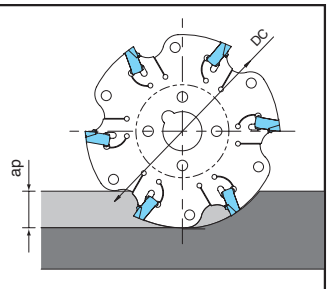
1. Insert one of the pins on the wrench (on **OUT** indicated side) into the wrench support hole, and insert other pin into the insert releasing hole.
2. Insert can be uninstalled by rotating the wrench counterclockwise. (A magnet is installed on **OUT** indicated side.)

Note) Use appropriate wrench for set up.

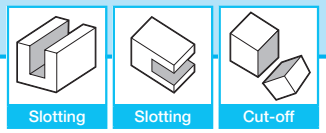
Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc : m/min)		fz (mm/t)				Remarks
			CVD Coated Carbide	PVD Coated Carbide	Edge Width (mm)				
			CA0835	**PR0735**	1.6	2.2(2.25)	3.05	4.05	
Low Carbon Steel	SS400 S10C~S25C	125	250~310	200~250	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	Coolant
Carbon Steel	S30C~S58C (Annealed)	190	160~190	130~160	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
	S30C~S58C (Heat treated)	250	140~180	110~150	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
Alloy Steel	Annealed	180	140~180	110~150	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
	Heat treated	275	120~160	100~130	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18	
High Carbon Alloy	SKD11, SKD61, etc.	280	100~140	80~120	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18	
Stainless Steel	Austenitic related	220	150~190	80~120	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18	
	Martensitic related	300	140~180	60~80	0.03~0.10	0.04~0.12	0.06~0.16	0.08~0.18	
Gray Cast Iron	FC250~FC350	260	160~200	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	Dry
Nodular Cast Iron	FCD400~FCD500	160	130~160	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	
	FCD600~FCD800	250	110~140	-	0.03~0.12	0.04~0.14	0.06~0.18	0.08~0.20	

Note) 1. Use down-cut machining.
2. If ap is 1/10 or under of Cutter Dia.(DC), it is possible to increase feed per tooth (fz) by 40%.



Slot Mill MSTB



Identification System

MSTB Slot Mill

Metric

M S T B ○○○ A N ○○○○ - ○ T

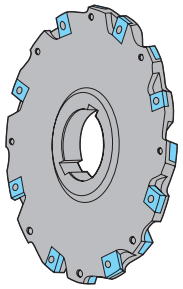
- M S T B: Slot Mill with Up-right Insert
- ○○○: Cutting Dia. (mm)
- A: A : Without Boss / S : With Boss
- N: N : Neutral
- ○○○○: Edge Width (mm)
- ○: No. of Flutes
- T

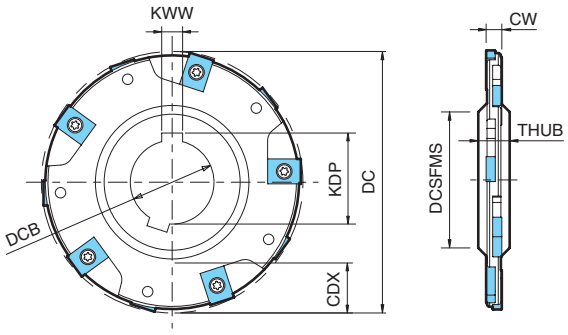
Inch spec

M S T B ○○○○ A N ○○○ - ○ T

- M S T B: Slot Mill with Up-right Insert
- ○○○○: Cutting Dia. (inch)
- A: A : Without Boss
- N: N : Neutral
- ○○○: Min. Edge Width (inch)
- ○: No. of Flutes
- T

Without Boss





In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

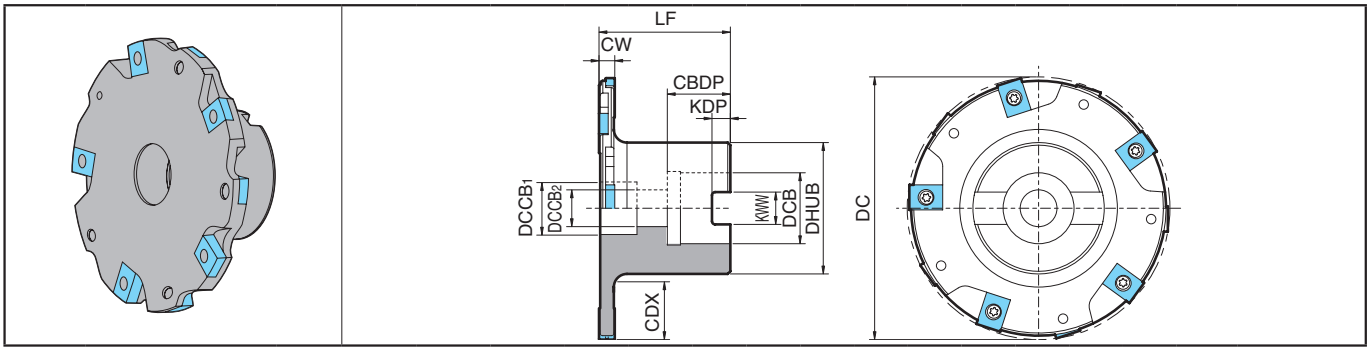
Description	Stock	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)						Weight (kg)	Max. Revolution (min^{-1})
		CW (min.)	CW (max.)	CDX (mm)			DC	DCB (H7)	DCSFMS	THUB	KDP	KWW		
MSTB 80AN0607-4T	●	6	7	15	8	4	80	27	44	12	29.8	7	0.3	9,240
100AN0607-5T	●			21	10	5	100	32	52		34.8	8	0.4	8,270
125AN0607-6T	●			28	12	6	125	40	63		43.5	10	0.7	7,390
160AN0607-8T	●			45.5	16	8	160						1.1	6,540
MSTB 80AN0809-4T	●	8	9	16	8	4	80	27	44		29.8	7	0.4	9,240
100AN0809-5T	●			22	10	5	100	32	52		34.8	8	0.5	8,270
160AN0809-8T	●			45.5	16	8	160	40	63		43.5	10	1.3	6,540
MSTB 125AN1011-4T	●	10	11	30	12	4	125						0.9	7,390
160AN1011-5T	●			47.5	15	5	160						1.6	6,540
MSTB 160AN1213-5T	●	12	13	48.5	15	5	160						1.6	6,540

Toolholder Dimensions (inch spec)

Description	Stock	Edge Width (inch)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (inch)						Weight (kg)	Max. Revolution (min^{-1})
		CW (min.)	CW (max.)	CDX (inch)			DC	DCB (H7)	DCSFMS	THUB	KDP	KWW		
MSTB 3000AN250-4T	○	.250 (6.35mm)	.289 (7.34mm)	.625 (15.875mm)	8	4	3.000 (76.2mm)	1.000 (25.4mm)	1.500 (38.1mm)	.500 (12.7mm)	1.106 (28.1mm)	.250 (6.35mm)	0.3	9,470
4000AN250-5T	○			.935 (23.8mm)	10	5	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.3	8,200
5000AN250-6T	○			1.435 (36.4mm)	12	6	5.000 (127mm)						0.7	7,300
6000AN250-8T	○			1.750 (44.45mm)	16	8	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.0	6,700
MSTB 4000AN312-5T	○	.312 (7.92mm)	.351 (8.91mm)	.966 (24.5mm)	10	5	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.5	7,400
5000AN312-6T	○			1.466 (37.2mm)	12	6	5.000 (127mm)						0.8	6,600
6000AN312-8T	○			1.781 (45.2mm)	16	8	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.1	6,000
MSTB 4000AN375-3T	○	.375 (9.525mm)	.414 (10.52mm)	1.000 (25.4mm)	9	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.5	7,400
5000AN375-4T	○			1.500 (38.1mm)	12	4	5.000 (127mm)						0.8	6,600
6000AN375-5T	○			1.812 (46.0mm)	15	5	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.3	6,000
MSTB 4000AN500-3T	○	.500 (12.7mm)	.539 (13.69mm)	1.060 (26.9mm)	9	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.8mm)		1.386 (35.2mm)	.312 (7.92mm)	0.6	4,900
5000AN500-4T	○			1.560 (39.6mm)	12	4	5.000 (127mm)						1.1	4,400
6000AN500-5T	○			1.875 (47.6mm)	15	5	6.000 (152.4mm)	1.500 (38.1mm)	2.250 (57.2mm)		1.665 (42.3mm)	.375 (9.52mm)	1.7	4,000

● : Std. Item
○ : Check Availability

With Boss



Toolholder Dimensions (Metric)

Description		Stock	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)									Weight (kg)	Max. Revolution (min^{-1})
			CW (min.)	CW (max.)	CDX (mm)			DC	DCB (H7)	DHUB	LF (min.)	CBDP	KDP	KWW	$DCCB_1$	$DCCB_2$		
MSTB	80SN0607-4T	●	6	7	16	8	4	80	22	40	50	23	6.3	10.4	18	12	0.7	9,240
	100SN0607-5T	●			21	10	5	100	27	50		24	7	12.4	20	14	1.0	8,270
	160SN0607-8T	●			41	16	8	160	40	70		28	9	16.4	33	22	1.9	6,540
MSTB	80SN0809-4T	●	8	9	16	8	4	80	22	40		23	6.3	10.4	18	12	0.8	9,240
	100SN0809-5T	●			21	10	5	100	27	50		24	7	12.4	20	14	1.2	8,270
	160SN0809-8T	●			41	16	8	160									2.2	6,540
MSTB	125SN1011-4T	●	10	11	26	12	4	125	40	70		28	9	16.4	33	22	2.0	7,390
	160SN1011-5T	●			43	15	5	160									2.5	6,540

Note) LF (min.) dimension shows in case of minimum of edge width (CW).

Spare Parts and Applicable Inserts

Spare Parts

Description				Spare Parts				Applicable Inserts	Recommended Cutting Conditions
				Clamp Screw	Wrench	Anti-seize Compound	Mounting bolt		
									
Metric	Without Boss	MSTB	○○○AN0607-○T	SE-40050TRN	TT-15	P-37	-	LN12... M188,M189	M190
			○○○AN0809-○T	SE-40068TR					
			○○○AN1011-○T						
			160AN1213-5T	SE-40090TR					
	With Boss	MSTB	80SN0607-4T	SE-40050TRN			HH10X35		
			100SN0607-5T				HH12X35		
			160SN0607-8T				HH20X40		
		MSTB	80SN0809-4T	SE-40068TR			HH10X35		
			100SN0809-5T				HH12X35		
			160SN0809-8T				HH20X40		
		MSTB	○○○SN1011-○T	SE-40068TR			HH20X40		
Inch spec	Without Boss	MSTB	○○○○AN250-○T	SE-40055TR	TT-15	P-37	-		
			○○○○AN312-○T	SE-40068TR					
			○○○○AN375-○T						
			○○○○AN500-○T	SE-40090TR					

 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

Inserts Identification System

L N E U	12	35	-	03	S
(1)	(2)	(3)		(4)	(5)

(1) Insert Symbol

(2) Insert Length

Symbol	Insert Length
12	12.7mm

(3) Edge Width

Symbol	Edge Width
35	3.5mm
40	4.0mm

(4) Corner-R(RE)

Symbol	Corner-R(RE)
03	0.3mm
04	0.4mm

(5) Edge Preparation

Symbol	Cutting Edge Spec.
S	Chamfered + R-honed

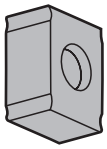
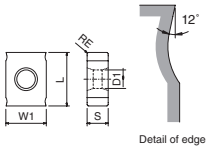
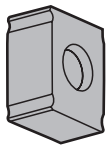
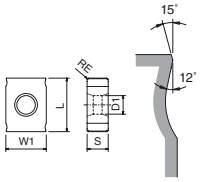
LN

Applicable Inserts (mm)

Description	L	W1
LNEU12	12.7	9.52

Classification of usage
● : 1st Choice
○ : 2nd Choice

		PVD Coated Carbide
P	Carbon Steel / Alloy Steel	●
M	Stainless Steel	●
K	Cast Iron	○
N	Non-ferrous Metals	
S	Heat-resistant Alloys	●
	Titanium Alloys	○

Insert	Description		Usable edges	Dimension (mm) S	D1	RE	PVD Coated Carbide PR0725	Applicable Clamp Screw	See Page for Applicable Toolholders	See Page for Recommended Cutting Conditions
 Honed		LNEU 1235-03-4	4	3.5	4.4	0.3	●	SE-40050TRN	M186 M187	M190
		1240-08-4	4	4.0	4.4	0.8	●	SE-40055TR		
		1245-04	4	4.5	4.2	0.4	●	SE-40068TR		
		1245-08				0.8	●			
		1250-04	4	5.0	4.2	0.4	●	SE-40080TR		
		1250-08				0.8	●			
		1255-04	4	5.5	4.2	0.4	●	SE-40090TR		
		1255-08				0.8	●			
		1260-04	4	6.0	4.2	0.4	●	SE-40100TR		
 Tough Edge		LNEU 1235-03S-4	4	3.5	4.4	0.3	●	SE-40050TRN		
		1240-03S-4	4	4.0	4.4	0.3	●	SE-40055TR		
		1245-04S	4	4.5	4.2	0.4	●	SE-40068TR		
		1245-08S				0.8	●			
		1250-04S	4	5.0	4.2	0.4	●	SE-40080TR		
		1250-08S				0.8	●			

Notes) 1. Please select the applicable clamp screw depending on each insert description.
2. See page **M189** for insert description and applicable clamp screw depending on edge width.

Features of Insert Grades

PR0725

· TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
· For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron
· For middle speed machining

Inserts are sold in 10 piece boxes

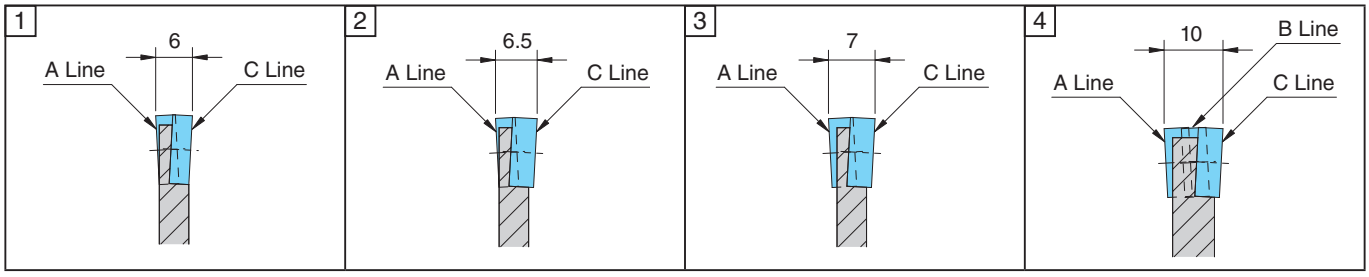
● : Std. Item

Combination of Applicable Inserts

Description		Clamp Screw (Standard attachment parts)	Edge Width mm	Edge Width inch (mm)	A Line Applicable Inserts	A Line Clamp Screw	B Line Applicable Inserts	B Line Clamp Screw	C Line Applicable Inserts	C Line Clamp Screw	Wrench for Clamp Screw	Tightening Torque (N·m)
Metric	MSTB ○○○AN0607-○T	SE-40050TRN	6	-	LNEU1235..	SE-40050TRN	-	-	LNEU1235..	SE-40050TRN	TT-15	3
	MSTB ○○○SN0607-○T		6.5						LNEU1240..	SE-40055TR		
			7		LNEU1240..	SE-40055TR						
	MSTB ○○○AN0809-○T	SE-40068TR	8	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
	MSTB ○○○SN0809-○T		8.5						LNEU1250..	SE-40080TR		
			9		LNEU1250..	SE-40080TR						
	MSTB ○○○AN1011-○T	SE-40068TR	10	-	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
	MSTB ○○○SN1011-○T		10.5						LNEU1250..	SE-40080TR		
			11		LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○AN1213-○T	SE-40090TR	12	-	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
			12.5						LNEU1260...	SE-40100TR		
			13		LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				
Inch spec	MSTB ○○○○AN250-○T	SE-40055TR	-	.250 (6.35mm)	LNEU1240..	SE-40055TR	-	-	LNEU1240..	SE-40055TR		
				.270 (6.86mm)					LNEU1245..	SE-40068TR		
				.289 (7.34mm)	LNEU1245..	SE-40068TR						
	MSTB ○○○○AN312-○T	SE-40068TR	-	.312 (7.92mm)	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
				.332 (8.43mm)					LNEU1250..	SE-40080TR		
				.351 (8.91mm)	LNEU1250..	SE-40080TR						
	MSTB ○○○○AN375-○T	SE-40068TR	-	.375 (9.525mm)	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR	LNEU1245..	SE-40068TR		
				.395 (10.33mm)					LNEU1250..	SE-40080TR		
				.414 (10.52mm)	LNEU1250..	SE-40080TR	LNEU1250..	SE-40080TR				
	MSTB ○○○○AN500-○T	SE-40090TR	-	.500 (12.7mm)	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR	LNEU1255...	SE-40090TR		
				.520 (13.21mm)					LNEU1260...	SE-40100TR		
				.539 (13.69mm)	LNEU1260...	SE-40100TR	LNEU1260...	SE-40100TR				

* For clamp screw, above listed "Standard attachment parts" are attached. In case of necessity of another size of clamp screw by changing slotting width, please purchase separately.

Slot width (edge width) adjustment



The slot width (edge width) of MSTB slot mills is adjustable by a maximum of 1mm (.039") with the combination of inserts.

1. In the case of MSTB○○○AN0607-○T the width (W) is 6mm by installing LNEU1235 on both A line and C line.
2. By replacing C line only with LNEU1240 the width (W) is 6.5mm.
3. By replacing A line and C line with LNEU1240 the width (W) is 7mm.
4. If the slotting width (edge width) is 10mm (.375"), the B line (middle edge) is necessary.

* Caution

1) There is no description such as "A line", "B line", and "C line" on the actual slot mill. These are only for explanation of the combination of insert.
2) Use proper clamp screws for applicable inserts on the basis of the above chart.
3) Please do not use any slot mills, that have a difference of width of more than 1mm (.039").

Bottom cutting shape of MSTB Slot Mill

Slot bottom shape will be (Fig. 1) convex shape.

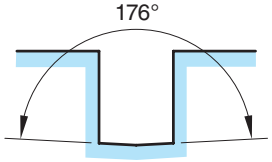


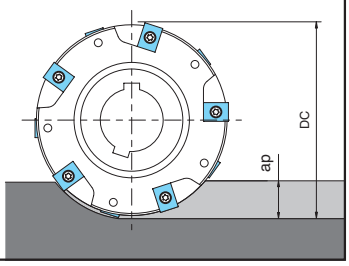
Fig. 1 Convex bottom shape

Slot Mill MSTB

Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc: m/min)	fz (mm/t)		Remarks
			PVD Coated Carbide	Insert Thickness (mm)		
			PR0725	3.5~4.0	4.5~6.0	
Low Carbon Steel	SS400 S10C~S25C	125	170~210	0.07~0.20	0.10~0.22	Dry
Carbon Steel	S30C~S58C (Annealed)	190	100~140	0.07~0.20	0.10~0.22	
	S30C~S58C (Heat treated)	250	90~120	0.07~0.20	0.10~0.22	
Alloy Steel	Annealed	180	90~120	0.07~0.20	0.10~0.22	
	Heat treated	275	80~110	0.05~0.18	0.08~0.20	
High Carbon Alloy	SKD11, SKD61, etc.	280	70~ 90	0.05~0.18	0.08~0.20	
Stainless Steel	Austenitic related	220	110~140	0.05~0.18	0.08~0.20	Coolant
	Martensitic related	300	100~120	0.05~0.18	0.08~0.20	
Heat-resistant Alloys	Ni-base heat-resistant alloys	350	15~ 30	0.05~0.18	0.08~0.20	
Titanium Alloys	Ti-6Al-4V, etc.	270	20~50	0.05~0.18	0.08~0.20	
Gray Cast Iron	FC250~FC350	260	110~130	0.07~0.22	0.10~0.25	Dry
Nodular Cast Iron	FCD400~FCD500	160	80~100	0.07~0.22	0.10~0.25	
	FCD600~FCD800	250	70~ 90	0.07~0.22	0.10~0.25	

Note) 1. Use down-cut machining.
2. If ap is 1/10 or under of Cutter Dia.(DC), it is possible to increase feed per tooth (fz) by 40%.

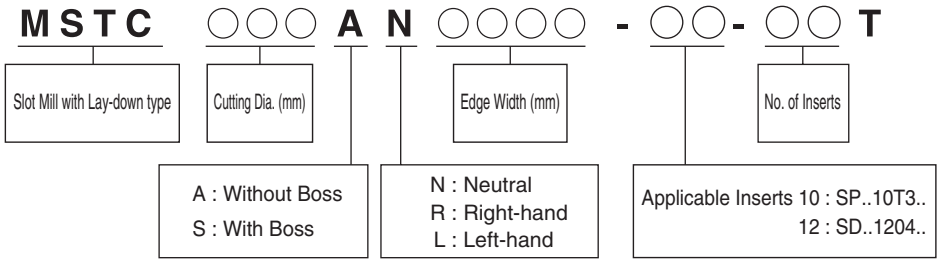


Slot Mill MSTC

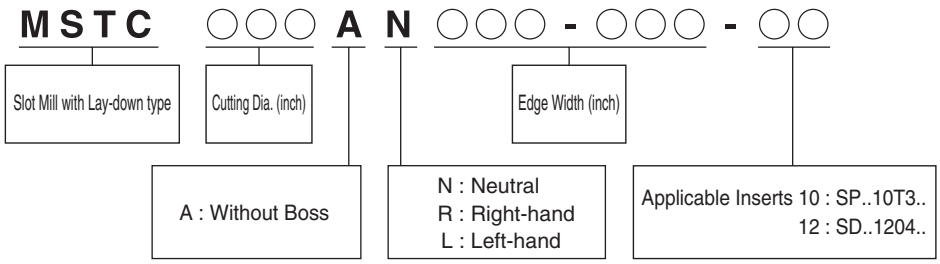
Identification System

● MSTC Slot Mill

Metric

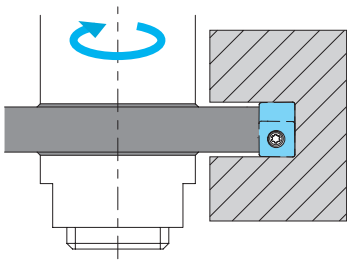


Inch spec

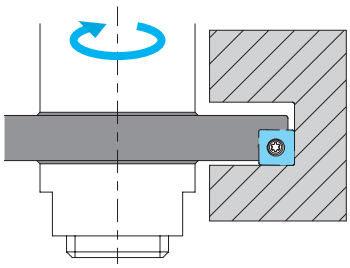


Cutting Direction of MSTC Slot Mill

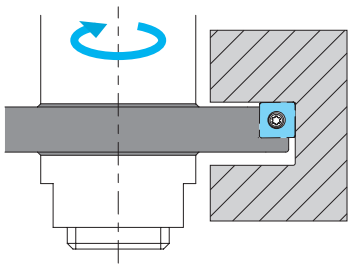
AN Type (Slotting)



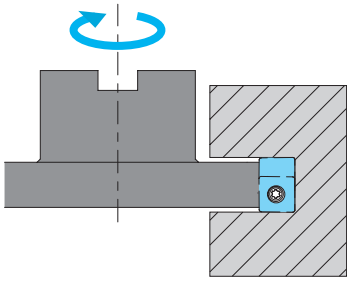
AR Type (Lower surface machining)



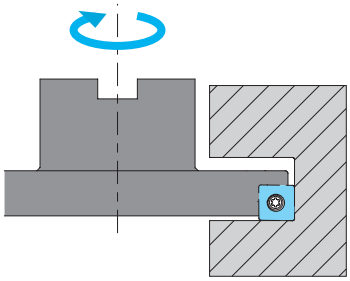
AL Type (Upper surface machining)



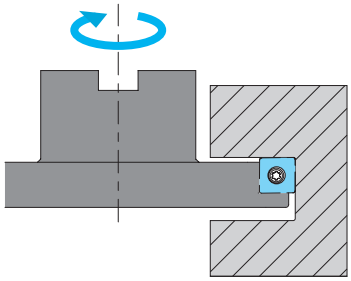
SN Type (Slotting)



SR Type (Lower surface machining)



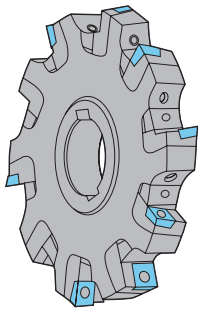
SL Type (Upper surface machining)

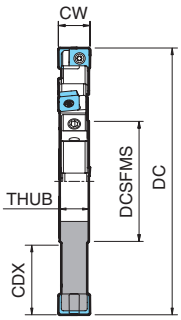


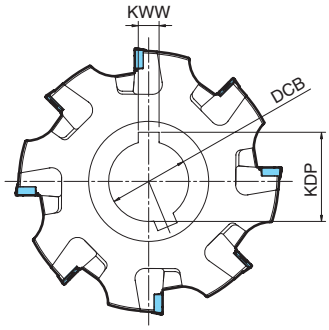
Slot Mill

Slotting | Slotting | Shouldering

Without Boss







In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

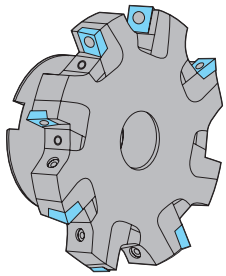
Description		Stock	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)						Weight (kg)	Max. Revolution (min^{-1})
			CW (min.)	CW (max.)	CDX (mm)			DC	DCB (H7)	DCSFMS	THUB	KDP	KWW		
MSTC	100AN1416-10-3T	●	14	16	25.9	6	3	100	32	46.8	13.9	34.8	8	0.5	17,250
	125AN1416-10-4T	●			34.4	8	4	125	40	54.8		43.5	10	0.8	15,450
	160AN1416-10-5T	●			51.9	10	5	160						1.5	13,650
MSTC	125AN1618-10-4T	●	16	18	34.4	8	4	125			15.9			1.0	15,450
	160AN1618-10-5T	●			51.9	10	5	160						1.8	13,650
MSTC	125AN1820-12-4T	●	18	20.6	34	8	4	125			18.2			1.0	10,350
	160AN1820-12-5T	●			51.5	10	5	160						1.8	9,150
MSTC	125AN2123-12-4T	●	20.6	23.3	34	8	4	125			20.8			1.2	10,350
	160AN2123-12-5T	●			51.5	10	5	160						2.1	9,150

Toolholder Dimensions (inch spec)

Description		Stock	Edge Width (inch)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (inch)						Weight (kg)	Max. Revolution (min^{-1})
			CW (min.)	CW (max.)	CDX (inch)			DC	DCB (H7)	DCSFMS	THUB	KDP	KWW		
MSTC	400AN551-630-10	○	.551 (14.0mm)	.630 (16.0mm)	1.030 (26.1mm)	6	3	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
	500AN551-630-10	○			1.345 (34.1mm)	8	4	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)		1.665 (42.3mm)	.375 (9.52mm)	0.9	15,300
	600AN551-630-10	○			1.845 (46.8mm)	10	5	6.000 (152.4mm)						1.4	14,000
MSTC	500AN630-709-10	○	.630 (16.0mm)	.709 (18.0mm)	1.345 (34.1mm)	8	4	5.000 (127.0mm)			.624 (15.85mm)			1.1	15,300
	600AN630-709-10	○			1.845 (46.8mm)	10	5	6.000 (152.4mm)						1.6	14,000
MSTC	500AN709-813-12	○	.709 (18.0mm)	.813 (20.6mm)	1.331 (33.8mm)	8	4	5.000 (127.0mm)			.716 (18.2mm)			1.1	10,300
	600AN709-813-12	○			1.831 (46.5mm)	10	5	6.000 (152.4mm)						1.7	9,400
MSTC	500AN813-917-12	○	.813 (20.6mm)	.917 (23.3mm)	1.331 (33.8mm)	8	4	5.000 (127.0mm)			.820 (20.8mm)			1.3	10,300
	600AN813-917-12	○			1.831 (46.5mm)	10	5	6.000 (152.4mm)						2.0	9,400

● : Std. Item
○ : Check Availability

With Boss



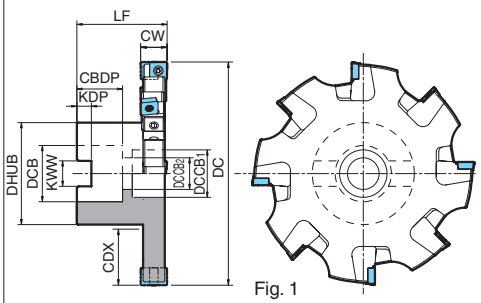


Fig. 1

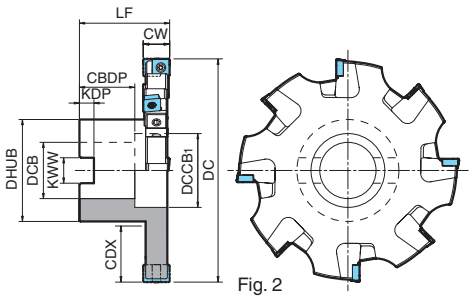


Fig. 2

Toolholder Dimensions (Metric)

Description		Stock	Edge Width (mm)		Slot Depth	No. of Inserts	No. of Edge Lines	Dimension (mm)									Drawing	Weight (kg)	Max. Revolution (min^{-1})
			CW (min.)	CW (max.)	CDX (mm)			DC	DCB (H7)	DHUB	LF (min.)	CBDP	KDP	KWW	$DCCB_1$	$DCCB_2$			
MSTC	100SN1416-10-3T	●	14	16	24.4	6	3	100	27	48	50.8	24	7	12.4	20	14	Fig. 1	1.0	17,250
	125SN1416-10-4T	●			31.9	8	4	125	32	58		26	8	14.4	27	18		1.6	15,450
	160SN1416-10-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig. 2	2.0	13,650
MSTC	125SN1618-10-4T	●	16	18	31.9	8	4	125	32	58	50.8	26	8	14.4	27	18	Fig. 1	1.7	15,450
	160SN1618-10-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig. 2	2.3	13,650
MSTC	125SN1820-12-4T	●	18	20.6	31.9	8	4	125	32	58	51.0	26	8	14.4	27	18	Fig. 1	1.6	10,350
	160SN1820-12-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig. 2	2.3	9,150
MSTC	125SN2123-12-4T	●	20.6	23.3	31.9	8	4	125	32	58	51.0	26	8	14.4	27	18	Fig. 1	1.7	10,350
	160SN2123-12-5T	●			43.4	10	5	160	40	70		30	9	16.4	56	-	Fig. 2	2.6	9,150

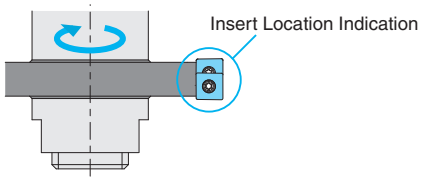
Note) LF (min.) dimension shows in case of minimum of edge width (CW).

Recommended Cutting Conditions ➔ **M202**

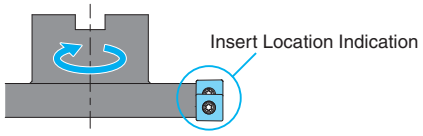
Applicable Insert Installation Method (common to Metric / Inch spec)

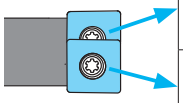
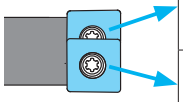
When installing handed inserts, it is necessary to equip same number of right-hand and left-hand inserts as shown in "No. of Edge Lines" respectively. Please Install as show in the figure below.

MSTC...AN... (Without Boss)



MSTC...SN... (With Boss)



Toolholder Description	Insert Location Indication	Applicable Inserts ➔ **M200-M201**	
		Handed	Neutral
MSTC...AN...10.. **MSTC...SN...10..**		**SP..10T3...L...** **SP..10T3...R...**	**SP..10T3...N...**
MSTC...AN...12.. **MSTC...SN...12..**		**SD..1204...L...** **SD..1204...R...**	**SD..1204...N...**

Spare Parts (common to Metric / Inch spec)

· See page **M198**

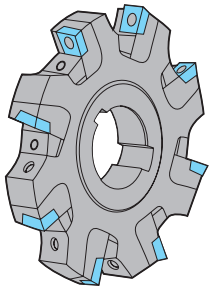
Slot width (edge width) adjustment

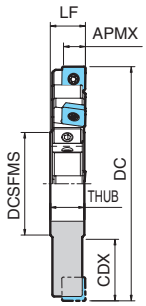
· See page **M202~M205**

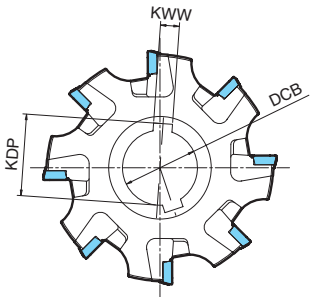
● : Std. Item

Half Side Slot Mill

Without Boss Right-hand







• Right-hand shown

In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

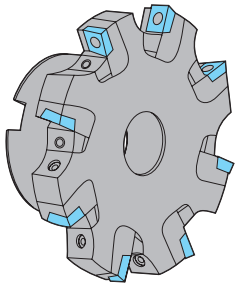
Description	Stock	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
			DC	DCB (H7)	DCSFMS	THUB	LF (min.)	LF (max.)	CDX	APMX (max.)	KDP	KWW		
MSTC 100AR1416-10-6T	○	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
125AR1416-10-8T	○	8	125	40	54.8				34.4		43.5	10	0.8	15,450
160AR1416-10-10T	○	10	160						51.9				1.5	13,650
MSTC 125AR1618-10-8T	○	8	125			15.9	15.9	16.9	34.4				1.0	15,450
160AR1618-10-10T	○	10	160						51.9				1.8	13,650
MSTC 125AR1820-12-8T	○	8	125			18.2	18.1	19.4	34.0	11.7			1.0	10,350
160AR1820-12-10T	○	10	160						51.5				1.8	9,150
MSTC 125AR2123-12-8T	○	8	125			20.8	20.7	22.0	34.0				1.2	10,350
160AR2123-12-10T	○	10	160						51.5				2.1	9,150

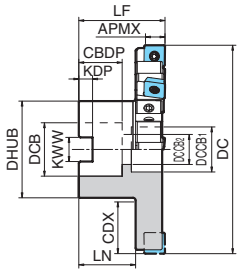
Toolholder Dimensions (inch spec)

Description	Stock	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
			DC	DCB (H7)	DCSFMS	THUB	LF (min.)	LF (max.)	CDX	APMX (max.)	KDP	KWW		
MSTC 400AR551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.9mm)	.588 (14.9mm)	1.030 (26.1mm)	.359 (9.1mm)	1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
500AR551-630-10	○	8	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)				1.345 (34.1mm)		1.665 (42.3mm)	.375 (9.52mm)	0.9	15,300
600AR551-630-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.4	14,000
MSTC 500AR630-709-10	○	8	5.000 (127.0mm)			.624 (15.85mm)	.627 (15.9mm)	.667 (16.9mm)	1.345 (34.1mm)				1.1	15,300
600AR630-709-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.6	14,000
MSTC 500AR709-813-12	○	8	5.000 (127.0mm)			.716 (18.2mm)	.712 (18.1mm)	.764 (19.4mm)	1.331 (33.8mm)	.461 (11.7mm)			1.1	10,300
600AR709-813-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				1.7	9,400
MSTC 500AR813-917-12	○	8	5.000 (127.0mm)			.820 (20.8mm)	.816 (20.7mm)	.868 (22.0mm)	1.331 (33.8mm)				1.3	10,300
600AR813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				2.0	9,400

○ : Check Availability

With Boss Right-hand





• Right-hand shown

Fig. 1

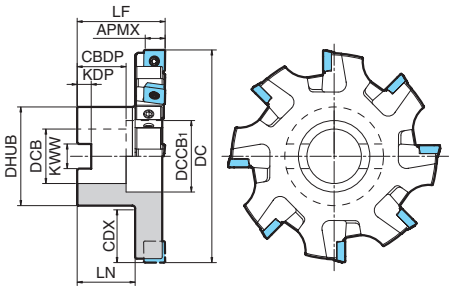


Fig. 2

Toolholder Dimensions (Metric)

Description		Stock	No. of Inserts	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min^{-1})
				DC	DCB (H7)	DHUB	LN	LF (min.)	LF (max.)	CDX	APMX (max.)	CBDP	KDP	KWW	$DCCB_1$	$DCCB_2$			
MSTC	100SR1416-10-6T	○	6	100	27	48	37.7	50.8	51.8	24.4	9.1	24	7	12.4	20	14	Fig. 1	1.0	17,250
	125SR1416-10-8T	○	8	125	32	58				31.9		26	8	14.4	27	18		1.6	15,450
	160SR1416-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.0	13,650
MSTC	125SR1618-10-8T	○	8	125	32	58	35.7			31.9		26	8	14.4	27	18	Fig. 1	1.7	15,450
	160SR1618-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	13,650
MSTC	125SR1820-12-8T	○	8	125	32	58	34.0	51.0	52.3	31.9	11.7	26	8	14.4	27	18	Fig. 1	1.6	10,350
	160SR1820-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	9,150
MSTC	125SR2123-12-8T	○	8	125	32	58	31.4			31.9		26	8	14.4	27	18	Fig. 1	1.7	10,350
	160SR2123-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.6	9,150

Applicable Inserts (common to Metric / Inch spec)

Toolholder Description	Applicable Inserts ➡ M200-M201	
	Handed	Neutral
MSTC...AR...10.. MSTC...SR...10..	SP..10T3...R...	SP..10T3...N...
MSTC...AR...12.. MSTC...SR...12..	SD..1204...R...	SD..1204...N...

Recommended Cutting Conditions ➡ M202

Spare Parts (common to Metric / Inch spec)

· See page M199

Slot width (edge width) adjustment

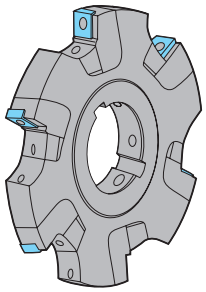
· See page M202~M205

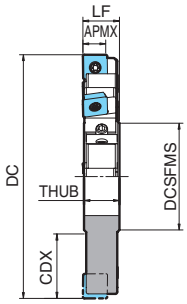
○ : Check Availability

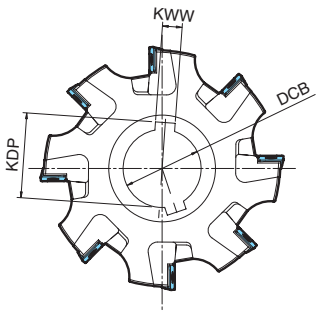
Half Side Slot Mill

Shouldering | Back side milling

Without Boss Left-hand







• Left-hand shown

In order to be used in combination with two or more mills, this slot mill has 2 key slots.

Toolholder Dimensions (Metric)

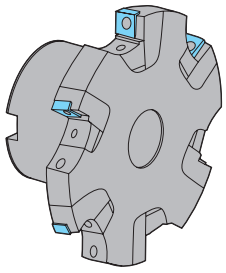
Description		Stock	No. of Inserts	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
				DC	DCB (H7)	DCSFMS	THUB	LF (min.)	LF (max.)	CDX	APMX (max.)	KDP	KWW		
MSTC	100AL1416-10-6T	○	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
	125AL1416-10-8T	○	8	125	40	54.8				34.4		43.5	10	0.8	15,450
	160AL1416-10-10T	○	10	160						51.9				1.5	13,650
MSTC	125AL1618-10-8T	○	8	125			15.9	15.9	16.9	34.4				1.0	15,450
	160AL1618-10-10T	○	10	160						51.9				1.8	13,650
MSTC	125AL1820-12-8T	○	8	125			18.2	18.1	19.4	34.0	11.7			1.0	10,350
	160AL1820-12-10T	○	10	160						51.5				1.8	9,150
MSTC	125AL2123-12-8T	○	8	125			20.8	20.7	22.0	34.0				1.2	10,350
	160AL2123-12-10T	○	10	160						51.5				2.1	9,150

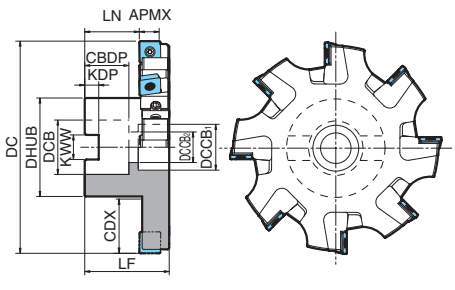
Toolholder Dimensions (inch spec)

Description		Stock	No. of Inserts	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
				DC	DCB (H7)	DCSFMS	THUB	LF (min.)	LF (max.)	CDX	APMX (max.)	KDP	KWW		
MSTC	400AL551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.9mm)	.588 (14.9mm)	1.030 (26.1mm)	.359 (9.1mm)	1.386 (35.2mm)	.312 (7.92mm)	0.6	17,100
	500AL551-630-10	○	8	5.000 (127.0mm)	1.500 (38.1mm)	2.250 (57.15mm)				1.345 (34.1mm)		1.665 (42.3mm)	.375 (9.52mm)	0.9	15,300
	600AL551-630-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.4	14,000
MSTC	500AL630-709-10	○	8	5.000 (127.0mm)			.624 (15.85mm)	.627 (15.9mm)	.667 (16.9mm)	1.345 (34.1mm)				1.1	15,300
	600AL630-709-10	○	10	6.000 (152.4mm)						1.845 (46.8mm)				1.6	14,000
MSTC	500AL709-813-12	○	8	5.000 (127.0mm)			.716 (18.2mm)	.712 (18.1mm)	.764 (19.4mm)	1.331 (33.8mm)	.461 (11.7mm)			1.1	10,300
	600AL709-813-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				1.7	9,400
MSTC	500AL813-917-12	○	8	5.000 (127.0mm)			.820 (20.8mm)	.816 (20.7mm)	.868 (22.0mm)	1.331 (33.8mm)				1.3	10,300
	600AL813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				2.0	9,400

○ : Check Availability

With Boss Left-hand





• Left-hand shown

Fig. 1

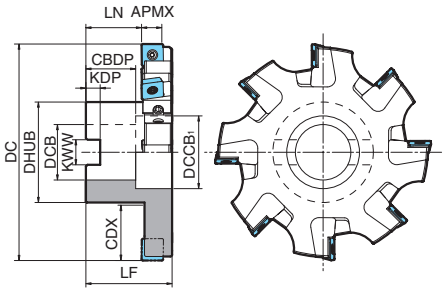


Fig. 2

Toolholder Dimensions (Metric)

Description		Stock	No. of Inserts	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min^{-1})
				DC	DCB (H7)	DHUB	LF	LN (min.)	LN (max.)	CDX	APMX (max.)	CBDP	KDP	KWW	$DCCB_1$	$DCCB_2$			
MSTC	100SL1416-10-6T	○	6	100	27	48	50	35.8	36.8	24.4	9.1	24	7	12.4	20	14	Fig. 1	1.0	17,250
	125SL1416-10-8T	○	8	125	32	58				31.9		26	8	14.4	27	18		1.6	15,450
	160SL1416-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.0	13,650
MSTC	125SL1618-10-8T	○	8	125	32	58		33.8	34.8	31.9		26	8	14.4	27	18	Fig. 1	1.7	15,450
	160SL1618-10-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	13,650
MSTC	125SL1820-12-8T	○	8	125	32	58		31.7	33.0	31.9	11.7	26	8	14.4	27	18	Fig. 1	1.6	10,350
	160SL1820-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.3	9,150
MSTC	125SL2123-12-8T	○	8	125	32	58		29.1	30.4	31.9		26	8	14.4	27	18	Fig. 1	1.7	10,350
	160SL2123-12-10T	○	10	160	40	70				43.4		30	9	16.4	56	-	Fig. 2	2.6	9,150

Applicable Inserts (common to Metric / Inch spec)

Toolholder Description	Applicable Inserts ➡ M200-M201	
	Handed	Neutral
MSTC...AL...10.. MSTC...SL...10..	SP..10T3...L...	SP..10T3...N...
MSTC...AL...12.. MSTC...SL...12..	SD..1204...L...	SD..1204...N...

Recommended Cutting Conditions ➡ M202

Spare Parts (common to Metric / Inch spec)

· See page M199

Slot width (edge width) adjustment

· See page M202~M205

○ : Check Availability

Spare Parts (common to Metric / Inch spec)

Description			Spare Parts										
			Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting bolt
			Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
													
Without Boss	Metric	MSTC 100AN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	-
		MSTC 125AN1416-10-4T				W6X20							
		MSTC 160AN1416-10-5T											
		MSTC 125AN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20							
		MSTC 160AN1618-10-5T											
		MSTC 125AN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC 160AN1820-12-5T											
		MSTC 125AN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20								
		MSTC 160AN2123-12-5T											
	Inch spec	MSTC 400AN551-630-10	C90SP1416-10R	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9		
		MSTC 500AN551-630-10				W6X20							
		MSTC 600AN551-630-10											
		MSTC 500AN630-709-10	C90SP1618-10R	C90SP1618-10L	WC-16	W6X20							
		MSTC 600AN630-709-10											
		MSTC 500AN709-813-12	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC 600AN709-813-12											
		MSTC 500AN813-917-12	C90SD2023-12R	C90SD2023-12L	WC-20								
		MSTC 600AN813-917-12											
With Boss	Metric	MSTC 100SN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	HH12X35
		MSTC 125SN1416-10-4T											HH16X35
		MSTC 160SN1416-10-5T											-
		MSTC 125SN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16								HH16X35
		MSTC 160SN1618-10-5T											-
		MSTC 125SN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15	P-37	HH16X35
		MSTC 160SN1820-12-5T											-
		MSTC 125SN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20								HH16X35
		MSTC 160SN2123-12-5T											-

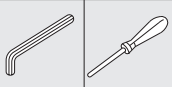
 Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (N·m)	5~6	1.5	4

Half Side Slot Mill

Spare Parts (common to Metric / Inch spec)

Description				Spare Parts										
				Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting bolt
				Right-hand	Left-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
														
Without Boss	Metric	MSTC	100AR1416-10-6T	C90SP1416-10R	-	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	-
			125AR1416-10-8T				W6X20							
			160AR1416-10-10T											
		MSTC	125AR1618-10-8T	C90SP1618-10R		WC-16	W6X20							
			160AR1618-10-10T											
		MSTC	125AR1820-12-8T	C90SD1820-12R		WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			160AR1820-12-10T											
		MSTC	125AR2123-12-8T	C90SD2023-12R		WC-20								
			160AR2123-12-10T											
		MSTC	100AL1416-10-6T	-	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP		LW-2.5	DTP-9		
			125AL1416-10-8T				W6X20							
			160AL1416-10-10T											
		MSTC	125AL1618-10-8T		C90SP1618-10L	WC-16	W6X20							
			160AL1618-10-10T											
		MSTC	125AL1820-12-8T		C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			160AL1820-12-10T											
		MSTC	125AL2123-12-8T		C90SD2023-12L	WC-20								
			160AL2123-12-10T											
	Inch spec	MSTC	400AR551-630-10	C90SP1416-10R	-	WC-14	W6X18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9		
			500AR551-630-10				W6X20							
			600AR551-630-10											
		MSTC	500AR630-709-10	C90SP1618-10R		WC-16	W6X20							
			600AR630-709-10											
		MSTC	500AR709-813-12	C90SD1820-12R		WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			600AR709-813-12											
		MSTC	500AR813-917-12	C90SD2023-12R		WC-20								
			600AR813-917-12											
		MSTC	400AL551-630-10	-	C90SP1416-10L	WC-14	W6X18	AP-1416	SE-3070TRP		LW-2.5	DTP-9		
			500AL551-630-10				W6X20							
			600AL551-630-10											
		MSTC	500AL630-709-10		C90SP1618-10L	WC-16	W6X20							
			600AL630-709-10											
		MSTC	500AL709-813-12		C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		
			600AL709-813-12											
		MSTC	500AL813-917-12		C90SD2023-12L	WC-20								
			600AL813-917-12											
With Boss	Metric	MSTC	100SR1416-10-6T	C90SP1416-10R	-	WC-14	W6X20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	P-37	HH12X35
			125SR1416-10-8T											HH16X35
			160SR1416-10-10T											-
		MSTC	125SR1618-10-8T	C90SP1618-10R		WC-16								HH16X35
			160SR1618-10-10T											-
		MSTC	125SR1820-12-8T	C90SD1820-12R		WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		HH16X35
			160SR1820-12-10T											-
		MSTC	125SR2123-12-8T	C90SD2023-12R		WC-20								HH16X35
			160SR2123-12-10T											-
		MSTC	100SL1416-10-6T	-	C90SP1416-10L	WC-14	W6X20	AP-1416	SE-3070TRP		LW-2.5	DTP-9		HH12X35
			125SL1416-10-8T											HH16X35
			160SL1416-10-10T											-
		MSTC	125SL1618-10-8T		C90SP1618-10L	WC-16								HH16X35
			160SL1618-10-10T											-
		MSTC	125SL1820-12-8T		C90SD1820-12L	WC-18	W6X20	AP-1820	SB-3590TRP		LW-3	DTP-15		HH16X35
			160SL1820-12-10T											-
		MSTC	125SL2123-12-8T		C90SD2023-12L	WC-20								HH16X35
			160SL2123-12-10T											-


Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (N·m)	5~6	1.5	4

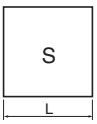
Inserts Identification System

Symbol	Shape
S	Square

(1) Shape

Symbol	Tolerance		
	Corner Height	Thickness	I.C. Size
C	±0.013mm	±0.025mm	±0.025mm
E	±0.025mm		

(3) Tolerance



(5) Edge Length

Symbol	Corner-R (RE)
16	1.6mm
12	1.2mm
08	0.8mm

(7) Corner-R(RE)

Symbol	Hand of Tool
N	Neutral
L	Left-hand
R	Right-hand

(9) Hand of Tool

S	P	C	T	10	T3	08	E	R	-	SD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		(10)

(2) Relief Angle

Symbol	Relief Angle
D	15°
P	11°

(4) Hole / Chipbreaker

Symbol	Shape
T	Single-sided chipbreaker, with hole

(6) Thickness

Symbol	Thickness
T3	3.97mm
04	4.76mm

(8) Edge Preparation

Symbol	Cutting Edge Spec.
E	Honed
F	Sharp Edge
S	Chamfered + R-honed

(10) Chipbreaker Symbol

Symbol	Rake Angle
SB	5°
SD	15°
SE	20°

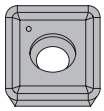
SP..10T3

Classification of usage
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel	●	●	
M	Stainless Steel	○	●	
K	Cast Iron	○	●	
N	Non-ferrous Metals			●
S	Heat-resistant Alloys		●	
	Titanium Alloys		●	○

Applicable Inserts (mm)

Description	IC	S	D1
SP..10T3	10.0	3.97	3.4

Insert (Handed Insert shows Right-hand)	Description	Usable edges	Dimension (mm) RE	Dimension (mm) BS (Wiper Edge)	CVD Coated Carbide CA0835	PVD Coated Carbide PR0725	PVD Coated Carbide PR0110
	**SPCT 10T316EN-SD**	4	1.6	-		●	
 With Wiper Edge	**SPCT 10T308E$^{R}_{L}$-SD**		0.8	2.5		●	
	10T312E$^{R}_{L}$-SD		1.2	1.8		●	
 Sharp Edge	**SPCT 10T316FN-SE**		1.6	-			●
 Sharp Edge / With Wiper Edge	**SPCT 10T308F$^{R}_{L}$-SE**		0.8	2.7			●
	10T312F$^{R}_{L}$-SE		1.2	2.2			●
 With Wiper Edge	**SPET 10T308E$^{R}_{L}$-SB**		0.8	2.7	●	●	
 Tough Edge / With Wiper Edge	**SPET 10T308S$^{R}_{L}$-SB**		0.8	2.7	●	●	

● : Std. Item

Inserts are sold in 10 piece boxes

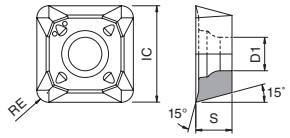
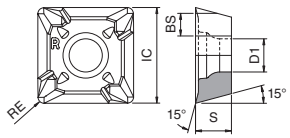
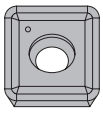
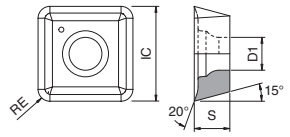
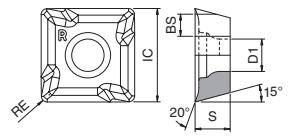
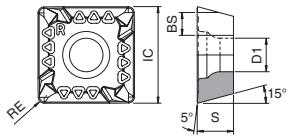
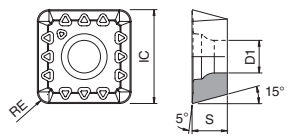
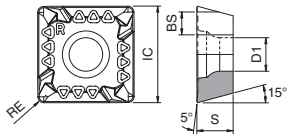
SD..1204

Applicable Inserts (mm)

Description	IC	S	D1
SD..1204	12.7	4.76	4.4

Classification of usage
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel	●	●	
M	Stainless Steel	○	●	
K	Cast Iron	○	●	
N	Non-ferrous Metals			●
S	Heat-resistant Alloys		●	
	Titanium Alloys		●	○

Insert (Handed Insert shows Right-hand)	Description	Usable edges	Dimension (mm) RE	Dimension (mm) BS (Wiper Edge)	CVD Coated Carbide CA0835	PVD Coated Carbide PR0725	PVD Coated Carbide PR0110
 	SDCT 120416EN-SD	4	1.6	-		●	
 With Wiper Edge 	SDCT 120408E$^{R}_{L}$-SD		0.8	2.5		●	
	120412E$^{R}_{L}$-SD		1.2	1.8		●	
 Sharp Edge 	SDCT 120416FN-SE		1.6	-			●
 Sharp Edge / With Wiper Edge 	SDCT 120408F$^{R}_{L}$-SE		0.8	2.7			●
	120412F$^{R}_{L}$-SE		1.2	1.9			●
 With Wiper Edge 	SDET 120408E$^{R}_{L}$-SB		0.8	2.5	●	●	
	120412E$^{R}_{L}$-SB		1.2	1.8	●	●	
 	SDET 120416SN-SB		1.6	-	●	●	
 Tough Edge / With Wiper Edge 	SDET 120408S$^{R}_{L}$-SB		0.8	2.5	●	●	

Features of Insert Grades

CA0835
- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel and Cast Iron
- For middle to high speed machining

PR0725
- TiN+TiCN+TiN based Multi-layer PVD Coated Carbide
- For Carbon Steel, Alloy Steel, Stainless Steel, Heat-resistant Alloys and Cast Iron
- For middle speed machining

PR0110
- TiB_2 based PVD Coated Carbide
- For Non-ferrous Metals such as Aluminum Alloys (Si<10%) and titanium Alloys
- For high speed machining

● : Std. Item

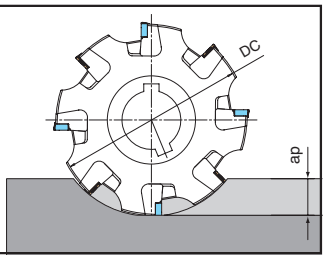
Inserts are sold in 10 piece boxes

Slot Mill MSTC

Recommended Cutting Conditions

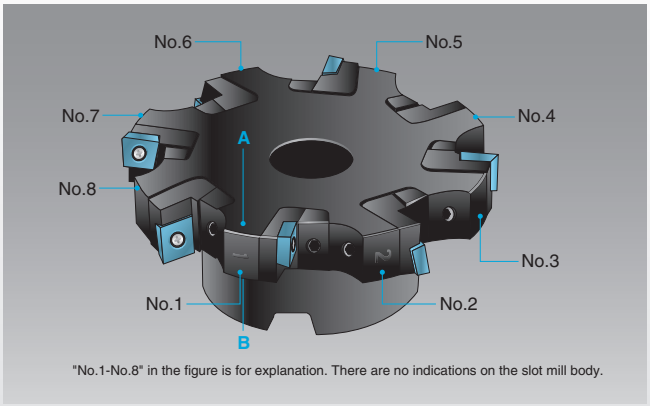
Workpiece Material		Hardness (HB)	Recommended Insert Grades (Cutting Speed Vc : m/min)			fz (mm/t)				Remarks
			CVD Coated Carbide	PVD Coated Carbide		Chipbreaker				
			CA0835	**PR0725**	**PR0110**	EN-SD ER-SD EL-SD	ER-SB EL-SB	SN-SB SR-SB SL-SB	FN-SE FR-SE FL-SE	
Low Carbon Steel	SS400 S10C~S25C	125	250~310	170~210	-	0.07~0.20	0.10~0.22	0.15~0.3	-	Dry
Carbon Steel	S30C~S58C (Annealed)	190	160~190	100~140	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
	S30C~S58C (Heat treated)	250	140~180	90~120	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
Alloy Steel	Annealed	180	140~180	90~120	-	0.07~0.20	0.10~0.22	0.15~0.3	-	
	Heat treated	275	120~160	80~110	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
High Carbon Alloy	SKD11, SKD61, etc.	280	110~130	70~ 90	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Stainless Steel	Austenitic related	220	160~200	110~140	-	0.05~0.18	0.08~0.20	0.12~0.25	-	Coolant
	Martensitic related	300	150~180	100~120	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Heat-resistant Alloys	Ni-base heat-resistant alloys	350	-	15~ 30	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Titanium Alloys	Ti-6Al-4V, etc.	270	-	20~ 50	-	0.05~0.18	0.08~0.20	0.12~0.25	-	
Gray Cast Iron	FC250~FC350	260	160~200	110~130	-	0.07~0.22	0.10~0.25	0.15~0.35	-	Dry
Nodular Cast Iron	FCD400~FCD500	160	130~160	80~100	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
	FCD600~FCD800	250	110~140	70~ 90	-	0.07~0.22	0.10~0.25	0.15~0.35	-	
Non-ferrous Metals	AC4A, A7050, etc.	-	-	-	750~950	-	-	-	0.07~0.20	Coolant

Note) 1. Use down-cut machining.
2. If ap is 1/10 or under of Cutter Dia.(DC), it is possible to increase feed per tooth (fz) by 40%.

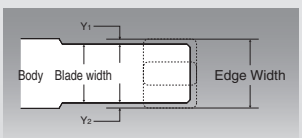


Slot width (edge width) adjustment of MSTC Slot Mill

Slot width (edge width) measurement and adjustment



"No.1-No.8" in the figure is for explanation. There are no indications on the slot mill body.



(1) Set up the slot mill on length measuring equipment such as tool presetters.

(2) Choose any one of the edges as a reference position. (No.1)

(3) Measure the blade width of the slot mill body at position No.1. (between point A and B in the figure)

(4) Move the length measuring equipment to the insert corner part and measure the step (Y_1) between the point A and the insert No.1.

(5) Using the same procedure, measure (Y_2) dimension based on point B.

Edge Width = Blade Width + Y_1 + Y_2

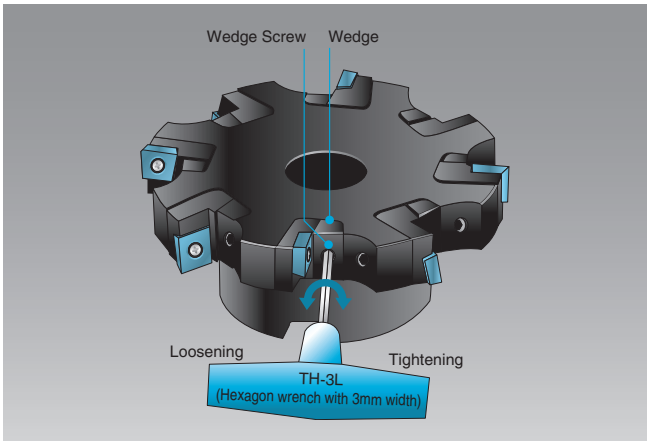
(6) Place the point A of the slot mill body near the position No.1 to "0 (zero)" of the length measuring equipment.

(7) Adjust the edge position of the inserts in odd numbered positions (No. 3, 5, 7) to "0 (zero)" with the length measuring equipment.

(8) Adjust the edge position of the inserts in even numbered positions (No. 2, 4, 6, 8) to the required edge width.

For steps (7) and (8), see "In the case of changing the slot width (edge width)" on next page.

In the case of changing the slot width (edge width)

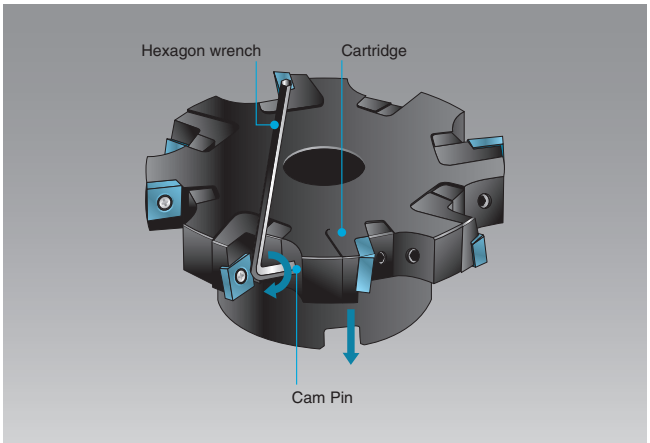


(1) Set up the slot mill on length measuring equipment such as tool presetters.

(2) Insert a Hexagon wrench with **3mm** width (**TH-3L**) into the Wedge Screw.

(3) Turn **TH-3L** counterclockwise to loosen the Wedge.

(4) Turn **TH-3L** clockwise by the torque of **1 N·m** to tighten the Wedge lightly and make the Wedge contact the Cartridge and the Slot Mill Body. In doing so, some resistance occurs against the Cartridge.

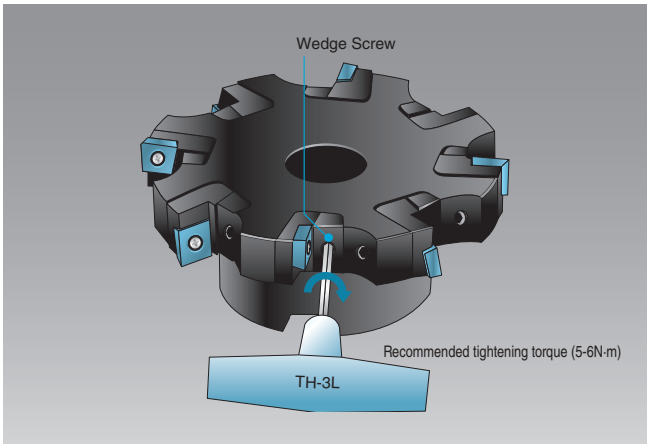


(5) Insert a Hexagon wrench (**LW-2.5** or **LW-3**) into the Cam Pin on the back of the Cartridge.

(6) Turn the wrench and adjust the position of the Cartridge.

(7) To secure the adjustment, back-turn the Cam Pin and make sure that it does not touch the groove surface of the back of the Cartridge.

(8) Remove the Hexagon wrench from the Cam Pin.

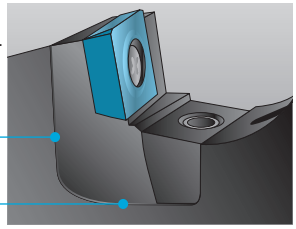


(9) Insert **TH-3L** into the Wedge Screw.

(10) Tighten the Wedge Screw by the torque of **5-6N·m**. (Use a torque wrench to get the correct torque.)

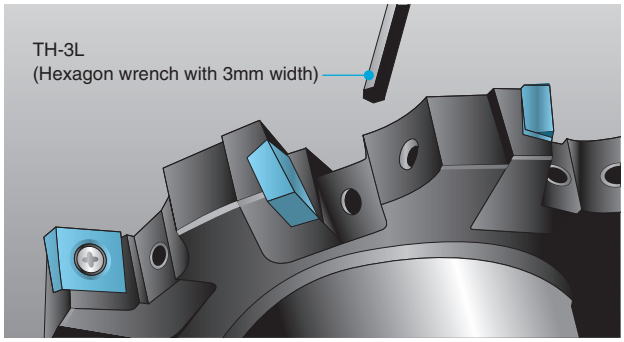
(11) Make sure there is no clearance between the Cartridge and the Slot Mill body.

Make sure there is no clearance.

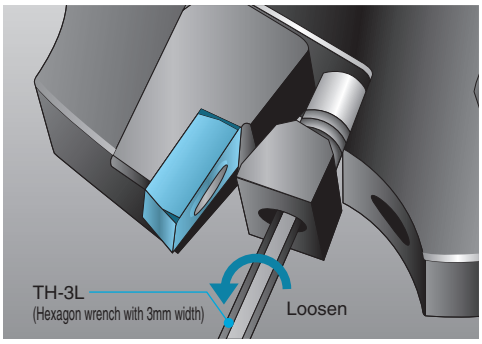


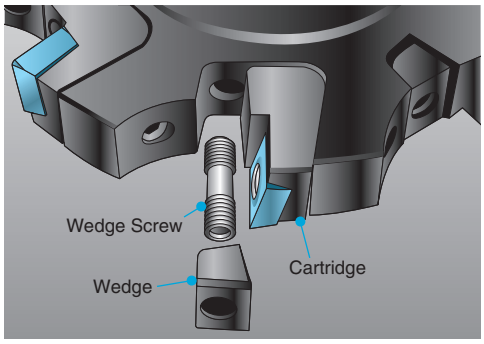
Replacement of the Cartridge

Follow the instruction below to replace the Cartridge.



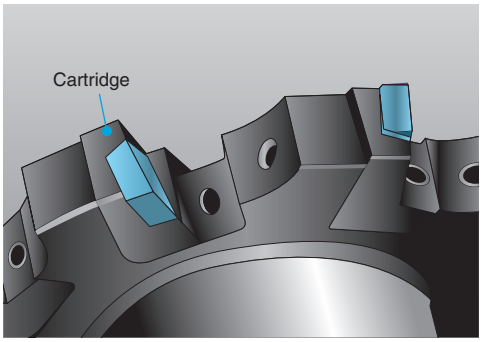
(1) Insert Hexagon wrench with 3mm width (TH-3L) into the Wedge Screw.

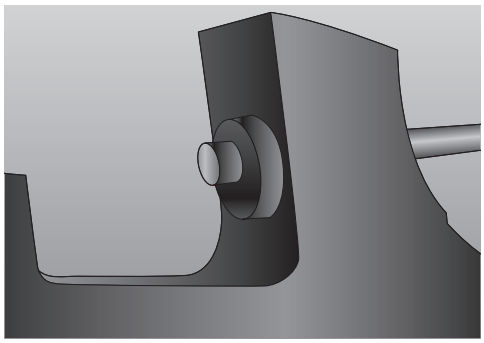




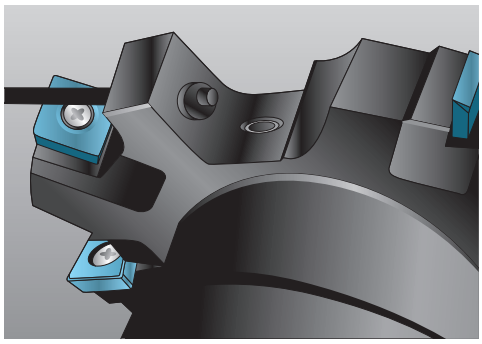
(2) Loosen the Wedge Screw.

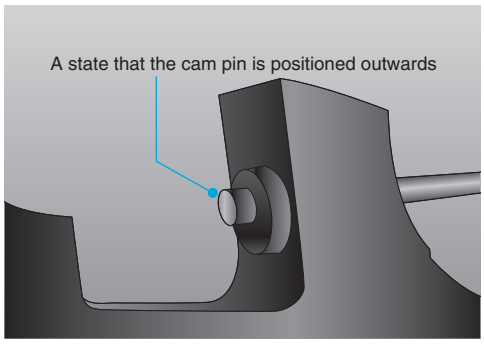
(3) Remove the Wedge Screw and Wedge.



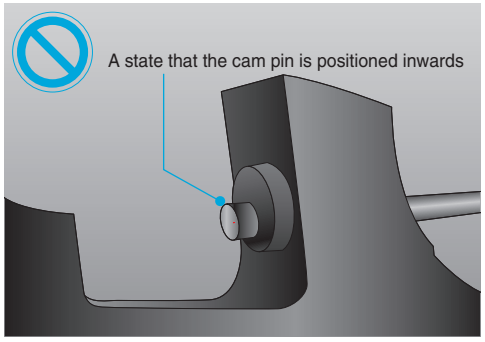


(4) Remove the Cartridge.

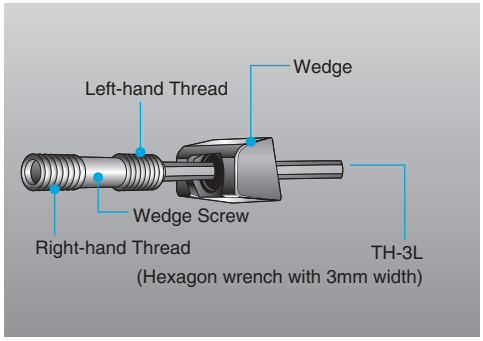


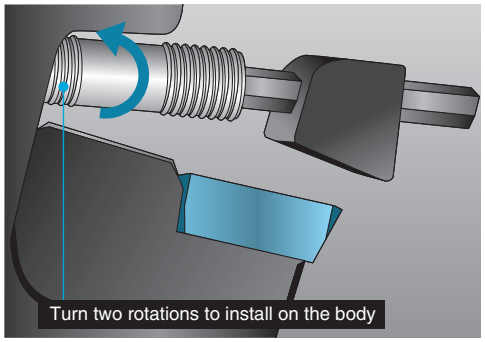


(5) Before replacing the Cartridge, make sure that the Cam Pin is positioned radially-outwards.



(6) If the Cam Pin is in the position shown in the left diagram, assembling the Cartridge is not possible.

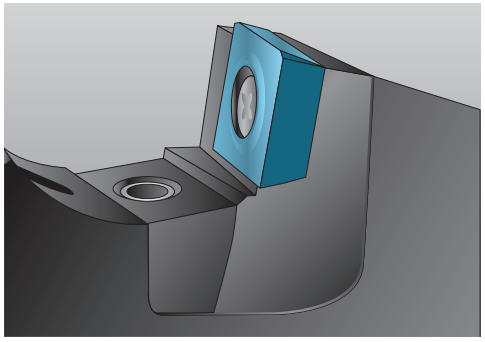




(7) Place the wedge so that its larger slant surface faces toward the Cartridge.

(8) Turn the Wedge Screw two rotations to install the Wedge to the body.

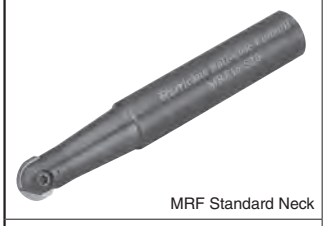
(9) When installing the Wedge Screw to the body, keep the Wedge from rotating and screw it in.

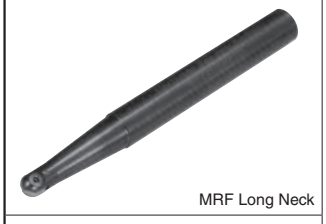


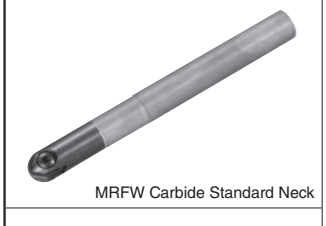
(10) Tighten the Wedge Screw by the torque of 5-6N·m.
Keep the Screw head and the Wedge even
(prevent either of those from sticking out).

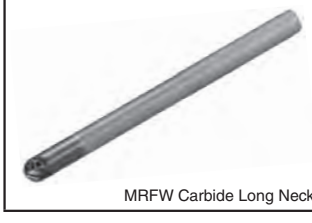
Ball-nose End Mill

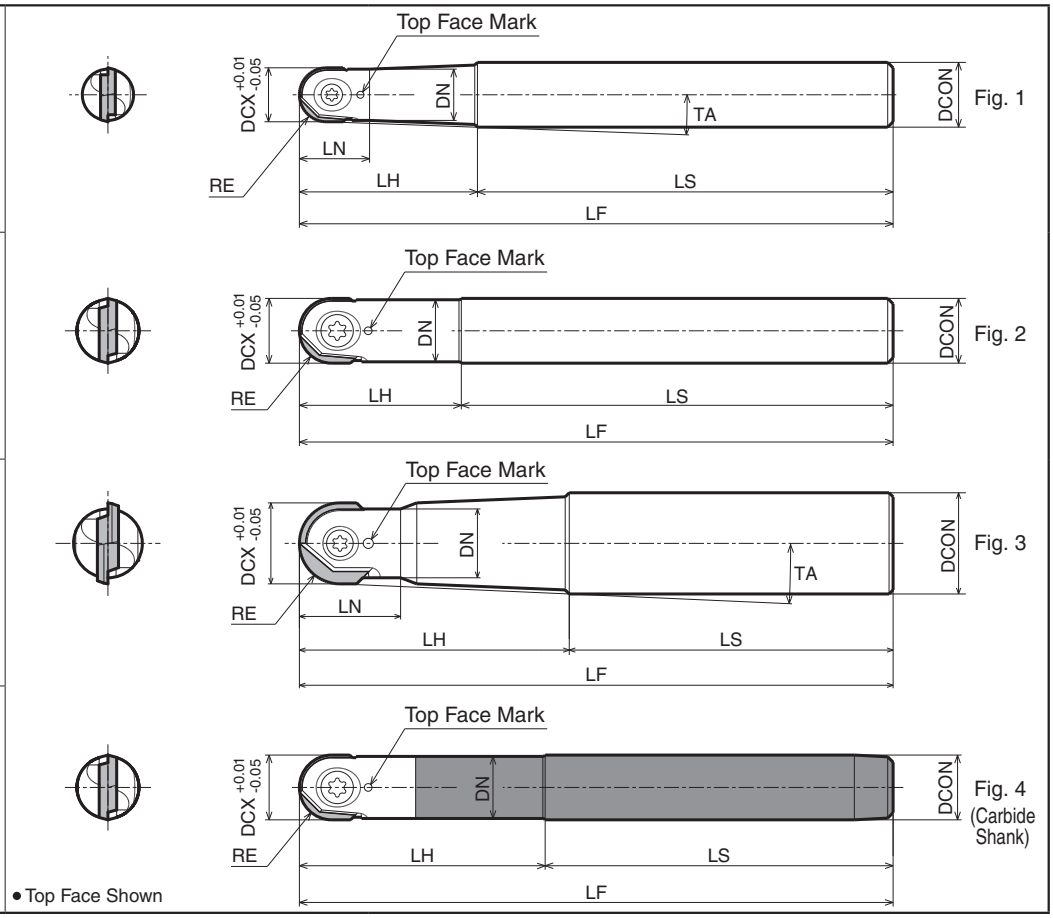
MRF / MRFW (Carbide Shank)


MRF Standard Neck


MRF Long Neck


MRFW Carbide Standard Neck


MRFW Carbide Long Neck



● Top Face Shown

Toolholder Dimensions

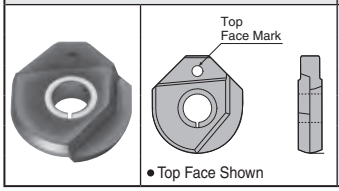
Description			Stock	No. of Inserts	Dimension (mm)										Drawing	Spare Parts			Applicable Inserts ➡ M25
					RE	DCX	DCON	DN	LF	LN	LH	LS	TA			Clamp Screw	Wrench DT / TT	Anti-seize Compound	
Standard Neck	MRF	08-S12	●	1	4	8	12	7.5	100	10	22	78	6°20'		Fig. 1	SC-30067	DT-8	P-37	RDFG08FR
		10-S12	●		5	10		9.5		13	25	75	3°			SC-35085	DT-10		RDFG10FR
		12-S12	●		6	12		11.5	110	-	30	80	-		Fig. 2	SC-40100	DT-15		RDFG12FR
		16-S20	●		8	16	20	14	130	20	50		2°50'		Fig. 1	SC-50130	DT-20		RDFG16FR
		20-S25	●		10	20	25	17	140	25	60		3°		Fig. 3	SC-60160	TT-25		RDFG20FR
		25-S32	●		12.5	25	32	22	150	31	70		3°30'			SC-60210	TT-30		RDFG25FR
Long Neck	MRF	08-S12-130	●	1	4	8	12	7.5	130	10	50	80	2°30'		Fig. 1	SC-30067	DT-8	P-37	RDFG08FR
		10-S16-150	●		5	10	16	9.5	150	15		100	3°50'			SC-35085	DT-10		RDFG10FR
		12-S16-160	●		6	12		11.5	160	16	60		2°10'			SC-40100	DT-15		RDFG12FR
		16-S20-160	●		8	16	20	14	160	20	65	95	2°			SC-50130	DT-20		RDFG16FR
		20-S25-180	●		10	20	25	17	180	25	80	100	2°10'		Fig. 3	SC-60160	TT-25		RDFG20FR
		25-S32-200	●		12.5	25	32	22	200	31	90	110	2°40'			SC-60210	TT-30		RDFG25FR
Carbide Standard Neck	MRFW	08-S08	●	1	4	8	8	7.4	100	-	30	70	-		Fig. 4	SC-30067	DT-8	P-37	RDFG08FR
		10-S10	●		5	10	10	9.5	100	-	35	65	-			SC-35085	DT-10		RDFG10FR
		12-S12	●		6	12	12	11.5	110	-	45		-			SC-40100	DT-15		RDFG12FR
Carbide Long Neck	MRFW	08-S08-130	●	1	4	8	8	7.4	130	-	65	65	-		Fig. 4	SC-30067	DT-8	P-37	RDFG08FR
		10-S10-140	●		5	10	10	9.5	140	-	75		-			SC-35085	DT-10		RDFG10FR
		12-S12-150	●		6	12	12	11.5	150	-	85		-			SC-40100	DT-15		RDFG12FR

· TA (Toolholder's interference angle) is the angle formed by the tangential line from insert dia. to toolholder's shank dia.

Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

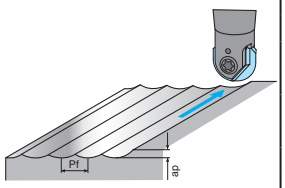
● : Std. Item

Applicable Inserts

Insert	Description
	RDFG 08FR 10FR 12FR 16FR 20FR 25FR

· Check the Top Face Mark of both insert and toolholder.

Recommended Depth of Cut

Description		Depth of Cut (mm) ap	Depth of Cut (mm) Pf	Applications
Standard Neck	MRF08-S12	0.2(Max0.3)	0.8	
	MRF10-S12	0.2	1	
	MRF12-S12	0.5	1.2	
	MRF16-S20	0.5	1.6	
	MRF20-S25	1	2	
	MRF25-S32	1	2.5	
Long Neck	MRF08-S12-130	0.2(Max0.3)	0.8	
	MRF10-S12-150	0.2	1	
	MRF12-S12-160	0.5	1.2	
	MRF16-S20-160	0.5	1.6	
	MRF20-S25-180	1	2	
	MRF25-S32-200	1	2.5	
Carbide Standard Neck	MRFW08-S08	0.2(Max0.3)	0.8	
	MRFW10-S10	0.2	1	
	MRFW12-S12	0.5	1.2	
Carbide Long Neck	MRFW08-S08-130	0.2(Max0.3)	0.8	
	MRFW10-S10-140	0.2	1	
	MRFW12-S12-150	0.5	1.2	

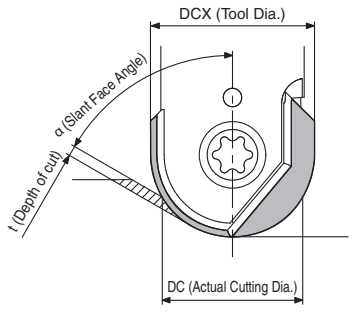
For ø8, Holder may be broken because of over load if ap exceeds 0.3mm.

Recommended Cutting Conditions (At Cutting Dia. øD)

Workpiece Material	Insert Grades	Vc (m/min)	fz (mm/t)	ø8 Vc(m/min) (n:min^{-1})	ø8 fz(mm/t) (Vf:mm/min)	ø10 Vc(m/min) (n:min^{-1})	ø10 fz(mm/t) (Vf:mm/min)	ø12 Vc(m/min) (n:min^{-1})	ø12 fz(mm/t) (Vf:mm/min)
Carbon Steel	PR915	100~200	0.1~0.3	150 (5,970)	0.2 (2,390)	150 (4,770)	0.2 (1,910)	150 (3,980)	0.2 (1,590)
Alloy Steel	PR915	80~180	0.1~0.3	130 (5,170)	0.2 (2,070)	130 (4,140)	0.2 (1,660)	130 (3,450)	0.2 (1,380)
Mold Steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Stainless Steel	PR915	50~150	0.1~0.2	100 (3,980)	0.15 (1,190)	100 (3,180)	0.15 (950)	100 (2,650)	0.15 (800)
Cast Iron	PR915	100~200	0.2~0.4	150 (5,970)	0.3 (3,580)	150 (4,770)	0.3 (2,860)	150 (3,980)	0.3 (2,390)
Workpiece Material	Insert Grades	Vc (m/min)	fz (mm/t)	ø16 Vc(m/min) (n:min^{-1})	ø16 fz(mm/t) (Vf:mm/min)	ø20 Vc(m/min) (n:min^{-1})	ø20 fz(mm/t) (Vf:mm/min)	ø25 Vc(m/min) (n:min^{-1})	ø25 fz(mm/t) (Vf:mm/min)
Carbon Steel	PR915	100~200	0.1~0.3	150 (2,980)	0.2 (1,190)	150 (2,390)	0.2 (950)	150 (1,910)	0.2 (760)
Alloy Steel	PR915	80~180	0.1~0.3	130 (2,590)	0.2 (1,030)	130 (2,070)	0.2 (830)	130 (1,660)	0.2 (660)
Mold Steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Stainless Steel	PR915	50~150	0.1~0.2	100 (1,990)	0.15 (600)	100 (1,590)	0.15 (480)	100 (1,270)	0.15 (380)
Cast Iron	PR915	100~200	0.2~0.4	150 (2,980)	0.3 (1,790)	150 (2,390)	0.3 (1,430)	150 (1,910)	0.3 (1,150)

Actual Cutting Speed (Vd) Conversion Coefficient Table

Vd varies depending on ap and slant face angle.
Vd can be obtained by dividing the conversion coefficient into the recommended cutting speed.

Model	Tool Dia. (DCX)		ø8		ø10		ø12	
	Depth of cut (t:mm)		0.1	0.2	0.1	0.2	0.2	0.5
	Slant Face Angle (α)	15°	1.00	1.00	1.00	1.00	1.00	1.00
		30°	1.05	1.02	1.05	1.03	1.04	1.01
		45°	1.18	1.12	1.20	1.14	1.16	1.07
		60°	1.47	1.34	1.51	1.38	1.42	1.24
		75°	2.15	1.82	2.24	1.92	2.02	1.60
		90°(Horizontal Plane)	4.48	3.22	5.06	3.57	3.92	2.50
	Tool Dia. (DCX)		ø16		ø20		ø25	
	Depth of cut (t:mm)		0.2	0.5	0.5	1	0.5	1
	Slant Face Angle (α)	15°	1.00	1.00	1.00	1.02	1.00	1.01
		30°	1.05	1.01	1.02	1.00	1.03	1.00
		45°	1.18	1.10	1.12	1.06	1.14	1.08
		60°	1.47	1.30	1.34	1.21	1.38	1.25
		75°	2.14	1.73	1.83	1.53	1.93	1.62
		90°(Horizontal Plane)	4.48	2.87	3.20	2.29	3.57	2.55

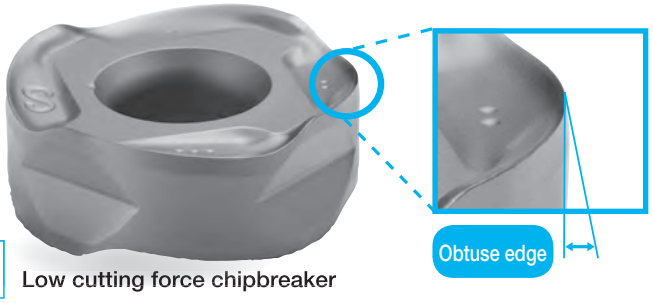
e.g.) Suppose tool dia. 8mm, ap=0.1mm, slant face angle 90°: The actual cutting speed Vd for carbon steel machining, when Vc is 150m/min at the biggest diameter, Vd can be obtained as Vd=150÷4.48=33.5m/min

Facing | Shouldering



MRW

Economical and high efficiency New radius cutter with double-sided insert for various types of workpieces



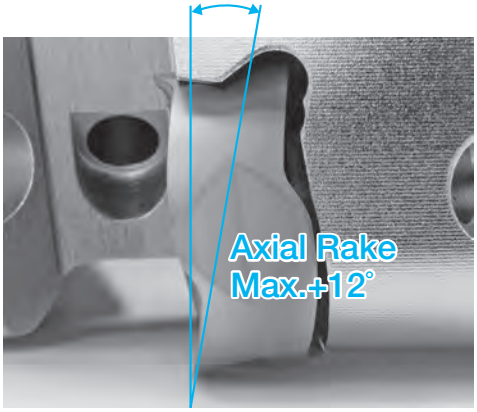
Low cutting force chipbreaker

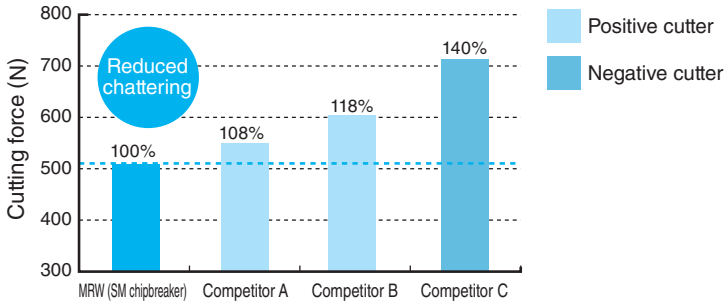
POINT.1 Economical Double-sided 8-edge Insert

POINT.2 Combine sharpness and cutting edge strength

Obtuse edge increases cutting edge toughness

POINT.3 Helical cutting edge design with maximum axial rake 12° reduced low cutting force equivalent to positive inserts

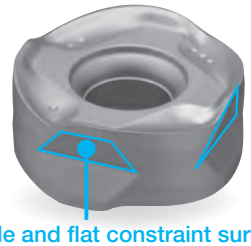




<Cutting Conditions>
Vc=120m/min, ap×ae=1×40mm, fz=0.2mm/t
SUS304, Cutter ø50

POINT.4 Flat Lock Structure to hold insert firmly.

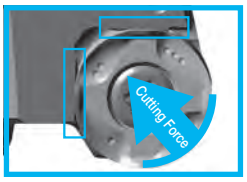
Prevent insert rotation during machining and realizes stable machining



Wide and flat constraint surface

Flat Lock Structure

Wide flat constraint surface
·Receives even cutting forces
·Controls insert rotation



Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

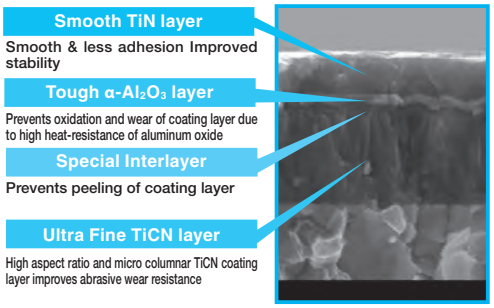
Workpiece Material		Applicable Insert Grades	Applicable Chipbreaker
P Carbon Steel / Alloy Steel / Mold Steel		PR1525	GM/SM/GH Chipbreaker
K Cast Iron		PR1510	GH/GM Chipbreaker
S Ni-base heat-resistant alloys	M Stainless Steel (Martensitic related)	CA6535	SM/GM Chipbreaker
S Ni-base heat-resistant alloys S Titanium Alloys	M Stainless Steel (Austenitic related) M Stainless Steel (Precipitation Hardening)	PR1535	SM/GM Chipbreaker

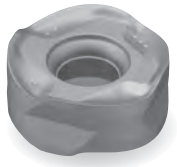
For Chipbreaker Selection and Recommended Cutting Conditions ➡ M212

POINT.5 Applicable for Variety of Workpieces from Steel to Heat-resistant Alloys

Controls sudden fracture and realizes stable machining
Suitable for high efficiency machining

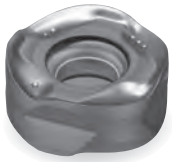






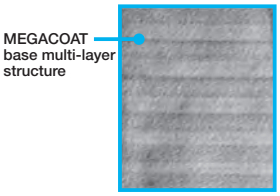
CA6535

For Martensitic stainless steel and Ni-base heat-resistant alloys
High heat resistance and wear resistance with CVD coating
Improved stability with thin layer coating technology



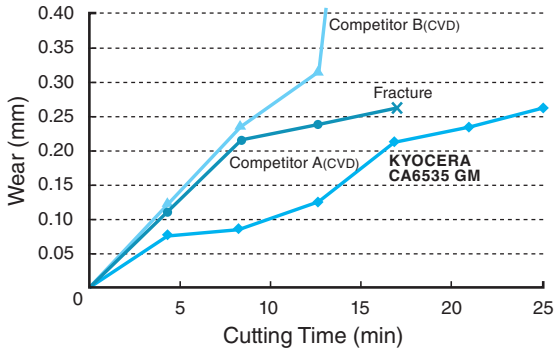
PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable and longer tool life by special nano coating layer "MEGACOAT NANO"



Tool Life Comparison (Internal evaluation)

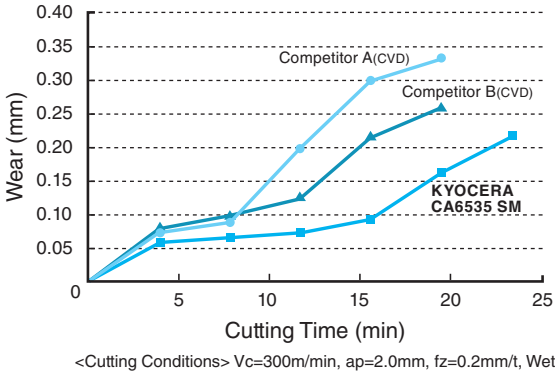
● Ni-base heat-resistant alloys



<Cutting Conditions> Vc=50m/min, ap=1.0mm, fz=0.15mm/t, Wet

1st Choice GM Chipbreaker

● Stainless Steel (Martensitic related)



<Cutting Conditions> Vc=300m/min, ap=2.0mm, fz=0.2mm/t, Wet

1st Choice SM Chipbreaker

MRW Face Mill



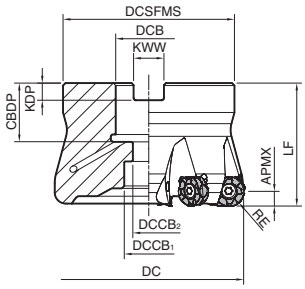


Fig. 1

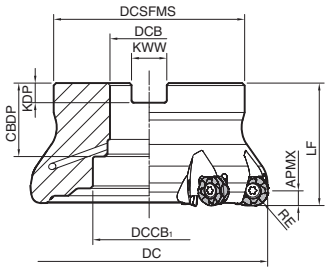


Fig. 2

Toolholder Dimensions

	Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				RE	DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R.	R.R.				
Metric	MRW 050R-12-5T-M	●	5	6	50	48	22	18	11	40	21	6.3	10.4	6.0	+12°	-15.5°	Yes	Fig. 1	0.3	16,000
	050R-12-6T-M	●	6																0.3	
	063R-12-6T-M	●	6		63	60		19											0.6	14,000
	063R-12-7T-M	●	7																0.6	
	080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4						1.1	12,000
	080R-12-8T-M	●	8																1.1	
	100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4					Fig. 2	1.5	10,600
	100R-12-9T-M	●	9																1.4	
	MRW 063R-16-5T-M	●	5	8	63	60	22	19	11	40	21	6.3	10.4	8.0	+11°	-16.5°		Fig. 1	0.5	12,800
	063R-16-6T-M	●	6																0.5	
	080R-16-6T-M	●	6		80	70	27	20	13	50	24	7	12.4						1.1	11,000
	080R-16-7T-M	●	7																1.0	
	100R-16-6T-M	●	6		100	78	32	46	-		30	8	14.4					Fig. 2	1.4	9,600
	100R-16-8T-M	●	8																1.3	
	125R-16-8T-M	●	8		125	89	40	55		63	33	9	16.4						2.6	8,560
	125R-16-10T-M	●	10																2.5	
Bore Dia. Inch spec	MRW 080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	6.0	+12°	-15.5°		Fig. 1	1.2	12,000
	080R-12-8T	●	8																1.1	
	100R-12-7T	●	7		100	78	31.75	46	-		34	8	12.7					Fig. 2	1.5	10,600
	100R-12-9T	●	9																1.4	
	MRW 080R-16-6T	●	6	8	80	70	25.4	20	13	50	27	6	9.5	8.0	+11°	-16.5°		Fig. 1	1.1	11,000
	080R-16-7T	●	7																1.1	
	100R-16-6T	●	6		100	78	31.75	46	-		34	8	12.7					Fig. 2	1.4	9,600
	100R-16-8T	●	8																1.4	
	125R-16-8T	●	8		125	89	38.1	55		63	38	10	15.9						2.6	8,560
	125R-16-10T	●	10																2.6	

- **Max. Revolution**
  Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
- APMX is Maximum ap. For more details, see page M212 below.

Spare Parts and Applicable Inserts

Description	Spare Parts					Applicable Inserts M19		
	Clamp Screw	Wrench		Anti-seize Compound	Mounting bolt			
		DTPM-15	TTP-20			General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW 050R-12...	SB-4085TRP	DTPM-15		P-37	HH10X30	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
063R-12...	Recommended tightening torque for Insert Clamp 3.5N·m				HH12X35			
080R-12...					-			
100R-12...								
MRW 063R-16...	SB-50140TRP	TTP-20		P-37	HH10X30	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
080R-16...	Recommended tightening torque for Insert Clamp 4.5N·m				HH12X35			
100R-16...					-			
125R-16...								

Recommended Cutting Conditions M212

● : Std. Item

MRW End Mill



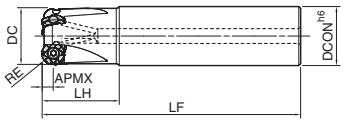


Fig. 1

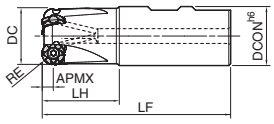


Fig. 3

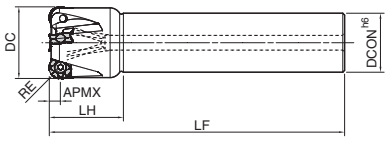


Fig. 2

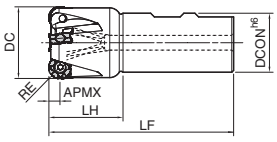


Fig. 4

Toolholder Dimensions

Description			Stock	No. of Inserts	Dimension (mm)						Rake Angle		Coolant Hole	Drawing	Max. Revolution (min^{-1})
					RE	DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			
Cylindrical	MRW	32-S32-12-3T	●	3	6	32	32	140	40	6.0	+12°	-20°	Yes	Fig. 1	22,000
		40-S32-12-4T	●	4		40		160				-16.5°		Fig. 2	18,800
		50-S42-12-5T	●	5		50	42	170				-15.5°			16,000
	MRW	40-S32-16-3T	●	3	8	40	32	160	40	8.0	+11°	-18°	Yes	Fig. 2	17,200
		50-S42-16-4T	●	4		50	42	170				-16.5°			14,800
		63-S42-16-5T	●	5		63			50						12,800
Long Shank	MRW	32-S32-12-2T-200	●	2	6	32	32	200	40	6.0	+12°	-20°	Yes	Fig. 1	22,000
		40-S32-12-3T-200	●	3		40						-16.5°		Fig. 2	18,800
		50-S42-12-4T-300	●	4		50	42	300				-15.5°			16,000
	MRW	40-S32-16-2T-200	●	2	8	40	32	200	40	8.0	+11°	-18°	Yes	Fig. 2	17,200
		50-S42-16-3T-300	●	3		50	42	300				-16.5°			14,800
		63-S42-16-4T-300	●	4		63			50						12,800
Weldon	MRW	32-W32-12-3T	●	3	6	32	32	102	40	6.0	+12°	-20°	Yes	Fig. 3	22,000
		40-W32-12-4T	●	4		40		100				-16.5°		Fig. 4	18,800
		50-W40-12-5T	●	5		50	40	110				-15.5°			16,000
	MRW	40-W32-16-3T	●	3	8	40	32	100	40	8.0	+11°	-18°	Yes	Fig. 4	17,200
		50-W40-16-4T	●	4		50	40	110				-16.5°			14,800
		63-W40-16-5T	●	5		63		120	50						12,800

- **Max. Revolution**
  Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.
- APMX is Maximum ap. For more details, see page ➡ **M212** below.

Spare Parts and Applicable Inserts

Description	Spare Parts				Applicable Inserts ➡ **M19**		
	Clamp Screw	Wrench		Anti-seize Compound			
		DTPM-15	TTP-20		General purpose	Low cutting force	Tough Edge (For Heavy Milling)
MRW ...-12...	SB-4085TRP	DTPM-15		P-37	ROMU1204M0ER-GM	ROMU1204M0ER-SM	ROMU1204M0ER-GH
	Recommended tightening torque for Insert Clamp 3.5N·m						
MRW ...-16...	SB-50140TRP	TTP-20		P-37	ROMU1605M0ER-GM	ROMU1605M0ER-SM	ROMU1605M0ER-GH
	Recommended tightening torque for Insert Clamp 4.5N·m						

Recommended Cutting Conditions ➡ **M212**

● : Std. Item

◆ Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz : mm/t) * Recommended feed rate (Reference value) for ROMU12 type : ap=3mm / for ROMU16 type : ap=4mm			Recommended Insert Grades (Cutting Speed Vc : m/min)			
				MEGACOAT NANO			CVD Coated Carbide
	GM	SM	GH	PR1535	PR1525	PR1510	CA6535
Carbon Steel	★ 0.1~**0.2**~0.3	☆ 0.06~**0.15**~0.2	☆ 0.15~**0.3**~0.35	☆ 120~**180**~250	★ 120~**180**~250	-	-
Alloy Steel	★ 0.1~**0.2**~0.3	☆ 0.06~**0.15**~0.2	☆ 0.15~**0.3**~0.35	☆ 100~**160**~220	★ 100~**160**~220	-	-
Mold Steel	★ 0.1~**0.15**~0.25	☆ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.3	☆ 80~**140**~180	★ 80~**140**~180	-	-
Stainless Steel (Austenitic related)	☆ 0.1~**0.15**~0.2	★ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.25	★ 100~**160**~200	☆ 100~**160**~200	-	-
Stainless Steel (Martensitic related)	☆ 0.1~**0.15**~0.2	★ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.25	☆ 150~**200**~250	-	-	★ 180~**240**~300
Stainless Steel (Precipitation Hardening)	★ 0.1~**0.15**~0.2	☆ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.25	★ 90~**120**~150	-	-	-
Gray Cast Iron	★ 0.1~**0.2**~0.3	-	☆ 0.15~**0.3**~0.35	-	-	★ 120~**180**~250	-
Nodular Cast Iron	★ 0.1~**0.15**~0.25	-	☆ 0.15~**0.2**~0.3	-	-	★ 100~**150**~200	-
Ni-base heat-resistant alloys	★ 0.1~**0.12**~0.15	☆ 0.06~**0.1**~0.15	☆ 0.12~**0.15**~0.2	☆ 20~**30**~50	-	-	★ 20~**30**~50
Titanium Alloys	☆ 0.1~**0.12**~0.15	★ 0.06~**0.1**~0.15	-	★ 40~**60**~80	-	☆ 30~**50**~70	-

★ : 1st Recommendation ☆ : 2nd Recommendation

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Recommended feed rate is the reference value when ap is RE/2 (3mm for ROMU12, 4mm for ROMU16).
  For lower ap than the above conditions, the conversion factor in the following table is recommended.

Insert	ap (recommended)	Max. ap	Conversion factor for feed per tooth fz				
			ap=0.5mm	ap=1mm	ap=2mm	ap=3mm	ap=4mm
ROMU12 type	3mm or less	6mm	2.1	1.5	1.1	1.0 (Standard)	-
ROMU16 type	4mm or less	8mm	2.4	1.7	1.3	1.1	1.0 (Standard)

* Example (ROMU12 type, Carbon Steel, GM chipbreaker, ap=1mm)

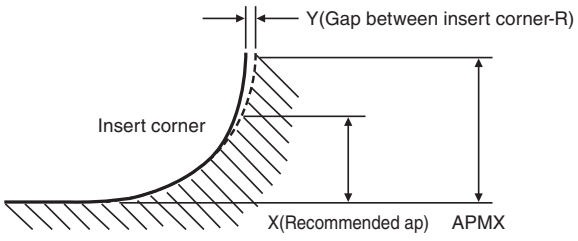
fz=0.2mm/t (Reference value for carbon steel and GM chipbreaker) × **1.5** (Conversion factor for ROMU12 type, ap=1mm) = **fz=0.3mm/t** (Recommended feed rate)

* Recommended ap : 3mm or less for ROMU12, 4mm or less for ROMU16
  Except the case that ap temporally surpass the recommended ap, machining under the recommended ap is recommended.

Corner-R shape during processing

Corner-R shape during processing with MRW (Ref. to the right figure)

Insert	APMX	X	Y
ROMU12 type	6mm	3mm	0.1mm
ROMU16 type	8mm	4mm	0.1mm



* When machining with larger ap than recommended ap (X), there is a gap (Y) between the workpiece corner and insert corner-R(RE).
* The above figure is estimation. There would be ±0.2mm variation depending on the cutting conditions.

How to mount an insert

1. Be sure to remove dust and chips from the insert mounting pocket.
2. Clamp screw
   (1) Apply anti-seize compound on portion of taper and thread of clamp screw.
   (2) Attach the screw to the front end of the wrench. While lightly pressing the insert against the constraint surfaces, put the screw into the hole of the insert and tighten. (Ref. to Fig. 1)
3. Wrenches and clamp screws are "Torx Plus".
   (1) Fig. 2 wrench is for MRW-12. (Straight grip)
   (2) Fig. 3 wrench is for MRW-16. (T-shaped grip)
   Please use a "Torx Plus" Wrench for tightening cramp screw.
   * If a "Torx" Wrench (Fig. 4) is used to tighten, the screw head might become damaged and then the screw cannot be removed.
4. When tightening the screw, make sure that the wrench is parallel to the screw.
   Recommended tightening torque, see page **M210, M211**
5. After tightening the screw, make sure that there is no clearance between the insert seat surface and the bearing surface of the toolholder or between the insert side surfaces and the constraint surface of the toolholder. If there is any clearance, remove the insert and mount it again according to the above steps.

Fig. 1

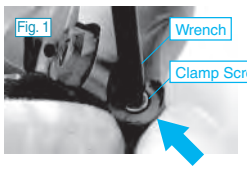
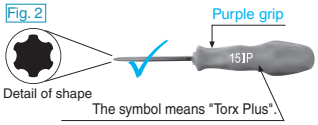
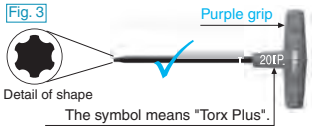


Fig. 2



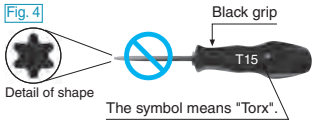
Straight grip wrench for MRW-12

Fig. 3



T-shaped grip wrench for MRW-16

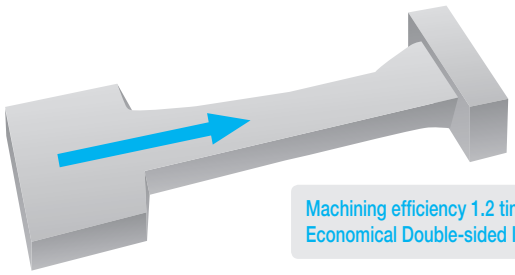
Fig. 4



Torx Wrench (Do NOT use it for MRW)

Case Studies

12Cr Steel



Machining efficiency 1.2 times
Economical Double-sided Insert

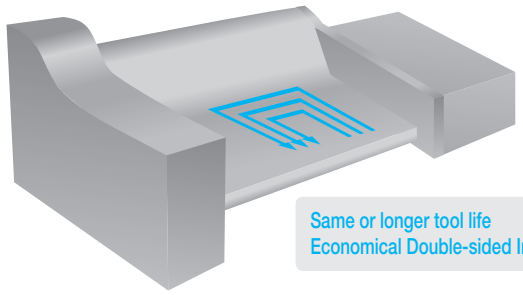
·Turbine Blade ·Vc=270m/min ·fz=0.278mm/t
·ap=0.5~1.0mm ae=max.35mm ·Dry
·MRW050R-12-6T-M (6 Flutes) ·ROMU1204M0ER-SM(CA6535)

CA6535	Stable machining
Competitor A (Positive Cutter)	Unstable machining with large noise

MRW improved machining efficiency by 1.2 times with same tool life compared with Competitor A.
MRW has cost advantage due to double-sided inserts.

(User Evaluation)

12Cr Steel



Same or longer tool life
Economical Double-sided Insert

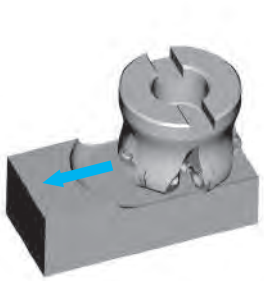
·Turbine Blade ·Vc=250m/min ·fz=0.16mm/t
·ap=2.0mm ae=5~30mm ·Wet
·MRW050R-12-5T-M (5 Flutes) ·ROMU1204M0ER-SM(CA6535)

CA6535	Stable, available for further machining
Competitor B (Positive Cutter)	Unstable machining with large noise

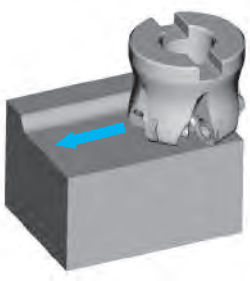
MRW showed less damage on the cutting edge and reduced machining noise.
MRW has equal or longer tool life and cost advantage due to double sided inserts.

(User Evaluation)

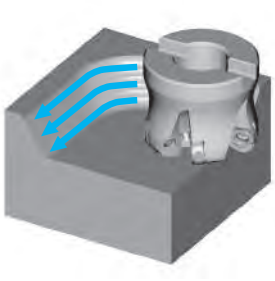
Applications



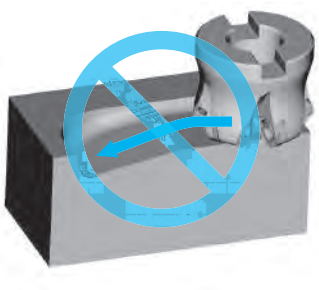
Facing



Shouldering

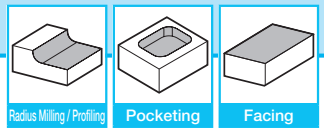


Contouring



Plunging / Profiling

* MRW type is not available for 3D machining such as Plunging and Profiling.

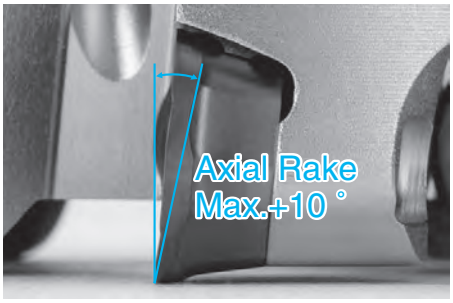




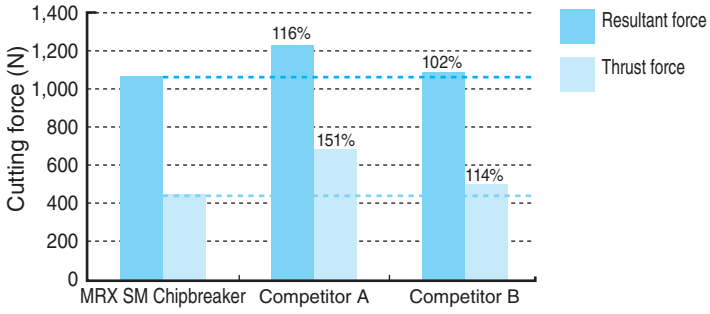
MRX

Excellent cutting performance with low cutting force design High efficiency radius cutter

POINT.1 Low cutting force with helical cutting-edge design



● Cutting Force Comparison (Internal evaluation)



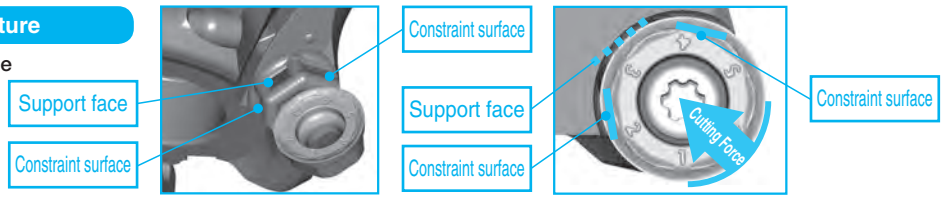
<Cutting Conditions>
Vc=120m/min, ap×ae=2×25mm, fz=0.2mm/t, SUS304, Cutter⌀50

POINT.2 Flat Lock Structure to hold insert firmly

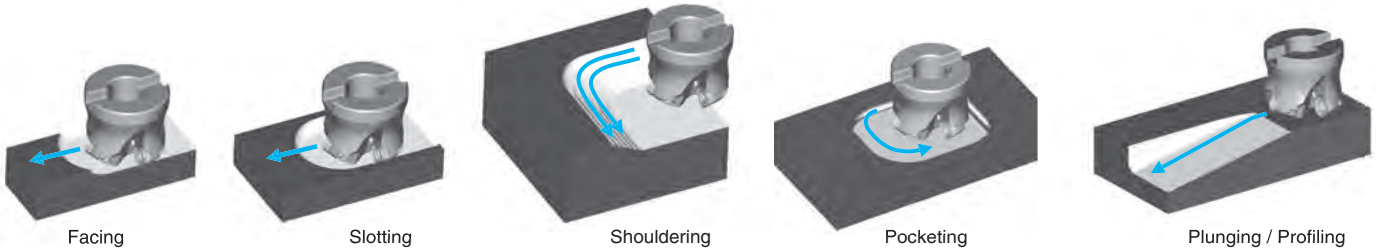
Prevent insert rotation during machining and realizes stable machining

Flat Lock Structure

Wide flat constraint surface
- Receives even cutting forces
- Controls insert rotation



POINT.3 Various applications



POINT.4

Insert grades CA6535 / PR1535 for difficult-to-cut material are available
Long tool life by wide lineup with 4 grades and 3 chipbreakers, available for steel, stainless steel and heat-resistant alloys

Cost-effective M class inserts are available

MRX Face Mill



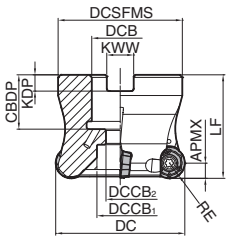


Fig. 1

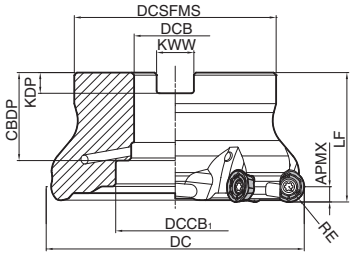


Fig. 2

Toolholder Dimensions

	Description	Stock	No. of Inserts	Dimension (mm)											Rake Angle		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				RE	DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	A.R.	R.R.				
Metric	MRX 040R-10-5T-M	●	5	5	40	38	16	15	9	40	19	5.6	8.4	5	+10°	-5.5°	Yes	Fig. 1	0.2	20,000
	050R-10-6T-M	●	6		50	48	22	18	11		21	6.3	10.4						0.3	17,500
	063R-10-7T-M	●	7		63	60													0.6	15,000
	MRX 040R-12-4T-M	●	4	6	40	38	16	13.5	9	40	19	5.6	8.4	6	+10°	-5.5°		Fig. 1	0.2	21,000
	050R-12-4T-M	●	4		50	48	22	18	11		21	6.3	10.4						0.3	18,000
	050R-12-5T-M	●	5																0.3	18,000
	063R-12-5T-M	●	5		63	60													0.6	15,500
	063R-12-6T-M	●	6																0.6	15,500
	080R-12-6T-M	●	6		80	70	27	20	13	50	24	7	12.4						1.2	13,500
	080R-12-8T-M	●	8																1.1	13,500
	100R-12-7T-M	●	7		100	78	32	46	-		30	8	14.4					Fig. 2	1.4	12,000
	100R-12-9T-M	●	9																1.4	12,000
	MRX 063R-16-4T-M	●	4	8	63	60	22	18	11	40	21	6.3	10.4	8	+10°	-5.5°		Fig. 1	0.5	13,500
	063R-16-5T-M	●	5																0.5	13,500
	080R-16-5T-M	●	5		80	70	27	20	13	50	24	7	12.4						1.1	11,500
	080R-16-6T-M	●	6																1.1	11,500
	100R-16-6T-M	●	6		100	78	32	46	-		30	8	14.4					Fig. 2	1.4	10,000
	100R-16-7T-M	●	7																1.4	10,000
	125R-16-6T-M	●	6		125	89	40	55		63	33	9	16.4						2.6	9,000
	125R-16-8T-M	●	8																2.6	9,000
Bore Dia. Inch spec	MRX 080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	6	+10°	-5.5°		Fig. 1	1.2	13,500
	080R-12-8T	●	8																1.1	13,500
	100R-12-7T	●	7		100	78	31.75	46	-		34	8	12.7					Fig. 2	1.5	12,000
	100R-12-9T	●	9																1.5	12,000
	MRX 080R-16-5T	●	5	8	80	70	25.4	20	13	50	27	6	9.5	8	+10°	-5.5°		Fig. 1	1.1	11,500
	080R-16-6T	●	6																1.1	11,500
	100R-16-6T	●	6		100	78	31.75	46	-		34	8	12.7					Fig. 2	1.4	10,000
	100R-16-7T	●	7																1.4	10,000
	125R-16-6T	●	6		125	89	38.1	55		63	38	10	15.9						2.7	9,000
	125R-16-8T	●	8																2.7	9,000

Spare Parts and Applicable Inserts

Description	Spare Parts: Clamp Screw	Wrench: DTPM	Wrench: TTP	Anti-seize Compound	Mounting bolt	Applicable Inserts M19
MRX 040R-10...	SB-3070TRP	DTPM-10		P-37	HH8X25	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH *1
050R-10...	Recommended tightening torque for Insert Clamp 2.0N·m				HH10X30	
063R-10...						
MRX 040R-12...	SB-4090TRPN	DTPM-15		P-37	HH8X25	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH *2
050R-12...					HH10X30	
063R-12...						
080R-12...	Recommended tightening torque for Insert Clamp 3.5N·m				HH12X35	
100R-12...					-	
MRX 063R-16...	SB-50120TRP	TTP-20		P-37	HH10X30	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH *3
080R-16...					HH12X35	
100R-16...	Recommended tightening torque for Insert Clamp 4.5N·m				-	
125R-16...						

● Max. Revolution

Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

● Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

*1··· Not compatible with the conventional RPMT10T3M0.
*2··· Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.
*3··· Not compatible with the conventional RPMT1606M0-H.

Recommended Cutting Conditions M218

● : Std. Item

MRX End Mill



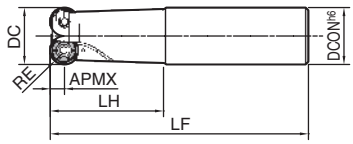


Fig. 1

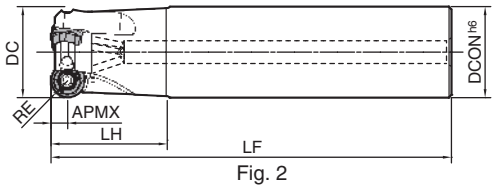


Fig. 2

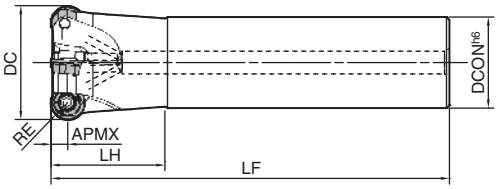


Fig. 3

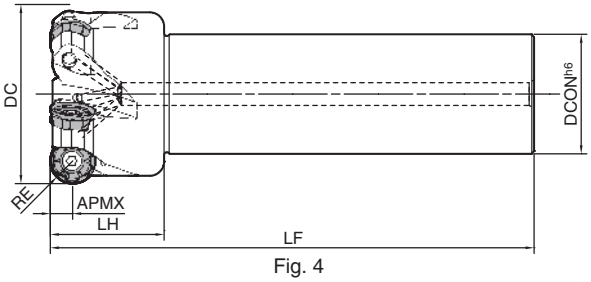


Fig. 4



Fig. 5

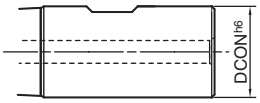


Fig. 6

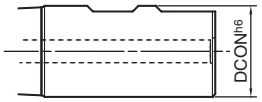


Fig. 7

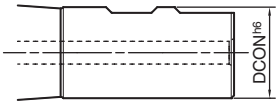


Fig. 8

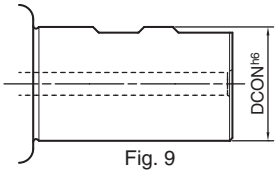


Fig. 9

Toolholder Dimensions

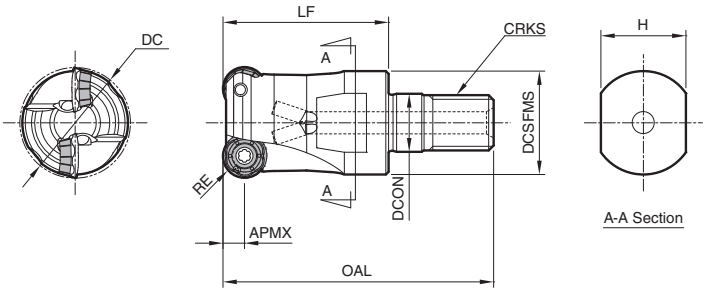
	Description	Stock	No. of Inserts	Dimension (mm)						Rake Angle		Coolant Hole	Drawing	Max. Revolution (min^{-1})
				RE	DC	DCON	LF	LH	APMX	A.R. (MAX.)	R.R.			
Cylindrical	MRX 16-S16-08-2T	●	2	4	16	16	110	40	4.0	+3°	-5.5°	No	Fig. 1	38,000
	20-S20-08-2T	●	2		20	20	120			+10°		Yes	Fig. 2	32,000
	25-S25-08-4T	●	4		25	25								28,000
	MRX 20-S20-10-2T	●	2	5	20	20	120	40	5.0	+5°	-8°	No	Fig. 1	30,000
	25-S25-10-3T	●	3		25	25				+10°	-5.5°	Yes	Fig. 2	28,000
	32-S32-10-4T	●	4		32	32	140							22,500
	MRX 32-S32-12-3T	●	3	6	32	32	140	40	6.0	+10°	-5.5°	Yes	Fig. 2	24,500
	40-S32-12-4T	●	4		40								Fig. 3	21,000
	50-S42-12-5T	●	5		50	42	170							18,000
	MRX 40-S32-16-2T	●	2	8	40	32	140	40	8.0	+10°	-5.5°	Yes	Fig. 3	18,000
	50-S42-16-4T	●	4		50	42	170							15,500
	63-S42-16-5T	●	5		63								Fig. 4	13,500
Weldon	MRX 16-W16-08-2T	●	2	4	16	16	89	40	4.0	+3°	-5.5°	No	Fig. 5	38,000
	20-W20-08-2T	●	2		20	20	91			+10°		Yes	Fig. 6	32,000
	25-W25-08-4T	●	4		25	25	97						Fig. 7	28,000
	MRX 20-W20-10-2T	●	2	5	20	20	91	40	5.0	+5°	-8°	No	Fig. 5	30,000
	25-W25-10-3T	●	3		25	25	97			+10°	-5.5°	Yes	Fig. 7	28,000
	32-W32-10-4T	●	4		32	32	101							22,500
	MRX 32-W32-12-3T	●	3	6	32	32	101	40	6.0	+10°	-5.5°	Yes	Fig. 7	24,500
	40-W32-12-4T	●	4		40								Fig. 8	21,000
	50-W40-12-5T	●	5		50	40	111							18,000
	MRX 40-W32-16-2T	●	2	8	40	32	101	40	8.0	+10°	-5.5°	Yes	Fig. 8	18,000
	50-W40-16-4T	●	4		50	40	111							15,500
	63-W40-16-5T	●	5		63		112						Fig. 9	13,500
Long Shank	MRX 16-S16-08-2T-160	●	2	4	16	16	160	70	4.0	+3°	-5.5°	No	Fig. 1	38,000
	20-S20-08-2T-180	●	2		20	20	180	80		+10°		Yes	Fig. 2	32,000
	25-S25-08-4T-180	●	4		25	25								28,000
	MRX 20-S20-10-2T-180	●	2	5	20	20	180	80	5.0	+5°	-8°	No	Fig. 1	30,000
	25-S25-10-2T-180	●	2		25	25				+10°	-5.5°	Yes	Fig. 2	28,000
	32-S32-10-4T-200	●	4		32	32	200							22,500
	MRX 32-S32-12-2T-200	●	2	6	32	32	200	80	6.0	+10°	-5.5°	Yes	Fig. 2	24,500
	40-S32-12-4T-200	●	4		40			40					Fig. 3	21,000
	50-S42-12-4T-300	●	4		50	42	300							18,000
	MRX 40-S32-16-2T-200	●	2	8	40	32	200	40	8.0	+10°	-5.5°	Yes	Fig. 3	18,000
	50-S42-16-4T-300	●	4		50	42	300							15,500
	63-S42-16-4T-300	●	4		63								Fig. 4	13,500

- **Max. Revolution**
  Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

● : Std. Item

MRX Head





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm) RE	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	Rake Angle A.R. (MAX.)	Rake Angle R.R.	Coolant Hole	Applicable Inserts	Max. Revolution (min^{-1})
MRX 16-M08-08-2T	●	2	4	16	14.7	8.5	42	25	M8xP1.25	12	4	+3°	-5.5°	No	RDMT08 RDGT08	38,000
20-M10-08-2T	●	2		20	18.7	10.5	48	30	M10xP1.5	15		+10°		Yes		32,000
25-M12-08-4T	●	4		25	23	12.5	56	35	M12xP1.75	19						28,000
MRX 20-M10-10-2T	●	2	5	20	18.7	10.5	48	30	M10xP1.5	15	5	+5°	-8°	No	RPMT10 RPGT10	30,000
25-M12-10-3T	●	3		25	23	12.5	56	35	M12xP1.75	19		+10°	-5.5°	Yes		28,000
32-M16-10-4T	●	4		32	30	17	62	40	M16xP2.0	24						22,500
MRX 32-M16-12-3T	●	3	6	32	30	17	62	40	M16xP2.0	24	6	+10°	-5.5°	Yes	RPMT12 RPGT12	24,500
40-M16-12-4T	●	4		40												21,000
MRX 40-M16-16-2T	●	2	8	40	30	17	62	40	M16xP2.0	24	8	+10°	-5.5°	Yes	RPMT16 RPGT16	18,000

See page ➔ **M60** for applicable arbor (BT arbor for exchangeable head / double-face clamping spindle)

Spare Parts and Applicable Inserts

Description	Clamp Screw	Wrench DTPM	Wrench TTP	Anti-seize Compound	Applicable Inserts ➔ M19
MRX ...-08...	SB-2555TRP	DTPM-8		P-37	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM RDMT0803M0EN-GH *1
	Recommended tightening torque for Insert Clamp 1.2N·m				
MRX ...-10...	SB-3070TRP	DTPM-10		P-37	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH *2
	Recommended tightening torque for Insert Clamp 2.0N·m				
MRX ...-12...	SB-4090TRPN	DTPM-15		P-37	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH *3
	Recommended tightening torque for Insert Clamp 3.5N·m				
MRX ...-16...	SB-50120TRP	TTP-20		P-37	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH *4
	Recommended tightening torque for Insert Clamp 4.5N·m				

- Max. Revolution
  Do not use the cutter at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.
- Coat Anti-seize Compound thinly on portion of taper and thread when insert is fixed.

*1··· Not compatible with the conventional RDMT08T2M0-H.
*2··· Not compatible with the conventional RPMT10T3M0.
*3··· Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.
*4··· Not compatible with the conventional RPMT1606M0-H.

Recommended Cutting Conditions ➔ **M218**

● : Std. Item

Recommended Cutting Conditions

Workpiece Material	Recommended Chipbreaker (fz : mm/t) * RD**08 type : ap=2mm, RP**10 type : ap=2.5mm RP**12 type : ap=3mm, RP**16 type : ap=4mm				Recommended Insert Grades (Cutting Speed Vc : m/min)			
					MEGACOAT NANO			CVD Coated Carbide
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	PR1535	PR1525	PR1510	CA6535
Carbon Steel	★ 0.1~**0.2**~0.3	☆ 0.1~**0.2**~0.3	☆ 0.06~**0.15**~0.2	☆ 0.15~**0.3**~0.35	☆ 120~**180**~250	★ 120~**180**~250	-	-
Alloy Steel	★ 0.1~**0.2**~0.3	☆ 0.1~**0.2**~0.3	☆ 0.06~**0.15**~0.2	☆ 0.15~**0.3**~0.35	☆ 100~**160**~220	★ 100~**160**~220	-	-
Mold Steel	★ 0.1~**0.15**~0.25	☆ 0.1~**0.15**~0.25	☆ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.3	☆ 80~**140**~180	★ 80~**140**~180	-	-
Stainless Steel (Austenitic related)	☆ 0.1~**0.15**~0.2	☆ 0.1~**0.15**~0.2	★ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.25	★ 100~**160**~200	☆ 100~**160**~200	-	-
Stainless Steel (Martensitic related)	☆ 0.1~**0.15**~0.2	☆ 0.1~**0.15**~0.2	★ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.25	☆ 150~**200**~250	-	-	★ 180~**240**~300
Stainless Steel (Precipitation Hardening)	☆ 0.1~**0.15**~0.2	★ 0.1~**0.15**~0.2	☆ 0.06~**0.12**~0.2	☆ 0.15~**0.2**~0.25	★ 90~**120**~150	-	-	-
Gray Cast Iron	★ 0.1~**0.2**~0.3	☆ 0.1~**0.2**~0.3	-	☆ 0.15~**0.3**~0.35	-	-	★ 120~**180**~250	-
Nodular Cast Iron	★ 0.1~**0.15**~0.25	☆ 0.1~**0.15**~0.25	-	☆ 0.15~**0.2**~0.3	-	-	★ 100~**150**~200	-
Ni-base heat-resistant alloys	☆ 0.1~**0.12**~0.15	★ 0.1~**0.12**~0.15	☆ 0.06~**0.1**~0.15	☆ 0.12~**0.15**~0.2	☆ 20~**30**~50	-	-	★ 20~**30**~50
Titanium Alloys	☆ 0.1~**0.12**~0.15	☆ 0.1~**0.12**~0.15	★ 0.06~**0.1**~0.15	-	★ 40~**60**~80	-	☆ 30~**50**~70	-

* Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys.
★ : 1st Recommendation ☆ : 2nd Recommendation
* RDGT/RPGT are recommended for stainless steel, Ni-base heat-resistant alloys and titanium alloy.
* The bold-faced number indicates a center value of recommended cutting condition. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
* Recommended feed rate in the table is the reference value when ap is RE/2. (2mm for RD**08 / 2.5mm for RP**10 / 3mm for RP**12 / 4mm for RP**16)
For other ap, calculate the recommended feed rate based on the conversion factor below.
* For MRX16-S16-08-2T(-160), MRX16-W-08-2T, MRX20-S20-10-2T(-180) and MRX20-W20-10-2T, set the feed rate not higher than 50% of the recommended cutting conditions.

Conversion factor for feed per tooth by depth of cut (ap)

Insert	Max. ap	Conversion factor for feed per tooth fz									
		ap=0.5mm	ap=1mm	ap=1.5mm	ap=2mm	ap=2.5mm	ap=3mm	ap=4mm	ap=5mm	ap=6mm	ap=8mm
RD**08 type (GM/SM/GH chipbreaker)	4mm	1.7	1.3	1.1	1 (Standard)	0.9	0.8	0.8	-	-	-
RP**10 type (GM/SM/GH chipbreaker)	5mm	1.9	1.4	1.2	1	1 (Standard)	0.9	0.8	0.8	-	-
RP**12 type (GM/SM/GH chipbreaker)	6mm	2.1	1.5	1.3	1.1	1	1 (Standard)	0.9	0.8	0.8	-
RP**16 type (GM/SM/GH chipbreaker)	8mm	2.4	1.7	1.4	1.3	1.1	1.1	1 (Standard)	0.9	0.8	0.8

* Example (RPMT12 type, Carbon Steel, GM chipbreaker, ap=1mm)

fz=0.2mm/t (Reference value for carbon steel and GM chipbreaker) × **1.5** (Conversion factor for RP**12 type, ap=1mm) = **fz=0.3mm/t** (Recommended feed rate)

Recommended cutting conditions for Drilling / Ramping / Helical milling

Tool spec.		Max. ap	Drilling		Ramping (Slant Milling)			Helical Milling		
Insert	Tool Dia.	ap	Max. Cutting Depth Pd	Min. cutting length X for flat bottom surface	Max. ramping angle RMPX	tan RMPX	Cutting Length L at Max. Ramping Angle	Min. Cutting Dia. øDh1	Min. Cutting Dia. for flat bottom facing øDh2	Max. Cutting Dia. øDh3
RD**08 type	16	4	0.7	9	8°	0.141	28	20	24	30
	20		1.4	13	9°	0.158	25	26	32	38
	25			18	5°	0.087	45	36	42	48
RP**10 type	20	5	0.6	11	5°	0.087	57	26	30	38
	25		1.9	16	10°	0.176	28	33	40	48
	32			23	6°	0.105	47	47	54	62
	40			31	4°	0.070	71	63	70	78
	50			41	3°	0.052	95	83	90	98
	63			54	2°	0.035	143	109	116	124
RP**12 type	32	6	2.4	21	9°	0.158	37	43	52	62
	40			29	5°	0.087	68	59	68	78
	50			39	4°	0.070	85	79	88	98
	63			52	2°	0.035	171	105	114	124
	80			69				139	148	158
	100			89	1°	0.017	343	179	188	198
RP**16 type	40	8	3.4	25	11°	0.194	41	51	64	78
	50			35	7°	0.123	65	71	84	98
	63			48	4°	0.070	114	97	110	124
	80			65	3°	0.052	152	131	144	158
	100			85	2°	0.035	229	171	184	198
	125			110	1°	0.017	458	221	234	248

* Above is the value considering the clearance 1mm between the tool body and the workpiece.
Unit : mm

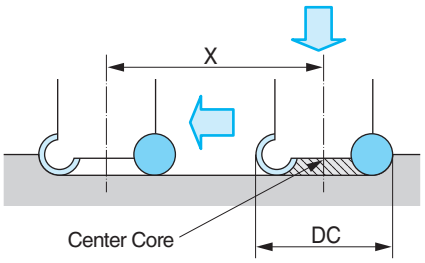
Guide for Drilling

[Depth of Drilling]

Refer to Max. Cutting Depth (Pd) shown in the lower table of **M218**.
(Pd Shows the maximum plunge depth.)

[When Traversing after Drilling]

(1) Reduce the table feed by 50% until the center core part (do not forget to grind) is completely cut off.
(The internal cutting edge's radial rake angle is large in the negative direction)
(2) The min. cutting length "X" for flat bottom surface is as follows **M218**.

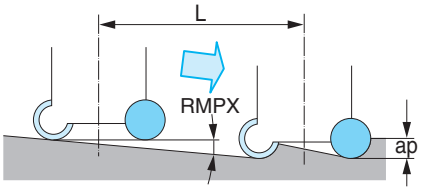


Guide for Ramping (Slant Milling)

· Ramping angle should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
· Feed rate should be 70% or under of the above cutting conditions.

Formula of the cutting length "L" at Max. ramping angle

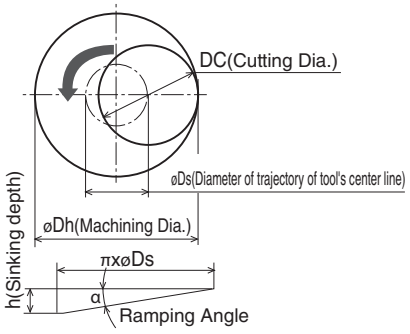
$$L = \frac{ap}{\tan RMPX}$$



Guide for Helical milling

· Sinking depth (h) per revolution when helical milling should be Max. ap or under in the above cutting conditions. Ramping angle α (with trajectory of the center line of tool) should be RMPX (Maximum ramping angle) or under in the above cutting conditions.
· Feed rate should be 70% or under of the above cutting conditions.
· Down-cut machining is recommended.

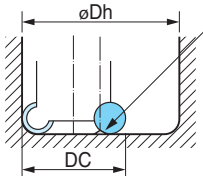
Helical Milling Factors



øDs (How to find diameter of trajectory of tool's center line)
øDs=øDh-DC

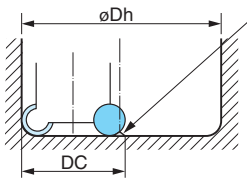
Formula for sinking depth (h)
h=π x øDs x tan α
(h should be ap or under)
(α should be RMPX or under)

[When cutting dia. øDh1≤øDh<øDh2]



Center core part remains after machining.
(Not removable with the same cutter)

[When cutting dia. øDh2≤øDh≤øDh3]



Center core part remains after machining.
(Removable by traversing with the same cutter)

Please refer to M218 the list for øDh1 ~ Dh3.

Max. ap and usable edges

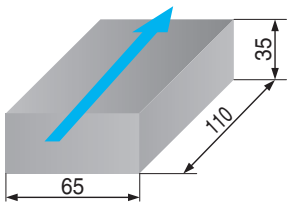
(mm)

Usable edges	Insert Corner-R			
	R4	R5	R6	R8
3 edges	ap=2.0~4.0	ap=2.5~5.0	ap=3.0~6.0	ap=4.0~8.0
6 edges	ap=2.0 Less than	ap=2.5 Less than	ap=3.0 Less than	ap=4.0 Less than

Case Studies

SUS304

· Nozzle parts
· Vc = 113m/min
· ap x ae = 1.0 x 65mm
· fz = 0.14mm/t
· Dry
· MRX100R-12-9T-M (9 Flutes)
· RPGT1204M0ER-SM (PR1535)



4.5 times longer tool life

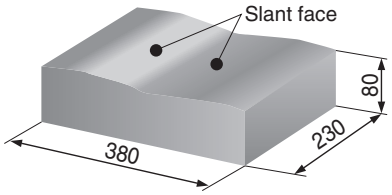
PR1535	450 pcs/edge
Conventional	100 pcs/edge

· High cost efficiency with 4.5 times longer tool life and 1.5 times more insert edges.
· MRX prevented burr formation and improved surface finish.

(User Evaluation)

SKD61(47~49HRC)

· Mold Part
· Vc = 125m/min
· ap x ae = 1.0~2.0 x 10mm
· fz = 0.25mm/t
· Dry
· MRX20-S20-08-2T (2 Flutes)
· RDGT0803M0ER-GM (PR1525)



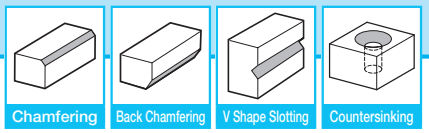
More than double tool life

PR1525	2 pcs and more Stable tool life
Conventional	1 pc Unstable tool life

· Conventional tool machined only 1 pc of workpiece due to unstable tool life, but MRX doubled the tool life with stable machining.

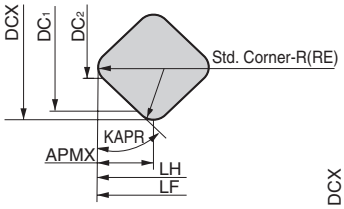
(User Evaluation)

Chamfering End Mill MCSE



MCSE





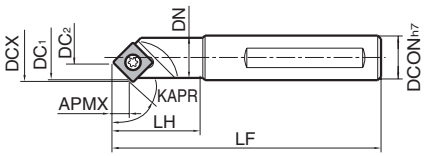


Fig. 1

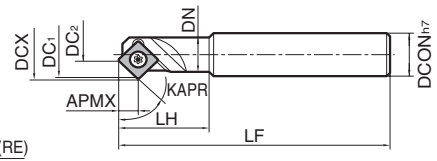


Fig. 2

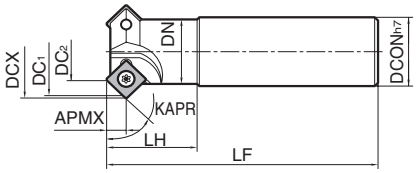


Fig. 3

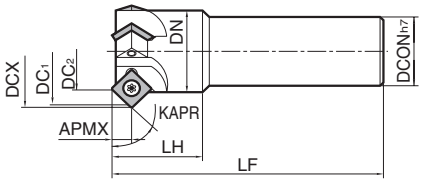


Fig. 4

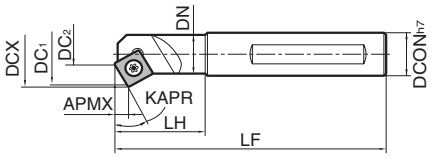


Fig. 5

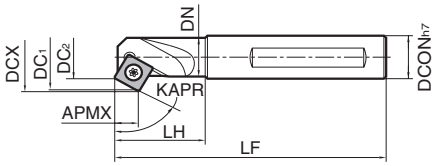
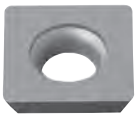


Fig. 6

Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm)								Std. Corner-R(RE)	Angle	Rake Angle		Drawing	Spare Parts	
				DCX	DC_1	DC_2	DCON	DN	LF	LH	APMX		KAPR	A.R.	R.R.		Clamp screw	Wrench
MCSE	104	●		16	15	4	16	15	85	31	6.5	0.4	45°	0°	-4.5°	Fig. 1	SB-3060TR	DT-10
	106	●	1	22	21	6	20	16	121	41	8.6	0.8			-1°	Fig. 2	SB-5090TR	LTW-20
	115	●		31	30	15		18							+5°			
	227	●	2	43	42	27	32	30							+8°	Fig. 3		
	336	●	3	52	51	36		38							+10°	Fig. 4		
MCSE	104-30D	●		19	18	4	16	15	85	31	4.7	0.4	30°	0°	-4°	Fig. 5	SB-3060TR	DT-10
	108-30D	●		28	27	8	20	19	110	41	6.3	0.8			-2.5°		SB-5090TR	LTW-20
	110-30D	●	1	30	28	10		18	120	40					0°			
MCSE	108-60D	●		19.5	19	8	20	19	110	41	10	0.8	60°	0°	-3.5°	Fig. 6	SB-5070TR	LTW-20
	120-60D	●		31	30	20		18	120	40					0°		SB-5090TR	

Applicable Inserts

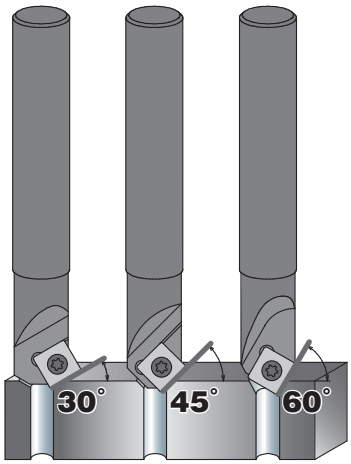
Description		Applicable Inserts ➡ M26		
				
MCSE	104 104-30D	SDKW 09T204TN	SDKW 09T204FN	SDMT 09T204C
MCSE	106 115 227 336	SEKW 120304TN 120308TN	SEKW 120304FN 120308FN	SEMT 120304C
MCSE	108-30D 110-30D			
MCSE	108-60D 120-60D			

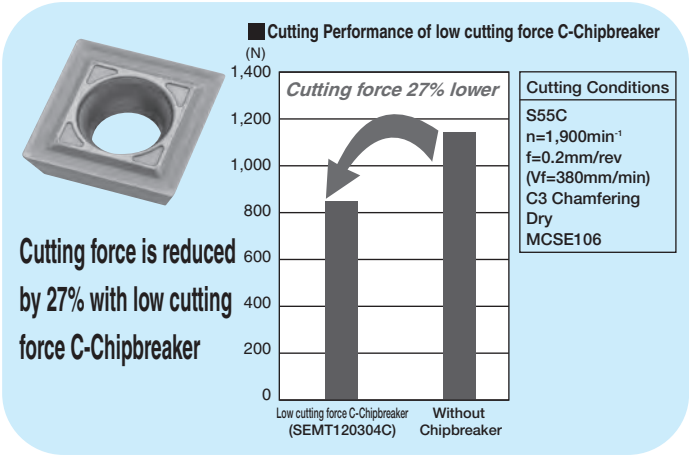
● : Std. Item

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grades (Cutting Speed Vc : m/min)		
			Cermet	MEGACOAT	Carbide
	DC_2 (ø4~ø20)	DC_2 (ø27~ø36)	**TN100M**	**PR1225**	**KW10**
Carbon Steel	0.05~0.25	0.2~0.4	★ 100~180	★ 120~250	-
Alloy Steel	0.05~0.25	0.2~0.4	★ 100~180	★ 100~220	-
Mold Steel	0.05~0.25	0.2~0.4	★ 100~150	★ 80~180	-
Stainless Steel	0.05~0.2	0.1~0.3	☆ 100~180	★ 120~220	-
Cast Iron	0.1~0.3	0.3~0.5	-	-	☆ 80~150
Non-ferrous Metals	0.1~0.3	0.3~0.5	-	-	★ 100~300

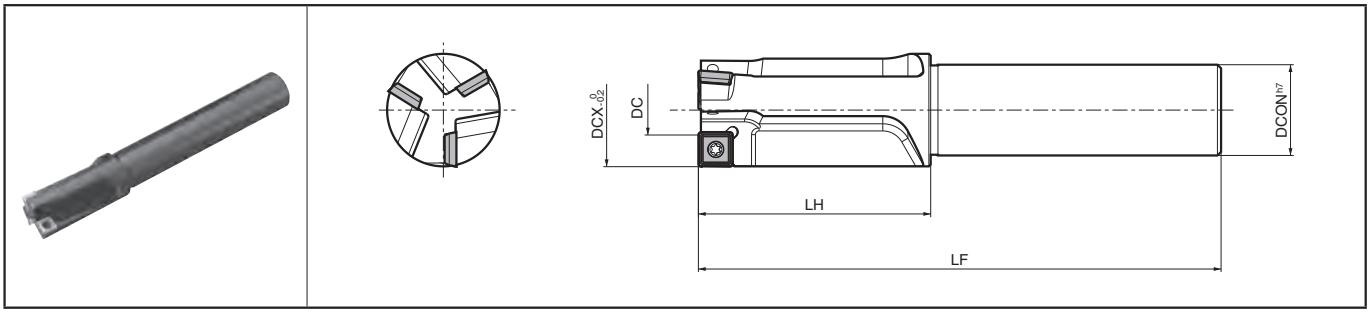
★ : 1st Recommendation ☆ : 2nd Recommendation





Bolt Countersink End Mill MEF

MEF

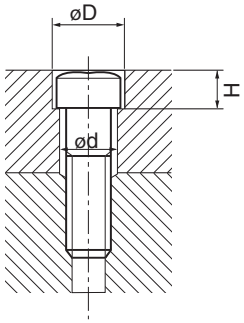


Toolholder Dimensions

Description		Stock	No. of Inserts	Dimension (mm) DCX	DC	DCON	LF	LH	Std. Corner-R(RE)	Rake Angle A.R.	R.R.	Objective Bolt Size	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ M28
MEF	11-S10	●	1	11	3.0	10	103	23	0.4	+5°	-13°	M6	SB-2250TR	DT-7	SPMT060204E-Z 060208E-Z
	14-S12	●	1	14	4.5	12	108	28	0.4	+5°	-13°	M8	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	17-S16	●	2	17.5	7.3	16	115	35	0.4	+5°	-13°	M10	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	18-S16	●	2	18	7.7	16	117	38	0.4	+5°	-13°	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	20-S16	●	3	20	9.5	16	120	40	0.4	+5°	-12°	M12	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	22-S20	●	3	22	11.4	20	124	44	0.4	+5°	-12°	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	23-S20	●	3	23	12.4	20	126	46	0.4	+5°	-12°	M14	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	24-S20	●	3	24	13.4	20	128	48	0.4	+5°	-12°	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	25-S20	●	3	25	14.4	20	130	50	0.4	+5°	-12°	-	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	26-S25	●	3	26	9.8	25	132	52	0.8	+5°	-13°	M16	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	27-S25	●	3	27	10.6	25	134	54	0.8	+5°	-13°	-	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	28-S25	●	3	28	11.5	25	136	56	0.8	+5°	-13°	-	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	29-S25	●	3	29	12.6	25	138	58	0.8	+5°	-13°	M18	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	30-S25	●	3	30	13.5	25	140	60	0.8	+5°	-13°	-	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	32-S25	●	3	32	15.5	25	144	64	0.8	+5°	-13°	M20	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	35-S32	●	3	35	18.4	32	150	70	0.8	+5°	-13°	M22	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	39-S32	●	4	39	22.5	32	158	78	0.8	+5°	-13°	M24	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	43-S32	●	4	43	26.2	32	166	86	0.8	+5°	-12°	M27	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	48-S32	●	4	48	31.3	32	176	96	0.8	+5°	-12°	M30	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z

· Although Corner-R(RE) pertains to MEF11-S10, DC=3.0mm.

Bolt Countersink (Hexagon Socket Head Cap Screw)



Nominal Screw Size	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
øD (mm)	11	14	17.5	20	23	26	29	32	35	39	43	48
H (mm)	6.5	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5	29	32
ød (mm)	6.6	9	11	14	16	18	20	22	24	26	30	33
Applicable End Mill	MEF11	MEF14	MEF17	MEF20	MEF23	MEF26	MEF29	MEF32	MEF35	MEF39	MEF43	MEF48

● : Std. Item

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)		
		MEGACOAT		Carbide
		PR1225	**PR1210**	**KW10**
Carbon Steel	0.1~0.15	★ 120~220	-	-
Alloy Steel	0.1~0.15	★ 120~220	-	-
Mold Steel	0.05~0.1	★ 100~180	-	-
Stainless Steel	0.05~0.1	★ 80~180	-	-
Cast Iron	0.1~0.2	-	★ 100~220	☆ 80~120
Non-ferrous Metals	0.1~0.2	-	-	★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

Points at Bolt Countersinking

(1) Carbon Steel

Increase the feed rate to **fz=0.1 ~ 0.15 (mm/t)** for preventing long chips at low feed rates.
Chip control is good when setting **(Vc=80m/min)** for **MEF11~MEF25**, and **(Vc=120m/min)** for **MEF26~MEF48**.

Toolholder Description	Cutting Speed Vc(m/min)	fz(mm/t)
MEF11~MEF25	80	0.1~0.15
MEF26~MEF48	120	0.1~0.15

(2) Sticky Materials

Step feed is recommended for good chip control
Increase the feed rate to fz=0.1 ~ 0.15 (mm/t) for preventing long chips at low feed rate (fz=0.05mm/t).
Use cover to prevent accidents or injury by thick chips at higher feed rates.

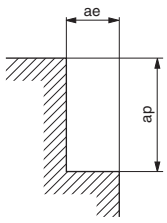
Toolholder Description	Cutting Speed Vc(m/min)	fz(mm/t)	Step Feed(mm)
MEF11~MEF48	80~150	0.1~0.15	0.5~1.5

(3) Stainless Steel

Use a lower Cutting Speed. High Cutting Speeds cause chattering.

Cutting Performance when Shouldering

MEF Bolt Countersink End Mill
is also recommended of shouldering.



Vc=80~120m/min
S55C
Dry
Overhang Length : Same as LH in the dimension table

· When shouldering, both side edge and bottom edges function.
Both edges wear at the same time depending on ap.
The insert uses 2 edges instead of 4. (Fig. 1)

· MEF type's side edge is designed to have a slight clearance for the countersinking.
Therefore, worked side wall is approx. 1˚ inclined against the vertical face.
(Fig. 2)

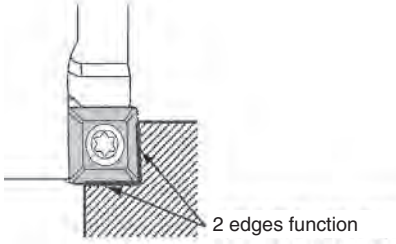


Fig. 1

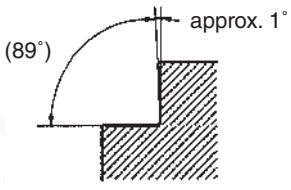
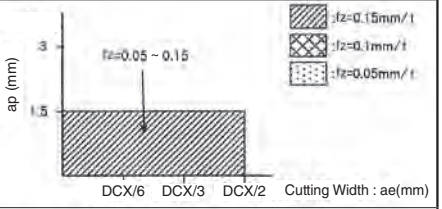
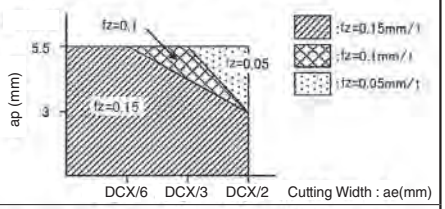
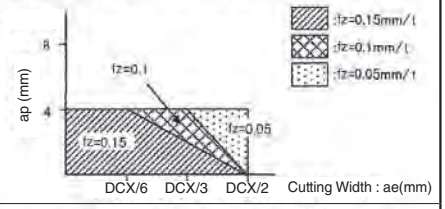
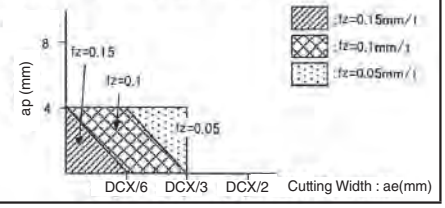


Fig. 2

Description	Cutting Range
MEF11-S12 **MEF14-S12** **MEF17-S16** **MEF18-S16**	
MEF20-S16 **MEF22-S20** ~ **MEF25-S20**	
MEF26-S25 ~ **MEF32-S25** **MEF35-S32**	
MEF39-S32 **MEF43-S32** **MEF48-S32**	

METS



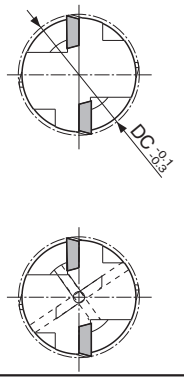


Fig. 1

Fig. 2

Toolholder Dimensions

Description		Stock	No. of Inserts	No. of Flutes	Dimension (mm) DC	DCON	DN	CW	LF	LU	L1	L2	L3	Rake Angle A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ M26
METS	21-S25	●	2	1	21	25	10.5	9	109	29	32	12	17	+9°	-10°	Fig. 1	SB-2560TR	DT-8	SDMT060304E-K
	25-S25	●	4	2	25		12.5	11	112	32									
	32-S32	●	4	2	32	32	15.5	14	120	38	36	14	19		-12°		SB-3060TR	DT-10	SDMT080308E-K
	40-S32	●			40		20.5	18	130	50							SB-4085TR	DT-15	SDMT120408E-K
	50-S32	●			50		26.5	22	140	60									
METS	21-S25-H	●	2	1	21	25	10.5	9	109	29	32	12	17	+9°	-10°	Fig. 2	SB-2560TR	DT-8	SDMT060304E-K
	25-S25-H	●	4	2	25		12.5	11	112	32									
	32-S32-H	●	4	2	32	32	15.5	14	120	38	36	14	19		-12°		SB-3060TR	DT-10	SDMT080308E-K
	40-S32-H	●			40		20.5	18	130	50							SB-4085TR	DT-15	SDMT120408E-K
	50-S32-H	●			50		26.5	22	140	60									

· METS...-H has air holes

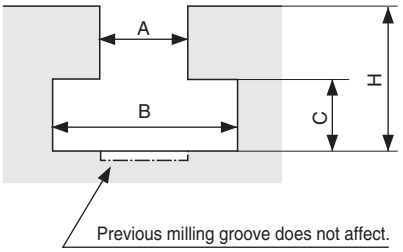
Applicable Inserts

Description		Applicable Inserts ➔ M26
METS	21-S25 21-S25-H 25-S25 25-S25-H	SDMT 060304E-K
METS	32-S32 32-S32-H	SDMT 080308E-K
METS	40-S32 40-S32-H 50-S32 50-S32-H	SDMT 120408E-K

JIS Standard of T-Slot (Extracted from B0952)

(Unit : mm)

A (Nominal Size)	B	C	H Max.	H Min.
12	19^{+2}_{0}	8^{+1}_{0}	25	20
14	23^{+2}_{0}	9^{+2}_{0}	28	23
18	30^{+2}_{0}	12^{+2}_{0}	36	30
22	37^{+3}_{0}	16^{+2}_{0}	45	38
28	46^{+4}_{0}	20^{+2}_{0}	56	48

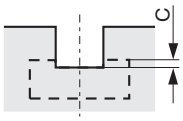
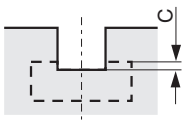
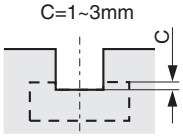
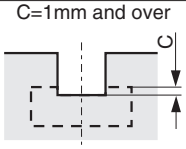
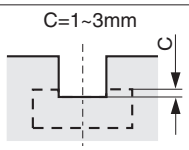
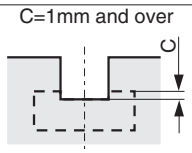
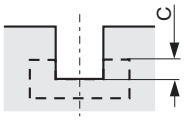
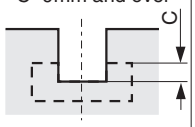
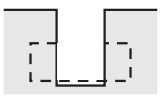


● : Std. Item

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)		
		MEGACOAT		Carbide
		PR1230	**PR1210**	**KW10**
Carbon Steel	0.1~0.15	★ 100~200	-	-
Alloy Steel	0.08~0.12	★ 100~200	-	-
Mold Steel	0.05~0.1	★ 80~150	-	-
Cast Iron	0.1~0.15	-	★ 100~200	☆ 80~120
Non-ferrous Metals	0.1~0.15	-	-	★ 100~300

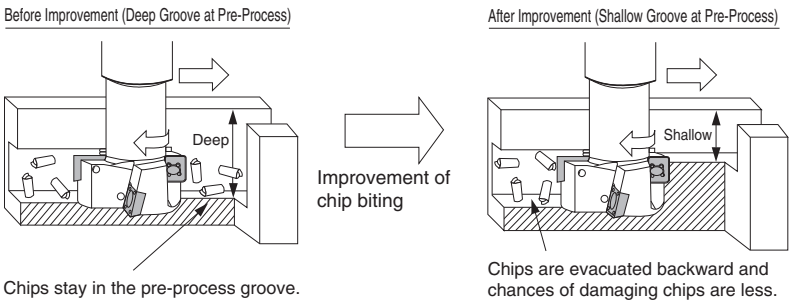
★ : 1st Recommendation ☆ : 2nd Recommendation

Description (T-Slot Nominal Size)	Steel			Cast Iron		
	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering	Groove Shape at Pre-process	T-Slotting Conditions	Conditions to prevent chattering
METS21-S25(-H) (Nominal Size 12)	C=1~3mm 	Vc= 120 fz= 0.1 (n= 1,820) (Vf= 182)	Vc= 60 fz= 0.15 (n= 920) (Vf= 137)	C=1mm and over 	Vc= 120 fz= 0.12 (n= 1,820) (Vf= 218)	Vc= 80 fz= 0.15 (n= 1,210) (Vf= 182)
METS25-S25(-H) (Nominal Size 14)	C=1~3mm 	Vc= 120 fz= 0.1 (n= 1,530) (Vf= 306)	Vc= 60 fz= 0.15 (n= 760) (Vf= 228)	C=1mm and over 	Vc= 120 fz= 0.12 (n= 1,530) (Vf= 367)	Vc= 80 fz= 0.15 (n= 1,020) (Vf= 306)
METS32-S32(-H) (Nominal Size 18)	C=1~3mm 	Vc= 100 fz= 0.1 (n= 1,000) (Vf= 200)	Vc= 60 fz= 0.15 (n= 600) (Vf= 180)	C=1mm and over 	Vc= 120 fz= 0.12 (n= 1,190) (Vf= 286)	Vc= 80 fz= 0.15 (n= 800) (Vf= 240)
METS40-S32(-H) (Nominal Size 22)	C=9mm 	Vc= 80 fz= 0.15 Chattering is likely when set to shallower than C=9mm.	Vz= 60 fz= 0.15 (n= 480) (Vf= 144)	C=9mm and over 	Vc= 120 fz= 0.15 (n= 960) (Vf= 228)	Vc= 80 fz= 0.15 (n= 640) (Vf= 192)
METS50-S32(-H) (Nominal Size 28)	Not recommended for steel because of chattering				Vc= 120 fz= 0.15 (n= 760) (Vf= 228)	Vc= 80 fz= 0.15 (n= 510) (Vf= 153)

[Cutting Speed : Vc(m/min), Revolution : n (min^{-1}), Feed Rate fz(mm/t), Table Feed Vf(mm/min)]

· Chattering is likely when fz is less than fz=0.1mm/t. Keep feed rate between fz=0.1 ~ 0.15mm/t.

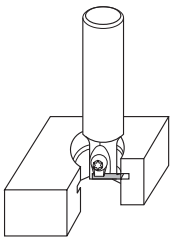
How to prevent damaging chips when steel machining



Make pre-process groove shallower to prevent the tool damage from chips.
Use compressed air to aid in chip evacuation.

MGI





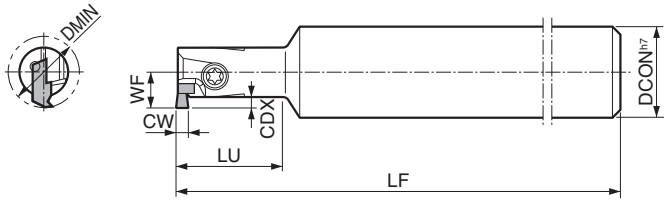


Fig. 1

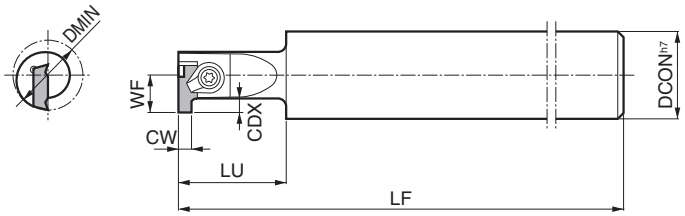


Fig. 2

Toolholder Dimensions

Description		Stock	Min. Bore Dia.	Dimension (mm)					Edge Width	Drawing	Spare Parts				Applicable Inserts ➔ M227
											Clamp Set		Clamp Screw	Wrench	
			DMIN	DCON	LF	LU	WF	CDX	CW		5F	6F		FT / LW	
MGI	1420-1SS	●	14	20	100	20	6.8	2.2	1.0~3.0	Fig. 1	-		SB-4065TR	FT-15	GVR...-020SS
	1620-1S	●	16		110	25	7.8				-		SB-4085TR	FT-15	GVR...-020S
	2020-1A	●	20			30	9.8	2.2	1.0~3.4	Fig. 2	CPS-5F		-	FT-15	GVR...-020A GVR...-...AR
	2220-1B	●	22				11	2.8	1.45~4.0						GVR...-020B GVR...-...BR
	3225-1C	●	32	25	120	35	16	5.5 (4.5)	2.8~4.0		CPS-6F		-	LW-3	GVR...-020C

· CDX shows available grooving depth.

· GVR280-020C, GVR300-020C is available to the groove depth up to 4.5mm.

· GVR430 ~ 500-020C can be installed to MGI3225-1C and 4025-1C, but not recommended for steel machining because of toolholder's rigidity.

Recommended Cutting Conditions

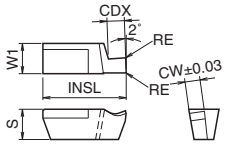
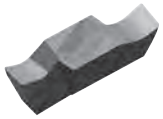
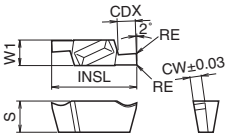
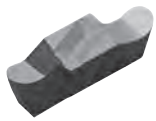
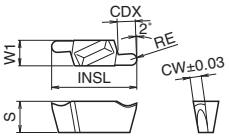
Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)					
		Cermet			MEGA COAT	PVD Coated Carbide	Carbide
		TN90	TC40N	TC60M	PR1225	PR930	KW10
Carbon Steel	0.05~0.15	★ 120~200	☆ 120~200	☆ 100~180	★ 80~150	☆ 80~150	-
Alloy Steel	0.05~0.15	★ 120~200	☆ 120~200	☆ 100~180	★ 80~150	☆ 80~150	-
Mold Steel	0.03~0.12	★ 100~180	☆ 100~180	☆ 80~150	★ 60~130	☆ 60~130	-
Stainless Steel	0.03~0.12	☆ 100~180	☆ 100~180	★ 80~150	★ 60~130	☆ 60~130	-
Cast Iron	0.05~0.2	★ 100~150	☆ 100~150	-	-	-	★ 80~150
Non-ferrous Metals	0.05~0.2	-	-	-	-	-	★ 100~300

· Use down-cut machining.

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item

Applicable Inserts

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)						Insert Grades					
										Cermet			MEGA COAT	PVD Coated Carbide	Carbide
				CW	CDX	RE	W1	INSL	S	TN90	TC40N	TC60M	PR1225	PR930	KW10
 1-edge		GVR	100-020SS	1.00	2.3	0.2	3.6	9	3.0	▲		●	●	●	●
			125-020SS	1.25								●	●	●	●
			145-020SS	1.45						▲		●	●	●	●
			200-020SS	2.00						▲		●	●	●	●
			250-020SS	2.50								●	●	●	●
			300-020SS	3.00								●	●	●	●
		GVR	100-020S	1.00	2.3	0.2	4.0	11	4.0	▲	●	●	●	●	●
			125-020S	1.25						▲	●	●	●	●	●
			145-020S	1.45							●	●	●	●	●
			185-020S	1.85							●	●	●	●	●
			200-020S	2.00						▲	●	●	●	●	●
			250-020S	2.50							●	●	●	●	●
			340-020S	3.40							●	●	●	●	●
 2-edge		GVR	100-020A	1.00	2.3	0.2	4.0	12	5.0	▲	●	●	●	●	●
			125-020A	1.25						▲	●	●	●	●	●
			145-020A	1.45						▲	●	●	●	●	●
			185-020A	1.85							●	●	●	●	●
			200-020A	2.00						▲	●	●	●	●	●
			250-020A	2.50						▲	●	●	●	●	●
			300-020A	3.00						▲	●	●	●	●	●
			340-020A	3.40							●	●	●	●	●
		GVR	145-020B	1.45	2.8	0.2	4.5	15	5.5	▲	●	●	●	●	●
			185-020B	1.85						▲	●	●	●	●	●
			200-020B	2.00	3.2					▲	●	●	●	●	●
			230-020B	2.30						▲	●	●	●	●	●
			250-020B	2.50						▲	●	●	●	●	●
			280-020B	2.80							●	●	●	●	●
			300-020B	3.00	4.2					▲	●	●	●	●	●
			340-020B	3.40							●	●	●	●	●
			400-020B	4.00						▲	●	●	●	●	●
		GVR	280-020C	2.80	4.5	0.2	5.8	21	6.5	▲	●	●	●	●	●
			300-020C	3.00						▲	●	●	●	●	●
			340-020C	3.40	5.5					▲	●	●	●	●	●
			400-020C	4.00						▲	●	●	●	●	●
			(430-020C)	4.30	6.3						●	●	●	●	●
			(460-020C)	4.60							●		●	●	●
			(500-020C)	5.00							●	●	●	●	●
 2-edge Full-R		GVR	200-100AR	2.00	2.3	1.00	4.0	12	5.0			●	●	●	●
			250-125AR	2.50		1.25						●	●	●	●
			300-150AR	3.00		1.50						●	●	●	●
		GVR	200-100BR	2.00	3.2	1.00	4.5	15	5.5	▲		●	●	●	●
			300-150BR	3.00	4.2	1.50				▲		●	●	●	●

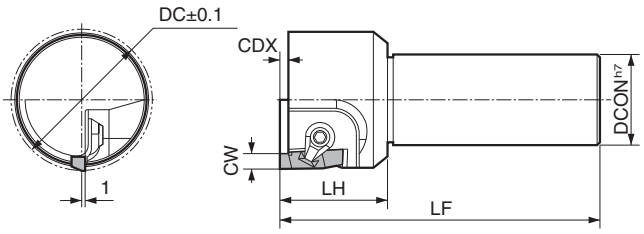
· Only Right-hand insert is applicable.

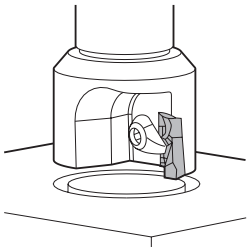
● : Std. Item
▲ : To be replaced by a new product

Ring Grooving End Mill MVG

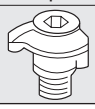
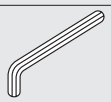
MVG





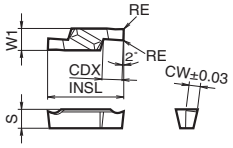


Toolholder Dimensions

Description		Stock	Dimension (mm)					Edge Width	Spare Parts	
									Clamp Set	Wrench
			DC	DCON	LF	LH	CDX	CW		
MVG	3032	●	30	32	120	40	5.2	4.00 ~ 4.90	CPS-6V	LW-3
	3532	●	35							
	4032	●	40							
	4532	●	45							
	5032	●	50							
	5532	●	55							
	6032	●	60							

· CDX shows available grooving depth.

Applicable Inserts

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm)						Insert Grades					
										Cermet			MEGA COAT	PVD Coated Carbide	Carbide
				CW	CDX	RE	W1	INSL	S	TN90	TC40N	TC60M	PR1225	PR930	KW10
		GVFR	400-020B	4.00	5.3	0.2	5.8	20	5.0	▲	●	●	●	●	●
			430-020B	4.30							●	●	●	●	●
			460-020B	4.60							●		●	●	●
			490-020B	4.90							●	●	●	●	●

· GVFR430B-020B is applicable for sealing groove of G-series
For other ring grooving, GVFR400B ~ 490B-020B are applicable.
· Only Right-hand insert is applicable.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)					
		Cermet			MEGA COAT	PVD Coated Carbide	Carbide
		TN90	TC40N	TC60M	PR1225	PR930	KW10
Carbon Steel	0.05~0.15	☆ 100~180	★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Alloy Steel	0.05~0.15	☆ 100~180	★ 120~200	☆ 100~180	★ 80~170	☆ 80~150	-
Mold Steel	0.03~0.12	☆ 80~150	★ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Stainless Steel	0.03~0.12	☆ 80~150	☆ 100~180	☆ 80~150	★ 60~150	☆ 60~130	-
Cast Iron	0.05~0.2		-	-	-	-	★ 80~150
Non-ferrous Metals	0.05~0.2		-	-	-	-	★ 100~300

★ :1st Recommendation ☆ : 2nd Recommendation

● : Std. Item
▲ : To be replaced by a new product



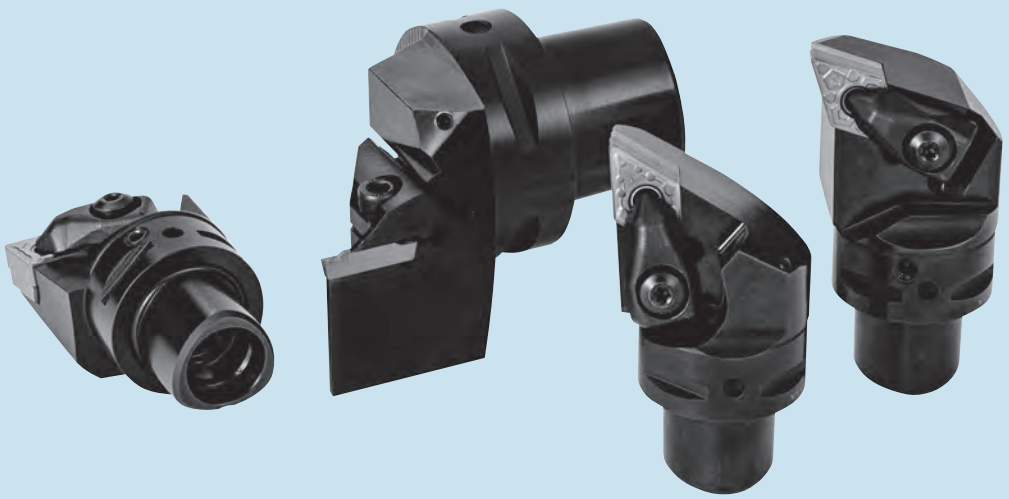
Tools for Turning Mill

N1~N28

N

Tools for Turning Mill		**N2~N20**
Polygon Taper Shank KPC Series		N2
HSK-T (ICTM Standard) Tooling		N12
Quick Change System		**N21~N22**
KQC	Petal-shaped adapter	N21
Cartridge		**N23~N26**
Lever Lock	PS□□ / PT□□	N24
Top Clamp	CT□□	N25
Screw Clamp	ST□□	N26
Flange holder	For Back Facing	**N27~N28**

Parts Compatibility of Lever Lock Toolholders ⊙ **R55**



Polygon Taper Shank

PSC Shank Tools

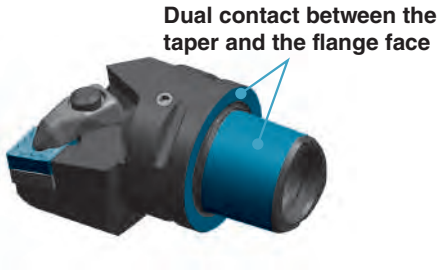
JIS B 6066-1

ISO26623-1 Polygonal taper interface with flange contact surface

Features

1 High Rigidity

Polygon taper design and dual contact between the taper and the flange face for high rigidity



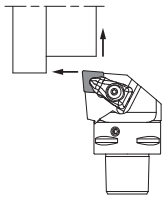
2 High Precision

Locational accuracy within ±2μm

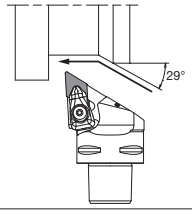
Distributes cutting forces evenly between 3 faces for enhanced rigidity and centering accuracy



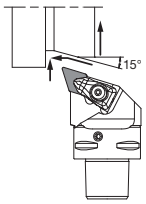
DCLN



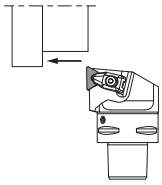
DDJN



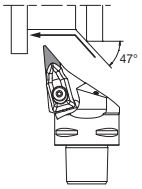
DDHN



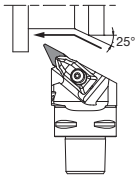
DTGN



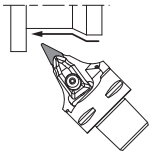
DVLN



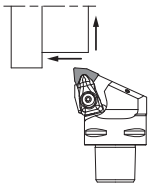
DVPN



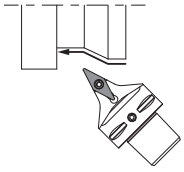
DVVN



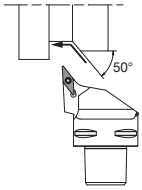
DWLN



SVVB



SVJB

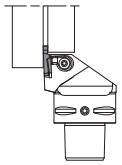


Grooving

Grooving / Cut-off

Threading

KGBA



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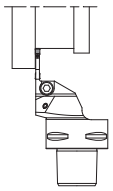

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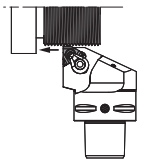
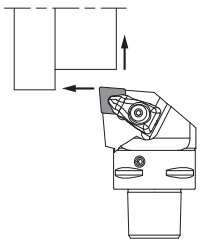


Identification System (External)

KPC3 - D C L N R 22 045 - 12 A

- **Interface Dimensions**: KPC3:PSC32 DCSFMS=32mm; KPC4:PSC40 DCSFMS=40mm; KPC5:PSC50 DCSFMS=50mm
- **Clamping System**: D : Double Clamp; S : Screw Clamp
- **Insert Type**: C : 80° Rhombic; D : 55° Rhombic; V : 35° Rhombic; W: 80° Trigon
- **Cutting Edge Angle**: L (95°), J (93°), H (107.5°), P (117.5°), V (72.5°)
- **Insert Relief Angle**: N : 0°
- **Hand of Tool**: R Right-hand; L Left-hand; N Neutral
- **Location of edge**: Dimension WF
- **Toolholder Length (Length from Gauge Line)** (mm): Dimension LF
- **Insert Size**: C, D, L, V
- **Coolant Hole**: A : Yes; S : No

DCLN (External / Facing)



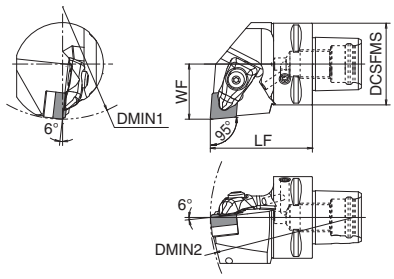


Fig. 1

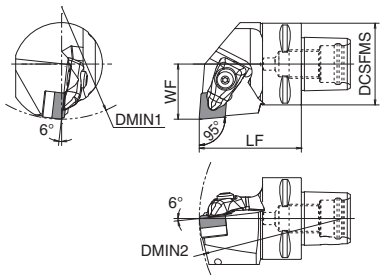


Fig. 2

Applicable Inserts	
CN□A CN□G CN□M	1204..

Side Rake Angle	- 6°
Inclination Angle	- 6°

•Right-hand shown

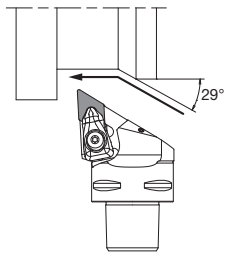
Toolholder Dimensions

Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	DMIN1	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Wrench
KPC3-DCLN[R/L] 22045-12A	●	●	Yes	32	45	22	60	121	0.8	Fig. 1	CP-3D-S	CS-3D-TR	SP-3D	SP-441P (*3 SP-441P-C)	M3X8	FT-15
KPC4-DCLN[R/L] 27050-12A	●	●		40	50	27	110	140						DC-44 (*3 DC-44-C)	SB-4085TR	
KPC5-DCLN[R/L] 35060-12A	●	●		50	60	35	110	165								
KPC3-DCLN[R/L] 22045-12S	●	●	No	32	45	22	60	121	0.8	Fig. 2	CP-3D-S	CS-3D-TR	SP-3D	SP-441P (*3 SP-441P-C)	M3X8	FT-15
KPC4-DCLN[R/L] 27050-12S	●	●		40	50	27	110	140						DC-44 (*3 DC-44-C)	SB-4085TR	
KPC5-DCLN[R/L] 35060-12S	●	●		50	60	35	110	165								

*1 Pressure Resistance: Up to 7 MPa
*2 When using inserts whose corner-R(RE) is greater than 1.2mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*3 When using the inserts with SX chipbreaker, prepare a shim separately.
*4 Recommended tightening torque 3.9N·m

● : Std. Item

DDJN (External / Copying)



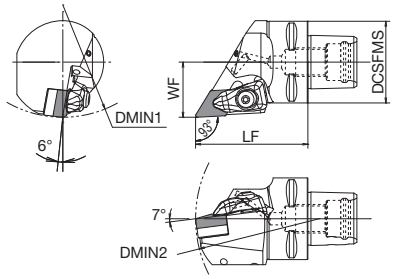


Fig. 1

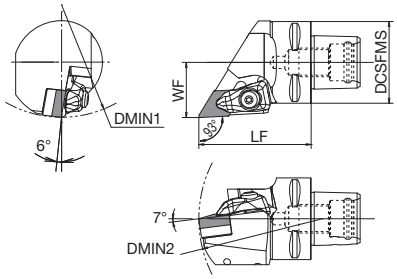


Fig. 2

Applicable Inserts	
DN□A DN□G DN□M	1504.. (1506..)

Side Rake Angle	- 6°
Inclination Angle	- 7°

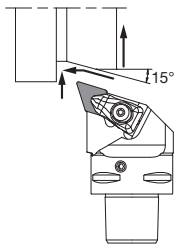
●Right-hand shown

Toolholder Dimensions

Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	DMIN1	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench
KPC3-DDJN$^{R}_{L}$ 22050-15A	●	●		32	50	22	110	121								
KPC4-DDJN$^{R}_{L}$ 27055-15A	●	●	Yes	40	55	27	110	145	0.8	Fig. 1	CP-3D-S	CS-3D-TR	SP-3D	DD-44 (*3 DD-43)	SB-4085TR	FT-15
KPC5-DDJN$^{R}_{L}$ 35060-15A	●	●		50	60	35	110	165								
KPC3-DDJN$^{R}_{L}$ 22050-15S	●	●		32	50	22	110	121								
KPC4-DDJN$^{R}_{L}$ 27055-15S	●	●	No	40	55	27	110	145	0.8	Fig. 2	CP-3D-S	CS-3D-TR	SP-3D	DD-44 (*3 DD-43)	SB-4085TR	FT-15
KPC5-DDJN$^{R}_{L}$ 35060-15S	●	●		50	60	35	110	165								

*1 Pressure Resistance: Up to 7 MPa
*2 When using inserts whose corner-R(RE) is greater than 1.2mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*3 Shims indicated within brackets ( ) are not included with the toolholder. To change insert thickness, please purchase it separately.
*4 Recommended tightening torque 3.9N·m

DDHN (External / Facing / Copying)



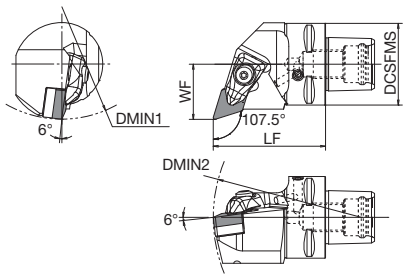


Fig. 1

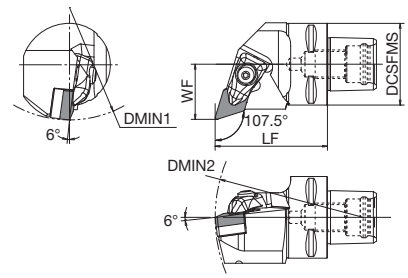


Fig. 2

Applicable Inserts	
DN□A DN□G DN□M	1504.. (1506..)

Side Rake Angle	- 6°
Inclination Angle	- 6°

●Right-hand shown

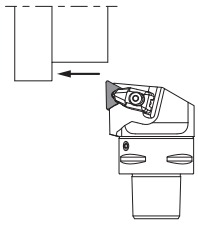
Toolholder Dimensions

Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	DMIN1	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench
KPC3-DDHN$^{R}_{L}$ 22050-15A	●	●		32	50	22	110	121								
KPC4-DDHN$^{R}_{L}$ 27055-15A	●	●	Yes	40	55	27	110	145	0.8	Fig. 1	CP-3D-S	CS-3D-TR	SP-3D	DD-44 (*3 DD-43)	SB-4085TR	FT-15
KPC5-DDHN$^{R}_{L}$ 35060-15A	●	●		50	60	35	110	165								
KPC3-DDHN$^{R}_{L}$ 22050-15S	●	●		32	50	22	110	121								
KPC4-DDHN$^{R}_{L}$ 27055-15S	●	●	No	40	55	27	110	145	0.8	Fig. 2	CP-3D-S	CS-3D-TR	SP-3D	DD-44 (*3 DD-43)	SB-4085TR	FT-15
KPC5-DDHN$^{R}_{L}$ 35060-15S	●	●		50	60	35	110	165								

*1 Pressure Resistance: Up to 7 MPa
*2 When using inserts whose corner-R(RE) is greater than 1.2mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*3 Shims indicated within brackets ( ) are not included with the toolholder. To change insert thickness, please purchase it separately.
*4 Recommended tightening torque 3.9N·m

● : Std. Item

DTGN (External)



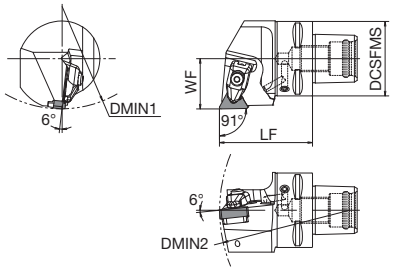


Fig.1

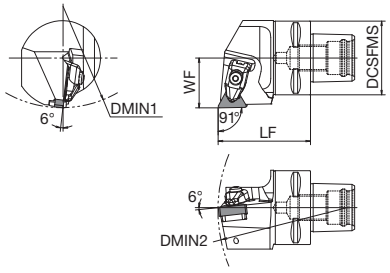


Fig.2

Applicable Inserts	
TN□A TN□G TN□M TNMX	1604...

Side Rake Angle	- 6°
Inclination Angle	- 6°

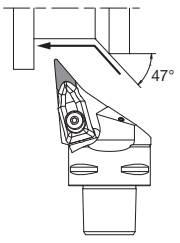
●Right-hand shown

Toolholder Dimensions

Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	DMIN1	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
																for Clamp	for Shim
KPC3-DTGN$^{R/L}$ 22040-16A	●	●		32	40	22	110	116									
KPC4-DTGN$^{R/L}$ 27050-16A	●	●	Yes	40	50	27	110	140	0.8	Fig.1	CP-2D	CS-2D	SP-2D	DT-32	SB-3080TR	LW-2.5	FT-10
KPC5-DTGN$^{R/L}$ 35060-16A	●	●		50	60	35	110	165									
KPC3-DTGN$^{R/L}$ 22040-16S	●	●		32	40	22	110	116									
KPC4-DTGN$^{R/L}$ 27050-16S	●	●	No	40	50	27	110	140	0.8	Fig.2	CP-2D	CS-2D	SP-2D	DT-32	SB-3080TR	LW-2.5	FT-10
KPC5-DTGN$^{R/L}$ 35060-16S	●	●		50	60	35	110	165									

*1 Pressure Resistance: Up to 7 MPa
*2 When using inserts whose corner-R(RE) is greater than 1.6mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*3 Recommended tightening torque 1.7N·m

DVLN (External / Copying)



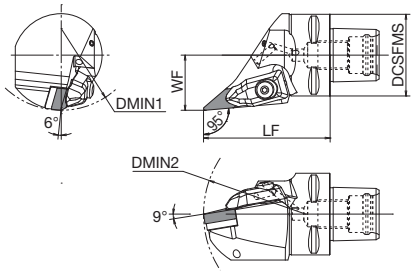


Fig. 1

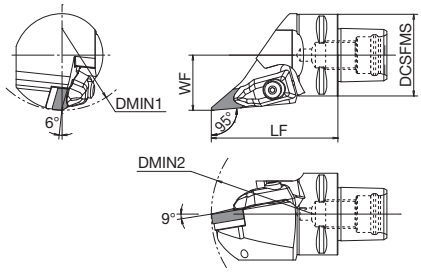


Fig. 2

Applicable Inserts	
VN□A VN□G VN□M	1604..

Side Rake Angle	- 6°
Inclination Angle	- 9°

●Right-hand shown

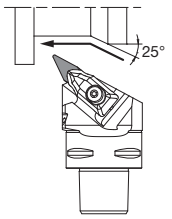
Toolholder Dimensions

Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	DMIN1	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench
KPC3-DVLN$^{R/L}$ 22058-16A	●	●		32	58	22	80	100								
KPC4-DVLN$^{R/L}$ 27062-16A	●	●	Yes	40	62	27	80	100	0.8	Fig. 1	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC5-DVLN$^{R/L}$ 35065-16A	●	●		50	65	35	80	100								
KPC3-DVLN$^{R/L}$ 22058-16S	●	●		32	58	22	80	100								
KPC4-DVLN$^{R/L}$ 27062-16S	●	●	No	40	62	27	80	100	0.8	Fig. 2	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC5-DVLN$^{R/L}$ 35065-16S	●	●		50	65	35	80	100								

*1 Pressure Resistance: Up to 7 MPa
*2 When using inserts whose corner-R(RE) is greater than 1.2mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*3 Recommended tightening torque 3.9N·m

● : Std. Item

DVPN (External / Facing / Copying / Undercutting)



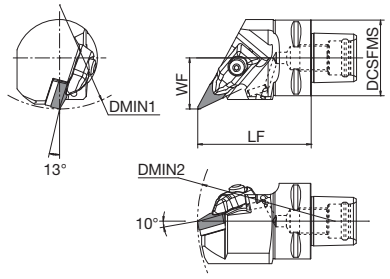


Fig. 1

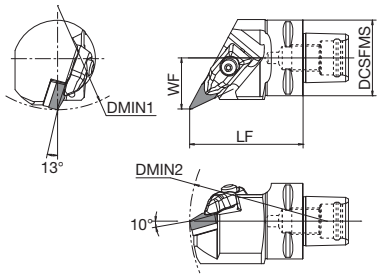


Fig. 2

Applicable Inserts	
VN□A VN□G VN□M	1604..

Side Rake Angle	- 13˚
Inclination Angle	- 10˚

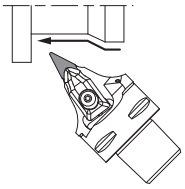
●Right-hand shown

Toolholder Dimensions

Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	DMIN1	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench
KPC3-DVPN[R/L] 22055-16A	●	●	Yes	32	55	22	110	130	0.8	Fig. 1	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC4-DVPN[R/L] 27060-16A	●	●	Yes	40	60	27	110	145	0.8	Fig. 1	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC5-DVPN[R/L] 35065-16A	●	●	Yes	50	65	35	110	165	0.8	Fig. 1	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC3-DVPN[R/L] 22055-16S	●	●	No	32	55	22	110	130	0.8	Fig. 2	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC4-DVPN[R/L] 27060-16S	●	●	No	40	60	27	110	145	0.8	Fig. 2	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC5-DVPN[R/L] 35065-16S	●	●	No	50	65	35	110	165	0.8	Fig. 2	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15

*1 Pressure Resistance: Up to 7 MPa
*2 When using inserts whose corner-R(RE) is greater than 1.2mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*3 Recommended tightening torque 3.9N·m

DVVN (External / Copying)



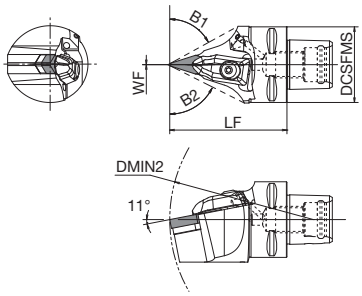


Fig. 1

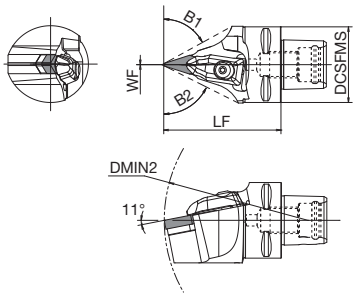


Fig. 2

Applicable Inserts	
VN□A VN□G VN□M	1604..

Back Rake Angle	- 11˚

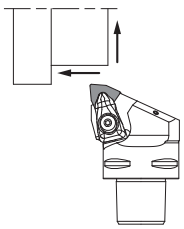
Toolholder Dimensions

Description	Stock R	Stock N	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	*3 B1 (˚)	*3 B2 (˚)	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench
KPC4-DVVNN 00062-16A		●		Yes	40	62	0	61	63	152	0.8	Fig. 1	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC5-DVVNN 00065-16A		●		Yes	50	65	0	59	59	170	0.8	Fig. 1	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC3-DVVNN 00058-16S		●		No	32	58	0	68	68	140	0.8	Fig. 2	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC4-DVVNN 00062-16S		●		No	40	62	0	61	63	152	0.8	Fig. 2	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15
KPC5-DVVNN 00065-16S		●		No	50	65	0	59	59	170	0.8	Fig. 2	CP-5D-S	CS-3D-TR	SP-3D	DV-33	SB-4085TR	FT-15

*1 Pressure Resistance: Up to 7 MPa
*2 When using inserts whose corner-R(RE) is greater than 1.2mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*3 Angle B1 and B2 show the interference angle from the line of cutting edge and toolholder.
*4 Recommended tightening torque 3.9N·m

● : Std. Item

DWLN (External / Facing)



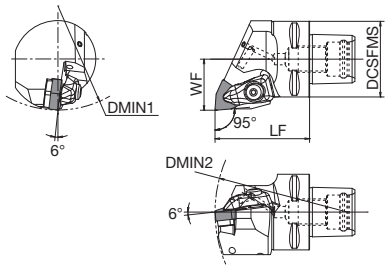


Fig. 1

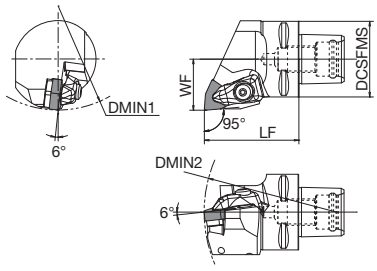


Fig. 2

Applicable Inserts	
WN□A WN□G WN□M	0804..

Side Rake Angle	- 6°
Inclination Angle	- 6°

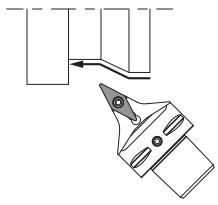
●Right-hand shown

Toolholder Dimensions

Description	Stock		Coolant Hole	Dimension (mm)					Std. Corner-R (RE)	Drawing	Spare Parts					
											Clamp	Screw	Spring	Shim	Shim Screw	Wrench
	R	L		DCSFMS	LF	WF	DMIN1	DMIN2								
KPC3-DWLNR/L **22047-08A**	●	●	Yes	32	47	22	110	121	0.8	Fig. 1	CP-3D-S	CS-3D-TR	SP-3D	DW-42	SB-4085TR	FT-15
KPC4-DWLNR/L **27050-08A**	●	●		40	50	27	110	140								
KPC5-DWLNR/L **35060-08A**	●	●		50	60	35	110	165								
KPC3-DWLNR/L **22047-08S**	●	●	No	32	47	22	110	121	0.8	Fig. 2	CP-3D-S	CS-3D-TR	SP-3D	DW-42	SB-4085TR	FT-15
KPC4-DWLNR/L **27050-08S**	●	●		40	50	27	110	140								
KPC5-DWLNR/L **35060-08S**	●	●		50	60	35	110	165								

*1 Pressure Resistance: Up to 7 MPa
*2 Recommended tightening torque 3.9N·m

SVVB (External / Copying)



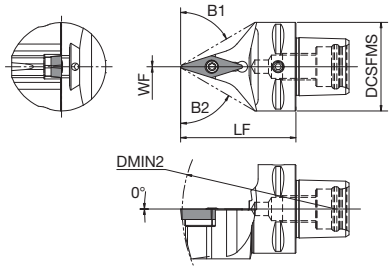


Fig.1

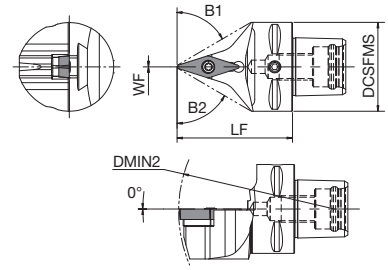


Fig.2

Applicable Inserts	
VB□□ VCGT	1604...

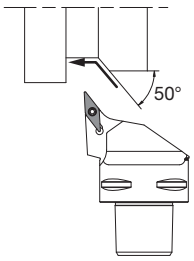
Toolholder Dimensions

Description	Stock			Coolant Hole	Dimension (mm)							Std. Corner-R (RE)	Drawing	Spare Parts				
								*3	*3					Clamp Screw	Wrench	Shim	Shim Screw	Wrench
	R	N	L		DCSFMS	LF	WF	B1 (°)	B2 (°)	DMIN1	DMIN2							
KPC3-SVVBN 00048-16A		●		Yes	32	48	0	62	62	-	116	0.8	Fig.1	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
KPC4-SVVBN 00052-16A		●			40	52	0	59	59	-	140							
KPC5-SVVBN 00060-16A		●			50	60	0	56	56	-	165							
KPC3-SVVBN 00048-16S		●		No	32	48	0	62	62	-	116	0.8	Fig.2					
KPC4-SVVBN 00052-16S		●			40	52	0	59	59	-	140							
KPC5-SVVBN 00060-16S		●			50	60	0	56	56	-	165							

*1 Pressure Resistance: Up to 7 MPa
*2 For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).
*3 Angle B1 and B2 show the interference angle from the line of cutting edge and toolholder.
*4 Recommended tightening torque 3.5N·m

● : Std. Item

SVJB (External / Copying)



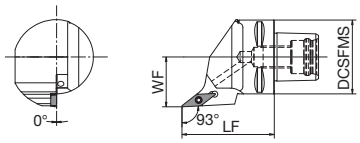
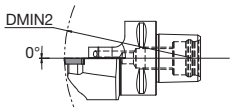


Fig.1



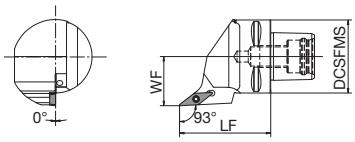
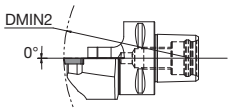


Fig.2



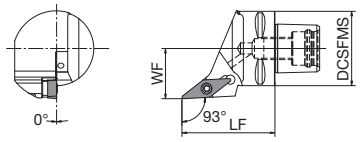
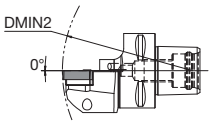


Fig.3



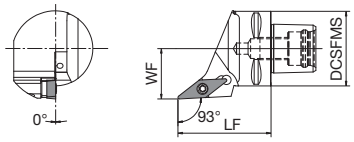
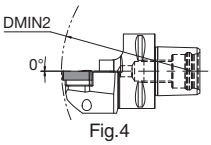


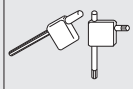
Fig.4



Applicable Inserts	
VB□□	1103... 1604...
VCGT	1604...

●Right-hand shown

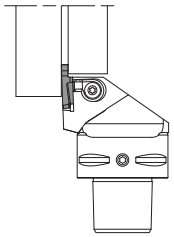
Toolholder Dimensions

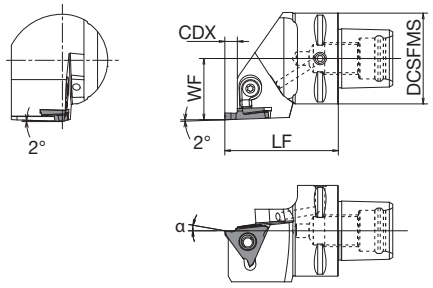
	Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	DMIN1	DMIN2	Std. Corner-R (RE)	Drawing	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench
																
*3	KPC3-SVJB[R/L] 22040-11A	●	●	Yes	32	40	22	-	116	0.4	Fig.1	SB-2570TR	FT-8	-	-	-
*3	KPC4-SVJB[R/L] 27050-11A	●	●		40	50	27	-	140							
*3	KPC5-SVJB[R/L] 35060-11A	●	●		50	60	35	-	165							
*3	KPC3-SVJB[R/L] 22040-11S	●	●	No	32	40	22	-	116	0.4	Fig.2	SB-2570TR	FT-8	-	-	-
*3	KPC4-SVJB[R/L] 27050-11S	●	●		40	50	27	-	140							
*3	KPC5-SVJB[R/L] 35060-11S	●	●		50	60	35	-	165							
*4	KPC3-SVJB[R/L] 22047-16A	●	●	Yes	32	47	22	-	116	0.8	Fig.3	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
*4	KPC4-SVJB[R/L] 27050-16A	●	●		40	50	27	-	140							
*4	KPC5-SVJB[R/L] 35060-16A	●	●		50	60	35	-	165							
*4	KPC3-SVJB[R/L] 22047-16S	●	●	No	32	47	22	-	116	0.8	Fig.4	SB-40125TRN	FT-15	SVN-32N *(SVN-32S)	SS-4N	LW-4
*4	KPC4-SVJB[R/L] 27050-16S	●	●		40	50	27	-	140							
*4	KPC5-SVJB[R/L] 35060-16S	●	●		50	60	35	-	165							

*1 Pressure Resistance: Up to 7 MPa
*2 Recommended tightening torque is 1.2N·m for VB□□1103 type and 3.5N·m for VB(C)□□1604 type.
*3 When using inserts whose corner-R(RE) is greater than 0.8mm, it could be necessary additional modifications on the toolholder in order to prevent interfere with workpiece.
*4 When using inserts whose corner-R(RE) is greater than 1.2mm, it could be necessary additional modifications on the toolholder or the shim in order to prevent interfere with workpiece.
*5 For insert with corner-R(RE) 0.2 or 0.4mm, shim of marked * is recommended (sold separately).

● : Std. Item

KGBA (External Shallow Grooving Toolholders)





●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Stock		Coolant Hole	Dimension (mm)				Spare Parts		Applicable Inserts ➡G6~G8
								Clamp Set	Wrench	
	R	L		DCSFMS	LF	WF	CDX			
KPC3-KGBA$^{R}_{L}$ 22040-16	●	●	Yes	32	40	22	2.5	LGBA-16$^{R}_{L}$S	FT-15	GBA32$^{R}_{L}$ type
KPC4-KGBA$^{R}_{L}$ 27050-16	●	●		40	50	27				
KPC5-KGBA$^{R}_{L}$ 35060-16	●	●		50	60	35				
KPC3-KGBA$^{R}_{L}$ 22040-2215	●	●	Yes	32	40	22	4.0	LGBA-22$^{R}_{L}$S		GBA43$^{R}_{L}$ type
KPC4-KGBA$^{R}_{L}$ 27050-2215	●	●		40	50	27				
KPC5-KGBA$^{R}_{L}$ 35060-2215	●	●		50	60	35				
KPC3-KGBA$^{R}_{L}$ 22040-2225	●	●	Yes	32	40	22	5.5			
KPC4-KGBA$^{R}_{L}$ 27050-2225	●	●		40	50	27				
KPC5-KGBA$^{R}_{L}$ 35060-2225	●	●		50	60	35				
KPC3-KGBA$^{R}_{L}$ 22040-2235	●	●	Yes	32	40	22	5.5			
KPC4-KGBA$^{R}_{L}$ 27050-2235	●	●		40	50	27				
KPC5-KGBA$^{R}_{L}$ 35060-2235	●	●		50	60	35				

*1 Pressure Resistance: Up to 7 MPa
*2 CDX shows the distance from the toolholder to the cutting edge. Available Groove Depth: "CDX" of Insert.
*3 Clamp Set : LGBA-◯◯RS for Right-hand Toolholder and LGBA-◯◯LS for Left-hand Toolholder.
*4 Rake Angle (α) after Installment of Insert (Ref. to the table below.)

Rake Angle (α) after Installment of GBA-GM insert

α	Insert Description
10°	GBA43$^{R}_{L}$150-020GM
15°	GBA43$^{R}_{L}$175-020GM ~ GBA43$^{R}_{L}$265-030GM
12°	GBA43$^{R}_{L}$300-030GM ~ GBA43$^{R}_{L}$400-040GM

α shows the rake angle at the center of the edge width after installing insert

Rake Angle (α) after Installment of GBA-MY insert

α	Insert Description
15°	GBA43$^{R}_{L}$175-020MY ~ GBA43$^{R}_{L}$350-030MY
14°	GBA43$^{R}_{L}$400-040MY

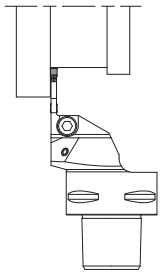
α shows the rake angle at the center of the edge width after installing insert

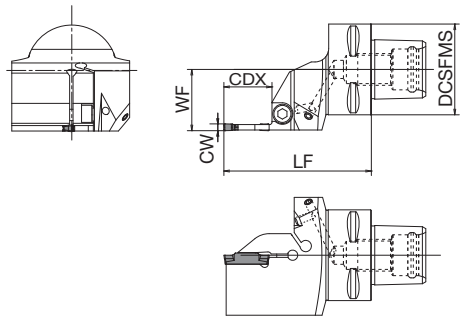
Rake Angle (α) after Installment of GBA insert

GBA32$^{R}_{L}$◯◯◯-◯◯◯		GBA43$^{R}_{L}$◯◯◯-◯◯◯		GBA43$^{R}_{L}$◯◯◯-◯◯◯R (Full-R)		
α	Insert Grades	α	Insert Grades	α	Insert Grades	Full-R Description
10°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625,PR905 KPD001,KPD010	0°	KBN510,KBN525	10°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625,PR905	050R ~ 150R
		10°	TN620,TC40N,TN90,PV7040 PR930,PR1115,PR1215,PR1625 PR905,KPD001,KPD010	14°	TN620,TN90,PV7040,PR930 PR1115,PR1215,PR1625,PR905	200R
20°	KW10	20°	KW10		KW10	050R ~ 200R

● : Std. Item

KGD (Grooving / Cut-off Toolholders)





●Right-hand shown

Toolholder Dimensions

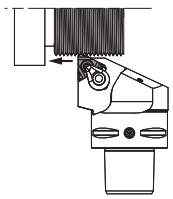
Width CW (mm)	Max. depth of cut (mm)	Description	Stock R	Stock L	Coolant Hole	Dimension (mm) DCSFMS	LF	WF	CDX	Edge Width CW (mm) MIN.	MAX.	Spare Parts Screw	Spare Parts Wrench	Applicable Inserts
2	10	KPC3-KGD R/L 22050-2T10	●	●	Yes	32	50	22	10	2.0	3.0	HH5X16	LW-4	GDM type GDG type
		KPC4-KGD R/L 27055-2T10	●	●		40	55	27						
		KPC5-KGD R/L 35060-2T10	●	●		50	60	35						
	17	KPC3-KGD R/L 22055-2T17	●	●		32	55	22	17					
		KPC4-KGD R/L 27060-2T17	●	●		40	60	27						
		KPC5-KGD R/L 35060-2T17	●	●		50	60	35						
3	10	KPC3-KGD R/L 22050-3T10	●	●		32	50	22	10	3.0	4.0			
		KPC4-KGD R/L 27055-3T10	●	●		40	55	27						
		KPC5-KGD R/L 35060-3T10	●	●		50	60	35						
	20	KPC3-KGD R/L 22060-3T20	●	●		32	60	22	20					
		KPC4-KGD R/L 27065-3T20	●	●		40	65	27						
		KPC5-KGD R/L 35065-3T20	●	●		50	65	35						
4	10	KPC3-KGD R/L 22050-4T10	●	●		32	50	22	10	4.0	5.0			
		KPC4-KGD R/L 27055-4T10	●	●		40	55	27						
		KPC5-KGD R/L 35060-4T10	●	●		50	60	35						
	20	KPC4-KGD R/L 27065-4T20	●	●		40	65	27	20					
		KPC5-KGD R/L 35065-4T20	●	●		50	65	35						
	25	KPC4-KGD R/L 27070-4T25	●	●		40	70	27	25					
		KPC5-KGD R/L 35070-4T25	●	●		50	70	35						
5	10	KPC4-KGD R/L 27055-5T10	●	●		40	55	27	10	5.0	6.0			
		KPC5-KGD R/L 35060-5T10	●	●		50	60	35						
	17	KPC4-KGD R/L 27060-5T17	●	●		40	60	27	17					
		KPC5-KGD R/L 35060-5T17	●	●		50	60	35						

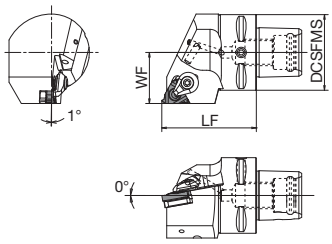
*1 Pressure Resistance: Up to 7 MPa
*2 Recommended tightening torque 6.5N·m
*3 CDX : Maximum depth to which processing can be made. (If the CDX is 20 mm or more, the maximum groove-depth made by the 2-edge insert will be 18 mm.)

N
Tools for Turning Mill

● : Std. Item

KTN (External Threading Toolholders)





●Right-hand shown

Right-hand Insert for Right-hand Toolholder, Left-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description		Stock		Coolant Hole	Dimension (mm)			Spare Parts				Applicable Inserts
								Clamp Set	Wrench	Shim	Shim Screw	
		R	L		DCSFMS	LF	WF					
KPC3-KTNR/L	**22040-16**	●	●	Yes	32	40	22	CPS-5S	FT-15	TN-32	SP3X8	➡**J6, J8, J10, J12, J14, J16, J18**
KPC4-KTNR/L	**27050-16**	●	●		40	50	27					16E R/L type
KPC5-KTNR/L	**35060-16**	●	●		50	60	35					

*1 Pressure Resistance: Up to 7 MPa

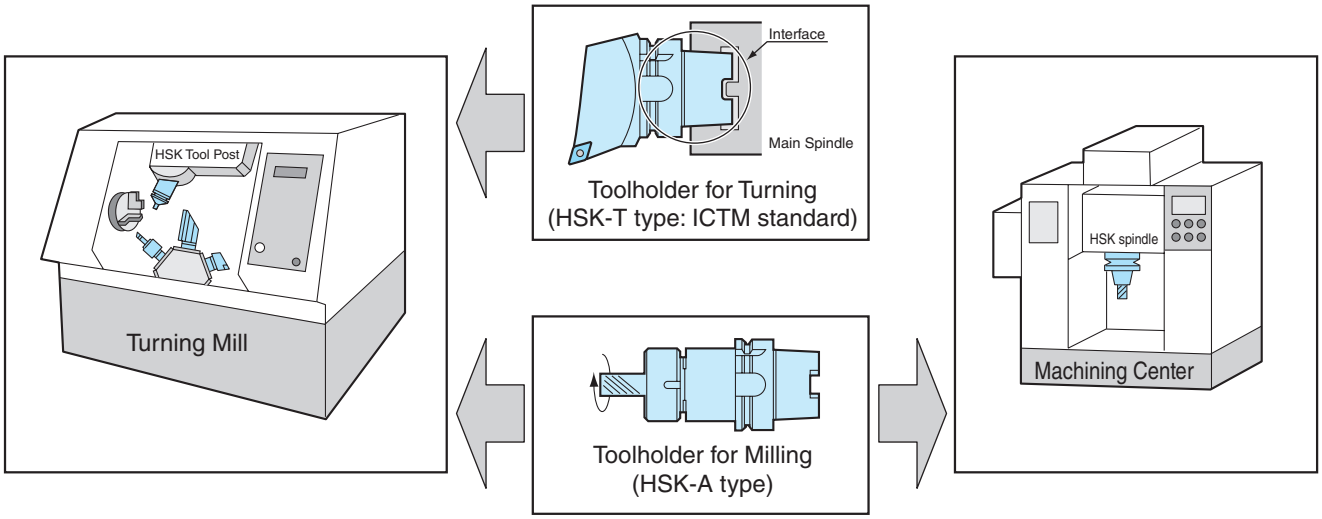
● : Std. Item

Tools for Turning Mill (HSK-T)

- The turning mill is a machine that combines turning and milling functions. Now an interface (between workpiece and toolholder - equivalent to the arbor for milling) is available for the turning mill that fulfils the ICTM standard.
- ICTM standard was developed by 16 companies in Japan, as the interface between turning mill machines. It is based on the two-face restraint type standard “ISO 12164-1:2001 HSK Standard Shank”
- This standard became an International Standard as ISO Standard “ISO12164-3:2008” in 2008.
  Description is indicated as HSK-T○○.

Features

(1) The interface is compatible with HSK-A type for milling tools.



(2) Machining precision for turning has improved by minimizing the gap between the drive key slot on toolholder side and the drive key on toolpost side.

Table 1 Comparison of the gap of a key and key slot

(Unit : mm)

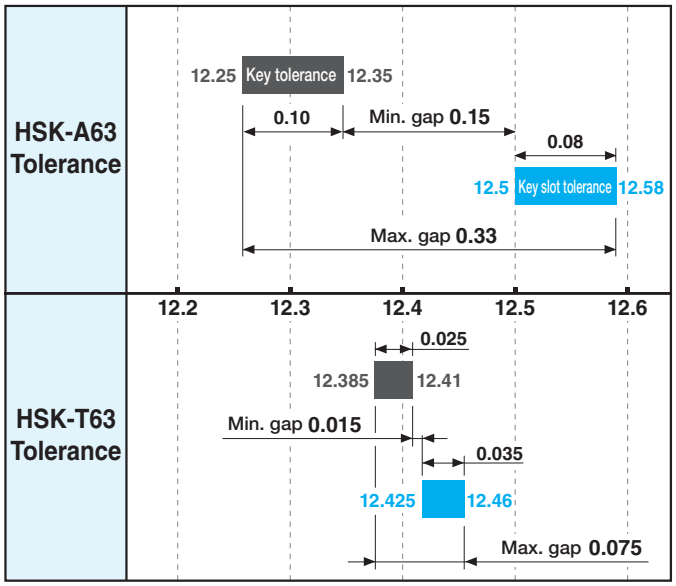
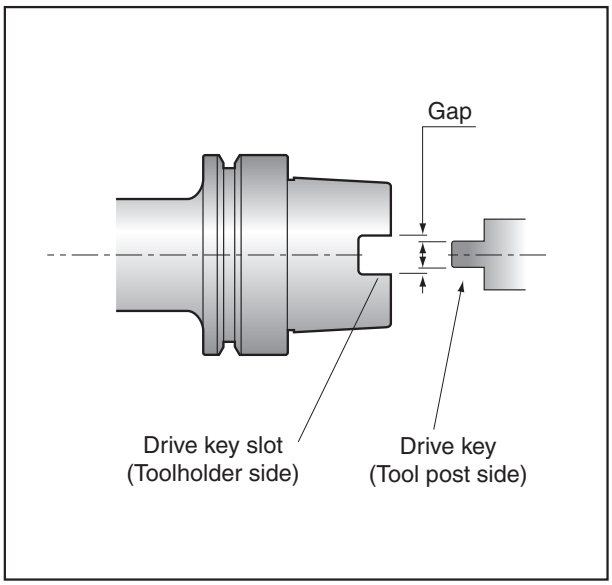


Fig. 1 Effect of the gap



Identification System (External)

Interface Size	Manual Clamp Hole	Shank Size	Hand of Tool	Toolholder Length
T63:HSK-T63 T100:HSK-T100	H Yes No Code No	25mm square (Height / Width)	R Right-hand L Left-hand	(mm) Length from Gauge Line

T63 **H** - **S2525** **R** - **105** …(Toolholder for Square Shank)

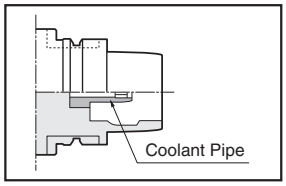
A63 (Previous Description)

P **C** **L** **N** **R** - **DX** **12** …(Solid type)

Clamping System	Insert Shape	Cutting Edge Angle	Insert Relief Angle	Hand of Tool	Toolholder Length (Length from Gauge Line) (mm)	Insert Size
P : Lever Lock M : Multi Lock W : Wedge Lock S : Screw Clamp	C : 80° Rhombic D : 55° Rhombic T : 60° Triangle V : 35° Rhombic W : 80° Trigon	E 60°, G 90°, J 93° L 95°, M 95°, N 50°, 63° V 72.5°	N : 0° B : 5°	R Right-hand L Left-hand N Neutral	DX : 65 H : 100 L : 140	T, C, L, D, V

Coolant Pipe

· Coolant pipe is built into toolholder.



Toolholder for Square Shank (External / Facing)

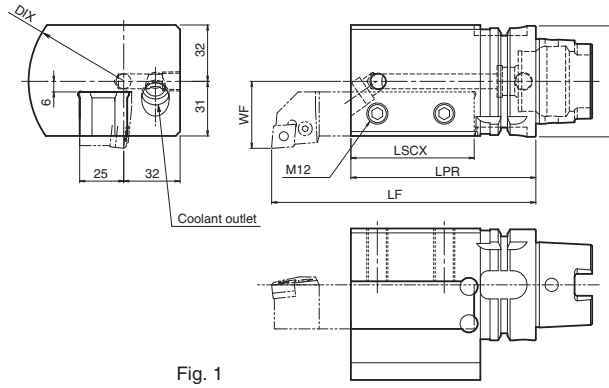


Fig. 1

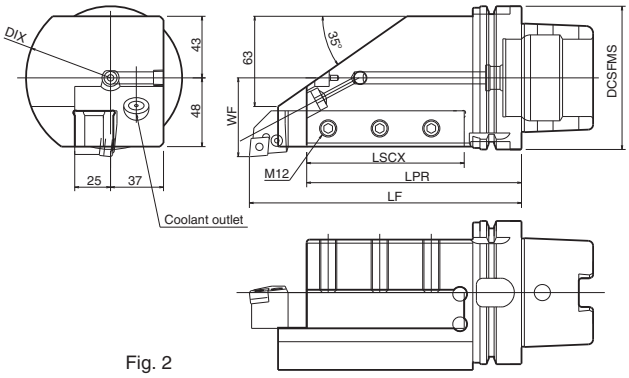


Fig. 2

●Right-hand shown

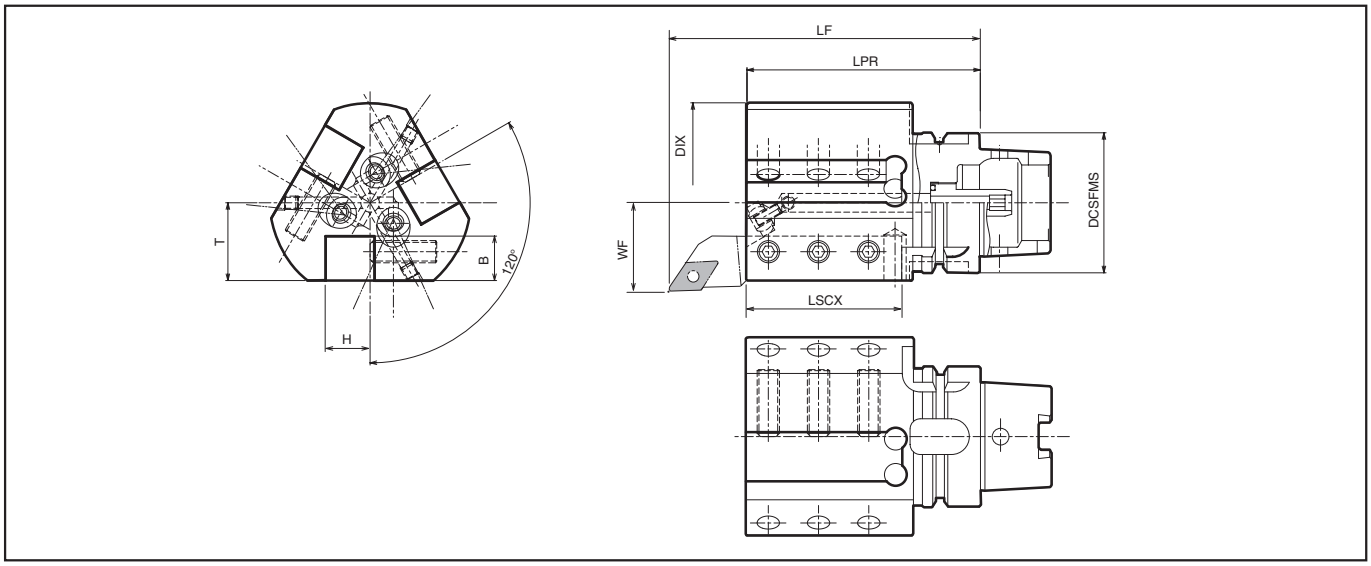
Toolholder Dimensions

Description	Stock	Dimension (mm) DCSFMS	DIX	LF	LPR	LSCX	WF	Drawing	Spare Parts: Screw	Wrench	Coolant Pipe
T63H- *S2525R-105	●	63	108	150	105	70	38	Fig. 1	HS12X25	LW-6	CL63-1
T63H- *S2525L-105	●										
T100H- S2525R-150	●	100	118	190	150	110	55	Fig. 2	HS12X30		CL100-1
T100H- S2525L-150	●										

· Coolant outlet direction is adjustable.
· For 25mm square shank.
* These toolholders are not compatible with Yamazaki Mazak INTRGREX i and j series.

● : Std. Item

Toolholder for Square Shank (External / Facing)

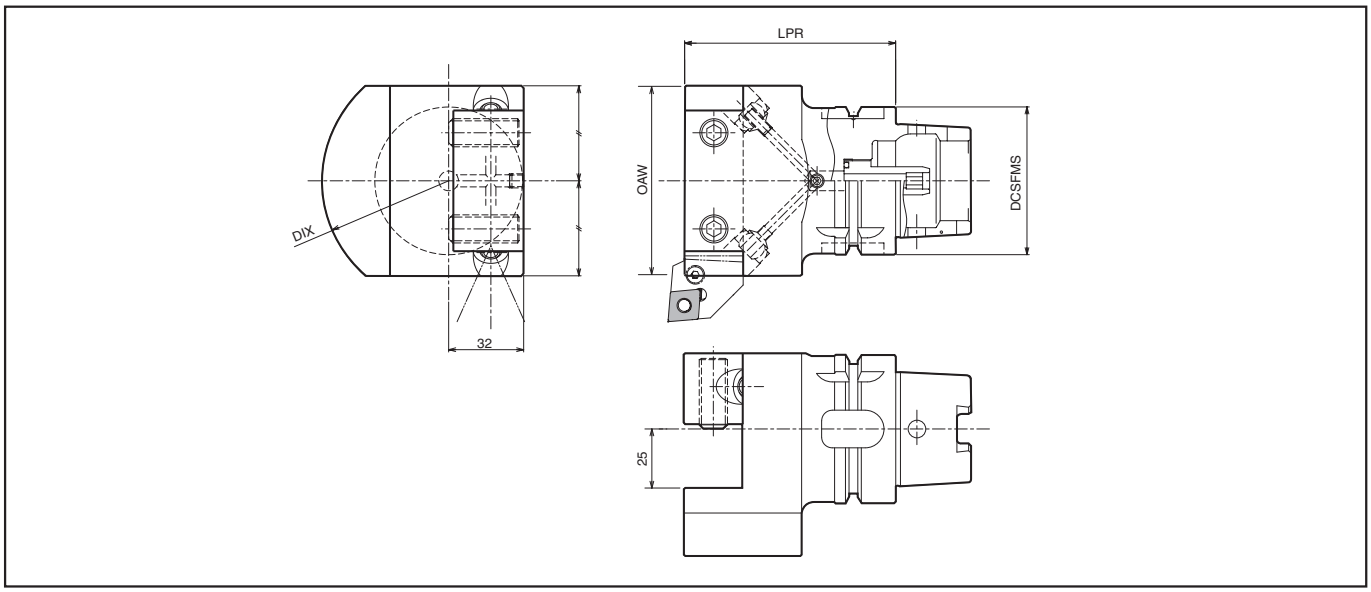


Toolholder Dimensions

Description		Attachment toolholder Shank Dimension	Stock	Dimension (mm)									Spare Parts		
				DCSFMS	DIX	H	B	T	LF	LPR	LSCX	WF	Screw	Wrench	Coolant Pipe
T63H-	**S2020R-105T**	(20mm square)	●	63	90	20	20	35	150	105	70	40	HS12X30	LW-6	CL63-1
T100H-	**S2525R-150T**	(25mm square)	●	100	118	25	25	48	190	150	110	55	HS12X35		CL100-1

· Coolant outlet direction is adjustable.

Toolholder for Square Shank (Facing / External)



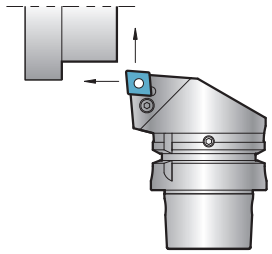
Toolholder Dimensions

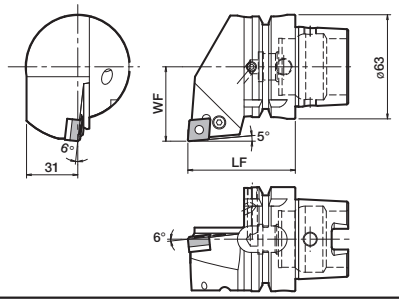
Description		Attachment toolholder Shank Dimension	Stock	Dimension (mm)				Spare Parts		
				DCSFMS	DIX	LPR	OAW	Screw	Wrench	Coolant Pipe
T63H-	***S2525-90F**	(25mm square)	●	63	108	90	81	HS12X30	LW-6	CL63-1
	***S2525-120F**		●			120				
T100H-	**S2525-105F**	(25mm square)	●	100	118	105	96			CL100-1
	S2525-150F		●			150				

· Coolant outlet direction is adjustable.
* These toolholders are not compatible with Yamazaki Mazak INTRGREX i and j series.

● : Std. Item

PCLN (External / Facing)





● Right-hand shown

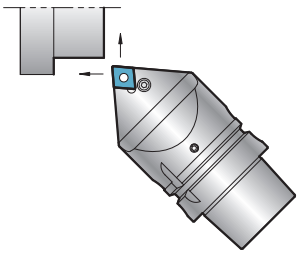
Applicable Inserts	
CN□A CN□G CN□M	1204..

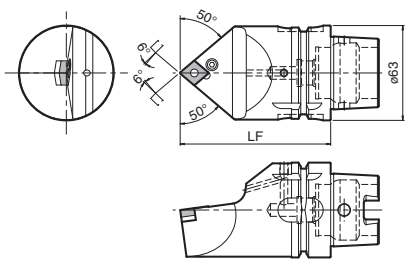
Toolholder Dimensions

Description		Stock	Dimension (mm)		Spare Parts						
			LF	WF	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PCLNR-DX12	●	65	45	LL-2N	LS-2N	LC-42N *LC-42N-C	LSP-2	PC-2	LW-3	CL63-1
	PCLNL-DX12	●									

* When using the inserts with SX chipbreaker, prepare a shim (LC-42N-C) separately.

PCMN (External / Facing)





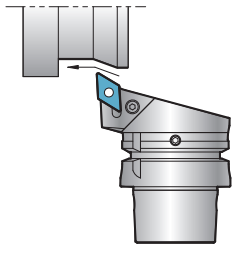
Applicable Inserts	
CN□A CN□G CN□M	1204..

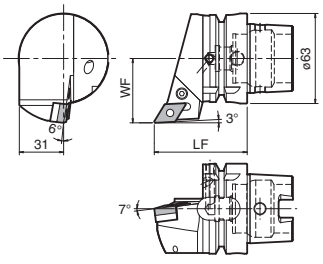
Toolholder Dimensions

Description		Stock	Dimension (mm)	Spare Parts						
			LF	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PCMNN-H12	●	100	LL-2N	LS-2N	LC-42N *LC-42N-C	LSP-2	PC-2	LW-3	CL63-1
	PCMNN-L12	●	140							

* When using the inserts with SX chipbreaker, prepare a shim (LC-42N-C) separately.

PDJN (External / Copying)





● Right-hand shown

Applicable Inserts	
DN□A DN□G DN□M	1504..

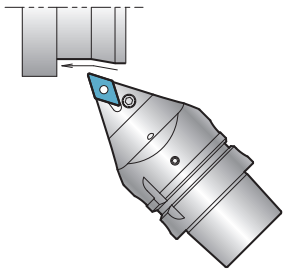
Toolholder Dimensions

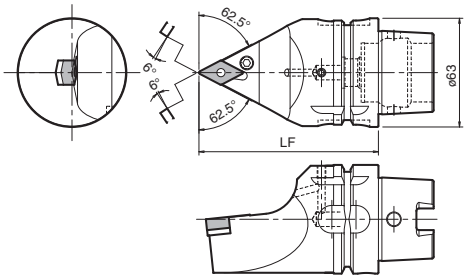
Description		Stock	Dimension (mm)		Spare Parts						
			LF	WF	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PDJNR-DX15	●	65	45	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2	LW-3	CL63-1
	PDJNL-DX15	●									

· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

● : Std. Item

PDNN (External / Copying)





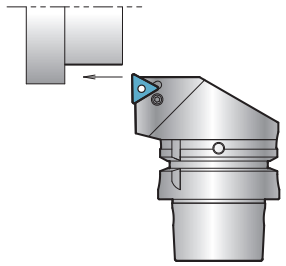
Applicable Inserts	
DN□A DN□G DN□M	1504..

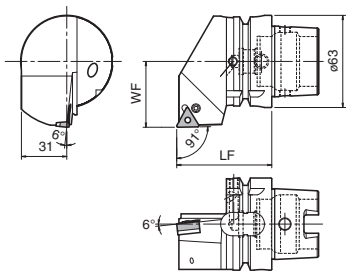
Toolholder Dimensions

Description		Stock	Dimension (mm)	Spare Parts						
			LF	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PDNNN-H15	●	100	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2	LW-3	CL63-1
	PDNNN-L15	●	140							

· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

PTGN (External)





●Right-hand shown

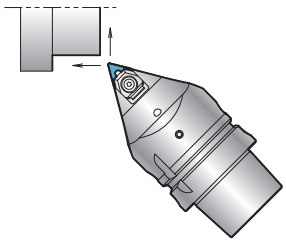
Applicable Inserts	
TN□A TN□G TN□M	1604..

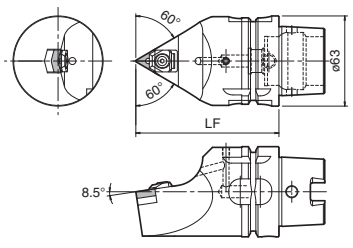
Toolholder Dimensions

Description		Stock	Dimension (mm)		Spare Parts						
			LF	WF	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PTGNR-DX16	●	65	45	LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5	CL63-1
	PTGNL-DX16	●									

· When using inserts whose corner-R(RE) is greater than 1.6mm, please purchase a shim with * mark and use it in order to prevent workpiece and shim from interfering each other.

WTEN (External)





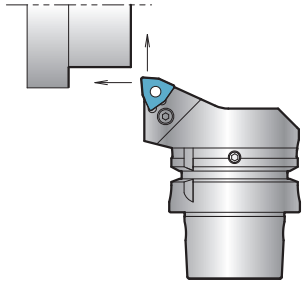
Applicable Inserts	
TN□A TN□G TN□M	1604..

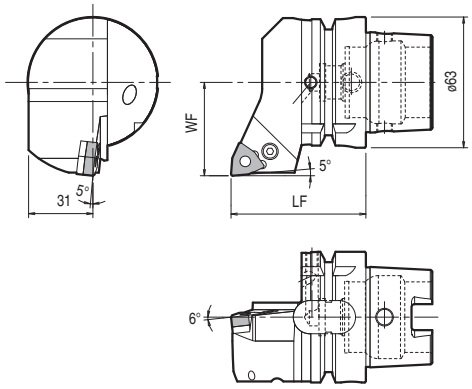
Toolholder Dimensions

Description		Stock	Dimension (mm)	Spare Parts						
			LF	Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Spacer	Coolant Pipe
T63H-	WTENN-H16	●	100	WCS-1N	WTN-33	WP-1S	WN-1	LW-3	WSP-1	CL63-1
	WTENN-L16	●	140							

● : Std. Item

PWLN (External / Facing)





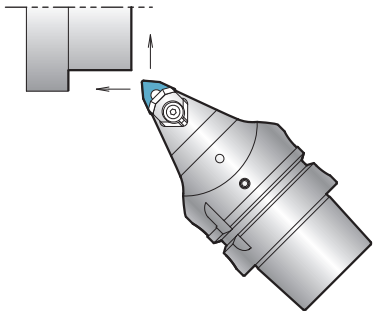
Applicable Inserts	
WN□A WN□G WN□M	0804..

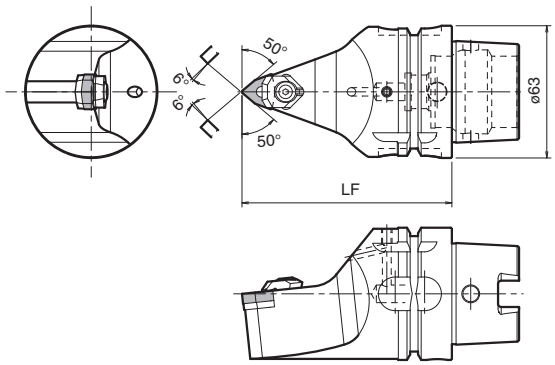
●Right-hand shown

Toolholder Dimensions

Description		Stock	Dimension (mm)		Spare Parts						
					Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
			LF	WF							
T63H-	PWLNR-DX08	●	65	45	LL-2N	LS-2N	LW-42N	LSP-2	PC-2	LW-3	CL63-1
	PWLNL-DX08	●									

WWMN (External / Facing)





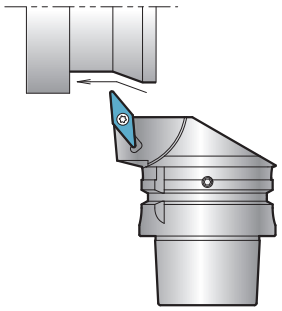
Applicable Inserts	
WN□A WN□G WN□M	0804..

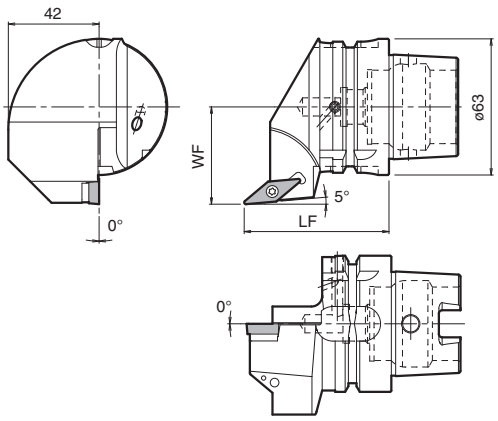
Toolholder Dimensions

Description		Stock	Dimension (mm)	Spare Parts					
				Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Coolant Pipe
			LF						
T63H-	WWMNN-H08	●	100	WCS-8	WWN-42	WP5X15	WN-1	LW-3	CL63-1
	WWMNN-L08	●	140						

● : Std. Item

SVLB (External / Copying)

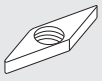




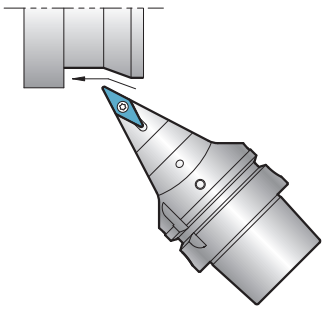
Applicable Inserts	
VB□T VBGW VCGT	1604..

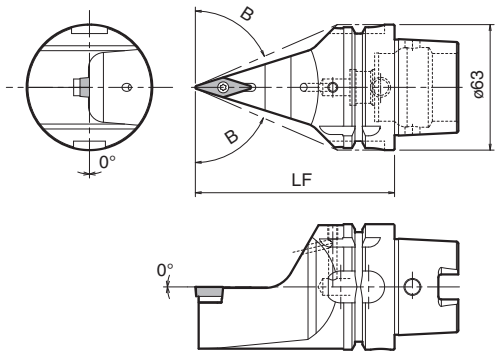
●Right-hand shown

Toolholder Dimensions

Description		Stock	Dimension (mm)		Spare Parts					
					Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)	Coolant Pipe
			LF	WF						
T63H-	SVLBR-DX16N	●	65	45	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4	CL63-1
	SVLBL-DX16N	●								

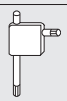
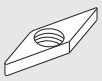
SVVB (External / Copying)





Applicable Inserts	
VB□T VBGW VCGT	1604..

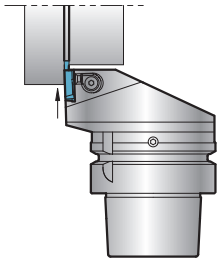
Toolholder Dimensions

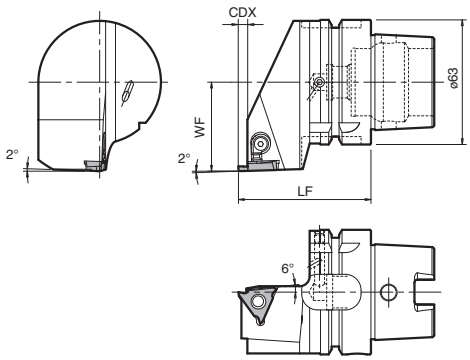
Description		Stock	Dimension (mm)		Spare Parts					
					Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)	Coolant Pipe
			LF	* B (°)						
T63H-	SVVBN-H16N	●	100	66.5	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4	CL63-1
	SVVBN-L16N	●	140	72.5						

* Angle B shows the interference angle from the line of cutting edge point and toolholder.

● : Std. Item

KGBA (External Grooving)





●Right-hand shown

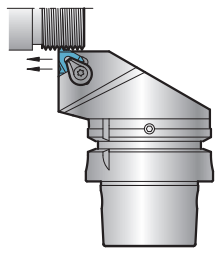
Right-hand Insert for Right-hand Toolholder,
Left-hand Insert for Left-hand Toolholder.

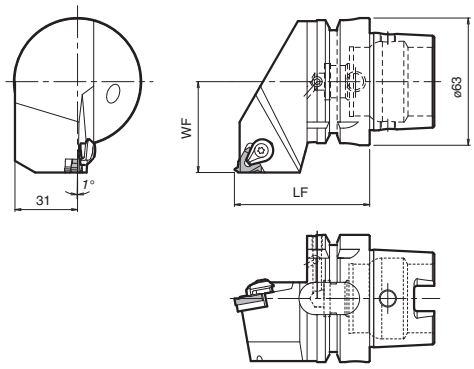
Toolholder Dimensions

Description		Stock	Dimension (mm)			Spare Parts			Applicable Inserts ➡G6~G8
			LF	WF	CDX	Clamp Set	Wrench	Coolant Pipe	
T63H-	KGBAR-16	●	67	45	2.5	LGBA-16RS	FT-15	CL63-1	GBA32R Type
	KGBAR-22-15	●	67	45	4.0	LGBA-22RS	FT-15	CL63-1	GBA43R Type
	KGBAR-22-25	●			4.5				
	KGBAR-22-35	●			5.5				
T63H-	KGBAL-16	●	67	45	2.5	LGBA-16LS	FT-15	CL63-1	GBA32L Type
	KGBAL-22-15	●	67	45	4.0	LGBA-22LS	FT-15	CL63-1	GBA43L Type
	KGBAL-22-25	●			4.5				
	KGBAL-22-35	●			5.5				

* For details of applicable inserts, See Page **G6~G8**.
· CDX shows the distance from the toolholder to the cutting edge.

KTN (Threading)





Right-hand Insert for Right-hand Toolholder

Toolholder Dimensions

Description		Stock	Dimension (mm)		Spare Parts					Applicable Inserts ➡J6, J8, J10, J12, J14, J16, J18
			LF	WF	Clamp Set	Wrench	Shim	Shim Screw	Coolant Pipe	
T63H-	KTNR-16	●	67	45	CPS-5S	FT-15	TN-32	SP3X8	CL63-1	16ER Type
	KTNR-22	●			CPS-6S	LW-3	TN-43			22ER Type

* For details of applicable inserts, See Page **J6**, **J8**, **J10**, **J12**, **J14**, **J16**, **J18**.

● : Std. Item

Identification System (For Boring Bar / Drill)

T63 H - N 08 - 70

Interface Size
T63:HSK-T63 T100:HSK-T100

Manual Clamp Hole	
H	Yes
No Code	No

Toolholder	
N	For Boring Bar
C	For Drill

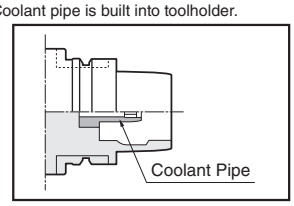
Internal Dia.	
08	ø8
10	ø10
⋮	

(mm)

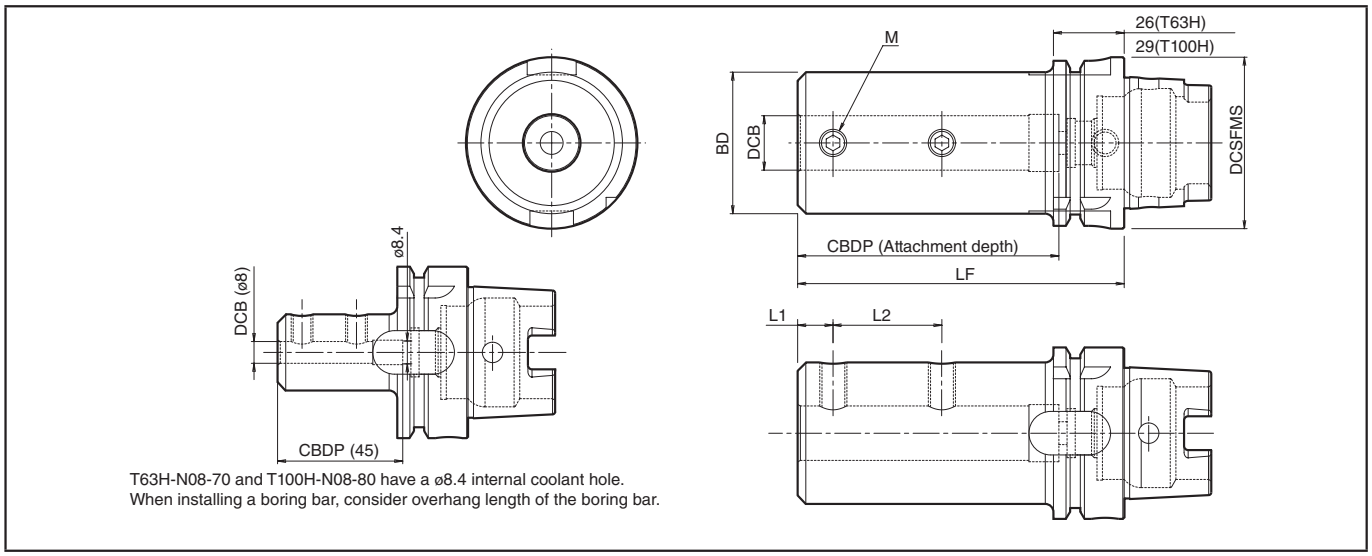
Toolholder Length
Length from Gauge Line

Coolant Pipe

· Coolant pipe is built into toolholder.



Toolholder for Boring Bar / Drill



T63H-N08-70 and T100H-N08-80 have a ø8.4 internal coolant hole.
When installing a boring bar, consider overhang length of the boring bar.

Toolholder Dimensions

Description		Stock	Dimension (mm)								Spare Parts			Remarks
											Screw	Wrench	Coolant Pipe	
			DCB	DCSFMS	BD	LF	CBDP	L1	L2	M				
T63H-	N08-70	●	8	63	28	70	45	9	20	M8	HS8X10	LW-4	CL63-1	For Boring Bar
	N10-80	●	10		35	80	55	9	22		HS8X12			
	N12-90	●	12		42	90	65	9	22					
	N16-100	●	16		48	100	75	11	30	M10	HS10X16	LW-5		
	N20-120	●	20		52	120	95	13	40					
	N25-140	●	25		56	140	115	13	50	M12	HS12X16	LW-6		
	N32-160	●	32		56	160	135	13	60		HS12X12			
T63H-	C20-75	●	20	63	52	75	50	13	22	M10	HS10X16	LW-5	CL63-1	*For Drill
	C25-85	●	25		56	85	58	15	28	M12	HS12X16	LW-6		
	C32-90	●	32		56	90	62	15	30		HS12X12			
	C40-100	●	40		68	100	72	18	35	M16	HS16X12	LW-8		
T100H-	N08-80	●	8	100	28	80	45	9	20	M8	HS8X10	LW-4	CL100-1	For Boring Bar
	N10-90	●	10		35	90	55	9	22		HS8X12			
	N12-100	●	12		42	100	65	9	22					
	N16-110	●	16		48	110	75	11	30	M10	HS10X16	LW-5		
	N20-130	●	20		52	130	95	13	40					
	N25-150	●	25		62	150	115	13	50	M12	HS12X18	LW-6		
	N32-170	●	32		72	170	135	13	60		HS12X20			
T100H-	C20-85	●	20	100	52	85	50	13	22	M10	HS10X16	LW-5	CL100-1	*For Drill
	C25-90	●	25		62	90	58	15	20	M16	HS16X18	LW-8		
	C32-95	●	32		72	95	62	15	20					
	C40-105	●	40		82	105	72	15	25	M16	HS16X20	LW-8		

* Shorter than the toolholder for boring bar.

● : Std. Item

Quick Change System of petal-shaped adapter

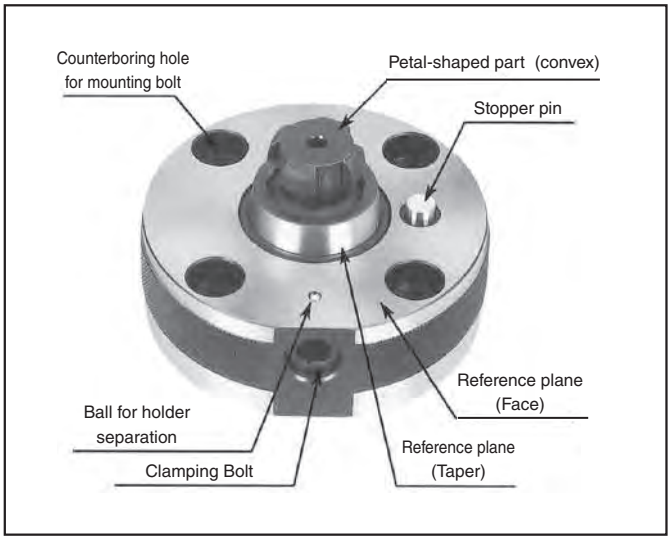
KQC Series



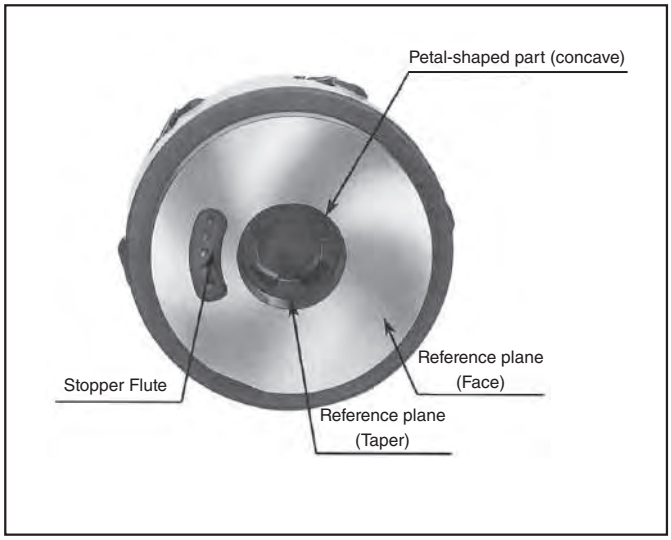
Features

1. The way to assemble holder is turn the clumping bolt 1 round. Tool exchange time is less than 1 minute.
2. Junction of adapter and attachment touch both taper part and face part. And repeatability is less than 2μm.
3. Applicable to various tools.
   - · Boring tool (Rough & Fine)
   - · Face milling (Min.ø63, Max.ø160 is possible)
   - · Centering Tool
   - · External Turning
   - · Combination Tool
   - · Applicable to tools with coolant hole

Clamping System



Adapter side

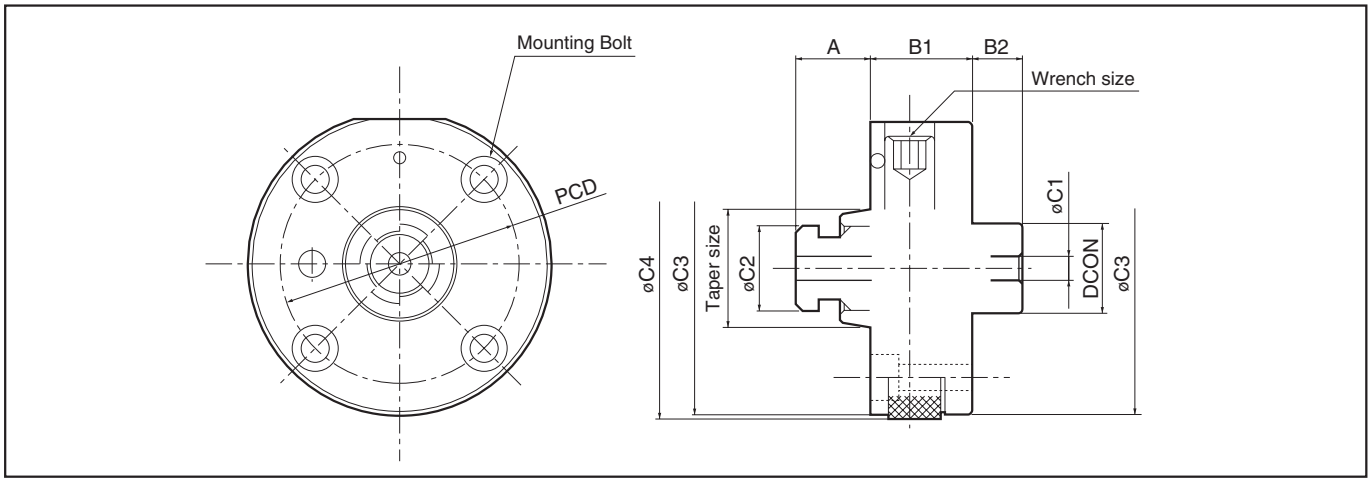


Attachment side

How to use Clamping System

1. Combine petal-shaped part of adapter side with that of attachment side and insert the attachment.
2. Turn the attachment 45 degrees until stop (Clockwise direction).
3. Turn the clamp bolt attached to adapter side 1 round and tighten by Hexagon wrench.

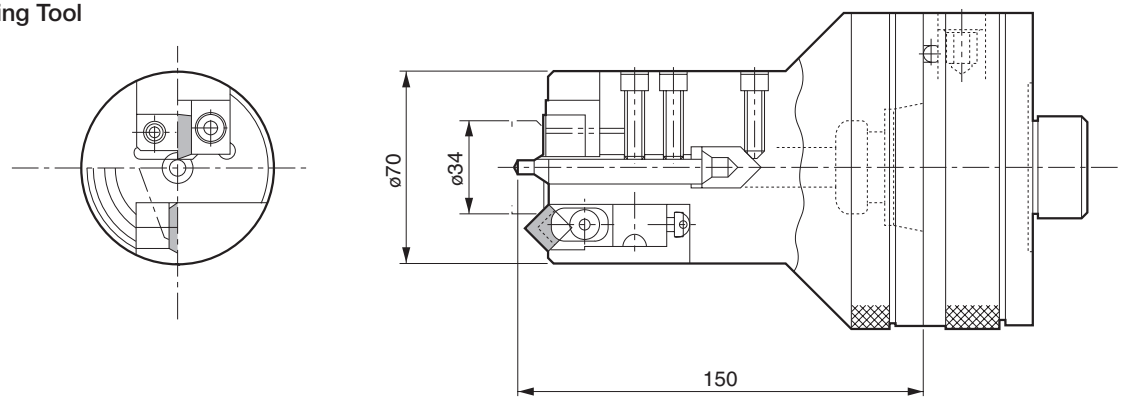
Adapter



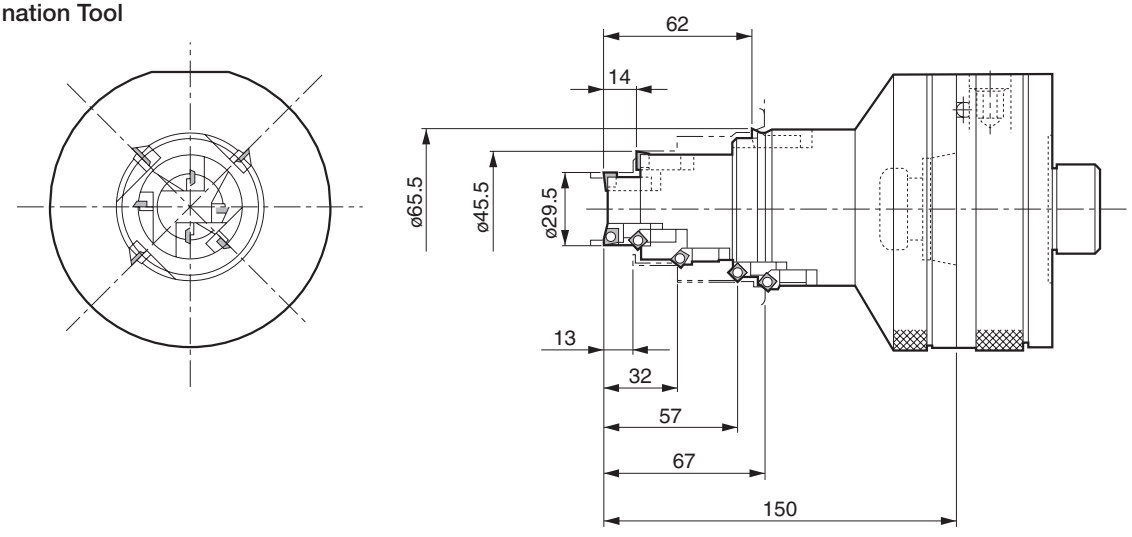
Description	Taper size	A	B1	B2	øC1	øC2	øC3	øC4	DCON	PCD	Wrench size	Mounting Bolt
KQC28	ø28	23	25 over	15 over	4	24	60 over	62 over	20	43 over	6	6 ~ 8
KQC35	ø35	27	30 over	15 over	6	28	75 over	77 over	25	54 over	8	8 ~ 10
KQC45	ø45	30	40 over	15 over	8	32	90 over	92 over	25	66 over	10	8 ~ 12
KQC70	ø70	33	50 over	15 over	10	40	130 over	132 over	25	100 over	12	10 ~ 16

Toolholder (attachment) reference example

Centering Tool



Combination Tool



Applicable to various tooling (also with coolant hole)

Identification System (Square Shank)

Clamping System	Insert Shape	Hand of Tool	Edge Height	Cartridge type
C : Top Clamp **P** : Lever Lock **S** : Screw Clamp	**S** : 90° Square **T** : 60° Triangle	**R** : Right-hand	Edge Height (mm)	**CA : ISO A type**

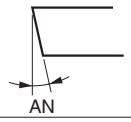
P	S	K	N	R	16	CA	12

Cutting Edge Angle

D	E	F	G
45°	60°	90°	90°

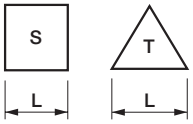
K	S	T	Y
75°	45°	60°	85°

Insert Relief Angle



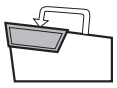
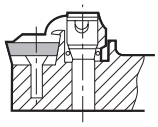
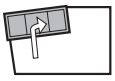
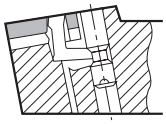
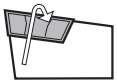
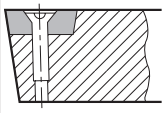
E : 20°Positive
N : 0°Negative
P : 11°Positive

Insert Size



● Specification may change without any prior notice.

Clamping System

Series	Design		Features	Series	Design		Features
Top Clamp (C)			· Rigid Clamping · Positive inserts : Low Cutting Force	Lever Lock (P)			· Easy Insert Replacement · General purpose
Screw Clamp (S)			· Simple Mechanism · Fewer Parts · Finishing to Medium Machining				

Lever Lock

Shape (Right-hand shown)

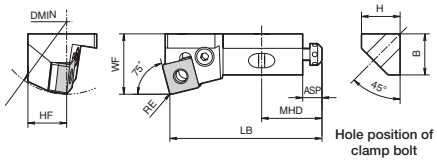


Fig. 1

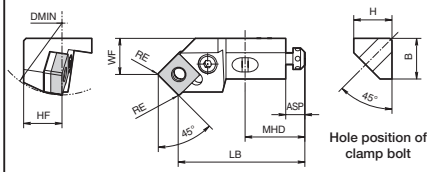


Fig. 2

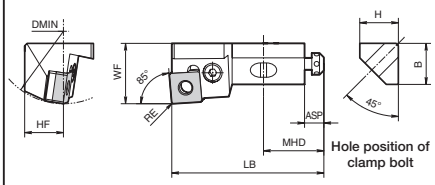


Fig. 3

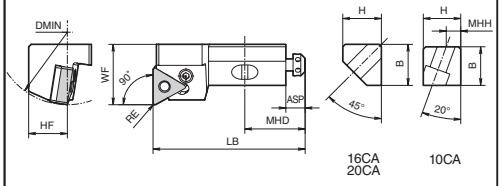


Fig. 4

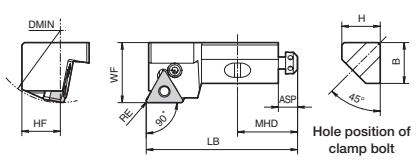


Fig. 5

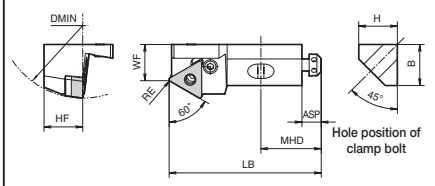


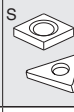
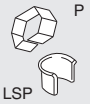
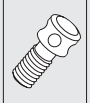
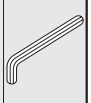
Fig. 6

Toolholder Dimensions

Description		Stock	Dimension (mm)								Std. Corner-R (RE)	Min. Bore Dia. DMIN (mm)	Drawing	Applicable Inserts		* See Page for Applicable Inserts
			H	B	LB	MHD	ASP	MHH	HF	WF						
PSKNR	**16CA12**	MTO	16	17	63	25	8	-	16	25	0.8	60	Fig. 1	SN□A	1204..	**B32 ~ B35 B109 C10**
PSSNR	**16CA12**	MTO			53					15			Fig. 2	SN□G		
PSYNR	**16CA12**	MTO			63					25			Fig. 3	SN□M		
PTFNR	**10CA11**	MTO	12.5	11	50	20	8	5	10	14	0.4	40	Fig. 4	TN□A TN□G	1103..	**B40 B42**
	16CA16	MTO	15.5	16	63	25	8	-	16	25	0.8	60		TN□A	1604..	**B36 ~ B43 B111 C11 C23**
	20CA22	MTO	20	19	70	30	10		20			70		TN□G	2204..	
PTGNR	**16CA16**	MTO	16	17	63	25	8		16	25		60	Fig. 5	TN□M	1604..	
PTTNR	**16CA16**	MTO								15		70	Fig. 6			

* See Page for Applicable Inserts (TN□G2204.., TN□M2204..) **B36,B37,B38,B39,B43**

Spare Parts

Description		Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Radial adjustment screw	Axial adjustment screw	Wrench	Axial screw driver	Plate	Clamp Bolt	Wrench
														
PSKNR	**16CA12**	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3	HS4X4	AJM5F	LW-2	SW-1.8	SM0816B SM1016B	HH8X25	LW-6
PSSNR	**16CA12**													
PSYNR	**16CA12**													
PTFNR	**10CA11**	LL-03N	LS-03N	-	P-03	-	FH-2	HS4X4	AJM5F	LW-2	SW-1.8	SM0810A SM1010A	HH6X16	LW-5
	16CA16	LL-1N	LS-1N	LT-32N	LSP-1	PC-1	FH-2.5	HS5X5		LW-2.5		SM0816B SM1016B	HH8X25	LW-6
	20CA22	LL-2N	LS-2N	LT-42N	LSP-2	PC-2	LW-3		AJM6			SM0820B SM1020B	HH8X30	
PTGNR	**16CA16**	LL-1N	LS-1N	LT-32N	LSP-1	PC-1	FH-2.5		AJM5F			SM0816B SM1016B	HH8X25	
PTTNR	**16CA16**													

Note 1 : Plate is included with different two pieces one set of the size.

MTO : Made to order

Top Clamp

Shape (Right-hand shown)

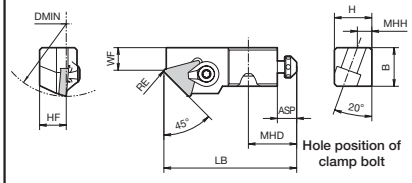


Fig. 1

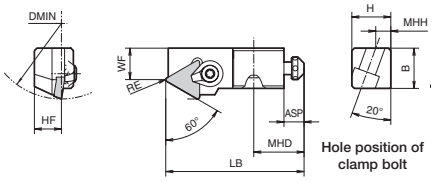


Fig. 2

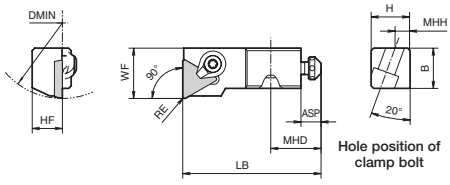


Fig. 3

Toolholder Dimensions

Description		Stock	Dimension (mm)								Std. Corner-R (RE)	Min. Bore Dia. DMIN (mm)	Drawing	Applicable Inserts		See Page for Applicable Inserts
			H	B	LB	MHD	ASP	MHH	HF	WF						
CTDPR	**10CA11**	MTO	12.5	11	50	20	8	5	10	7	0.4	38	Fig. 1	TP□N	1103..	**B87** **B88** **B113** **C18** **C29**
	12CA16	MTO	15.5	16	55			6	12	10	0.8	50			1603..	
CTEPR	**10CA11**	MTO	12.5	11	50			5	10	9	0.4	38	Fig. 2		1103..	
	12CA16	MTO	15.5	16	55			6	12	13	0.8	50		TP□R	1603..	
CTFPR	**10CA11**	MTO	12.5	11	50			5	10	14	0.4	38	Fig. 3		1103..	
	12CA16	MTO	15.5	16	55			6	12	20	0.8	50			1603..	

Spare Parts

Description		Clamp Set	Wrench	Radial adjustment screw	Axial adjustment screw	Wrench	Axial screw driver	Plate	Clamp Bolt	Wrench
										
CTDPR	**10CA11**	CPS-4V	FT-10	HS4X4	AJM5F	LW-2	SW-1.8	SM0810A SM1010A	HH6X16	LW-5
	12CA16	CPS-5V	FT-15	HS5X5		LW-2.5		SM0812A SM1012A	HH6X20	
CTEPR	**10CA11**	CPS-4V	FT-10	HS4X4		LW-2		SM0810A SM1010A	HH6X16	
	12CA16	CPS-5V	FT-15	HS5X5		LW-2.5		SM0810A SM1010A	HH6X20	
CTFPR	**10CA11**	CPS-4V	FT-10	HS4X4		LW-2		SM0810A SM1010A	HH6X16	
	12CA16	CPS-5V	FT-15	HS5X5		LW-2.5		SM0812A SM1012A	HH6X20	

Note 1 : Plate is included with different two pieces one set of the size.

MTO : Made to order

Screw Clamp

Shape (Right-hand shown)

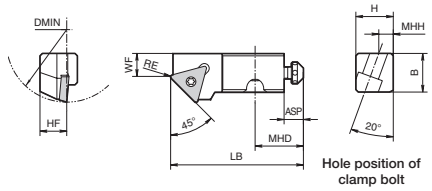


Fig. 1

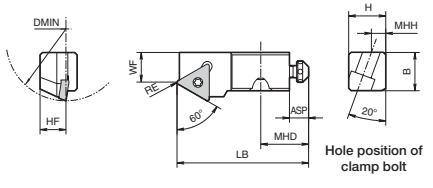


Fig. 2

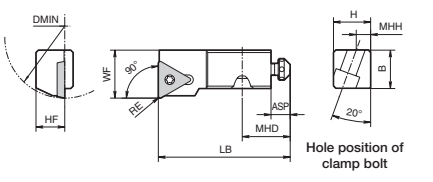


Fig. 3

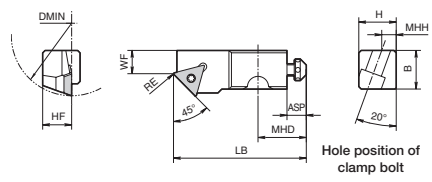


Fig. 4

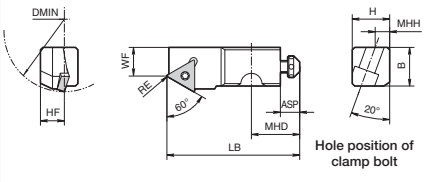


Fig. 5

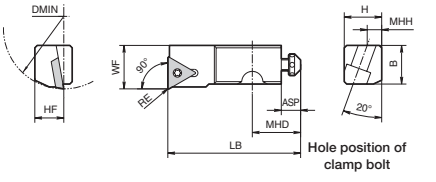
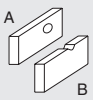


Fig. 6

Toolholder Dimensions

Description		Stock	Dimension (mm)								Std. Corner-R (RE)	Min. Bore Dia. DMIN (mm)	Drawing	Applicable Inserts		See Page for Applicable Inserts
			H	B	LB	MHD	ASP	MHH	HF	WF						
STDPR	**10CA11**	MTO	12.5	11	50	20	8	5	10	7	0.4	38	Fig. 1	TP□H TP□T TPGB	1103..	**B80** ~ **B86** **C16** **C26** ~ **C28**
	12CA16	MTO	15.5	16	55			6	12	10	0.8	50			1603..	
STEPR	**10CA11**	MTO	12.5	11	50			5	10	9	0.4	38	Fig. 2		1103..	
	12CA16	MTO	15.5	16	55			6	12	13	0.8	50			1603..	
STFPR	**10CA11**	MTO	12.5	11	50			5	10	14	0.4	38	Fig. 3		1103..	
	12CA16	MTO	15.5	16	55			6	12	20	0.8	50			1603..	
STDER	**12CA13**	MTO	15.5	16	55	20	8	6	12	10	0.4	50	Fig. 4	TEGW	1303..	-
STEER	**12CA13**	MTO								12			Fig. 5			
STFER	**12CA13**	MTO								18			Fig. 6			

Spare Parts

Description		Clamp Screw	Wrench	Radial adjustment screw	Axial adjustment screw	Wrench	Axial screw driver	Plate	Clamp Bolt	Wrench
										
STDPR	**10CA11**	SB-3TR	FT-10	HS4X4	AJM5F	LW-2	SW-1.8	SM0810A SM1010A	HH6X16	LW-5
	12CA16	SB-4TR	FT-15	HS5X5		LW-2.5		SM0812A SM1012A	HH6X20	
STEPR	**10CA11**	SB-3TR	FT-10	HS4X4		LW-2		SM0810A SM1010A	HH6X16	
	12CA16	SB-4TR	FT-15	HS5X5		LW-2.5		SM0812A SM1012A	HH6X20	
STFPR	**10CA11**	SB-3TR	FT-10	HS4X4		LW-2		SM0810A SM1010A	HH6X16	
	12CA16	SB-4TR	FT-15	HS5X5		LW-2.5		SM0812A SM1012A	HH6X20	
STDER	**12CA13**	SB-3080TR	FT-10	HS4X4	AJM5F	LW-2	SW-1.8	SM0812A SM1012A	HH6X20	LW-5
STEER	**12CA13**									
STFER	**12CA13**									

Note 1 : Plate is included with different two pieces one set of the size.

MTO : Made to order

For Star Micronics exclusive use　Back Facing Holder

Flange Holder

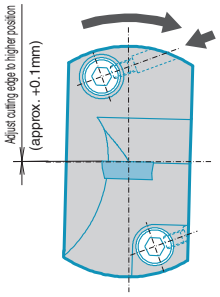
Back Facing Holder with Center Height Adjustment Function (Height adjustment approx. ±0.1mm)



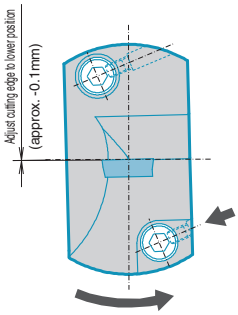
Flange Holder Center Height Adjustment

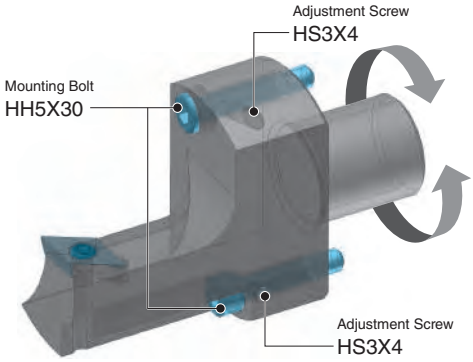
(1) Mount ø22 shank to toolpost
(2) Tighten the holder by the mounting bolts (HH5X30 x 2) temporary
(3) Adjust center height by the adjustment screw (HS3X4)
　A: Tighten the adjustment screw on the top of holder
　　⇒ Adjust cutting edge to higher position (approx. +0.1mm)
　B: Tighten the adjustment screw on the bottom of holder
　　⇒ Adjust cutting edge to lower position (approx. -0.1mm)
(4) Tighten the holder by the mounting bolts (HH5X30 x 2) additionally

A: Tighten the adjustment screw on the top of holder



B: Tighten the adjustment screw on the bottom of holder





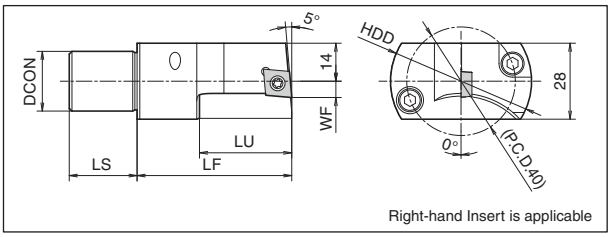
Compatible Machines with the Flange Holders

ECAS-20, SB-16(D/E), SB-12ⅡE, SB-16ⅡE, SB-20E, SB-20R TYPE-N,
SR-20RⅡ, SR-20RⅢ, SR-20RⅣ, SW-20, SR-25J/32J

Note 1) SR-20RIV, SW-20 have the limitation for install position.　Attaching both on the top and bottom is impossible.
　　It is necessary additional modifications on the plug cover.
Note 2) Cautions
　　(1) Avoid interfere with other tools
　　(2) Special chuck may be required for some workpieces.
　　(3) Limitation of stroke at the machine (soft limit) may required
　　(4) Shorter wrench is necessary when using close to the machine.

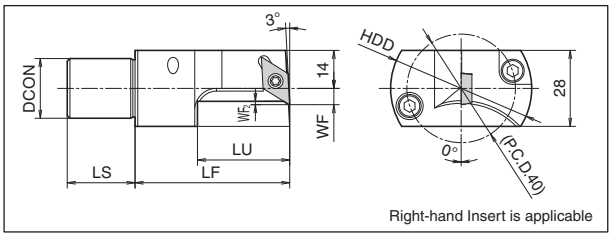
Flange holder

SF22F-SCLC (External / Facing) Applicable Inserts : CC...09...



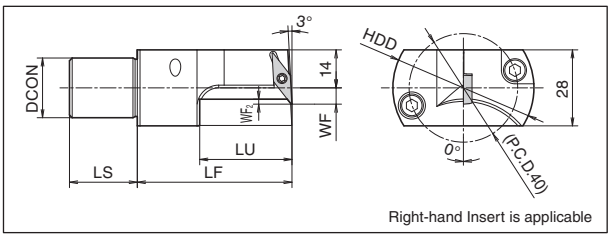
Right-hand Insert is applicable

SF22F-SDUC (External / Facing) Applicable Inserts : DC...11...



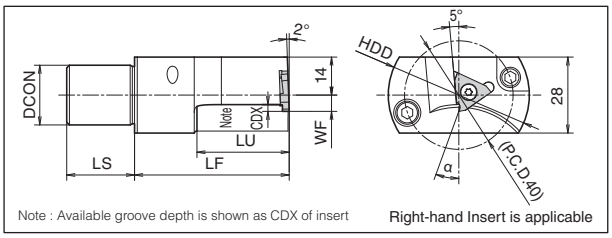
Right-hand Insert is applicable

SF22F-SVUB (External / Undercutting) Applicable Inserts : VB...11...



Right-hand Insert is applicable

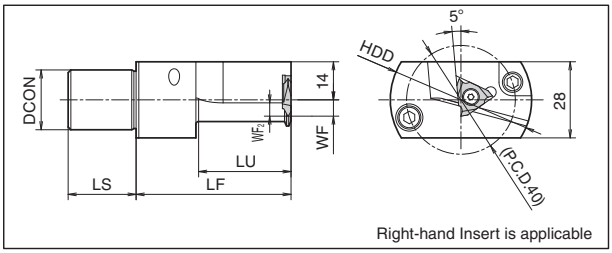
SF22F-KTGF (External Shallow Grooving) Applicable Inserts : TGF32R...



Note : Available groove depth is shown as CDX of insert

Right-hand Insert is applicable

SF22F-KTTX (External Threading) Applicable Inserts : TTX32R...



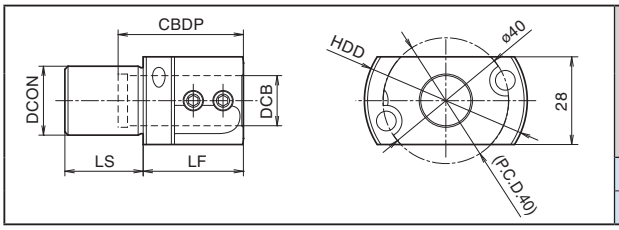
Right-hand Insert is applicable

α	Insert Grades
20°	PR1115, PR1215 PR930, KW10
11°	KPD001
6°	TC40N

Toolholder Dimensions

Description	Stock	Dimension (mm)							Std. Corner-R (RE)	Spare Parts					
		DCON	HDD	LF	LS	LU	WF	WF_2 CDX		Screw	Wrench	Mounting Bolt	Wrench	Adjustment Screw	Wrench
SF22F-SCLCL09-40P	▲	22	52	57	25	34	6	-	0.2	SB-4085TR	FT-15	HH5X30	LW-4	HS3X4	LW-1.5
SF22F-SDUCL11-40P	▲							1.5	0.2						
SF22F-SVUBL11-40P	▲							3	0.2	SB-2570TR	FT-8				
SF22F-KTGFL16-40P	▲							2.5	-	SB-4070TRS	FT-10				
SF22F-KTTXL16-40P	▲							4	-	SB-4070TRW	FT-8				

Flange holder (Sleeve Type)



Description	Stock	Dimension (mm)					
		DCON	HDD	DCB	LF	LS	CBDP
SF22F-SH16-40P	▲	22	52	16	32	25	40
SF22F-SH20-40P	▲			20	48		43

Spare Parts

Mounting Bolt	Wrench	Adjustment Screw	Wrench	Screw (For fixing toolholder)	Wrench
HH5X30	LW-4	HS3X4	LW-1.5	HS6X4P	LW-3

▲ : To be discontinued



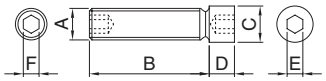
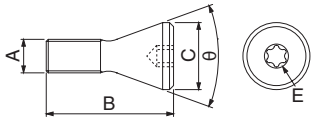
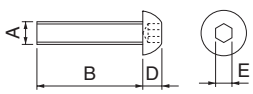
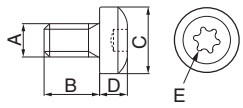
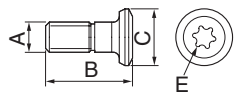
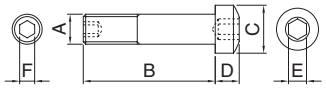
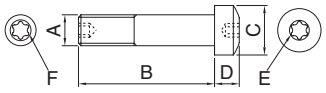
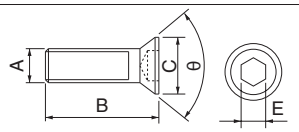
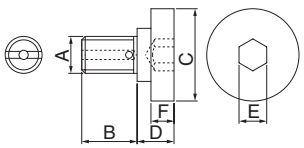
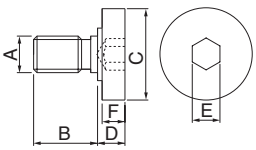
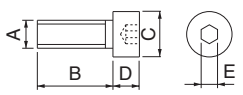
Spare Parts

P

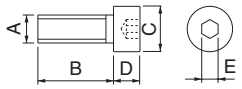
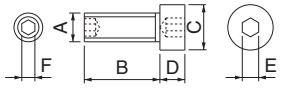
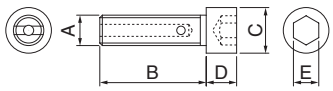
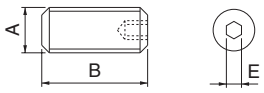
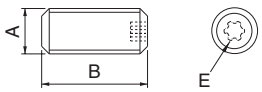
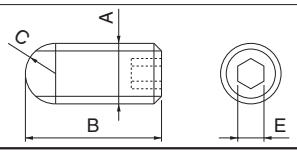
P1~P34

Screws	P2~P6
Pins	P7
Shims	P8~P12
Cartridges	P12
Clamp Sets	P13~P14
Clamps	P15~P16
Chipbreakers	P16
Wrenches	P17~P18
Springs / Nuts / Punches / Others	P18~P19
Former Parts List	P20~P34

Screws

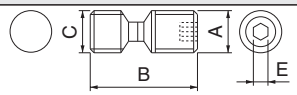
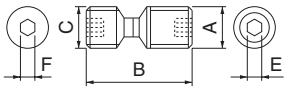
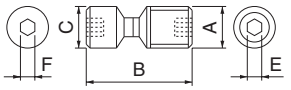
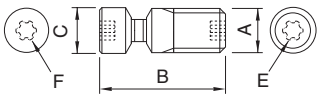
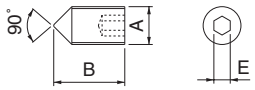
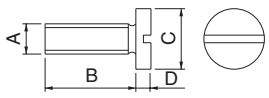
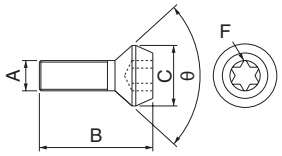
Shape	Description		Stock	Dimension (mm)						Angle		Torque (N·m)	Remarks
				A	B	C	D	E	F	α	θ		
	AJ	-6X38	●	M6X1.0	38.0	6.0	10.0	3.0	3.0	-	-	-	
		-8X44-9.5	●	M8X1.25	44.0	9.5	6.0	4.0	4.0	-	-		
		-10X46	●	M10X1.5	46.0	11.5	8.0	5.0	5.0	-	-		
	AJ	-519TR	●	M5X0.8	19.0	10.0	-	T15	-	-	40°	-	
	BH	3X6	●	M3X0.5	6.0	-	2.0	2.0	-	-	-	-	
		3X12	●	M3X0.5	12.0	-	2.0	2.0	-	-	-		
		6X25	●	M6X1.0	25.0	-	4.0	4.0	-	-	-		
	BH	6X10TR	●	M6X1.0	10.0	12.0	5.0	T25	-	-	-	6.5	
	CP	8X15TL	●	M8X1.25	15.0	15.0	-	T25	-	-	-	6.0	L···shows Left-hand Thread
		8X23TL	●		23.0								
	CS	-2D	●	M4X0.7	21.5	6.4	3.5	2.5	2.0	-	-	1.7	
		-3D	●	M5X0.8	22.0	8.0	4.0	3.0	2.5	-	-	3.9	
		-5D	●	M5X0.8	28.0	8.0	4.0	3.0	2.5	-	-	3.0	
	CS	-3D-TR	●	M5X0.8	22.0	8.0	4.0	T15	T15	-	-	3.9	
	GS	-50	●	M5X0.8	13.0	7.5	-	3.0	-	-	82°	-	
	HF	20X53H	●	M20X2.5	35.0	43.0	18.0	14.0	14.0	-	-	-	With Coolant Hole
		20X53HA	●		33.0	50.0	20.0						
		24X60H	●	M24X3.0	40.5	65.0	19.5	17.0					
		24X60HA	●		36.0		24.0						
	HF	16X40S	●	M16X2.0	29.0	40.0	11.0	14.0	10.0	-	-	-	
	HH	3X6	●	M3X0.5	6.0	5.5	3.0	2.5	-	-	-	-	
		3X12	●		12.0								
	HH	4X16	●	M4X0.7	16.0	7.0	4.0	3.0	-	-	-		
	HH	5X15	●	M5X0.8	15.0	8.5	5.0	4.0	-	-	-		
		5X16	●		16.0								
		5X20	●		20.0								
		5X25	●		25.0								
		5X30	●		30.0								
	HH	6X12	●	M6X1.0	12.0	10.0	6.0	5.0	-	-	-		
		6X16	●		16.0								
		6X16A	●		16.0								
		6X18	●		18.0								
		6X18A	●										
		6X20	●		20.0								
		6X25	●		25.0								
		6X30	●		30.0								
	HH	8X20	●	M8X1.25	20.0	13.0	8.0	6.0	-	-	-		
		8X25	●		25.0								

● : Std. Item

Shape	Description		Stock	Dimension (mm)						Angle		Torque (N·m)	Remarks
				A	B	C	D	E	F	α	θ		
	HH	10X25	●	M10X1.5	25.0	16.0	10.0	8.0	-	-	-	-	
		10X30	●		30.0								
		10X30S	●		30.0		6.0	7.0					
		10X35	●		35.0		10.0	8.0					
		10X40	●		40.0								
	HH	12X35	●	M12X1.75	35.0	18.0	12.0	10.0	-	-	-		
		12X40	●		40.0								
	HH	16X35	●	M16X2.0	35.0	24.0	16.0	14.0	-	-	-		
		16X40	●		40.0								
		16X45	●		45.0								
	HH	20X40	●	M20X2.5	40.0	30.0	20.0	17.0	-	-	-		
		20X55	●		55.0								
	HH	4X12	●	M4X0.7	10.0	7.0	4.0	3.0	2.0	-	-	-	
	HH	8X25H	●	M8X1.25	25.0	13.0	8.0	5.0	-	-	-	-	With Coolant Hole
		10X30H	●	M10X1.5	30.0	16.0	10.0	6.0					
		10X35HK	●		35.0								
		12X35H	●	M12X1.75	35.0	18.0	12.0	8.0					
		12X35HK	●										
		16X52H	●	M16X2.0	36.0	24.0	16.0	12.0					
	HS	3X3P	●	M3X0.5	2.9	-	-	1.5	-	-	-	1.0	HS4X4P and HS6X4P have a flat edge Clamp screw equivalent to JIS B-1177
		3X4P	●		3.9								
		3X4	●		4.0								
	HS	4X4P	●	M4X0.7	3.9	-	-	2.0	-	-	-	2.0	
		4X4	●		4.0								
	HS	5X5	●	M5X0.8	5.0			2.5				3.0	
	HS	6X4P	●	M6X0.75	3.9	-	-	3.0	-	-	-	4.0	
		6X6	●	M6X1.0	6.0								
		6X8T	●		8.0								
		6X14	●		14.0								
		6X22	●		22.0								
	HS	8X10	●	M8X1.25	10.0	-	-	4.0	-	-	-	-	
		8X12	●		12.0								
	HS	10X10	●	M10X1.5	10.0	-	-	5.0	-	-	-		
		10X16	●		16.0								
	HS	12X12	●	M12X1.75	12.0	-	-	6.0	-	-	-		
		12X16	●		16.0								
		12X18	●		18.0								
		12X20	●		20.0								
		12X25	●		25.0								
		12X30	●		30.0								
		12X35	●		35.0								
	HS	16X12	●	M16X2.0	12.0	-	-	8.0	-	-	-		
		16X18	●		18.0								
		16X20	●		20.0								
	HS	-2524TRP	●	M2.5X0.35	2.4	-	-	5IP	-	-	-	0.5	◯IP shows Torx Plus
		-2534TRP	●		3.4								
		-3048TRP	●	M3X0.5	4.8			6IP				0.8	
		-4067TRP	●	M4X0.7	6.7			7IP				1.2	
	HSB	4X8R/L	●	M4X0.7	8.0	R2.0	-	2.0	-	-	-	2.0	R···shows Right-hand Thread L···shows Left-hand Thread

● : Std. Item

Screws

Shape	Description		Stock	Dimension (mm)						Angle		Torque (N·m)	Remarks
				A	B	C	D	E	F	α	θ		
	LS	-03N	●	M5X0.8	9.7	M5X0.8	-	2.0	-	-	-	2.0	N : Silver coated
		-03SN	●		12.0			2.5				3.0	
	LS	-05	●	M5X0.8	15.5	M5X0.8	-	2.0	2.0	-	-	2.0	
	LS	-1N	●	M6X1.0	17.0	6.0	-	2.5	2.5	-	-	3.0	N : Silver coated
		-1SN	●		14.2								
		-1T	●		21.0								
	LS	-2N	●	M8X1.0	20.0	8.0	-	3.0	3.0	-	-	4.0	
		-3	●		22.0								
		-4N	●		24.0								
		-5	●	M10X1.0	29.0	10.0	-	4.0	4.0	-	-	-	
	LS	-1P	●	M6X1.0	16.5	6.0	-	10IP	10IP	-	-	2.0	○○IP shows Torx Plus
		-2P	●	M8X1.0	18.2	8.0		15IP	15IP			3.5	
		-3P	●		21.8								
	LS	-11	●	M6X1.0	9.5	-	-	3.0	-	-	-	-	
		-15	●		12.5								
	M	3X8	●	M3X0.5	8.0	5.5	2.0	-	-	-	-	-	Flat fillister head screw equivalent to JIS B-1101
		3X12	●		12.0								
		4X10	●	M4X0.7	10.0	7.0	2.6						
	SB	-1TR	●	M2X0.4	5.3	3.8	-	-	T6	-	82°	0.5	R···shows Right-hand Thread
		-2TR	●	M2.5X0.45	6.2	4.5			T8			1.2	
		-3TR	●	M3X0.5	7.2	4.8			T10			2.0	
		-3STR	●		6.4	5.2							
		-3.5TR	●	M3.5X0.6	9.3	5.6			T15			3.5	
		-4TR	●	M4X0.7	7.7	5.8							
		-5TR	●	M5X0.8	20.0	8.7			T20		90°	4.5	
		-2290TR	●	M2.2X0.45	9.2	2.8			T6		60°	0.5	
		-25100TR	●	M2.5X0.45	10.0	3.5			T7			0.8	
		-40115TR	●	M4X0.7	11.5	5.5			T15			3.5	
		-5070TR	●	M5X0.8	7.0	6.8			T20			4.5	
		-5090TR	●		9.0								
		-50120TR	●		12.0								

Reference

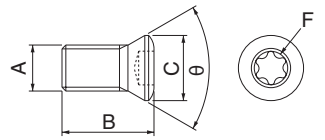
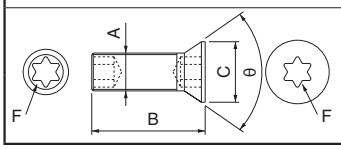
Torx and Torx Plus have different cross-sections.



Torx

Torx Plus

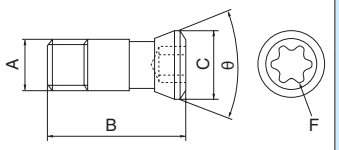
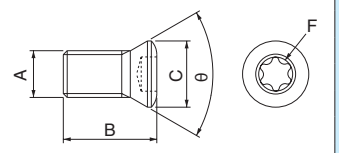
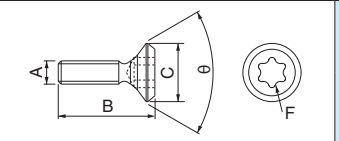
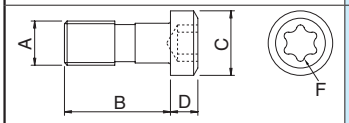
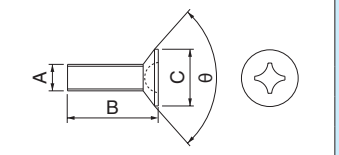
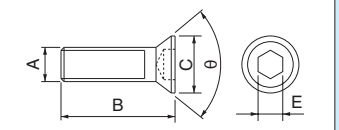
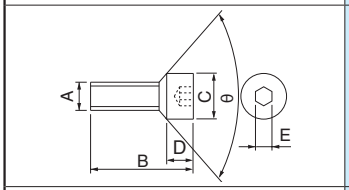
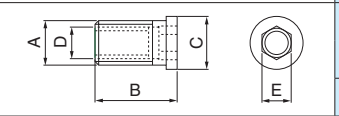
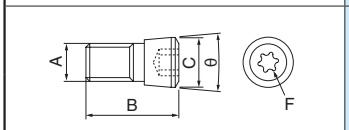
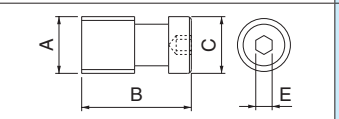
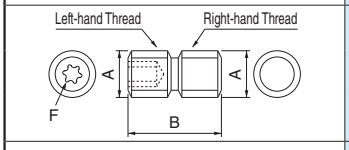
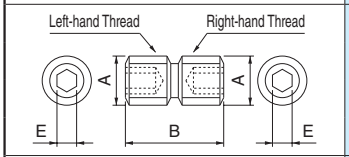
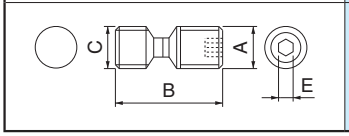
● : Std. Item

Shape	Description	Stock	Dimension (mm)						Angle		Torque (N·m)	Remarks
			A	B	C	D	E	F	α	θ		
	SB -1635TR	●	M1.6X0.35	3.3	2.6			T6		60˚		
	SB -1STR	●	M2X0.4	5.0	3.1							
	-1840TRP	●	M1.8X0.35	4.0	2.5			6IP		55˚		
	-2035TR	●		3.7	3.0			T6		60˚		
	-2035TRG	●		3.5	2.7							
	-2037TRP	●		3.7				6IP		55˚		
	-2040TR	●		3.8	3.0			T6				
	-2040TRG	●		4.0		-	-		-		0.5	
	-2041TRP	●	M2X0.4	4.1	2.7			6IP		60˚		
	-2042TRG	●						T6				
	-2045TR	●		4.3								
	-2045TRN	●			2.8					37˚		
	-2050TR	●		4.8	3.0					60˚		
	-2060TR	●		5.8	3.5			T8			1.2	
	-2080TR	●		8.3	2.8			T6			0.5	
	SB -2250TR	●		5.1	3.1							
	-2255TR	●	M2.2X0.45	5.5	3.5	-	-	T7	-	60˚	0.8	
	-2260TR	●		5.8	3.1							
	-2270TR/L	●		6.8	3.2							
	SB -2545TR	●		4.6	3.5			T8				
	-2555TRG	●		5.4								
	-2555TRP	●	M2.5X0.45	5.5		-	-	8IP	-	60˚	1.2	
	-2560TR	●		5.7				T8				
	-2570TR	●		6.8								
	SB -3060TR	●		5.3	4.2			T10			2.0	
	-3060TRP	●		6.0				10IP				
	-3065TRP	●		6.5	4.0			8IP		60˚	1.2	
	-3070TRG	●		7.0	4.2			T10			2.0	
	-3070TR/L	●	M3X0.5		4.0	-	-	T8	-		1.2	R···shows Right-hand Thread
	-3070TRP	●			4.2			10IP				
	-3076TRP	●		7.6	3.9					55˚	2.0	
	-3080TR	●		8.0	4.2			T10		60˚		L···shows Left-hand Thread
	SB -3573TRP	●		7.3	5.0			10IP			2.0	
	-3580TR	●		8.0	5.3			T15			3.5	
	-3590TRP	●	M3.5X0.6	9.0		-	-	15IP	-	60˚	4.0	
	-3592TR	●		9.2	5.1			T10			2.0	
	SB -4050TRN	●	M4X0.5	4.6	5.1			T10		57˚	2.0	○○IP shows Torx Plus
	-4060TR	●		5.9	5.5			T15		60˚	3.5	
	-4065TR	●		6.7								
	-4070TRG	●		7.0								
	-4070TRN	●		7.7	5.4							
	-4070TRS	●		6.7	5.5			T10			2.0	
	-4075TRP	●		7.5				15IP			3.5	
	-4082TPR	●		8.2								
	-4085TR	●	M4X0.7	8.5		-	-	T15	-			
	-4085TRP	●						15IP				
	-4086TRP	●		8.6								
	-4090TRP	●		9.0	5.7							
	-4090TRPN	●			5.5							
	-40120TR	●		12.0	5.1			T15		50˚		
	-40125TRN	●		12.5	5.2							
	-40140TR	●		14.0	5.5					60˚		
	-40140TRN	●			6.7					75˚		
	SB -4570TRN	●	M4.5X0.5	6.8	6.0	-	-	T10	-	57˚	2.0	
	-45130TR	●	M4.5X0.75	13.0	6.6			20IP		55˚	4.5	
	SB -5085TR	●		8.5	6.8			T20		50˚	4.5	
	-50120TRP	●		12.0				20IP		60˚		
	-50120TRPH	●										
	-50120TRS	●	M5X0.8		7.2			15IP			3.5	
	-50137K	●		13.7	9.7	-	-	T20	-	70˚	4.5	
	-50140TR	●		14.0	7.3			T15		50˚	3.5	
	-50140TRP	●						20IP		60˚	4.5	
	SB -60120TR	●		12.0	8.5			T25			6.0	
	-60130TRP	●	M6X1.0	13.0				20IP			4.5	
	-60200TRP	●		20.0							6.0	
	SB -4070TRW	●	M4X0.7	6.7	5.5	-	-	T8	-	60˚	1.2	R···shows Right-hand Thread
	-4590TRWN	●	M4.5X0.75	9.3	5.6			T10		57˚	2.0	

SB-40125TRN

● : Std. Item

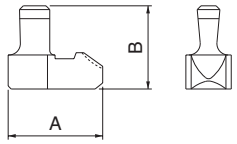
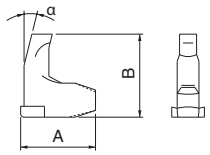
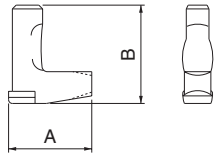
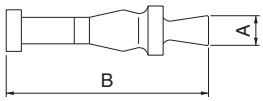
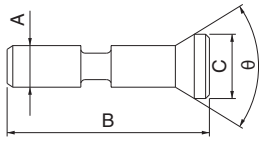
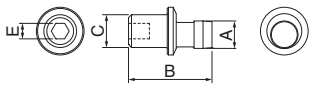
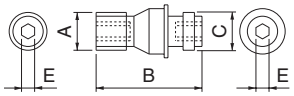
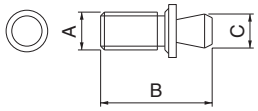
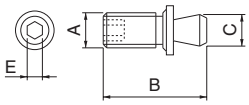
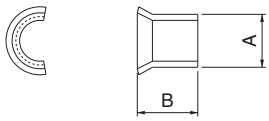
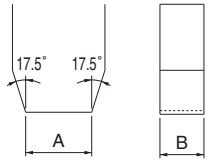
Screws

Shape	Description		Stock	Dimension (mm)						Angle		Torque (N·m)	Remarks
				A	B	C	D	E	F	α	θ		
	SC	-30067	●	M3X0.35	6.7	4.4	-	-	T8	-	60˚	1.2	
		-35085	●	M3.5X0.35	8.5	5.7			T10			2.0	
		-40100	●	M4X0.5	10.0	6.0			T15			3.5	
		-50130	●	M5X0.5	13.0	6.6			T20		40˚	4.5	
		-60160	●	M6X0.75	16.0	8.0			T25			6.0	
		-60210	●		21.0	9.6			T30			8.0	
	SE	-3070TRP	●	M3X0.5	7.0	4.3	-	-	9IP	-	43˚	1.7	○○IP shows Torx Plus
		-40050TRN	●	M4X0.7	5.0	5.0			T15		44˚	3.5	
		-40055TR	●		5.5								
		-40068TR	●		6.8								
		-40080TR	●		8.0								
		-40090TR	●		9.0								
		-40100TR	●		10.0								
	SE	-40120TR	●	M4X0.7	12.0	5.6	-	-	T15	-	60˚	3.5	
		-50125TR	●	M5X0.8	12.5	6.8			T20			4.5	
	SH	-50150TR	●	M5X0.8	15.1	7.3	3.1	-	T20	-	-	4.5	
	SP	3X4	●	M3X0.5	4.0	4.0	-	-	-	-	90˚	-	With additional machining below the flat head screw
		3X6	●		6.0	6.0							Cross recessed flat head screw equivalent to JIS···B-1111
		3X8	●		8.0								
		3X10	●		10.0								
	SP	4X9	●	M4X0.7	9.0	5.6	-	2.0	-	-	90˚	-	
	SP	8X35	●	M8X1.25	35.0	11.0	4.4	5.0	-	-	90˚	-	
	SPW	-6045	●	M6X0.75	9.0	7.5	M4.5X0.75	4.5	-	-	-	-	A shows External, D shows Internal. External and Internal threads are both Right-hand threads.
		-7050	●	M7X0.75	9.0	8.8	M5X0.8	5.0	-	-	-		
	SS	-4N	●	M5.5X0.5	8.5	6.6	M4X0.7	4.0	-	-	-		
	SV	-60136R	●	M6X1.0	13.6	6.3	-	-	T25	-	6˚	-	Torx
		-60136TR	●						T20			4.5	
	TH	8X15	●	M8X1.25	20.0	8.5	-	4.0	-	-	-	-	
	W	6X17	●	M6X1.0	17.0	-	-	-	T20	-	-	4.5	
		6X18N	●		18.0				T15			3.5	
		8X16	●	M8X1.0	16.0				T25			6.0	
	W	6X18	●	M6X1.0	17.5	-	-	3.0	-	-	-	-	
		6X20	●	M6X1.0	20.5								
		8X18	●	M8X1.25	18.0			4.0					
		*8X21	●	M8X1.0	21.0								
	W	10X31	●	M10X1.0	31.0	M10X1.5	-	5.0	-	-	-	-	

* No socket on right-hand thread side

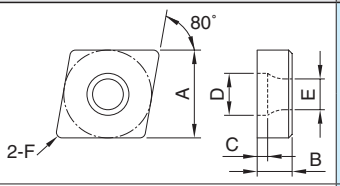
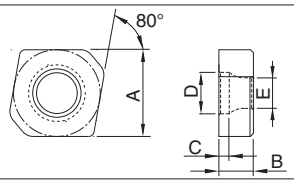
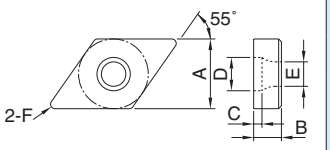
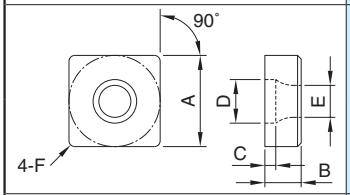
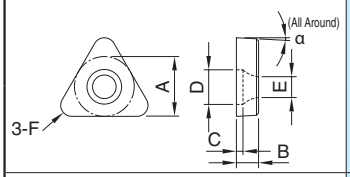
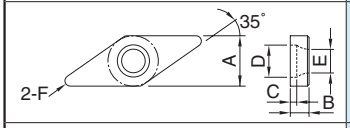
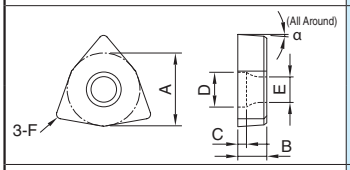
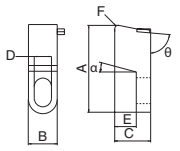
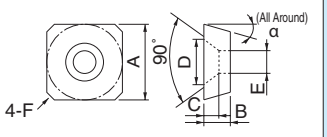
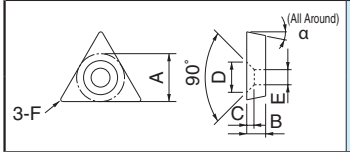
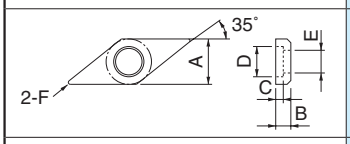
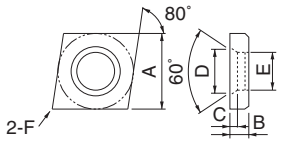
● : Std. Item

Pins

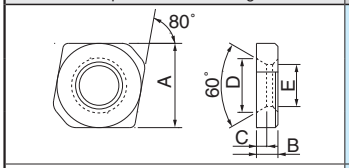
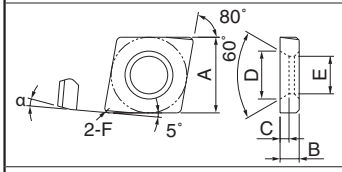
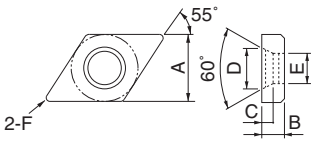
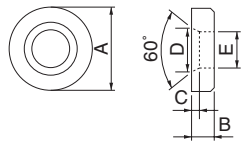
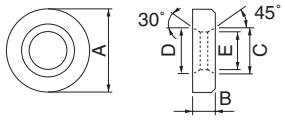
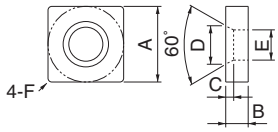
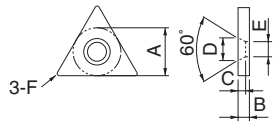
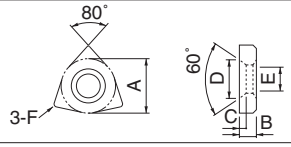
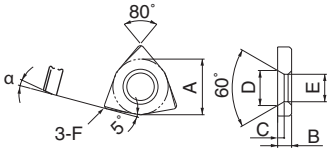
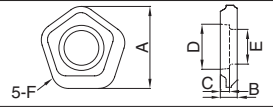
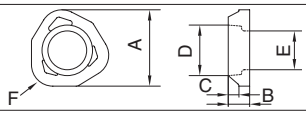
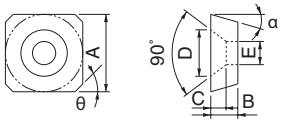
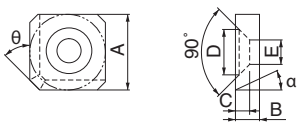
Shape	Description		Stock	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	LL	-03N	●	7.8	6.3	-	-	-	-	-	-	
		-03SN	●	11.1	8.9							
		-03TN	●	8.3	8.9							
	LL	-05C	●	10.7	11.7	-	-	-	-	12°	-	
		-1CN	●	13.0	13.3					14°		
		-2C	●	18.8	17.6					14°		
	LL	-1K	●	10.0	12.0	-	-	-	-	-	-	
		-1N	●	10.3	12.0							
		-1DN	●	12.3	12.0							
		-2K	●	13.3	13.2							
		-2N	●	13.5	13.0							
		-3K	●	16.0	14.8							
		-3N	●	16.4	13.0							
		-4	●	16.4	14.7							
		-5N	●	17.1	16.7							
		-6	●	20.7	21.0							
	LP	-2S	●	3.65	20.0	-	-	-	-	-	-	
		-6S	●	3.65	25.0	-	-	-	-	-	-	
	LPA	-11	●	2.8	11.0	4.2	-	-	-	-	60°	
		-13	●		13.0							
		-17	●		17.0							
	LPF	-11	●	2.5	11.0	3.5	-	-	-	-	60°	
		-1113	●		13.0							
		-1117	●		17.0							
		-13	●	3.8	13.0	5.5						
		-17	●		17.0							
	PP	-4	●	4.6	14.0	5.5	-	3.0	-	-	-	
	TS	-3S	●	M5X0.8	15.0	3.60	-	2.0	-	-	-	
	WP	-1S	●	M5X0.8	18.0	3.65	-	-	-	-	-	
		5X15	●		15.0	5.0						
	WP	5X11	●	M5X0.8	10.5	5.0	-	2.0	-	-	-	
	LSP	-1	●	5.0	5.3	-	-	-	-	-	-	
		-2	●	6.5	5.6							
		-3	●	8.25	7.9							
		-4	●	9.5	10.0							
	LSP	-2K	●	5.1	5.2							
		-3K	●	6.7	5.7							
	P	-03	●	2.8	1.95	-	-	-	-	-	-	
		-03S	●	3.5	1.95	-	-	-	-	-	-	

● : Std. Item

Shims

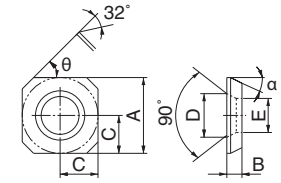
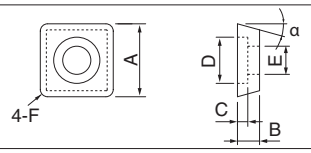
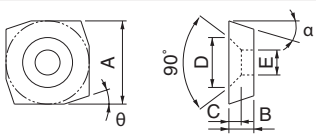
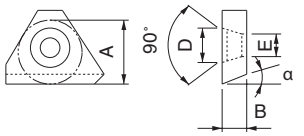
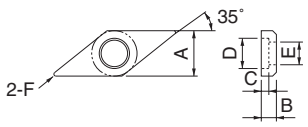
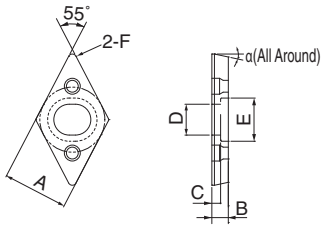
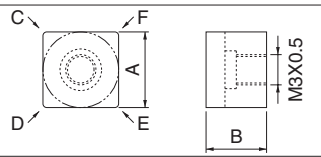
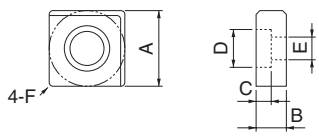
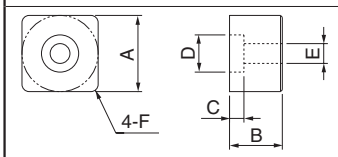
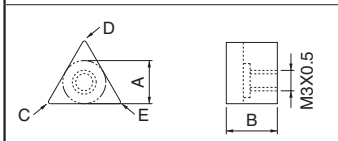
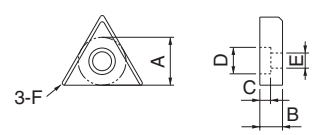
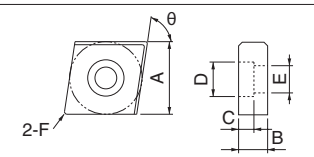
Shape (Handed Spare Parts show Right-hand)	Description		Stock	Dimension (mm) A	B	C	D	E	F	Angle α	θ	Remarks
	**DC**	**-42**	●	12.0	3.2	1.2	6.0	4.4	R1.2	-	-	Shim Screw : SB-4085TR
		-44	●	12.55	5.0	1.5			R0.8			
	**DC**	**-44-C**	●	12.55	5.0	1.5	6.0	4.4	-	-	-	Shim Screw : SB-4085TR
	**DD**	**-42**	●	12.55	3.2	1.2	6.0	4.4	R1.2	-	-	Shim Screw : SB-4085TR
		-42-16	●						R1.6			
		-43	●		3.4	1.3			R0.8			
		-44	●		5.0	1.5						
	**DS**	**-42**	●	12.0	3.2	1.2	6.0	4.4	R1.2	-	-	Shim Screw : SB-4085TR
		-44	●	12.55	5.0	1.5			R0.8			
	**DT**	**-32**	●	8.63	3.2	0.95	5.0	3.4	R1.6	3°	-	Shim Screw : SB-3080TR
		-42	●	12.46		1.2	6.0	4.4	R1.2	-		Shim Screw : SB-4085TR
	**DV**	**-33**	●	9.40	3.5	1.2	6.0	4.4	R1.0	-	-	Shim Screw : SB-4085TR
	**DW**	**-42**	●	11.5	3.2	1.2	6.0	4.4	R1.2	4°	-	Shim Screw : SB-4085TR
		-44	●	12.65	5.0	1.5			R0.8	-		
	**556**	**C**R/L	●	34.0	10.0	12.7	5.6	5.0	R1.6	0°	55°	R···shows Right-hand L···shows Left-hand Shim Screw : HH5X16
	**KPS**	**-42**	●	11.5	3.2	2.0	7.2	3.2	C1.0	7°	-	Shim Screw : SP3X8
	**KPT**	**-32**	●	8.0	3.2	1.9	7.0	3.2	R0.4	11°	-	Shim Screw : SP3X8 : SP3X10
		-42	●	10.5	3.2	1.9	7.0	3.2	R0.8	11°	-	
	**KVN**	**-32**	●	9.52	3.2	2.1	7.6	5.5	R0.8	-	-	Lock Pin : LP-2S : LP-6S
	**LC**	**-32N**	●	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
		-4K	●	11.7	3.2	1.4	8.1	6.73	R0.8	-	-	Shim Pin : LSP-3K
		-42N	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
		-42N-20	●						R2.0			
		-53N	●	15.9	4.8	1.7	10.0	8.0	R1.2	-	-	Shim Pin : LSP-3
		-63	●	19.0	4.8	2.0	11.61	9.3	R1.6	-	-	Shim Pin : LSP-4

● : Std. Item

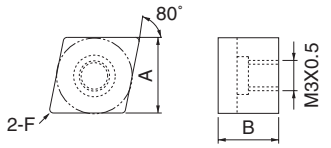
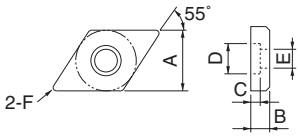
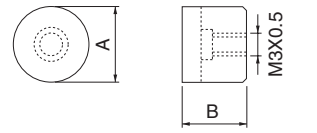
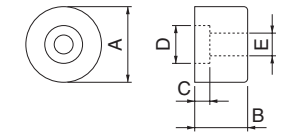
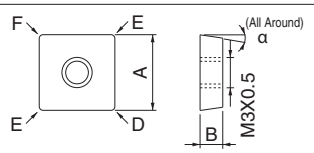
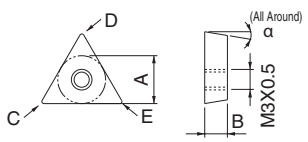
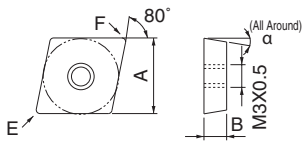
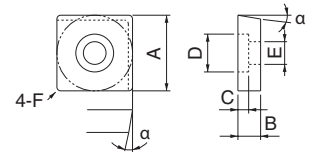
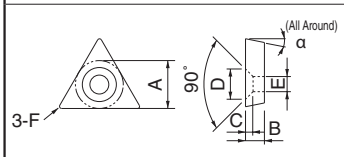
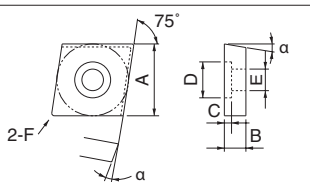
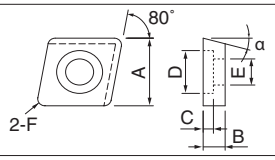
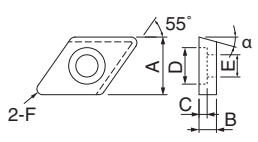
Shape Handed Spare Parts show Right-hand	Description		Stock	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	LC	-42N-C	●	12.65	3.2	1.5	8.01	6.28	-	-	-	Shim Pin : LSP-2
		-53N-C	●	15.9	4.8	1.7	10.0	8.0	-	-	-	Shim Pin : LSP-3
		-63-C	●	19.0	4.8	2.0	11.61	9.3	-	-	-	Shim Pin : LSP-4
	LC	-42N R/L	●	12.65	3.2	1.5	8.01	6.28	R0.8	10°	-	R···shows Right-hand L···shows Left-hand Shim Pin : LSP-2
	LD	-32N	●	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
		-4K	●	11.7	3.2	1.4	8.1	6.73	R0.8	-	-	Shim Pin : LSP-3K
		-4K43	●		4.8	3.0	8.3	6.60	R1.2			
		-42	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
		-42-20	●						R2.0			
		-43	●	12.65	4.8	3.1	8.5	6.28	R0.8	-	-	
		-43-20	●						R2.0			
	LR	-80	●	9.47	3.2	1.3	6.25	4.75	-	-	-	Shim Pin : LSP-1
		-81	●	12.65	3.2	1.5	8.01	6.28	-	-	-	Shim Pin : LSP-2
	LR	-10C	●	8.5	3.2	6.3	6.3	4.7	-	-	-	Shim Pin : LSP-1
		-12C	●	10.0	3.2	6.3	6.3	4.7	-	-	-	
		-16C	●	13.6	3.2	7.9	8.01	6.28	-	-	-	Shim Pin : LSP-2
	LS	-32	●	9.47	3.2	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
		-42	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
	LT	-3K	●	8.53	2.7	1.0	6.1	5.13	R0.8	-	-	Shim Pin : LSP-2K
		-32N	●	9.47	2.7	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
		-32N-20	●						R2.0			
		-42N	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
		-42N-20	●						R2.0			
	LW	-32N	●	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin : LSP-1
		-42N	●	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin : LSP-2
	LW	-42N R/L	●	12.65	3.2	1.5	8.01	6.28	R0.8	10°	-	R···shows Right-hand L···shows Left-hand Shim Pin : LSP-2
	MFPN	-45	●	17.07	3.5	1.95	9.8	7.18	R3.5	-	-	Shim Screw : SPW-7050
	MFWN	-90	●	15.25	4.0	2.5	9.44	7.25	R3.0 R4.0	-	-	Shim Screw : SPW-7050
	MSD	-42	●	10.7	3.2	1.85	7.0	3.3	-	20°	45°	Shim Screw : SP3X8
	MSE	-4245S	●	10.3	3.2	2.0	6.0	5.0	-	20°	45°	Shim Screw : SP4X9
	MSE	-4215	●	10.53	3.2	1.5	6.4	3.4	-	25°	15°	Shim Screw : SP3X8
		-4245	●	10.53	3.2	1.5	6.4	3.4	-	25°	45°	Shim Screw : SP3X8

● : Std. Item

Shims

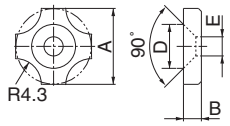
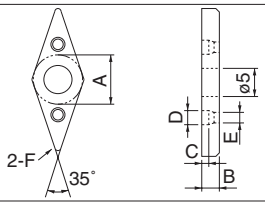
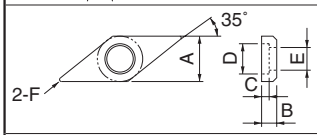
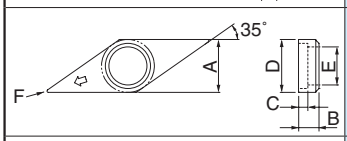
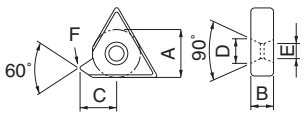
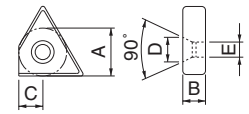
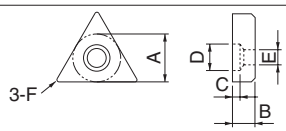
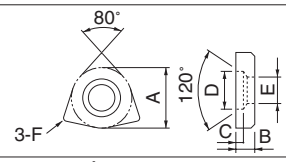
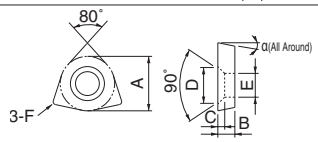
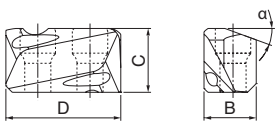
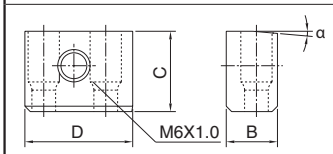
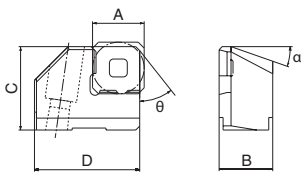
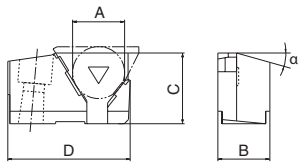
Shape	Description	Stock	Dimension (mm)						Angle		Remarks
			A	B	C	D	E	F	α	θ	
	**MSO -4T245**	●	10.0	2.0	4.7	6.4	4.8	-	27°	45°	Shim Screw : SP3X6
	**MSO -5200**	●	12.6	3.18	1.8	8.27	6.66	R0.8	15°	-	Shim Screw : SPW-6045
	**MSP -42**	●	11.3	3.2	1.85	7.0	3.3	-	15°	15°	Shim Screw : SP3X8
	**MTE -42**	●	9.8	3.2	-	6.4	3.4	-	25°	-	Shim Screw : SP3X8
	**MVN -32**	●	9.52	3.2	2.1	7.4	6.5	R0.8	-	-	Lock Pin : TS-3S
	**PD -42**	●	12.7	3.2	1.7	6.0	8.4	0.8	12°	-	Shim Screw : SB-2050TR
	**SP -129**	●	9.52	9.52	R0.8	R1.6	R1.2	R1.6	-	-	Shim Screw : HH3X12
	**SP -141**	●	12.7	4.0	2.4	6.2	3.3	R1.2	-	-	Shim Screw : M3X8
	-143	●	12.7	7.2	2.4	6.2	3.3	R1.2	-	-	Shim Screw : M3X12
	-162	●	15.8	6.0	3.4	8.0	4.4	R1.5	-	-	Shim Screw : M4X10
	**SP -148**	●	12.7	8.8	2.4	6.2	3.3	R1.2	-	-	Shim Screw : BH3X12
	**SP -219**	●	6.35	9.52	R0.8	R1.2	R1.6	-	-	-	Shim Screw : HH3X12
	**SP -221**	●	9.52	4.0	2.5	6.5	3.5	R1.2	-	-	Shim Screw : M3X8
	-223	●	9.52	7.2	2.5	6.5	3.5	R1.2	-	-	Shim Screw : M3X12
	**SP -342**	●	12.7	6.0	2.5	6.5	3.5	R1.2	-	75°	Shim Screw : M3X8
	-441	●	12.7	4.0	2.5	6.2	3.3	R0.8	-	80°	Shim Screw : M3X8
	-443	●	12.7	7.2	2.5	6.2	3.3	R0.8	-	80°	Shim Screw : M3X12
	-454	●	15.7	8.0	3.4	8.0	4.5	R1.6	-	80°	Shim Screw : M4X10

● : Std. Item

Shape	Description		Stock	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	SP	-429	●	9.52	9.52	-	-	-	R1.2	-	-	Shim Screw : HH3X12
	SP	-521	●	10.0	4.0	2.5	6.2	3.3	R1.0	-	-	Shim Screw : M3X8
		-523	●		7.2							Shim Screw : M3X12
		-541	●	12.7	4.0	2.5	6.2	3.3	R1.2	-	-	Shim Screw : M3X8
		-543	●		7.2							Shim Screw : M3X12
	SP	-826	●	9.52	7.9	-	-	-	-	-	-	Shim Screw : HH3X12
		-829	●	9.52	9.52	-	-	-	-	-	-	
	SP	-841	●	12.7	4.0	2.4	6.2	3.3	-	-	-	Shim Screw : M3X8
		-843	●	12.7	7.2	2.4	6.2	3.3	-	-	-	Shim Screw : M3X12
		-849	●	12.7	8.8	2.4	6.2	3.3	-	-	-	Shim Screw : BH3X12
		-861	●	15.8	6.0	3.4	8.0	4.4	-	-	-	Shim Screw : M4X10
	SP	-130A	●	9.52	3.2	-	R0.4	R0.8	R1.2	8°	-	Shim Screw : BH3X12
	SP	-210A	●	6.35	3.2	R0.4	R0.8	R1.2	-	8°	-	Shim Screw : BH3X6
	SP	-420A	●	9.52	3.2	-	-	R0.8	R1.2	8°	-	Shim Screw : BH3X6
	SP	-141P	●	12.7	4.0	2.4	6.2	3.3	R1.2	7°	-	Shim Screw : M3X8
		-143P	●	12.7	7.2	2.4	6.2	3.3	R1.2	7°	-	Shim Screw : M3X12
	SP	-230P	●	8.3	3.2	2.0	7.2	3.2	R0.5	7°	-	Shim Screw : SP3X10
	SP	-341P	●	12.6	4.0	2.5	6.5	3.5	R1.2	7°	-	Shim Screw : M3X8
	SP	-441P	●	12.7	4.0	2.5	6.2	3.3	R1.2	11°	-	Shim Screw : M3X8
		-443P	●		7.2							Shim Screw : M3X12
	SP	-521P	●	10.0	4.0	2.5	6.2	3.3	R1.2	11°	-	Shim Screw : M3X8
		-523P	●		7.2							Shim Screw : M3X12

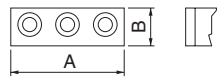
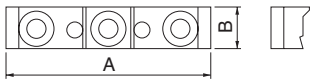
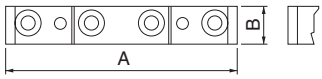
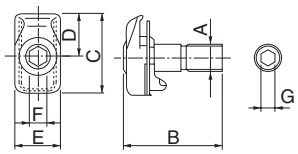
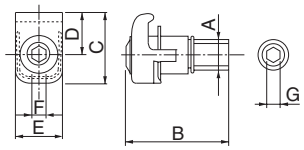
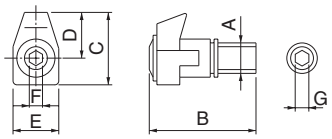
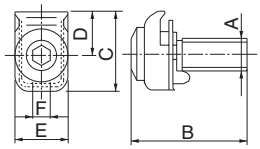
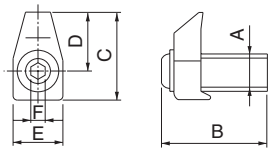
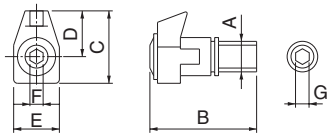
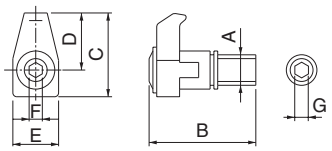
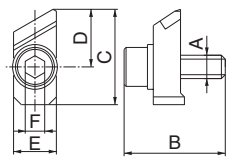
● : Std. Item

Shims / Cartridges

Shape (Handed Spare Parts show Right-hand)	Description		Stock	Dimension (mm) A	B	C	D	E	F	Angle α	θ	Remarks
	SP	-RC	●	12.6	3.0	-	7.35	3.35	-	-	-	Shim Screw : SP3X8
	SVN	-32	●	8.0	3.2	1.5	3.1	2.3	R0.4	-	-	Shim Screw : SB-2050TR
	SVN	-32N	●	8.2	3.2	1.5	7.0	5.9	R0.6	-	-	Shim Screw : SS-4N
	SVN	-32S	●	8.2	3.2	1.5	7.0	5.9	R0.2	-	-	Shim Screw : SS-4N 1-edge
	TN	-32	●	9.52	3.2	6.5	7.0	4.2	R0.4	-	-	Shim Screw :SP3X8
		-43	●	12.70	3.2	8.1	7.0	4.2	R0.5	-	-	
	TNW	-32	●	9.52	3.2	4.8	7.0	4.2	-	-	-	Shim Screw :SP3X8
	WTN	-33	●	9.52	4.76	2.5	7.0	5.3	R0.8	-	-	Shim Pin : WP-1S
		-33-20	●						R2.0			
	WWN	-42	●	12.7	3.0	1.4	7.0	5.3	R1.2	-	-	Shim Pin : WP5X15
	WWP	-42	●	12.7	3.0	1.5	8.3	5.3	R1.2	11°	-	Shim Pin : WP5X11
		-42-16	●						R1.6			
	MAP	-2216	●	-	9.0	11.0	19.8	-	-	20°	-	Clamp Screw : SB-40140TR
	MAP	-2506	●	-	9.5	14.9	20	-	-	5°	-	Clamp Screw :SB-40140TR
	LSD	-445R	●	12.7	13.0	20.0	26.5	-	-	20°	45°	Dimension A shows Insert I.C.
	LSE	-445R	●	12.7	13.0	19.5	26.0	-	-	20°	45°	
	LSO	-445R	●	13.494	12.0	21.3	23.5	-	-	27°	45°	
	LSP	-415R	●	12.7	13.0	18.0	26.0	-	-	15°	15°	
	LTE	-490R	●	12.7	12.0	17.0	30.0	-	-	15°	-	Dimension A shows Insert I.C.

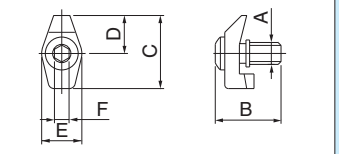
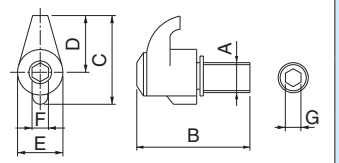
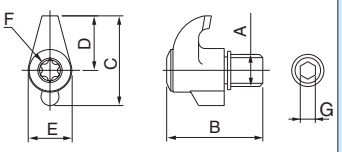
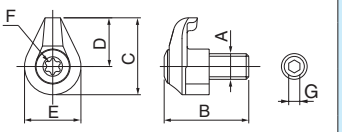
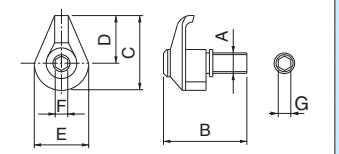
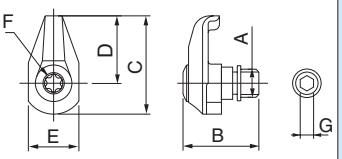
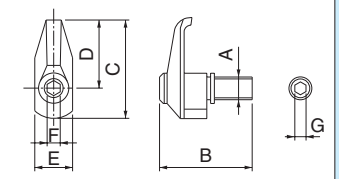
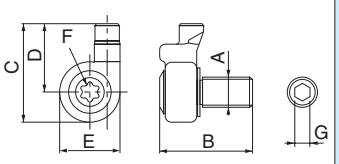
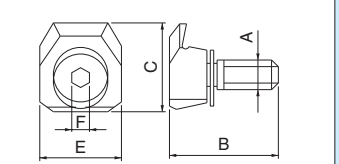
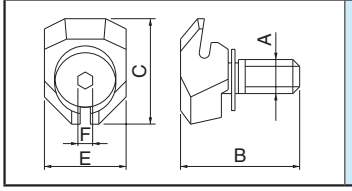
● : Std. Item

Clamp Sets

Shape Handed Spare Parts show Right-hand	Description		Stock	Dimension (mm)							Remarks
				A	B	C	D	E	F	G	
	**BCS**	**-1**	●	64.0	13.0	-	-	-	-	-	
		-5	●	48.0	16.5	-	-	-	-	-	
	**BCS**	**-2**	●	74.0	15.0	-	-	-	-	-	
		-3	●	88.0	16.0	-	-	-	-	-	
	**BCS**	**-4**	●	98.0	16.0	-	-	-	-	-	
	**CE**	**-010**	●	M8X1.25	28.0	24.0	12.8	13.0	4.0	4.0	G : Indicates hexagon hole two side widths of back side of bolts
		-220	●			27.0	15.8	15.0			
	**CE**	**-020**	●	M8X1.25	30.0	17.0	10.5	12.7	4.0	4.0	G : Indicates hexagon hole two side widths of back side of bolts
	**CE**	**-030**	●	M8X1.25	30.0	19.0	12.5	12.7	4.0	4.0	G : Indicates hexagon hole two side widths of back side of bolts
		-040	●			22.5	16.0				
	**CE**	**-320**	●	M6X1.0	24.5	18.2	9.7	12.7	4.0	-	
	**CE**	**-360S**	●	M6X1.0	16.0	18.0	10.55	12.4	4.0	-	
	**CE**	**-030A**	●	M8X1.25	30.0	20.0	13.7	12.7	4.0	-	G : Indicates hexagon hole two side widths of back side of bolts
	**CE**	**-410**	●	M8X1.25	30.0	26.0	19.5	12.7	4.0	4.0	G : Indicates hexagon hole two side widths of back side of bolts
		-430	●			29.0	22.5				
	**CP**	**-RC**$^{R}_{L}$	●	M6X1.0	20.0	24.5	14.8	11.0	5.0	-	R···shows Right-hand L···shows Left-hand

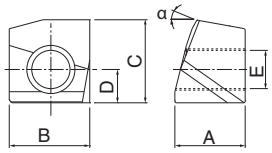
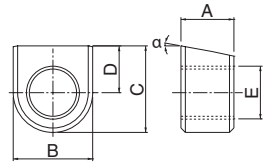
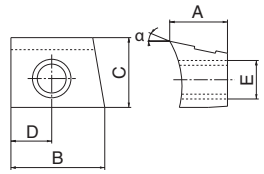
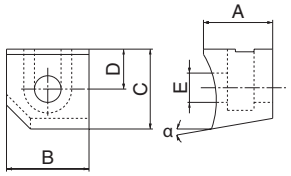
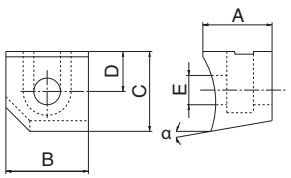
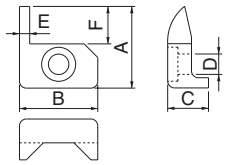
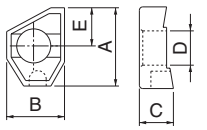
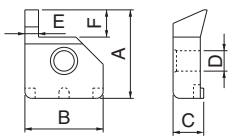
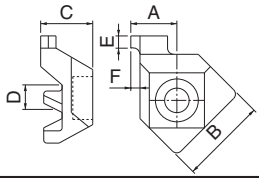
● : Std. Item

Clamp Sets

Shape Handed Spare Parts show Right-hand	Description	Stock	Dimension (mm)							Remarks
			A	B	C	D	E	F	G	
	**CPS -1**	●	M3X0.5	9.0	10.0	5.2	5.5	2.0	-	
	**CPS -2**	●	M5X0.8	14.5	14.0	8.5	6.8	2.5	2.5	G : Indicates hexagon hole two side widths of back side of bolts
	-2P	●		18.0						
	-3	●	M6X1.0	19.0	16.5	10.0	8.8	3.0	3.0	
	**CPS -2S**	●	M5X0.8	13.5	14.0	8.5	6.8	T15	2.0	G : Indicates hexagon hole two side widths of back side of bolts
	-2TR	●		15.0						
	**CPS -4V**	●	M4X0.7	8.9	11.3	7.3	8.0	T10	-	G : Indicates hexagon hole two side widths of back side of bolts
	-5F	●	M5X0.8	11.3	12.7	7.5	10.3	T15	2.5	
	-5S	●		18.0	15.0	9.5	11.0		2.0	
	-5V	●		13.5	12.7	7.5	10.3		2.5	
	**CPS -6F**	●	M6X1.0	16.5	15.6	9.5	12.2	3.0	-	G : Indicates hexagon hole two side widths of back side of bolts
	-6M	●		18.5	17.5	11.0	13.0		3.0	
	-6S	●			18.0	12.0	12.0			
	-6V	●			15.6	9.5	12.2			
	-8V	●	M8X1.25	24.0	20.8	13.0	15.5	4.0	4.0	
	**CPS -5E**	●	M5X0.8	13.5	17.5	12.0	9.0	T15	2.5	G : Indicates hexagon hole two side widths of back side of bolts
	**CPS -5R/L**	●	M5X0.8	18.0	17.5	12.0	9.0	2.5	2.5	G : Indicates hexagon hole two side widths of back side of bolts R···shows Right-hand Thread L···shows Left-hand Thread
	**LGBA -16R/LS**	●	M5X0.8	15.0	16.1	11.2	9.85	T15	2.0	G : Indicates hexagon hole two side widths of back side of bolts R···shows Right-hand L···shows Left-hand
	-22R/LS	●			17.6	12.7				
	**WCS -1N**	●	M6X1.0	21.0	15.7	-	15.0	3.0	-	
	**WCS -8**	●	M6X1.0	21.0	19.4	-	15.0	3.0	-	

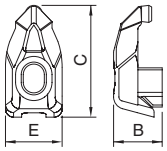
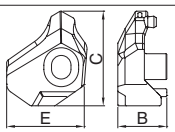
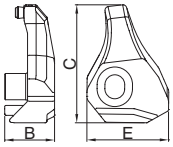
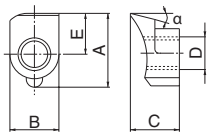
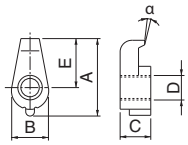
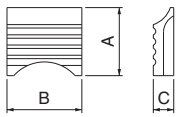
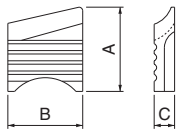
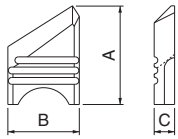
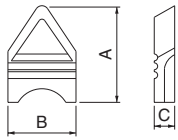
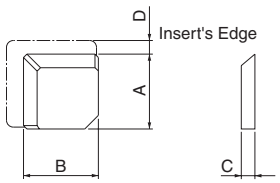
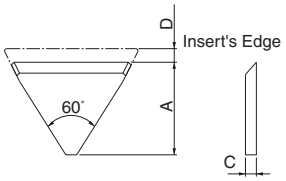
● : Std. Item

Clamps

Shape Handed Spare Parts show Right-hand	Description		Stock	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**C**	**08R**	●	7.6	8.7	8.9	3.6	M5X0.8 (Left-hand Thread)	-	10°	-	
	**C**	**09N**	●	6.0	9.0	9.8	5.3	M6X1.0 (Left-hand Thread)	-	10°	-	Clamp Screw : W6X18N
	**C**	**17R**	●	12.2	20.0	14.3	8.5	M8X1.25 (Left-hand Thread)	-	12°	-	Clamp Screw : W8X18
	**C**	**20R**	●	15.1	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw : TH8X15
	CH	**-20R**	●	13.1	15.5	14.8	7.5	5.3	-	10°	-	Clamp Screw : TH8X15
	**C**	**25R**	●	13.2	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw : TH8X15
	**CGA**	**-3R/L**	●	24.0	17.66	12.0	6.2	1.9	11.0	-	-	R···shows Right-hand L···shows Left-hand
		-4R/L	●	24.0	17.66	12.0	6.2	2.9	11.0	-	-	
		-5R/L	●	27.5	18.66	12.0	6.2	3.9	14.5	-	-	
	**CGB**	R/L	●	19.0	14.0	8.2	6.35	9.5	-	-	-	R···shows Right-hand L···shows Left-hand
	**CGH**	**-1R/L**	●	25.0	22.0	8.0	6.05	3.0	5.5	-	-	R···shows Right-hand L···shows Left-hand
		-2R/L	●					5.0				
		-3R/L	●	30.0	23.0	8.5		6.0	7.0			
	**CGIA**	**-3R**	●	10.7	17.0	10.5	5.2	1.8	2.0	-	-	
		-4R	●			11.5		2.5				
		-5R	●	15.7		10.5		3.5	7.0			

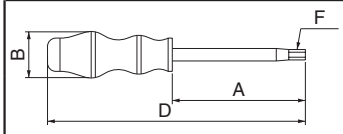
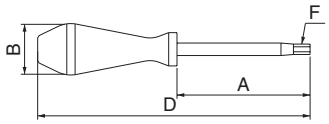
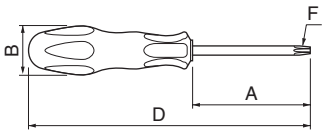
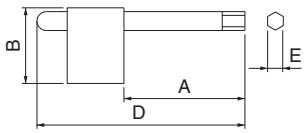
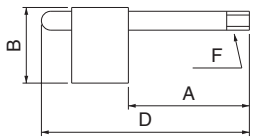
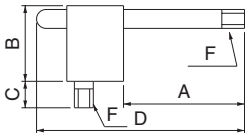
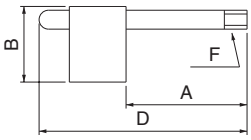
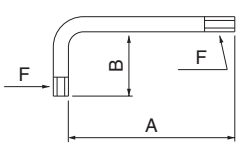
● : Std. Item

Clamps / Chipbreakers

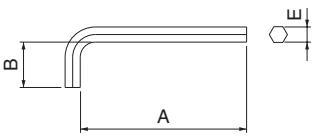
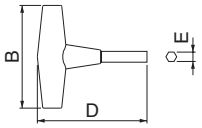
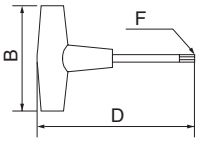
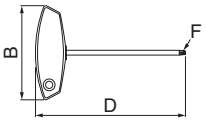
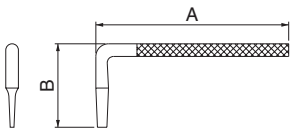
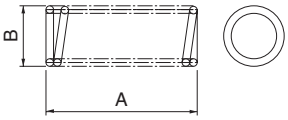
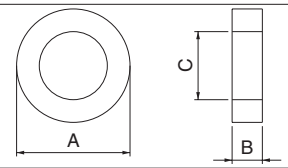
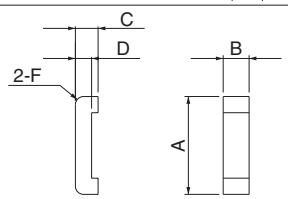
Shape (Handed Spare Parts show Right-hand)	Description		Stock	Dimension (mm) A	B	C	D	E	F	Angle α	θ	Remarks
	CP	-2D	●	-	10.0	21.6	-	10.4	-	-	-	
		-3D	●		12.0	27.6		14.0				
		-5D	●		13.0	32.0						
	CP	-2D$^{R}_{L}$-JCT	●	-	13.5	25.3	-	21.5	-	-	-	
	CP	-3D-$^{R}_{L}$-JCT	●	-	13.1	26.4	-	17.9	-	-	-	
		-4D-$^{R}_{L}$-JCT	●			28.4		18.2				
		-5D-JCT	●			31.9		21.5				
	CP	-8TE	●	17.9	12.0	12.0	M8X1.25 (Left-hand Thread)	10.0	-	15°	-	
	CP	-8W	●	20.9	12.0	8.0	M8X1.25 (Left-hand Thread)	13.0	-	3°	-	
	CB	-11	●	11.5	12.7	3.5	-	-	-	-	-	
		-51	●	16.0	15.6	3.5	-	-	-	-	-	
	CB	-12	●	14.0	12.7	3.5	-	-	-	-	-	Right-hand
		-13	●	14.0	12.7	3.5	-	-	-	-	-	Left-hand
	CB	-14	●	18.51	12.7	3.5	-	-	-	-	-	Right-hand
		-15	●	18.51	12.7	3.5	-	-	-	-	-	Left-hand
	CB	-16	●	18.0	12.7	3.5	-	-	-	-	-	
		-17	●	21.0	15.6	3.5	-	-	-	-	-	
	CB	-S3220	●	7.94	7.94	1.0	2.0	-	-	-	-	
		-S4220	●	11.12	11.12	2.0	2.0	-	-	-	-	
	CB	-T2212	●	7.48	-	1.5	1.2	-	-	-	-	
		-T3220	●	10.87	-	2.0	2.0	-	-	-	-	

● : Std. Item

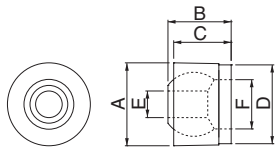
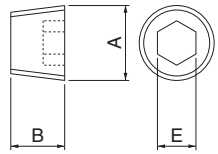
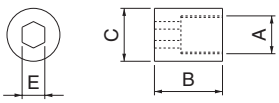
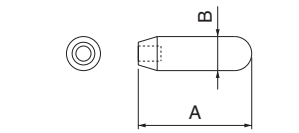
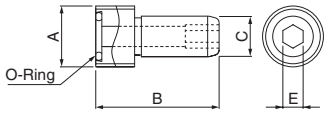
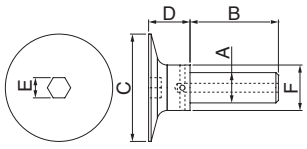
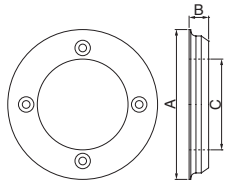
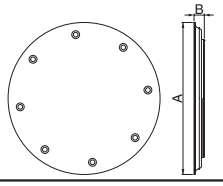
Wrenches

Shape	Description		Stock	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**DT**	**-7**	●	44	16	-	114	-	T7	-	-	Torx
		-8	●	70	26		150		T8			
	**DT**	**-10**	●	70	29	-	160	-	T10	-	-	Torx
		-15	●	70	32		170		T15			
		-20	●	90	32		190		T20			
		-25	●	82	36		190		T25			
	DTM	**-6**	●	40	17	-	115	-	T6	-	-	Torx Top of wrench is magnetized
		-7	●	44	17		119		T7			
		-8	●	70	24		150		T8			
		-10	●	70	28		167		T10			
		-15	●	70	31		174		T15			
	**DTP**	**-6**	●	73	23	-	150	-	6IP	-	-	○○IP shows Torx Plus
		-7	●						7IP			
		-9	●	61	30		174		9IP			
		-15	●	81	33		186		15IP			
		-20	●	100			206		20IP			
	DTPM	**-8**	●	70	24	-	150	-	8IP	-	-	○○IP shows Torx Plus Top of wrench is magnetized
		-10	●	70	28		165		10IP			
		-15	●	70	31		174		15IP			
	**FH**	**-2**	●	40	20	-	71	2.0	-	-	-	Hexagon
		-2.5	●	45	20		76	2.5				
	**FT**	**-6**	●	35	15	-	65	-	T6	-	-	Torx
		-7	●	34	15		62		T7			
		-8	●	40	20		74		T8			
		-10	●	40	20		74		T10			
	**FT**	**-15**	●	45	25	10	80	-	T15	-	-	Torx
	**FTP**	**-5**	●	35	15	-	65	-	5IP	-	-	○IP shows Torx Plus
		-6	●	34			62		6IP			
	**LTW**	**-8SS**	●	43	6	-	-	-	T8	-	-	Torx
		-10S	●	62	10				T10			
		-10SS	●	47	7				T10			
		-15S	●	62	10				T15			
		-20	●	58	19				T20			
		-25	●	65	20				T25			

● : Std. Item

Shape	Description		Stock	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**LW**	**-1.5**	●	45	14	-	-	1.5	-	-	-	Hexagon
		-2	●	50	16			2.0				
		-2.5	●	56	18			2.5				
		-3	●	63	20			3.0				
		-4	●	70	25			4.0				
		-4.5	●	78	26			4.5				
		-5	●	80	28			5.0				
		-6	●	90	32			6.0				
		-8	●	109	36			8.0				
		-10	●	112	40			10.0				
		-14	●	140	56			14.0				
		-17	●	160	63			17.0				
		-19	●	180	70			19.0				
	**TH**	**-4**	●	-	80	-	83	4.0	-	-	-	Hexagon
	**TT**	**-15**	●	-	70	-	118	-	T15	-	-	Torx
		-25	●		70		69		T25			
		-25L	●		80		145		T25			
		-30	●		80		110		T30			
	TTC	**-20**	●	-	98	-	130	-	T20	-	-	
		-25	●						T25			
	TTP	**-20**	●	-	70	-	138	-	20IP	-	-	○○IP shows Torx Plus
	**TTW**	**-15**	●	-	80	-	125	-	T15	-	-	Torx
	**LTK**	**-5**	●	70	30	-	-	-	-	-	-	
	**SP**	**-2D**	●	8.5	5.6	-	-	-	-	-	-	Spring
		-3D	●	12.0	7.2							
		-5	●	12.0	6.7							
		-5D	●	12.0	7.2							
		-6	●	12.0	7.7							
	**W**	**-6**	●	11.5	1.6	6.4	-	-	-	-	-	Washer
		6-14	●	11.5	1.4	6.4						
	WB	**-5**	●	10.0	1.0	5.3	-	-	-	-	-	Washer (Brass)
		-6	●	11.5	1.6	6.4						
		-8	●	15.5	1.6	8.4						
	**WSP**	**-1**	●	15.1	4.0	3.5	2.5	-	R1.25	-	-	Spacer

● : Std. Item

Shape	Description		Stock	Dimension (mm)						Angle		Remarks
				A	B	C	D	E	F	α	θ	
	**DN**	**10**	●	6.2	5.1	4.5	5.7	2.6	4.0	-	-	Nozzle
		20	●	10.1	7.7	7.0	9.6	M4X0.7	6.0			
	**GP**	**-1**	●	PT1/8	7.0	-	-	5.0	-	-	-	Plug
		-2	●	PT1/4	9.0	-	-	6.0	-	-	-	
	**WN**	**-1**	●	M5X0.8	10.0	7.0	-	3.0	-	-	-	Nut
	**PC**	**-1**	●	60.0	8.5	-	-	-	-	-	-	Punch
		-2	●	62.2	10.0	-	-	-	-	-	-	
	**CL**	**63-1**	●	M18X1.0	36.5	12	-	6.0	-	-	-	Coolant Pipe
		100-1	●	M24X1.5	44.0	16.0		8.0				
	**HH**	**12X35HC**	●	M12X1.75	35.0	42.5	16.4	8.0	18.0	-	-	Arbor Bolt
	HF	**16X44HC**	●	M16X2.0	30.0	62.5	14.4	12.0	40.0	-	-	
		16X48HC	●	M16X2.0			18.4			-	-	
	**CC**	**-125-MFAH**	●	87.5	11.4	53.0	-	-	-	-	-	Coolant Cover
		-160-MFAH	●	122.5	12.4	70.0	-	-	-	-	-	
	**CC**	**-200-MFAH**	●	162.5	14.4	-	-	-	-	-	-	Coolant Cover
		-250-MFAH	●	212.5		-	-	-	-	-	-	
		-315-MFAH	●	277.5		-	-	-	-	-	-	

● : Std. Item

Former Parts List

External Toolholders

Description	Spare Parts			
	Lever	Lock Screw	Shim Pin	Wrench
PTGNR/L 1212F -11	LL-03N	LS-03N	P-03	FH-2
..... -11	LL-03TN	LS-03SN	P-03S	FH-2.5
PTFNR/L 1212F -11	LL-03N	LS-03N	P-03	FH-2
..... -11	LL-03TN	LS-03SN	P-03S	FH-2.5

Toolholders for Ceramic Tools

Description	Spare Parts				
	Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CCLNR 2525M -16	CB-17	CE-220	LW-4	SP-454	M4X10
CS-NR/L ..... -12	CB-11	CE-020	LW-4	SP-141 *(SP-143)	M3X8 *(M3X12)
CSKNR/L ..... -12	CB-11	CE-020	LW-4	SP-141 *(SP-143)	M3X8 *(M3X12)
CSYNR/L ..... -12	CB-11	CE-020	LW-4	SP-141 *(SP-143)	M3X8 *(M3X12)
CSSNR/L ..... -12	CB-11	CE-020	LW-4	SP-141 *(SP-143)	M3X8 *(M3X12)

* Shim & Shim Screw : When using SN□□1204 Insert, purchase spare parts in ( ) separately.

Toolholders for Ceramic Tools

Description	Spare Parts			
	Clamp Set	Wrench	Shim	Shim Screw
CCLNR/L ..... -12GX	CE-410	LW-4	SP-441	M3X8
CDHNR/L ..... -12GX	CE-410	LW-4	SP-521	M3X8
..... -15GX	CE-430		SP-541	
CDJNR/L ..... -12GX	CE-410	LW-4	SP-521	M3X8
..... -15GX	CE-430		SP-541	
CSRNR/L ..... -12GX	CE-410	LW-4	SP-141	M3X8
..... -15GX			SP-162	M4X10
CSDNN ..... -12GX	CE-410	LW-4	SP-141	M3X8
..... -15GX			SP-162	M4X10
CSSNR/L ..... -12GX	CE-410	LW-4	SP-141	M3X8
..... -15GX			SP-162	M4X10
CS-NR/L ..... -12GX	CE-410	LW-4	SP-141	M3X8
..... -15GX			SP-162	M4X10
CSKNR/L ..... -12GX	CE-410	LW-4	SP-141	M3X8
..... -15GX			SP-162	M4X10
CSYNR/L ..... -12GX	CE-410	LW-4	SP-141	M3X8
..... -15GX			SP-162	M4X10

Toolholders for Solid CBN Tools

Description	Spare Parts			
	Clamp Set	Wrench	Shim	Shim Screw
CCLNR/L ..... -09A	CE-030A	LW-4	SP-429	HH3X12
CSRNR/L 2525M -09A	CE-030A	LW-4	SP-129	HH3X12
2525M -12A			SP-148 (SP-143)	BH3X12
CSKNR/L 2525M -09A	CE-030A	LW-4	SP-129	HH3X12
2525M -12A			SP-148 (SP-143)	BH3X12
CSYNR/L 2525M -09A	CE-030A	LW-4	SP-129	HH3X12
2525M -12A			SP-148 (SP-143)	BH3X12
CSDNN ..... -09A	CE-040	LW-4	SP-129	HH3X12
2525M -12A			SP-148 (SP-143)	BH3X12
CTUNR/L ..... -11A	CE-030A	LW-4	SP-219	HH3X12

· Shim for-12A type toolholder : When using SN□□1204 Insert, purchase spare parts in ( ) separately.

Toolholders for Bearing Machining

Description	Spare Parts					
	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PRGCR/L **.....** **-12BE**	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
..... **-16BE**	LL-2C	LS-1T	LR-16C	LSP-2	PC-2	FH-2.5
PRGCR/L **.....** **-12BF**	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
..... **-16BF**	LL-2C	LS-1T	LR-16C	LSP-2	PC-2	FH-2.5

Toolholders for Back Turning

Description	Spare Parts			
	Anchor Pin	Lock Screw	Clamp Screw	Wrench
AABSR 0810K -40F	LPA-11	HSB4X8R	-	FH-2
1010.. -40F				
1212.. -40F	LPA-13			
1616.. -40F	LPA-17			
SABSR ..... -40F	-	-	SB-3080TR	FT-10
AABWR 0810K -40F	LPA-11	HSB4X8R	-	FH-2
1010.. -40F				
1212.. -40F	LPA-13			
1616.. -40F	LPA-17			
SABWR ..... -40F	-	-	SB-3080TR	FT-10
AABWR 0810K -50F	LPA-11	HSB4X8R	-	FH-2
1010.. -50F				
1212.. -50F	LPA-13			
1616.. -50F	LPA-17			
SABWR ..... -50F	-	-	SB-3080TR	FT-10

KTKF

Description	Spare Parts	
	Clamp Screw	Wrench
KTKFR/L **..... -12**	SB-4590TRWN	LTW-10S
..... -16		

External Toolholders (Back Clamp)

Description	Spare Parts		
	Anchor Pin	Lock Screw	Wrench
ACLCR/L **0810K -06F**	LPF-11	HSB4X8R/L	FH-2
1010K -06F			
1010K -09F	LPF-13		
1212M -09F			
1616M -09F	LPF-17		
ADJCR/L **0810K -07F**	LPF-11	HSB4X8R/L	FH-2
1010K -07F			
1010K -11F	LPF-13		
1212M -11F			
1616M -11F	LPF-17		
ADNCR 0810K -07F	LPF-11	HSB4X8R	FH-2
1010K -07F			
1010K -11F	LPF-13		
1212M -11F			
1616M -11F	LPF-17		
AVJBR/L **1010K -11F**	LPF-11	HSB4X8R/L	FH-2
1212M -11F	LPF-1113		
1616M -11F	LPF-1117		
AVVBR 1010K -11F	LPF-11	HSB4X8R	FH-2
1212M -11F	LPF-1113		
1616M -11F	LPF-1117		

* Lock Screw : HSB4X8R for R-hand Toolholder, HSB4X8L for L-hand Toolholder.

Former Parts List

External Toolholders (Screw Clamp)

Description			Spare Parts	
			Clamp Screw	Wrench
SCLCR/L	.....	**-06**	SB-2570TR	FT-8
	.....	**-09**	SB-4085TR	FT-15
	.....	**-12**	SB-5090TR	LTW-20
SCACR/L	.....	**-06**	SB-2570TR	FT-8
	.....	**-09**	SB-4085TR	FT-15
	1212F	**-09FF**		
SDJCR/L	.....	**-07F**	SB-2570TR	FT-8
	.....	**-11F**	SB-4085TR	FT-15
SDLCR/L	.....	**-07FF**	SB-2570TR	FT-8
	.....	**-11FF**	SB-4085TR	FT-15
SDXCR/L	.....	**-07**	SB-2570TR	FT-8
	.....	**-11**	SB-4085TR	FT-15
SDNCR/L	.....	**-07F**	SB-2570TR	FT-8
	.....	**-11F**	SB-4085TR	FT-15
SDNCN	.....	**-07**	SB-2570TR	FT-8
	.....	**-11**	SB-4085TR	FT-15
SDLPR/L	.....	**-07F**	SB-2570TR	FT-8
	.....	**-11F**	SB-4085TR	FT-15
STGCR/L	.....	**-08**	SB-2050TR	FT-6
STGPR/L	.....	**-08**	SB-2050TR	FT-6
	.....	**-11**	SB-3080TR	FT-10
SVJBR/L	.....	**-11F**	SB-2570TR	FT-8
SVLPR/L	.....	**-08FF**	SB-2050TR	FT-6
	.....	**-11FF**	SB-2570TR	FT-8
	.....	**-11F**		
SVPPR/L	.....	**-08FF**	SB-2050TR	FT-6
	.....	**-11FF**	SB-2570TR	FT-8
	.....	**-11**		
SYXPR/L	.....	**-06F**	SB-2050TR	FT-6

External Toolholders (Screw Clamp)

Description			Spare Parts				
			Clamp Screw	Wrench	Shim	Shim Screw	Wrench
SVPBR/L	.....	**-11**	SB-2570TR	FT-8	-	-	-
	.....	**-16N**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
SVVBN	.....	**-11**	SB-2570TR	FT-8	-	-	-
	.....	**-16N**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4

External Toolholders (Top Clamp)

Description			Spare Parts				
			Clamp Set	Wrench	Shim	Shim Screw	Chipbreaker
CSBPR/L	.....	**-09N**	CPS-2P	LW-2.5	-	-	CB-S3220
CSKPR/L	.....	**-09N**	CPS-2P	LW-2.5	-	-	CB-S3220
	.....	**-12N**	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
CSSPR/L	.....	**-09N**	CPS-2P	LW-2.5	-	-	CB-S3220
	.....	**-12N**	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
CSDPN	.....	**-12N**	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
CTGPR/L	.....	**-11N**	CPS-2P	LW-2.5	-	-	CB-T2212
	.....	**-16N**	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
CTFPR/L	.....	**-11N**	CPS-2P	LW-2.5	-	-	CB-T2212
	.....	**-16N**	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
CTTPR/L	.....	**-11N**	CPS-2P	LW-2.5	-	-	CB-T2212
	.....	**-16N**	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220

EZ Bar PLUS

Description	Spare Parts	
	Clamp Screw	Wrench
S045X-SCLCR03-050EZ	SB-1635TR	FT-6
S060X-SCLCR04-070EZ	SB-2035TR	
C045X-SCLCR03-050EZ	SB-1635TR	FT-6
C060X-SCLCR04-070EZ	SB-2035TR	

Twin-Bars

Description	Spare Parts	
	Clamp Screw	Wrench
STW$^{R}/_{L}$ ..... -15	SB-3080TR	LTW-10S
STWSR ..... -15T	SB-3080TR	LTW-10S

System Tip-Bars

Description	Spare Parts			
	Clamp Screw	Wrench	Screw (Side Stopper)	Wrench
SVNR 1010H -12	SB-3080TR	FT-10	HS3X4	LW-1.5
1212K -12				
1616K -12			HS3X8	
2020K -12			HS3X12	
2525M -12			HS3X16	
SVNSR ..... -12-..	SB-3080TR	LTW-10S	HS3X4	LW-1.5
S12F- SVNR 12	SB-3080TR	FT-10	HS3X4	LW-1.5
S14G- SVNR 12				
S16H- SVNR 12			HS3X8	
S19H- SVNR 12				
S19N- SVNR 12				
S20H- SVNR 12				
S25H- SVNR 12			HS3X12	
S25Q- SVNR 12				
S.... SVNR 12S	SB-3080TR	FT-10	HS3X4	LW-1.5

System Tip-Bars (S-SVN-XN)

Description	Spare Parts		
	Clamp Screw	Wrench	Clamp Screw
S...- SVNR 12XN	SB-3080TR	FT-10	SP3X4

PSH Sleeve

Description	Spare Parts	
	Clamp Screw	Wrench
PSH 02.. -..	HS3X4P	LW-1.5
03.. -..		
PSH 04.. -..	HS4X4P	LW-2
05.. -..		
06.. -..		
07.. -..		

Former Parts List

Boring Bars (Screw Clamp)

Description		Spare Parts	
		Clamp Screw	Wrench
S10H-	SCLC[R/L]03-..E	SB-1635TR	FT-6
S10J-	SCLC[R/L]04-..E	SB-2035TR	
S08X-	SCLC[R/L]06-10E	SB-2545TR	FT-8
S08X-	SCLC[R/L]06-10	SB-2545TR	FT-8
C...-	SCLC[R/L]03-..	SB-1635TR	FT-6
C...-	SCLC[R/L]04-..	SB-2035TR	
C08L-	SCLC[R/L]06-10	SB-2545TR	FT-8
A08H-	SCLC[R/L]06-10E	SB-2545TR	FT-8
E...-	SCLC[R/L]06-..	SB-2545TR	FT-8
S..M-	SCLP[R/L]08-..E	SB-3STR	FT-10
S...-	SCLP[R/L]09-..E	SB-4TR	FT-15
S..M-	SCLP[R/L]08-..	SB-3STR	FT-10
S...-	SCLP[R/L]09-..	SB-4TR	FT-15
C10N-	SCLP[R/L]08-..	SB-3STR	FT-10
C...-	SCLP[R/L]09-..	SB-4TR	FT-15
A..X-	SCLP[R/L]08-..E	SB-3STR	FT-10
A...-	SCLP[R/L]09-..E	SB-4TR	FT-15
E10N-	SCLP[R/L]08-12	SB-3STR	FT-10
E10N-	SCLP[R/L]08-12A-..	SB-3060TR	
E...-	SCLP[R/L]09-..	SB-4TR	FT-15
S...-	SDUC[R/L]07-..E	SB-2560TR	FT-8
S...-	SDUC[R/L]11-..E	SB-4085TR	FT-15
S...-	SDUC[R/L]07-..	SB-2560TR	FT-8
S...-	SDUC[R/L]11-..	SB-4085TR	FT-15
C...-	SDUC[R/L]07-..	SB-2560TR	FT-8
C...-	SDUC[R/L]11-..	SB-4085TR	FT-15
S...-	SDZC[R/L]07-..E	SB-2560TR	FT-8
S...-	SDZC[R/L]11-..E	SB-4085TR	FT-15
S...-	SDZC[R/L]07-..	SB-2560TR	FT-8
S...-	SDZC[R/L]11-..	SB-4085TR	FT-15
C06J-	STLB[R/L]06-08A	SB-2035TR	FT-6
E08L-	STLP[R/L]08-10A	SB-1TR	
E08L-	STLP[R/L]09-10A	SB-2545TR	FT-8
E10N-	STLP[R/L]09-..		
E10N-	STLP[R/L]11-..	SB-3060TR	FT-10
S06H-	STUB[R/L]06-08E	SB-1STR	FT-6
S08K-	STUP[R/L]08-10E	SB-1TR	
S..M-	STUP[R/L]09-..E	SB-2TR	FT-8
S...-	STUP[R/L]11-..E	SB-3TR	FT-10
S..X-	STUP[R/L]16-..E	SB-4TR	FT-15
S06H-	STUB[R/L]06-08	SB-1STR	FT-6
S08K-	STUP[R/L]08-10	SB-1TR	
S..M-	STUP[R/L]09-..	SB-2TR	FT-8
S...-	STUP[R/L]11-..	SB-3TR	FT-10
S25X-	STUP[R/L]16-32	SB-4TR	FT-15
C10L-	STUB[R/L]06-08	SB-1STR	FT-6
C08L-	STUP[R/L]08-10	SB-1TR	
C...-	STUP[R/L]09-..	SB-2TR	FT-8
C...-	STUP[R/L]11-..	SB-3TR	FT-10
C20S-	STUP[R/L]16-..	SB-4TR	FT-15
A08H-	STUP[R/L]08-10E	SB-1TR	FT-6
A..X-	STUP[R/L]09-..E	SB-2TR	FT-8
A...-	STUP[R/L]11-..E	SB-3TR	FT-10
A...-	STUP[R/L]16-..E	SB-4TR	FT-15
E08L-	STUP[R/L]08-10	SB-1TR	FT-6
E...-	STUP[R/L]09-..	SB-2TR	FT-8
E...-	STUP[R/L]11-..	SB-3TR	FT-10
E20S-	STUP[R/L]16-25	SB-4TR	FT-15

Boring Bars (Screw Clamp)

Description		Spare Parts	
		Clamp Screw	Wrench
S...-	SWUB R/L 08-..E	SB-2050TR	FT-6
S12M-	SWUP R/L 11-14E	SB-2545TR	FT-8
S...-	SWUP R/L 11-..E	SB-2560TR	
S...-	SWUP R/L 16-..E	SB-4065TR	FT-15
S...-	SWUB R/L 06-..	SB-2040TR	FT-6
S10J-	SWUB R/L 08-..	SB-2035TR	
C...-	SWUB R/L 06-..	SB-2035TR	FT-6
C07K-	SWUB R/L 08-..		
C08L-	SWUB R/L 08-..	SB-2050TR	
C10N-	SWUB R/L 08-..		
C12Q-	SWUP R/L 11-14(-./.)	SB-2545TR	FT-8
C12Q-	SWUP R/L 11-16(-./.)	SB-2560TR	
C16X-	SWUP R/L 11-18(-./.)		
C...-	SWUP R/L 16-..	SB-4065TR	FT-15
E...-	SWUB R/L 08-..	SB-2050TR	FT-6
S16Q-	SSKPR09-20	SB-4TR	FT-15
S20R-	SSKPR09-25		
S25X-	SSKPR12-32	GS-50S	LW-3
S32S-	SSKPR12-40	GS-50	
S12M-	SYXP R/L 06-12E	SB-2040TR	FT-6
S16Q-	SYXP R/L 06-16E	SB-2045TR	

Boring Bars (Screw Clamp)

Description		Spare Parts				
		Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)
S12M-	SVJP R/L 08-16E	SB-2050TR	FT-6	-	-	-
S...-	SVJC R/L 08-..E					
S...-	SVJB R/L 11-..E	SB-2570TR	FT-8			
S...-	SVJB R/L 16-..EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S32S-	SVJB R/L 16-40E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S40T-	SVJB R/L 16-50E					
S10M-	SVPC R/L 08-16E	SB-2050TR	FT-6	-	-	-
S...-	SVPB R/L 11-..E	SB-2570TR	FT-8			
S...-	SVPB R/L 16-..EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S25X-	SVPB R/L 16-34E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S32S-	SVPB R/L 16-40E					
S12M-	SVUC R/L 08-16E	SB-2050TR	FT-6	-	-	-
S...-	SVUB R/L 11-..E	SB-2570TR	FT-8			
S...-	SVUB R/L 16-..EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S25X-	SVUB R/L 16-34E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S32S-	SVUB R/L 16-40E					
S12M-	SVZC R/L 08-16E	SB-2050TR	FT-6	-	-	-
S...-	SVZB R/L 11-..E	SB-2570TR	FT-8			
S...-	SVZB R/L 16-..EN	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S25X-	SVZB R/L 16-34E	SB-40115TR	FT-15	SVN-32	SB-2050TR	FT-6
S32S-	SVZB R/L 16-40E					

Boring Bars (Top Clamp)

Description		Spare Parts				
		Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
S12L-	CTUP R/L 09-16	-	CPS-1	FH-2	-	-
S...-	CTUP R/L 11-..	-	CPS-2	FH-2.5	-	-
S25X-	CTUP R/L 16-34	-	CPS-3	LW-3	-	-
S32S-	CTUP R/L 16-43				KPT-32	SP3X10
S40X-	CTUP R/L 16-50					
S32S-	CTUC R/L 16-40	*CB-13/12	CE-320	LW-4	SP-230P	SP3X10
S...-	CCLN R/L 09-..A	-	CE-360S	LW-4	SP-420A	BH3X6
S...-	CSKN R/L 09-..A	-	CE-360S	LW-4	SP-130A	BH3X12
S32S -	CSKPR12-43	CPS-3	-	LW-3	KPS-42	SP3X10

* CB-13 for Right-hand Toolholder, CB-12 for Left-hand Toolholder.

Former Parts List

Boring Bars for Ceramic Tools (Top Clamp)

Description	Spare Parts				
	Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
S32S- CCLN$^{R}_{L}$ -12-40GX	-	CE-410	LW-4	-	-
S40T- CCLN$^{R}_{L}$ -12-50GX				SP-441P	M3X8
S32S- CDUN$^{R}_{L}$ -12-40GX	-	CE-410	LW-4	-	-
S40T- CDUN$^{R}_{L}$ -12-50GX				SP-521P	M3X8
S32S- CSKN$^{R}_{L}$ -12-40GX	-	CE-410	LW-4	-	-
S40T- CSKN$^{R}_{L}$ -12-50GX				SP-141P	M3X8
S40T- CSKN$^{R}_{L}$ -12-50	*1 CB-13/12	CE-320	LW-4	SP-141P *2 (SP-143P)	M3X8 *2 (M3X12)

*1 CB-13 for Right-hand Toolholder, CB-12 for Left-hand Toolholder.
*2 When using SN□□1204 Insert, please purchase spare parts in ( ) separately.

Boring Toolholders for Bearing Machining (Square Shank) (Boring)

Description	Spare Parts	
	Clamp Screw	Wrench
SRCP$^{R}_{L}$ 2020B-12 -A20	SB-4TR	FT-15
2525B-16 -A32	SB-5090TR	LTW-20

Boring Toolholders for Bearing Machining (Square Shank) (Internal Round Chamfering)

Description	Spare Parts	
	Clamp Set	Wrench
CBSN$^{R}_{L}$ ....B-12 -A20	CP-RC$^{R}_{L}$	LW-5

Sleeves for Tip-Bars

Description		Spare Parts	
		Screw	Wrench
PH	**02 ..-..**	HS3X4	LW-1.5
	03 ..-..		
	04 ..-..	HS4X4	LW-2
	05 ..-..		
	06 ..-..		
	07 ..-..		

KTGF-F

Description	Spare Parts	
	Clamp Screw	Wrench
KTGF$^{R}_{L}$ ..... -16F	SB-4070TRW	FT-8

KTG

Description		Spare Parts	
		Clamp Screw	Wrench
KTG$^{R}_{L}$	**.... -16**	SB-4TR	FT-15
	.... 22-..	GS-50	LW-3

KN91

Description		Spare Parts				
		Clamp	Clamp Bolt	Washer	Spring	Wrench
KN91$^{R}_{L}$	**44 -4**	*CE-111/121	BH8X30	W-8	SP-8	LW-5
	44 -5					
	44 -7	*CE-131/141				

* KN91$^{R}_{L}$44-4 / 5 ... CE-111 for Right-hand Toolholder, and CE-121 for Left-hand Toolholder.
KN91$^{R}_{L}$44-7 ... CE-131 for Right-hand Toolholder, and CE-141 for Left-hand Toolholder.

KGHS

Description		Spare Parts				
		Clamp	Clamp Bolt	Washer	Spring	Wrench
KGHS$^{R}_{L}$	**..... -4**	CGH-1$^{L}_{R}$	HH6X25	W-6	SP-6	LW-5
	..... -5					
	..... -7	CGH-2$^{L}_{R}$				

· Clamp : KGHS$^{R}_{L}$ ... CGH-◯L for Right-hand Toolholder, and CGH-◯R for Left-hand Toolholder.

KGA

Description		Spare Parts			
		Clamp	Clamp Bolt	Spring	Wrench
KGA$^{R}_{L}$	**.... -3**	CGA-3$^{R}_{L}$	HH6X20	SP-6	LW-5
	.... -4	CGA-4$^{R}_{L}$			
	.... -5	CGA-5$^{R}_{L}$			

· Clamp : CGA-◯R for Right-hand Toolholder and CGA-◯L for Left-hand Toolholder.

KGD$^{R}/_{L}$....-S

Description	Spare Parts		
	Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
KGD$^{R}/_{L}$ ....-S	BH6X10TR	SB-60120TR	LTW-25

KGDF$^{R}/_{L}$....-S

Description	Spare Parts		
	Clamp Bolt (for Insert Clamp)	Clamp Screw (for Blade)	Wrench
KGDF$^{R}/_{L}$ ....-S	BH6X10TR	SB-60120TR	LTW-25

KGM

Description		Spare Parts	
		Screw	Wrench
KGM$^{R}/_{L}$	**1212H -3**	SB-5TR	LTW-20
	1616H -3	HH5X16	LW-4
	2020K -3		
	2525M -3	HH5X25	
KGM$^{R}/_{L}$	**2020K -4**	HH5X16	LW-4
	2525M -4	HH5X25	
KGM$^{R}/_{L}$	**2020K -5**	HH5X16	LW-4
	2525M -5	HH5X25	
	3232P -5		
KGM$^{R}/_{L}$	**2525M -8**	HH6X25	LW-5
	3232P -8		

KGM-T

Description		Spare Parts	
		Screw	Wrench
KGM$^{R}/_{L}$	**2012K-2T17**	SB-5TR	LTW-20
	2020K-2T17	HH5X16	LW-4
	2525M-2T17	HH5X25	
KGM$^{R}/_{L}$	**1616H-3T20**	HH5X16	LW-4
	2012K-3T20	SB-5TR	LTW-20
	2020K-3T20	HH5X16	LW-4
	2525M-3T20	HH5X25	
KGM$^{R}/_{L}$	**2020K-4T20**	HH5X16	LW-4
	2525M-4T20	HH5X25	
	2525M-4T25		
KGM$^{R}/_{L}$	**2525M-5T25**	HH5X25	LW-4
	3232P-5T25		
KGM$^{R}/_{L}$	**2525M-6T30**	HH5X25	LW-4

KGM (for Automatic Lathe)

Description		Spare Parts	
		Clamp Screw	Wrench
KGM$^{R}/_{L}$	**0810K - ...**	SE-40120TR	LTW-15S
	1010.. - ...		
	1212.. - 1.5-...		
	1212.. - 2-...		
	1212.. - 2.5-...		
	1616.. - 2-...	SE-50125TR	LTW-20
	1616.. - 2.5-...		
	1616.. - 3-...		

KGMM / KGMS

Description		Spare Parts	
		Screw	Wrench
KGMM$^{R}/_{L}$	**1212H-3**	SB-5TR	LTW-20
	1616H-3	HH5X16	LW-4
	2020K-3		
	2525M-3	HH5X25	
KGMS$^{R}/_{L}$	**1212H-3**	SB-5TR	LTW-20
	1616H-3	GS-50	LW-3
	2020K-3	HH5X16	LW-4
	2525M-3	HH5X25	

Former Parts List

KGMU

Description	Spare Parts	
	Clamp Bolt	Wrench
KGMU R/L 2020K	HH5X16	LW-4
2525M	HH5X25	

KIGH

Description	Spare Parts				
	Clamp	Clamp Bolt	Washer	Spring	Wrench
KIGHR ....-4	CGH-1L	HH6X25	W-6	SP-6	LW-5
....-5					
....-7	CGH-2L				

KIGM-V

Description	Spare Parts	
	Clamp Screw	Wrench
KIGM R/L 2016B-3V	GS-50	LW-3
2520B-3V		
3225B-3V	SB-5TR	LTW-20
3225B-4V	SB-5TR	LTW-20
4032B-4V		

GFVS-AA / GFVT-AA

Description	Spare Parts	
	Clamp Set	Wrench
GFVS R/L ..... -08AA	CPS-5V	FT-15
GFVT R/L ..... -08AA	CPS-5V	FT-15

GIFV

Description	Spare Parts	
	Clamp Set	Wrench
GIFV R/L 5032B-502B	CPS-6V	LW-3

KTKH-S

Description	Spare Parts
	Releasing Wrench
KTKH R/L ..... - ...S	LTK-5

KTKH-B

Description	Spare Parts	
	Clamp Screw	Wrench
KTKH R/L 0808K - ...B	SE-40120TR	FT-15
1010K - ...B		
1212M - ...B		
1414M - ...B		
1616M - ...B	SE-50125TR	LTW-20

KTTX

Description	Spare Parts	
	Clamp Screw	Wrench
KTTXR ..... -16F	SB-4070TRW	FT-8

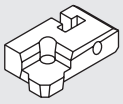
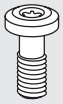
MFPN45 (Face Mill)

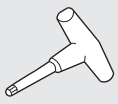
Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
MFPN 45100R-10T-M ~ 45200R-20T-M	SB-40140TRN	DTM-15	P-37

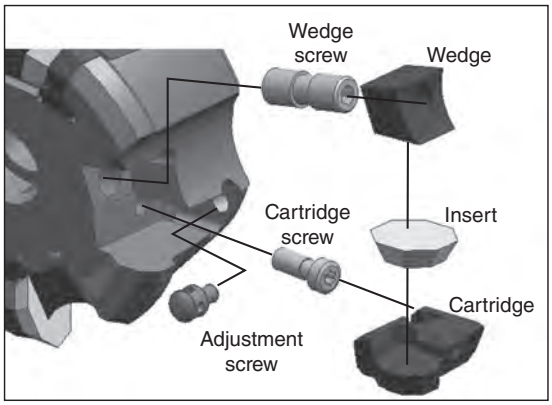
MOF45

Description	Spare Parts		
	Clamp Screw	Wrench	Mounting bolt
MOF 45080R-05-6T	SB-4082TPR	DTP-15	HH12X35
45100R-05-.T ~ 45200R-05-..T			-
MOF 45080R-07-5T	SB-50120TRS	DTP-15	HH12X35
45100R-07-.T ~ 45200R-07-..T			-
MOF 45040R-05-3T-M	SB-4082TPR	DTP-15	HH8X25
45050R-05-4T-M			HH10X30
45063R-05-5T-M			
45080R-05-6T-M			HH12X35
45100R-05-.T-M ~ 45200R-05-..T-M			-
MOF 45063R-07-4T-M	SB-50120TRS	DTP-15	HH10X30S
45080R-07-5T-M			HH12X35
45100R-07-.T-M ~ 45200R-07-..T-M			-

MOFX45

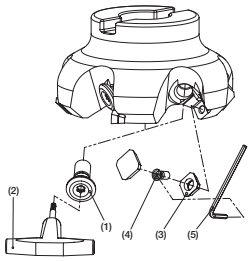
Description	Cartridge	Cartridge screw	Wedge	Wedge screw
				
MOFX45…	LOF07R	SH-50150TR	WOF07R	W8X21

Description	Adjustment screw	Wrench (for Wedge)	Wrench (for Cartridge)
			
MOFX45…	AJ-412	TH-4	TTC-20



MSE45 (Face Mill)

Description	(1) Clamp Screw	(2) Wrench	(3) Shim	(4) Shim Screw	(5) Wrench
					
MSE 45040R-.T-M ~ 45050R-.T-M	CP8X15TL (Left-hand Thread)	TTC-25	MSE-4245S	SP4X9	LW-2 (for Shim Screw)
MSE 45080R-.T ~ 45200R-..T	CP8X23TL (Left-hand Thread)				
MSE 45063R-.T-M ~ 45200R-..T-M					

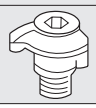
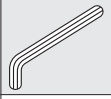
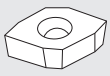


Clamp Screw (1) has Left-hand thread.
Therefore, turn the wrench to the right to remove the insert.

· Mounting bolt (SP8X35) is included for MSE45040R-○T-M.
· Mounting bolt (HH10X30S) is included for MSE45050R-○T-M and MSE45063R-○T-M.
· Mounting bolt (HH12X35) is included for MSE45080R-○T-M and MSE45080R-○T.

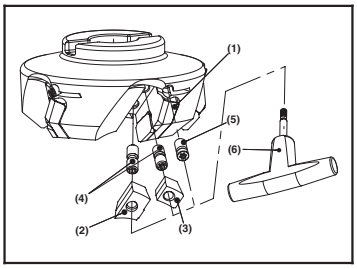
Former Parts List

MSE45 (End Mill)

Description	Spare Parts			
	Clamp Set	Wrench	Shim	Shim Screw
				
MSE 4550 **4563** **4580-32**	CPS-6M	LW-3	MSE-4245	SP3X8

MSE45-SF (Face Mill)

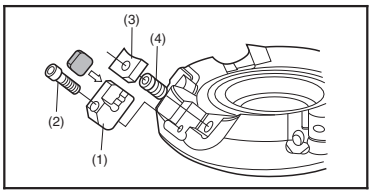
Description	(1) Cartridge	(2) Clamp	(3) Clamp	(4) Clamp Screw	(5) Adjustment Screw	(6) Wrench
						
MSE 45..R-.T-SF **MSE 45..R-.T-M-SF**	LSE-445SR	C43R (for Insert)	C44R (for Cartridge)	W6X17	SV-60136TR	TTC-20



· Mounting bolt (HH10X30S) is included for MSE45063R-4T-M-SF.
· Mounting bolt (HH12X35) is included for MSE45080R-5T-M-SF.

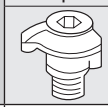
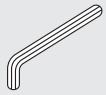
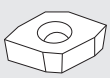
MSD45 (Face Mill)

Description	(1) Cartridge	(2) Cartridge Clamp Screw	(3) Clamp	(4) Clamp Screw	Wrench
					
MSD 45...R	LSD-445R	HH4X16	C20R	TH8X15	TH-4

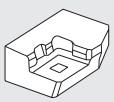


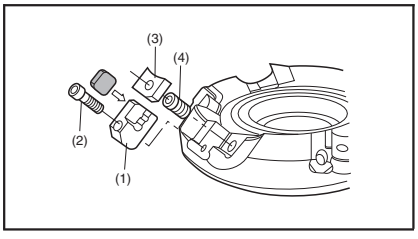
· Mounting bolt (HH12X35) is included for MSD4580R.

MSD45 (End Mill)

Description	Spare Parts			
	Clamp Set	Wrench	Shim	Shim Screw
				
MSD 4550 **4563** **4580-32**	CPS-6M	LW-3	MSD-42	SP3X8

MSO45 (Face Mill)

Description	(1) Cartridge	(2) Cartridge Clamp Screw	(3) Clamp	(4) Clamp Screw	Wrench
					
MSO 45...R	LSO-445R	HH4X16	CH-20R	TH8X15	TH-4



MSO45-S (End Mill)

Description	Spare Parts				
	Shim	Shim Screw	Clamp	Clamp Screw	Wrench
MSO 45..-S	MSO-4T245	SP3X6	CH-20R	TH8X15	TH-4

MSO45-09 (Face Mill)

Description	Spare Parts	
	Clamp Screw	Wrench
MSO 45...R-09	SB-3060TR	DT-10

MSO45-S-09 (End Mill)

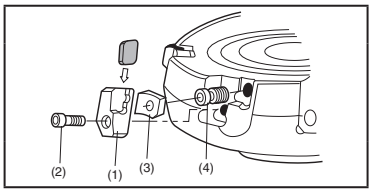
Description	Spare Parts	
	Clamp Screw	Wrench
MSO 45..-S32-09	SB-3060TR	DT-10

MSP15 / MSE15 (End Mill)

Description		Clamp Set	Wrench	Shim	Shim Screw
MSP	**15..**	CPS-6M	LW-3	MSP-42	SP3X8
MSE	**15..**	CPS-6M	LW-3	MSE-4215	SP3X8

MSP15 (Face Mill)

Description		(1) Cartridge	(2) Cartridge Clamp Screw	(3) Clamp	(4) Clamp Screw	Wrench
MSP	**15...R**	LSP-415R	HH4X16	C25R	TH8X15	TH-4



· Mounting bolt (HH12X35) is included in MSP1580R.

MEC (Face Mill)

Description		Spare Parts	
		Clamp Screw	Wrench
MEC	**...R-11-..T(-M)**	SB-2555TRG	DTM-8
	...R-17-..T(-M)	SB-4070TRN	DTM-15

MEC (End Mill)

Description		Spare Parts	
		Clamp Screw	Wrench
MEC	**..-W..-1103(-H)**	SB-2545TR	DTM-8
	..-W..-11T3(-H)	SB-2555TRG	DTM-8
	..-W..-1704-H	SB-4070TRN	DTM-15

MECX (Face Mill)

Description		Spare Parts	
		Clamp Screw	Wrench
MECX	**050R-07-12T-M**	SB-2042TRG	DTM-6
	063R-07-14T-M		

MECX (End Mill)

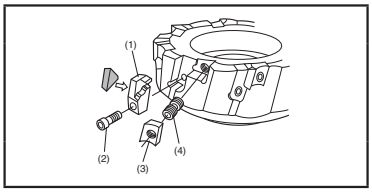
Description		Spare Parts	
		Clamp Screw	Wrench
MECX	**32-S32-07-6T**	SB-2042TRG	DTM-6
	33-S32-200-07-6T		

MTE90-SF

Description		Cartridge	Clamp	Clamp	Clamp Screw	Adjustment Screw	Wrench
MTE	**90...-SF**	LTE-490SR	C91R (for Insert)	C92R (for Cartridge)	W8X16	SV-60136R	TTC-25

MTE90 (Face Mill)

Description		(1) Cartridge	(2) Cartridge Clamp Screw	(3) Clamp	(4) Clamp Screw	Wrench
MTE	**90...R**	LTE-490R	HH4X16	C17R	W8X18	TH-4



MTE90 (End Mill)

Description		Spare Parts				
		Clamp	Clamp screw	Wrench	Shim	Shim Screw
MTE	**9050**	CP-8TE	W8X18	LW-4	MTE-42	SP3X8
	9063					
	9080-32					

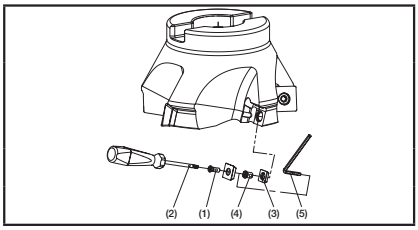
Former Parts List

MFWN (Face Mill)

Description	Spare Parts		
	Clamp Screw	Wrench	Anti-seize Compound
MFWN 90100R-9T-M ~ 90250R-18T-M	SB-40140TRN	DTM-15	P-37

MSO90 (Face Mill)

Description	(1) Clamp Screw	(2) Wrench	(3) Shim	(4) Shim Screw	(5) Wrench
					
MSO 90...R-15-.T	SB-45130TR	DTP-20	MSO-5200	SPW-6045	LW-4.5 (for Shim Screw)
MSO 90...R-15-.T-M					



· Mounting bolt (HH12X35) is included for MSO90080R-15-◯T-M and MSO90080R-15-◯T
· Mounting bolt (HH10X30S) is included for MSO90063R-15-◯T-M

MSO90-S (End Mill)

Description	Spare Parts	
	Clamp Screw	Wrench
MSO 90..-S32-09	SB-3080TR	DT-10
90..-S32-15	SB-5085TR	DT-20

MSO90-09 (Face Mill)

Description	Spare Parts	
	Clamp Screw	Wrench
MSO 90...R-09	SB-3080TR	DT-10

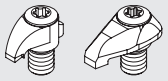
MEA / MEB

Description	Spare Parts	
	Clamp Screw	Wrench
MEA .. -S..(- ...)	SB-2560TR	DT-8
MEB .. -S..	SB-4085TR	DT-15

DMC

Description	Spare Parts	
	Clamp Screw	Wrench
DMC ... -S..	SB-2545TR	FT-8
DMC 0..	SB-3060TR	FT-10

MTPS / MTES

Description	Clamp Set	Wrench
	 2S 5ES	
MTPS ...	CPS-2S	FT-15
MTES ...	CPS-5ES	

MEAL

Description	Spare Parts	
	Clamp Screw	Wrench
MEAL .. -S..	SB-5085TR	DT-20

MRP-S (End Mill)

Description	Spare Parts	
	Clamp Screw	Wrench
MRP ...-S.. -08(-...)	SB-3060TR	DT-10
...-S.. -10-.T(-...)	SB-3080TR	DT-10
...-S.. -12(-.T)(-...)	SB-4085TR	DT-15
050-S42 -12(-300)	SB-40115TR	
...-S.. -16(-...)	SB-50120TR	DT-20

MRP (Face Mill)

Description	Spare Parts	
	Clamp Screw	Wrench
MRP ...R -10- .T	SB-3080TR	DT-10
MRP 050R -12	SB-40115TR	DT-15
063R -12		
080R -12	SB-4085TR	
080R -12-7T		
MRP ...R -16(- .T)	SB-50120TR	DT-20
MRP ...R -20	SB-60120TR	DT-25

MHD (Helical End Mill)

Description			Spare Parts				
			Clamp Screw	Wrench	Clamp Bolt		Wrench
					1 Front Piece	2 Front Pieces	
MHD	32-S32	-SA	SB-2560TR	DT-8	-	HH8X50	LW-6
	40-S32	-SA	SB-3080TR	DT-10		HH8X65	
	40-S42	-SA					
	50-S42	-SA				HH12X65	LW-10
MHD	40-S42	-SB	SB-3080TR	DT-10	HH8X40	-	LW-6
	50-S42	-SB			HH12X40		LW-10
MHD	20S-S20	-C	SB-2560TR	DT-8	-	-	-
	25-S25	-C					
	32-S32	-C					
	40-S42	-C	SB-3080TR	DT-10			
	50-S42	-C					
MHD	32-S32	-A	SB-2560TR	DT-8	HH8X35	HH8X50	LW-6
	40-S32	-A	SB-3080TR	DT-10	HH8X40	HH8X65	
	40-S42	-A					
	50-S42	-A			HH12X40	HH12X65	LW-10
MHD	32-S32	-A-130	SB-2560TR	DT-8	HH8X35	HH8X50	LW-6
	40-S32	-A-150	SB-3080TR	DT-10	HH8X40	HH8X65	
	50-S42	-A-150			HH12X40	HH12X65	LW-10
MHD	40-S42	-B	SB-3080TR	DT-10	HH8X40	-	LW-6
	50-S42	-B			HH12X40		LW-10
MHD	32	-F	SB-2560TR	DT-8	-	-	-
	40	-F	SB-3080TR	DT-10			
	50	-F					

MHD (Face Mill and Integral Arbor type)

Description			Spare Parts			
			Clamp Screw	Wrench	Clamp Bolt	Wrench
MHD	63-FMA	-SA	SB-3080TR	DT-10	HH16X90	LW-14
	80-FMA	-SA			HH20X110	LW-17
	100-FMA	-SA			HH24X110	LW-19
MHD	63-FMA	-A			HH16X90	LW-14
	80-FMA	-A			HH20X110	LW-17
	100-FMA	-A			HH24X110	LW-19
MHD	63-BT50	-SA			HH16X65	LW-14
	80-BT50	-SA			HH20X90	LW-17
	100-BT50	-SA			HH24X90	LW-19
MHD	63-BT50	-A			HH16X65	LW-14
	80-BT50	-A			HH20X90	LW-17
	100-BT50	-A			HH24X90	LW-19
MHD	63	-F			-	-
	80	-F				
	100	-F				

Former Parts List

MHD (Radius)

Description			Spare Parts						
			Clamp Screw		Wrench		Clamp Bolt		Wrench
			for Bottom Insert	for Middle Insert	for Bottom Insert	for Middle Insert	1 Front Piece	2 Front Pieces	
MHD	**32-S32**	**-4RSA**	SB-2560TR	SB-2560TR	DT-8	DT-8	-	HH8X50	LW-6
	40-S32	**-5RSA**	SB-3080TR	SB-3080TR	DT-10	DT-10		HH8X55	
	40-S42	**-5RSA**							
	50-S42	**-6RSA**	SB-4085TR		DT-15			HH12X55	LW-10
MHD	**32-S32**	**-A**	SB-2560TR		DT-8		-	HH8X50	LW-6
	40-S32	**-A**	SB-3080TR		DT-10			HH8X65	
	40-S42	**-A**							
	50-S42	**-A**						HH12X65	LW-10
MHD	**32**	**-F**	SB-2560TR		DT-8		-	-	-
	40	**-F**	SB-3080TR		DT-10				
	50	**-F**							
MHD	**32**	**-4RF**	SB-2560TR	SB-2560TR	DT-8	DT-8	-	-	-
	40	**-5RF**	SB-3080TR	SB-3080TR	DT-10	DT-10			
	50	**-6RF**	SB-4085TR		DT-15				

MGI

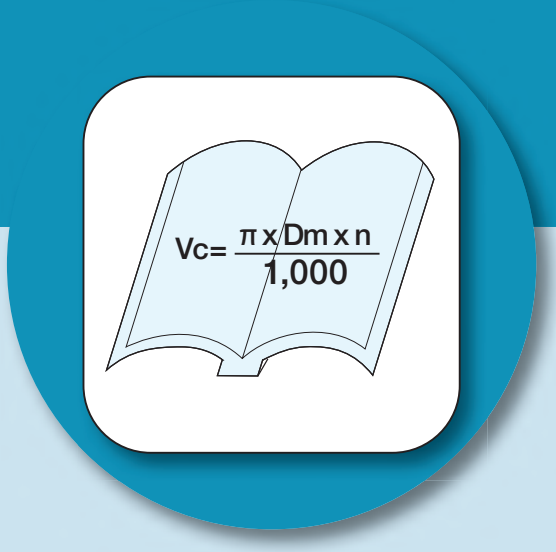
Description		Spare Parts	
		Clamp Set	Wrench
MGI	**....-1C**	CPS-6F	LW-3

MVG

Description		Spare Parts	
		Clamp Set	Wrench
MVG	**....**	CPS-6V	LW-3

Blank Tool

Description		Spare Parts
		Coolant Pipe
T63H-	**BL...- ...**	CL63-1



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ISO13399 Compliant Dimension Markings

All Dimension Markings in the 2018-2019 General Catalog are Complied with ISO13399. Symbol, Detail and Previous Symbol are shown below.

(1) Insert

Symbol	Detail	Previous Symbol
AN	Relief Angle	α
D1	Hole Diameter	ød
IC	I.C. Size	A
RE	Corner-R	rε
S	Insert Thickness	T

(2) Toolholder for External

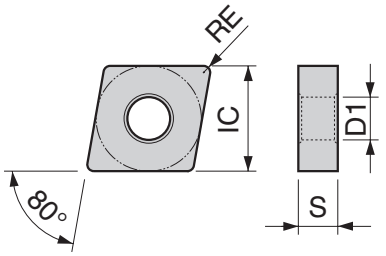
Symbol	Detail	Previous Symbol
B	Shank Width	B
H	Shank Height	H1
HF	Edge Height	h
LF	Overall Length	L1
LH	Head Length	L2
WF	Functional Width	F1

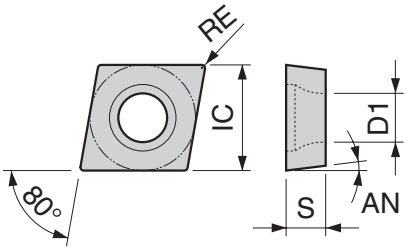
(3) Small Parts Machining

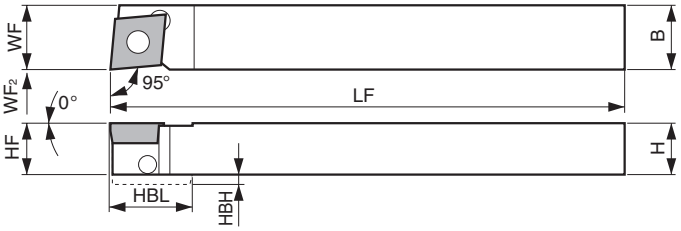
Symbol	Detail	Previous Symbol
B	Shank Width	B
H	Shank Height	H1
HF	Edge Height	h
LF	Overall Length	L1
LH	Head Length	L2
LU	Usable Length	L2
WF	Functional Width	F1

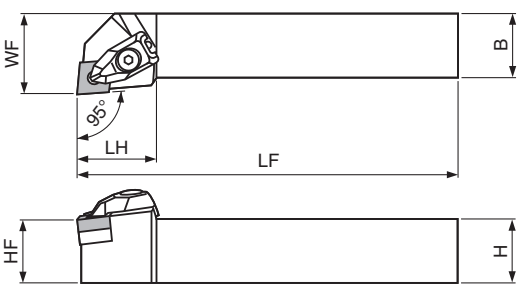
(4) Boring Bars

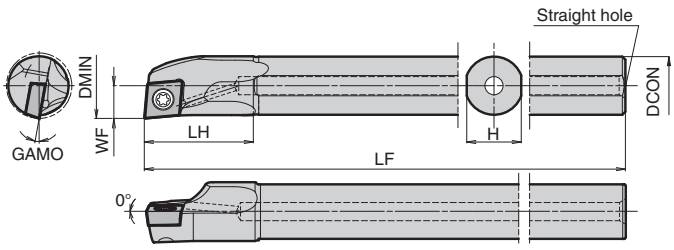
Symbol	Detail	Previous Symbol
DMIN	Min. Bore Dia.	øA
DCON	Shank Dia.	øD, øD1
GAMO	Rake Angle	θ
H	Shank Width	H
LF	Overall Length	L1
LH	Head Length	L2
LPR	Overall Length	L1
LU	Usable Length	L2
RE	Corner-R	rε
WF	Functional Width	F









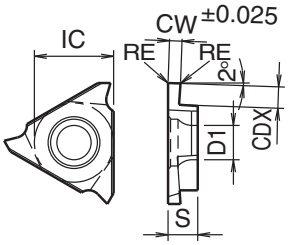


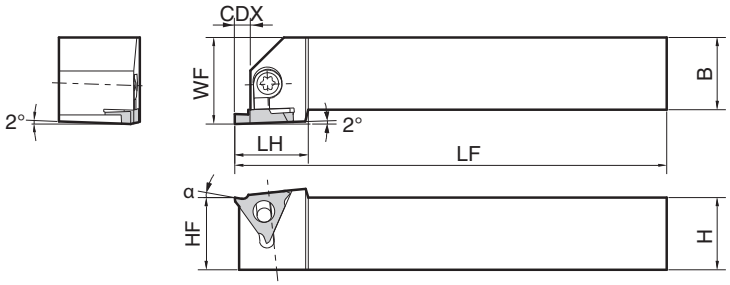
(5) Grooving / Cut-off Inserts

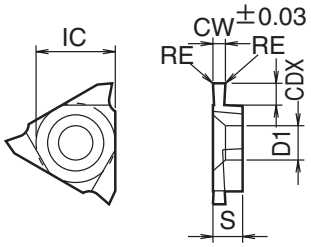
Symbol	Detail	Previous Symbol
IC	I.C. Size	A
BCH	Chamfer width	C
CDX	Max. Cutting Depth	B
CW	Edge Width	W
D1	Hole Diameter	ød
DAXN	External dia. of the groove (MAX.)	øD
DAXX	External dia. of the groove (MIN.)	øD
INSL	Insert Length	L
PSIR$^{R}_{L}$	Lead Angle	θ
RE	Corner-R	rε
S	Insert Thickness	H, T
W1	Insert Width	A

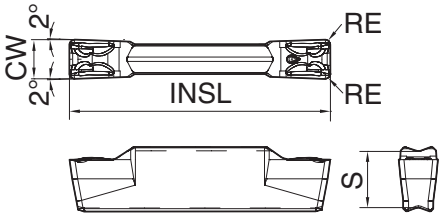
(6) Grooving / Cut-off Toolholders

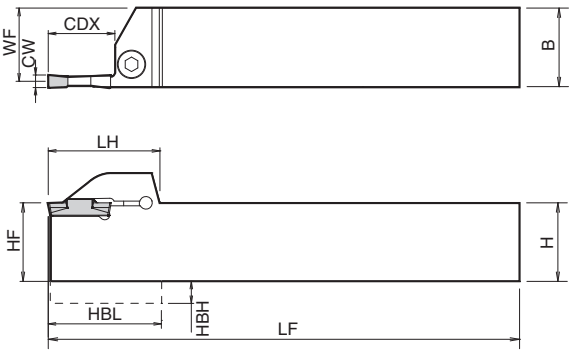
Symbol	Detail	Previous Symbol
B	Shank Width	B
CDX	Max. Cutting Depth	T
CUTDIA	Max. Cut-off Dia.	øDmax
DAXN	External dia. of the groove (MAX.)	øD
DAXX	External dia. of the groove (MIN.)	øD
DCB	Connection Bore Dia. (Sleeve)	ød1
DMIN	Min. Bore Dia.	øA
DCON	Shank Dia.	øD, øD1
H	Shank Height	H1
HF	Edge Height	h
LF	Overall Length	L1
LH	Head Length	L2
WF	Functional Width	F1

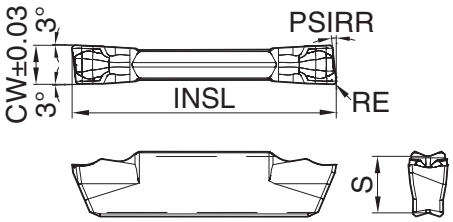












ISO13399 Compliant Dimension Markings

(7) Threading Inserts

Symbol	Detail	Previous Symbol
IC	I.C. Size	A
D1	Hole Diameter	ød
PNA	Thread Angle	θ
PDX	Profile Distance	S
S	Insert Thickness	T
RE	Corner-R	rε

(8) Threading Toolholders

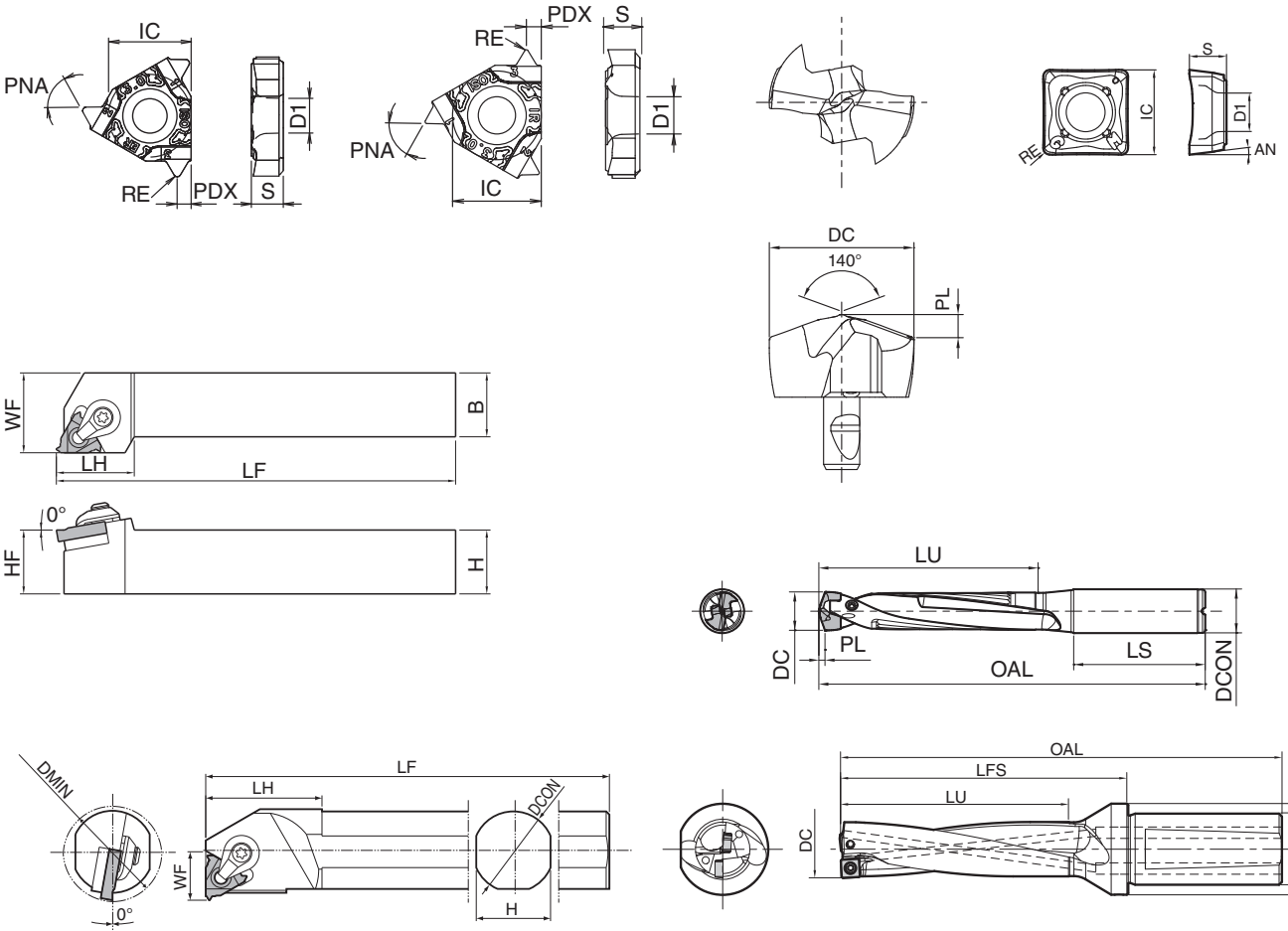
Symbol	Detail	Previous Symbol
B	Shank Width	B
DMIN	Min. Bore Dia.	øA
DCON	Shank Dia.	øD
H	Shank Height	H1
HF	Edge Height	h
LF	Overall Length	L1
LH	Head Length	L2
LU	Usable Length	L2
WF	Functional Width	F, F1

(9) Inserts for Drill

Symbol	Detail	Previous Symbol
IC	I.C. Size	A
D1	Hole Diameter	ød
DC	Drill Dia.	øDc
PL	Insert Point Length	Lp
RE	Corner-R	rε
S	Insert Thickness	T
INSL	Insert Length	A
W1	Insert Width	W

(10) Drill holder

Symbol	Detail	Previous Symbol
DC	Drill Dia.	øDc
DCON	Shank Dia.	øDs
OAL	Overall Length	L
LU	Usable Length (Drilling Depth)	L3
PL	Insert Point Length	Lp
LS	Shank Length	Ls
DCSFMS	Flange Dia.	ød1
LFS	Functional Length	L1
LCF	Flute Length	L2



(11) Solid End Mill

Symbol	Detail	Previous Symbol
APMX	Max. Depth of Cut	ℓ
CHW	Chamfer Width	C
DC	Cutting Dia.	øDc
DCON	Shank Dia.	øDs
DN	Neck Dia.	øD1
LF	Overall Length	L
LU	Under Neck Length	ℓ2
RE	Corner-R	rε, r
ZEFP	No. of Inserts	Z

(12) Solid Drill

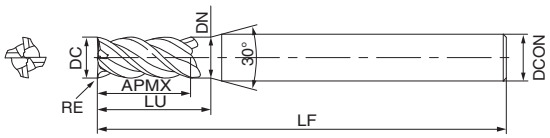
Symbol	Detail	Previous Symbol
OAL	Overall Length	L
DC	Cutting Dia.	øDc
DCON	Shank Dia.	øDs
LCF	Flute Length	ℓ
LN	Under Neck Length	ℓ2
LS	Shank Length	Ls
LU	Usable Length	ℓe

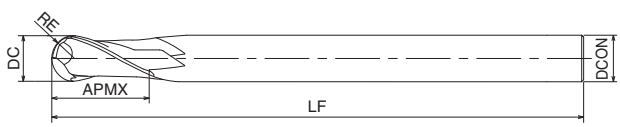
(13) Milling Inserts

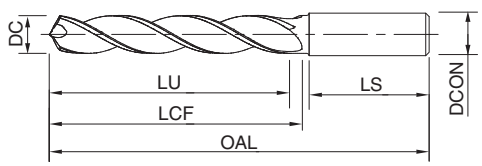
Symbol	Detail	Previous Symbol
BCH	Corner Chamfer Length	X
BS	Wiper Edge Width	Z
D1	Hole Diameter	ød
IC	I.C. Size	A
INSL	Insert Length	W
L	Cutting Edge Length	W
RE	Corner-R	rε
S	Insert Thickness	T

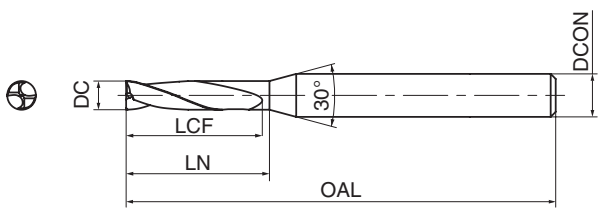
(14) Toolholder for Milling

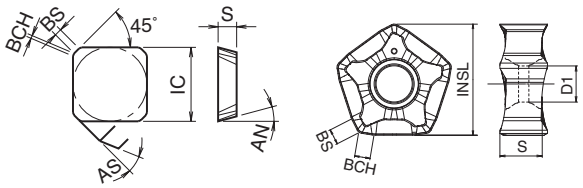
Symbol	Detail	Previous Symbol
APMX	Max. Depth of Cut	S
CBDP	Connection Bore Depth	E
DC	Cutting Dia.	øD
DCB	Bore Dia.	ød
DCON	Shank Dia.	øDs
DCSFMS	Contact Surface Dia.	øD2
DCX	Maximum Cutting Dia.	øD1
KDP	Keyway Depth	a
KWW	Keyway Width	b
LF	Toolholder Height	H
LH	Head Length	ℓ

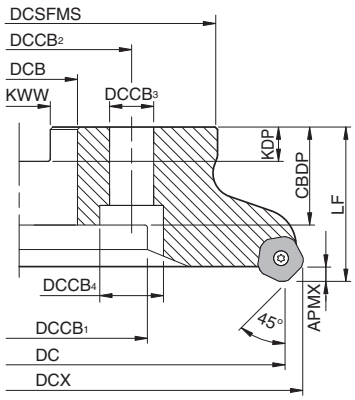


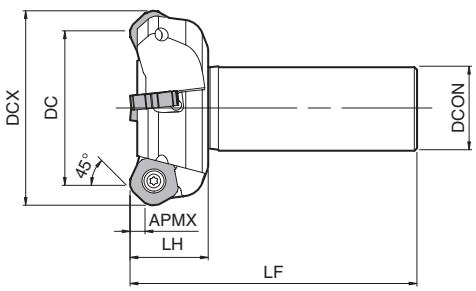












SI Unit Conversion Table / Cutting Symbol

SI Derived Units Conversion Chart

(Bold lined units are the ones by SI Derived Unit.)

(Extracted from JIS Handbook "Iron & Steel")

Force

N	kgf	dyn
1	$1.019\ 72 \times 10^{-1}$	1×10^{5}
9.806 65	1	$9.806\ 65 \times 10^{5}$
1×10^{-5}	$1.019\ 72 \times 10^{-6}$	1

Stress

$1Pa=1N/m^2$, $1MPa=1N/mm^2$

Pa or N/m^2	**MPa or N/mm^2**	kgf/mm^2	kgf/cm^2	kgf/m^2
1	1×10^{-6}	$1.019\ 72 \times 10^{-7}$	$1.019\ 72 \times 10^{-5}$	$1.019\ 72 \times 10^{-1}$
1×10^{6}	1	$1.019\ 72 \times 10^{-1}$	$1.019\ 72 \times 10$	$1.019\ 72 \times 10^{5}$
$9.806\ 65 \times 10^{6}$	9.806 65	1	1×10^{2}	1×10^{6}
$9.806\ 65 \times 10^{4}$	$9.806\ 65 \times 10^{-2}$	1×10^{-2}	1	1×10^{4}
9.806 65	$9.806\ 65 \times 10^{-6}$	1×10^{-6}	1×10^{-4}	1

Pressure

$1Pa=1N/m^2$

Pa	**kPa**	**MPa**	bar	kgf/cm^2
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	$1.019\ 72 \times 10^{-5}$
1×10^{3}	1	1×10^{-3}	1×10^{-2}	$1.019\ 72 \times 10^{-2}$
1×10^{6}	1×10^{3}	1	1×10	$1.019\ 72 \times 10$
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.019 72
$9.806\ 65 \times 10^{4}$	9.806 65 x 10	$9.806\ 65 \times 10^{-2}$	$9.806\ 65 \times 10^{-1}$	1

Cutting Symbol

Cutting conditions below are indicated by the new symbols listed in 2nd column.

1) Turning

Cutting Conditions	Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Rate	f	f	mm/rev
Depth of Cut	ap	d	mm
Edge Width	CW	W	mm
Workpiece Dia.	Dm	D	mm
Required Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Theoretical Surface Roughness	h	Rz	μm
Corner Radius	RE	R	mm
Revolution	n	N	min^{-1}

2) Milling

Cutting Conditions	Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Speed	Vf	F	mm/min
Feed per tooth	fz	f	mm/t
Feed Rate	f	f	mm/rev
No. of Inserts	Z	Z	teeth
Depth of Cut	ap	d	mm
Width of Cut	ae	w	mm
Pick feed	Pf	Pf	mm
Required Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Chip Removal Volume	Q	Q	cm^3/min
Revolution	n	N	min^{-1}

3) Drilling

Cutting Conditions	Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Speed	Vf	F	mm/min
Feed Rate	f	f	mm/rev
Drill Dia.	DC	D (Ds)	mm
Required Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Drilling Depth	H	d	mm
Revolution	n	N	min^{-1}

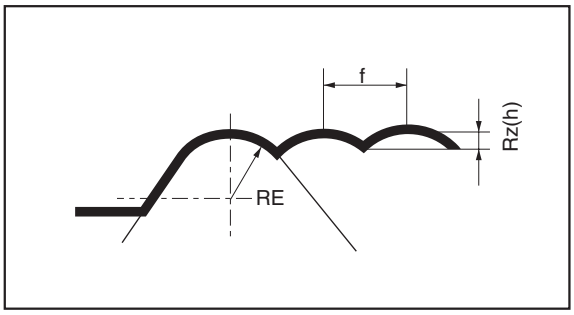
Surface Roughness (JIS B 0601-2001)

Theoretical (Geometrical) Surface Roughness

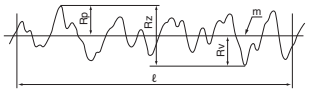
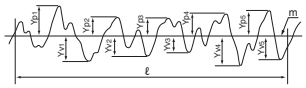
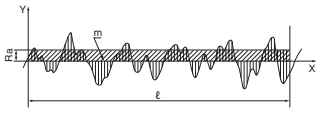
Theoretical surface roughness for turning indicates the minimum roughness value from the cutting conditions and it is shown by the formula as follows.

$$Rz(h) = \frac{f^2}{8RE} \times 10^3$$

Rz(h) : Theoretical Surface Roughness [μm]
f : Feed Rate [mm/rev]
RE : Corner Radius of Insert [mm]



How to Obtain Surface Roughness Values

Type	Symbol	How to Obtain	Explanation
Max. Height Roughness	Rz	Rz is a mean value in micron meter obtained from the distance of the highest peaks and the lowest valleys within the range of sampled reference length (" ℓ ") in the direction of the center line of the roughness curve. Note) When calculating Rz, extraordinarily high or low threads are considered as damages and excluded from the calculation, and only standard lengths are used. Rz=Rp+Rv	
Ten Points Mean Roughness	RzJIS	RzJIS is a mean value in micron meter obtained from the distance of 5 highest peaks (Yp) and the 5 lowest valleys (Yv) measured from the center line of the roughness curve within the range of sampled reference length " ℓ ". $Rz_{JIS}=\frac{(Yp1+Yp2+Yp3+Yp4+Yp5)+(Yv1+Yv2+Yv3+Yv4+Yv5)}{5}$	 *Yp1, Yp2, Yp3, Yp4, Yp5* : Distance from the mean line to the highest 5 peaks in the range of sampled reference length " ℓ " *Yv1, Yv2, Yv3, Yv4, Yv5* : Distance from the mean line to the lowest 5 valleys in the range of sampled reference length " ℓ "
Arithmetical Mean Roughness	Ra	Ra is obtained from the following formula in micron meter, the roughness curve is expressed by y=f(x), the X-axis is in the direction of the center line and the Y-axis is the vertical magnification of the roughness curve in the range of sampled reference length " ℓ ". $Ra=\frac{1}{\ell}\int_0^{\ell}\{f(x)\}\,dx$	

Relationship with Triangle Symbol

Arithmetical Mean Roughness Ra(μm)	Max. Height Roughness Rz(μm)	Ten Points Mean Roughness RzJIS(μm)	* (Triangle Symbol)
0.025 0.05 0.1 0.2	0.1 0.2 0.4 0.8	0.1 0.2 0.4 0.8	▽▽▽▽
0.4 0.8 1.6	1.6 3.2 6.3	1.6 3.2 6.3	▽▽▽
3.2 6.3	12.5 25	12.5 25	▽▽
12.5 25	50 100	50 100	▽

* Triangle symbol was removed from JIS standard in the 1994 Revision.

· How to Indicate
(1) When Ra is 1.6μm→1.6μmRa
(2) When Rz is 6.3μm→6.3μmRz
(3) When RzJIS is 6.3μm→6.3μmRzJIS

Indication in JIS Standard

Example of Ra Indication		Example of Rz Indication	
(1) When indicating the upper limit only (when upper limit is 6.3μmRa)	6.3	(1) When indicating the upper limit only indicate surface roughness following the parameter symbol.	Rz6.3
(2) When indicating both lower and upper limit (when upper limit is 6.3μmRa, lower limit is 1.6μmRa)	6.3 1.6	(2) When indicating both lower and upper limit indicate surface roughness as (upper limit ~ lower limit) following the parameter symbol.	Rz6.3 ~ 1.6

Note: The indications of Ra and Rz are different.

Caution-Symbols for Surface Roughness

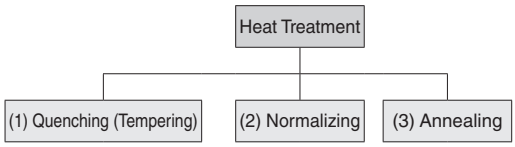
The above information is based on JIS B 0601-2001.
However, some symbols were revised as shown in the right table in accordance with ISO Standard from JIS B 0601-2001 version.
Ten Points Mean Roughness (Rz) was eliminated from 2001 version but it still remains as RzJIS reference, since it was popular in Japan.

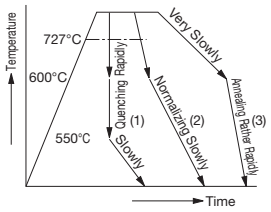
Type	Symbol of JIS B 0601-1994		Symbol of JIS B 0601-2001
Max. Height Roughness	Ry	→	Rz
Ten Points Mean Roughness	Rz	→	(RzJIS)
Arithmetical Mean Roughness	Ra	→	Ra

Heat Treatment and Hardness Expression

Heat Treatment

One of the ways to determine the hardness of steel is the heat treatment and it is classified to 3 types.



Heat Treatment Method		Detail	Effect
	· Quenching (Tempering)	After heating to 727˚C or over, cool rapidly down to 550˚C in water or oil.	Quenching makes steel hard. Because it cools down red-hot steel very rapidly in water or oil, but it may promote internal stress. In order to remove such internal stress, tempering is used. (After cooled down once, reheat it to 200˚C ~ 600˚C)
	· Normalizing	After heating to 727˚C or over, cool down rapidly to 600˚C and then to normal temperature.	It miniaturizes the crystals. (Steel is also composed of small cells.) It is used to improve the mechanical character or machinability.
	· Annealing	After heating to 727˚C or over, cool down very slowly to 600˚C, then to normal temperature.	It miniaturizes the crystals like the process of normalizing, but the crystal size is bigger than that of normalizing. It targets machinability improvement and distortion correction.

Hardness Expression

Hardness	Reference Standard	Example	Explanation of Example
Brinell Hardness	JIS Z 2243 : 1992	250HB	Hardness Value : 250, Hardness Symbol : HB
		200 ~ 250HB	When the hardness has the range
Vickers Hardness	JIS Z 2244 : 1998	640HV	Hardness Value : 640, Hardness Symbol : HV
Rockwell Hardness	JIS Z 2245 : 1992	60HRC	Hardness Value : 60, Hardness Symbol : HRC
Shore Hardness	JIS Z 2246 : 1992	50HS	Hardness Value : 50, Hardness Symbol : HS

Vickers Hardness Conversion Chart

Vickers Hardness (HV)	Brinell Hardness 10mm Dia. Ball Load : 3,000kgf (HB)		Rockwell Hardness [2]			Shore Hardness (HS)	Tensile Strength MPa [1]
	Standard Ball	Tungsten Carbide Ball	A Scale Load : 60kgf Diamond Point (HRA)	B Scale Load : 100kgf 1.6mm (1/16in) Dia. ball (HRB)	C Scale Load : 150kgf Diamond Point (HRC)		
940	-	-	85.6	-	68.0	97	
920	-	-	85.3	-	67.5	96	
900	-	-	85.0	-	67.0	95	
880	-	(767)	84.7	-	66.4	93	
860	-	(757)	84.4	-	65.9	92	
840	-	(745)	84.1	-	65.3	91	
820	-	(733)	83.8	-	64.7	90	
800	-	(722)	83.4	-	64.0	88	
780	-	(710)	83.0	-	63.3	87	
760	-	(698)	82.6	-	62.5	86	
740	-	(684)	82.2	-	61.8	84	
720	-	(670)	81.8	-	61.0	83	
700	-	(656)	81.3	-	60.1	81	
690	-	(647)	81.1	-	59.7	-	
680	-	(638)	80.8	-	59.2	80	
670	-	630	80.6	-	58.8	-	
660	-	620	80.3	-	58.3	79	
650	-	611	80.0	-	57.8	-	
640	-	601	79.8	-	57.3	77	
630	-	591	79.5	-	56.8	-	
620	-	582	79.2	-	56.3	75	
610	-	573	78.9	-	55.7	-	
600	-	564	78.6	-	55.2	74	
590	-	554	78.4	-	54.7	-	2055
580	-	545	78.0	-	54.1	72	2020
570	-	535	77.8	-	53.6	-	1985
560	-	525	77.4	-	53.0	71	1950
550	505	517	77.0	-	52.3	-	1905
540	496	507	76.7	-	51.7	69	1860
530	488	497	76.4	-	51.1	-	1825
520	480	488	76.1	-	50.5	67	1795
510	473	479	75.7	-	49.8	-	1750
500	465	471	75.3	-	49.1	66	1705
490	456	460	74.9	-	48.4	-	1660
480	448	452	74.5	-	47.7	64	1620
470	441	442	74.1	-	46.9	-	1570
460	433	433	73.6	-	46.1	62	1530
450	425	425	73.3	-	45.3	-	1495
440	415	415	72.8	-	44.5	59	1460
430	405	405	72.3	-	43.6	-	1410
420	397	397	71.8	-	42.7	57	1370
410	388	388	71.4	-	41.8	-	1330
400	379	379	70.8	-	40.8	55	1290
390	369	369	70.3	-	39.8	-	1240
380	360	360	69.8	(110.0)	38.8	52	1205
370	350	350	69.2	-	37.7	-	1170
360	341	341	68.7	(109.0)	36.6	50	1130
350	331	331	68.1	-	35.5	-	1095
340	322	322	67.6	(108.0)	34.4	47	1070
330	313	313	67.0	-	33.3	-	1035
320	303	303	66.4	(107.0)	32.2	45	1005
310	294	294	65.8	-	31.0	-	980
300	284	284	65.2	(105.5)	29.8	42	950
295	280	280	64.8	-	29.2	-	935
290	275	275	64.5	(104.5)	28.5	41	915
285	270	270	64.2	-	27.8	-	905
280	265	265	63.8	(103.5)	27.1	40	890
275	261	261	63.5	-	26.4	-	875
270	256	256	63.1	(102.0)	25.6	38	855
265	252	252	62.7	-	24.8	-	840
260	247	247	62.4	(101.0)	24.0	37	825
255	243	243	62.0	-	23.1	-	805
250	238	238	61.6	99.5	22.2	36	795
245	233	233	61.2	-	21.3	-	780
240	228	228	60.7	98.1	20.3	34	765
230	219	219	-	96.7	(18.0)	33	730
220	209	209	-	95.0	(15.7)	32	695
210	200	200	-	93.4	(13.4)	30	670
200	190	190	-	91.5	(11.0)	29	635
190	181	181	-	89.5	(8.5)	28	605
180	171	171	-	87.1	(6.0)	26	580
170	162	162	-	85.0	(3.0)	25	545
160	152	152	-	81.7	(0.0)	24	515
150	143	143	-	78.7	-	22	490
140	133	133	-	75.0	-	21	455
130	124	124	-	71.2	-	20	425
120	114	114	-	66.7	-	-	390
110	105	105	-	62.3	-	-	-
100	95	95	-	56.2	-	-	-
95	90	90	-	52.0	-	-	-
90	86	86	-	48.0	-	-	-
85	81	81	-	41.0	-	-	-

· Extracted from JIS Handbook "Iron & Steel" (SAE J 417)

Note 1) 1MPa = 1N/mm^2

2) Value in ( ) is not in practical use, but reference only.

Material List (JIS)

Ferrous Materials

Classification		Name of JIS Standard	Symbol
Structural Steel		Rolled Steel for Welded Structure	SM
		Re-Rolled Steel	SRB
		Rolled Steel for General Structure	SS
		Light Gauge Steel for General Structure	SSC
		Hot-Rolled Steel Plate, Sheet and Strip for Automobile Structural Use	SAPH
Steel Sheet		Cold-Rolled Steel Plate, Sheet and Strip	SPC
		Hot-Rolled Soft Steel Plate, Sheet and Strip	SPH
Steel Pipe		Carbon Steel Pipe for Ordinary Piping	SGP
		Carbon Steel Pipe for Boiler / Heat Exchanger	STB
		Seamless Steel Pipe for High Pressure Gas Cylinder	STH
		Carbon Steel Pipe for General Structural Use	STK
		Carbon Steel Pipe for Machine Structural Use	STKM
		Alloy Steel Pipe for Structural Use	STKS
		Stainless Steel Pipe for Machine Structural Use	SUS-TK
		Steel Square Pipe for General Structural Use	STKR
		Alloy Steel Pipe for Ordinary Piping	STPA
		Carbon Steel Pipe for Pressure Service	STPG
		Carbon Steel Pipe for High-Temperature Service	STPT
		Carbon Steel Pipe for High-Pressure Service	STS
		Stainless Steel Pipe for Ordinary Piping	SUS-TP
Machine Structural Steel		Carbon Steel for Machine Structural Use	SxxC,SxxCK
		Aluminum Chromium Molybdenum Steel	SACM
		Chromium Molybdenum Steel	SCM
		Chromium Steel	SCr
		Nickel Chromium Steel	SNC
		Nickel Chromium Molybdenum Steel	SNCM
		Manganese Steel and Manganese Chromium Steel for Machine Structural Use	SMn,SMnC
Special Steel	Tool Steel	Carbon Tool Steel	SK
		Hollow Drill Steel	SKC
		Alloy Tool Steel	SKS,SKD,SKT
		High Speed Tool Steel	SKH
	Special Steel	Free Cutting Carbon Steel	SUM
		High Carbon Chromium Bearing Steel	SUJ
		Spring Steel	SUP
	Stainless Steel	Stainless Steel Bar	SUS-B
		Hot-Rolled Stainless Steel Plate, Sheet and Strip	SUS-HP,SUS-HS
		Cold-Rolled Stainless Steel Plate, Sheet and Strip	SUS-CP,SUS-CS
	Heat-Resisting Steel	Heat-Resisting Steel Bar	SUH-B,SUH-CB
		Heat-Resisting Steel Plate and Sheet	SUH-HP,SUH-CP
	Superalloy	Corrosion-Resisting and Heat-Resisting Superalloy Bar	NCF-B
		Corrosion-Resisting and Heat-Resisting Superalloy Plate and Sheet	NCF-P
Forged Steel		Carbon Steel Forging	SF
		Chromium Molybdenum Steel Forging	SFCM
		Nickel Chromium Molybdenum Steel Forging	SFNCM
Cast Iron		Gray Cast Iron	FC
		Spheroidal Graphite Cast Iron	FCD
		Blackheart Malleable Cast Iron	FCMB
		Whiteheart Malleable Cast Iron	FCMW
		Pearlitic Malleable Cast Iron	FCMP
Cast Steel		Carbon Cast Steel	SC
		High Tensile Strength Carbon Cast Steel & Low Alloy Cast Steel	SCC
		Stainless Cast Steel	SCS
		Heat-Resisting Cast Steel	SCH
		High Manganese Cast Steel	SCMnH
		Cast Steel for High Temperature and High Pressure Service	SCPH

Non-ferrous Metals

Classification	Name of JIS Standard	Symbol
Copper	Copper and Copper Alloy Sheet / Strip	CxxxxP CxxxxPP CxxxxR
	Copper and Copper Alloy Rod and Bar	CxxxxBD CxxxxBDS CxxxxBE
Aluminum Alloys and Aluminum Alloys Expanded Material	Aluminum and Al. Alloy Sheet / Strip	AxxxxP AxxxxPC
	Aluminum and Al. Alloy Rod, Bar, and Wire	AxxxxBE AxxxxBES AxxxxBD AxxxxBDS AxxxxW AxxxxWS
	Aluminum and Al. Alloy Extruded Shape	AxxxxS
	Aluminum and Al. Alloy Forging	AxxxxFD AxxxxFH
Magnesium Alloy Expanded Material	Magnesium Alloy Sheet and Plate	MP
	Magnesium Alloy Rod and Bar	MB
Nickel Alloy	Nickel Copper Alloy Sheet and Plate	NCuP
	Nickel Copper Alloy Rod and Bar	NCuB
Titanium Expanded Material	Titanium Rod and Bar	TB
Casting	Brass Casting	CAC20x
	High Strength Brass Casting	CAC30x
	Bronze Casting	CAC40x
	Phosphoric Bronze Casting	CAC50x
	Aluminum Bronze Casting	CAC70x
	Aluminum Alloy Casting	AC
	Magnesium Alloy Casting	MC
	Zinc Alloy Die Casting	ZDCx
	Aluminum Alloy Die Casting	ADC
	Magnesium Alloy Die Casting	MD
	White Metal	WJ

Material Cross Reference Table

● Steel

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/SAE	BS	DIN	NF	ГОСТ
Carbon Steel for Machine Structural Use	S10C	08 10	1010	040A10 045A10 045M10	C10E C10R	XC10	
	S12C		1012	040A12		XC12	
	S15C	15	1015	055M15	C15E C15R		
	S17C		1017			XC18	
	S20C	20	1020	070M20 C22 C22E C22R	C22 C22E C22R	C22 C22E C22R	
	S22C		1023				
	S25C	25	1025	C25 C25E C22R	C25 C25E C25R	C25 C25E C25R	
	S28C		1029				25Г
	S30C	30	1030	080A30 080M30 C30 C30E C30R	C30 C30E C30R	C30 C30E C30R	30Г
	S33C						30Г
	S35C	35	1035	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35Г
	S38C		1038				35Г
	S40C	40	1039 1040	080M40 C40 C40E C40R	C40 C40E C40R	C40 C40E C40R	40Г
	S43C		1042 1043	080A42			40Г
	S45C	45	1045 1046	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45Г
	S48C			080A47			45Г
	S50C	50	1049	080M50 C50 C50E C50R	C50 C50E C50R	C50 C50E C50R	50Г
	S53C		1050 1053				50Г
	S55C	55	1055	070M55 C55 C55E C55R	C55 C55E C55R	C55 C55E C55R	
	S58C	60	1059 1060	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60Г
	S09CK			045A10 045M10	C10E	XC10	
	S15CK	15F			C15E	XC12	
	S20CK					XC18	

Material Cross Reference Table

Steel

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/SAE	BS	DIN	NF	ГОСТ
Nickel Chromium Steel	SNC236				36NiCr6		40ХН
	SNC415	12CrNi2			14NiCr10		
	SNC631	30CrNi3			36NiCr10		30ХН3А
	SNC815	12Cr2Ni4		655M13	15NiCr13		
	SNC836	37CrNi3			31NiCr14		
Nickel Chromium Molybdenum Steel	SNCM220	20CrNiMo	8615 8617 8620 8622	805A20 805M20 805A22 805M22	20NiCrMo2 20NiCrMoS2	20NCD 2	
	SNCM240		8637 8640		40NiCrMo2-2		
	SNCM415						
	SNCM420	18CrNiMnMoA	4320		17NiCrMo6-4		20ХН2М (20ХНМ)
	SNCM431				30CrNiMo8		
	SNCM439	40CrNiMoA	4340		40NiCrMo6		
	SNCM447				34CrNiMo6		
	SNCM616						
	SNCM625						
	SNCM630						
	SNCM815						
Chromium Steel	SCr415	15Cr 15CrA			17Cr3 17CrS3		15Х 15ХА
	SCr420	20Cr	5120				20Х
	SCr430	30Cr	5130 5132	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30Х
	SCr435	35Cr	5132	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35Х
	SCr440	40Cr	5140	530M40 41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40Х
	SCr445	45Cr 50Cr					45Х
Chromium Molybdenum Steel	SCM415	15CrMo			15CrMo4		
	SCM418	20CrMo			18CrMo4 18CrMoS4		20ХМ
	SCM420			708M20	20CrMo5		20ХМ
	SCM421						
	SCM430	30CrMo 30CrMoA	4130				30ХМ 30ХМА
	SCM432						
	SCM435	35CrMo	4137	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	35ХМ
	SCM440	42CrMo	4140 4142	708M40 709M40 42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	
	SCM445		4145 4147				
	SCM822						

● Steel

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/SAE	BS	DIN	NF	ГОСТ
Manganese Steel Manganese Chromium Steel	SMn420	20Mn2	1522	150M19	20Mn5		
	SMn433	30Mn2 35Mn2	1536	150M36	34Mn5		30Г2 35Г2
	SMn438	40Mn2	1541	150M36	36Mn5		35Г2 40Г2
	SMn443	45Mn2	1541				40Г2 45Г2
	SMnC420	15CrMn	5115		16MnCr5		
	SMnC443	40CrMn	5140				
Structural Steel with Specified Hardenability Band	SMn420H		1522H				
	SMn433H						
	SMn438H		1541H				
	SMn443H		1541H				
	SMnC420H						
	SMnC443H						
	SCr415H	15CrH			17Cr3 17CrS3		15Х
	SCr420H	20Cr1H	5120H		17Cr3		20Х
	SCr430H		5130H 5132H	34Cr4 34CrS4	34Cr4 34CrS3	34Cr4 34CrS4	30Х
	SCr435H		5135H	37Cr4 37CrS4	37Cr4 34CrS4	37Cr4 37CrS4	35Х
	SCr440H	40CrH	5140H	41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40Х
	SCM415H	15CrMoH	4118H		15CrMo5		
	SCM418H				18CrMo4 18CrMoS4		
	SCM420H	20CrMoH	4118H	708H20	18CrMo4		
	SCM435H		4135H 4137H	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	
	SCM440H	42CrMoH	4140H 4142H	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	
	SCM445H		4145H 4147H				
	SCM822H						
	SNC415H						
	SNC631H						
	SNC815H	12Cr2Ni4H		655H13	15NiCr13		
	SNCM220H	20CrNiMoH	8617H 8620H 8622H	805H17 805H20 805H22	21NiCrMo2	20N CD 2	
	SNCM420H	20CrNi2MoH	4320H		20NiCrMoS6-4		

Material Cross Reference Table

Steel

Classification	Japan	China	USA		UK	Germany	France	Russia
	JIS	GB	UNS	AISI	BS	DIN	NF	ГОСТ
Stainless Steel	SUS 201	1Cr17Mn6Ni5N	S20100	201			Z12CMN17-07Az	
	SUS 202	1Cr18Mn8Ni5N	S20200	202	284S16			12Х17Г9АН4
	SUS 301	1Cr18Mn10Ni5Mo3N 1Cr17Ni7	S30100	301	301S21	X12CrNi17 7	Z11CN17-08	07Х16Н6
	SUS 301L		S30153			X2CrNiN18-7		
	SUS 301J1					X12CrNi17 7		
	SUS 302	1Cr18Ni9	S30200	302	302S25		Z12CN18-09	12Х18Н9
	SUS 302B		S30215	302B				
	SUS 303	Y1Cr18Ni9	S30300	303	303S21	X10CrNiS18 9	Z8CNF18-09	
	SUS 303Se	Y1Cr18Ni9Se	S30323	303Se	303S41			12Х18Н10Е
	SUS 304	0Cr18Ni9	S30400	304	304S31	X5CrNi18 10	Z7CN18-09	08Х18Н10
	SUS 304L	00Cr18Ni10	S30403	304L	304S11	X2CrNi19 11	Z3CN19-11	03Х18Н11
	SUS 304N1	0Cr18Ni9N	S30451	304N			Z6CN19-09Az	
	SUS 304N2	0Cr19Ni10NbN	S30452					
	SUS 304LN	00Cr18Ni10N	S30453	304LN		X2CrNiN18 10	Z3CN18-10Az	
	SUS 304J1							
	SUS 304J2							
	SUS 304J3		S30431	S30431				
	SUS 305	1Cr18Ni12	S30500	305	305S19	X5CrNi18 12	Z8CN18-12	06Х18Н11
	SUS 305J1							
	SUS 309S	0Cr23Ni13	S30908	309S			Z10CN24-13	
	SUS 310S	0Cr25Ni20	S31008	310S	310S31		Z8CN25-20	10Х23Н18
	SUS 316	0Cr17Ni12Mo2	S31600	316	316S31	X5CrNiMo17 12 2	Z7CND17-12-02	
	SUS 316F					X5CrNiMo17 13 3	Z6CND18-12-03	
	SUS 316L	00Cr17Ni14Mo2	S31603	316L	316S11	X2CrNiMo17 13 2	Z3CND17-12-02	
						X2CrNiMo17 14 3	Z3CND17-13-03	03Х17Н14М3
	SUS 316N	0Cr17Ni12Mo2N	S31651	316N				
	SUS 316LN	00Cr17Ni13Mo2N	S31653	316LN		X2CrNiMoN17 12 2	Z3CND17-11Az	
						X2CrNiMoN17 13 3	Z3CND17-12Az	
	SUS 316Ti		S31635			X6CrNiMoTi17 12 2	Z6CNDT17-12	08Х17Н13М2Т
	SUS 316J1	0Cr18Ni12Mo2Cu2						
	SUS 316J1L	00Cr18Ni14Mo2Cu2						
	SUS 317	0Cr19Ni13Mo3	S31700	317	317S16			
	SUS 317L	00Cr19Ni13Mo3	S31703	317L	317S12	X2CrNiMo18 16 4	Z3CND19-15-04	
	SUS 317LN		S31753				Z3CND19-14Az	
	SUS 317J1	0Cr18Ni16Mo5						
	SUS 317J2							
	SUS 317J3L							
	SUS 836L		N08367					
	SUS 890L		N08904	N08904	904S14		Z2NCDU25-20	
	SUS 321	1Cr18Ni9Ti 0Cr18Ni10Ti	S32100	321	321S31	X6CrNiTi18 10	Z6CNT18-10	08Х18Н10Т
	SUS 347	0Cr18Ni11Nb	S34700	347	347S31	X6CrNiNb18 10	Z6CNNb18-10	08Х18Н12Б
	SUS 384		S38400	384			Z6CN18-16	
	SUS XM7	0Cr18Ni9Cu3	S30430	304Cu	394S17		Z2CNU18-10	
	SUS XM15J1	0Cr18Ni13Si4	S38100				Z15CNS20-12	
	SUS 329J1	0Cr26Ni5Mo2	S32900	329				
	SUS 329J3L		S39240	S31803			Z3CNDU22-05Az	08Х21Н6М2Т
	SUS 329J4L		S39275	S31260			Z3CNDU25-07Az	

Steel

Classification	Japan	China	USA		UK	Germany	France	Russia
	JIS	GB	UNS	AISI	BS	DIN	NF	ГОСТ
Stainless Steel	SUS 405	0Cr13Al 0Cr13	S40500	405	405S17	X6CrAl13	Z8CA12	
	SUS 410L	00Cr12					Z3C14	
	SUS 429		S42900	429				
	SUS 430	1Cr17	S43000	430	430S17	X6Cr17	Z8C17	12Х17
	SUS 430F	Y1Cr17	S43020	430F		X7CrMoS18	Z8CF17	
	SUS 430LX		S43035			X6CrTi17	Z4CT17	
	SUS 430J1L					X6CrNb17	Z4CNb17	
	SUS 434	1Cr17Mo	S43400	434	434S17	X6CrMo17 1	Z8CD17-01	
	SUS 436L		S43600	436				
	SUS 436J1L							
	SUS 444		S44400	444			Z3CDT18-02	
	SUS 447J1	00Cr30Mo2	S44700					
	SUS XM27	00Cr27Mo	S44627				Z1CD26-01	
	SUS 403	1Cr12	S40300	403				
	SUS 410	1Cr13	S41000	410	410S21	X10Cr13	Z13C13	
	SUS 410S		S41008	410S	403S17	X6Cr13	Z8C12	08Х13
	SUS 410F2							
	SUS 410J1	1Cr13Mo 1Cr12Mo	S41025			X12CrS13		
	SUS 416	Y1Cr13	S41600	416	416S21		Z11CF13	
	SUS 420J1	2Cr13	S42000	420	420S29	X20Cr13	Z20C13	20Х13
	SUS 420J2	3Cr13	S42000	420	420S37	X30Cr13	Z33C13	30Х13
	SUS 420F	Y3Cr13	S42020	420F			Z30CF13	
	SUS 420F2							
	SUS 429J1							
	SUS 431	1Cr17Ni2	S43100	431	431S29	X20CrNi17 2	Z15CN16-02	20Х17Н2
	SUS 440A	7Cr17	S44002	440A			Z70C15	
	SUS 440B	8Cr17	S44003	440B				
	SUS 440C	9Cr18 11Cr17 9Cr18Mo	S44004	440C			Z100CD17	95Х18
	SUS 440F	Y11Cr17	S44020	S44020				
	SUS 630	0Cr17Ni4CuNb	S17400	S17400		X5CrNiCuNb16-4	Z6CNU17-04	
	SUS 631	0Cr17Ni7Al	S17700	S17700		X7CrNiAl17 7	Z9CNA17-07	09Х17Н7 Ю
	SUS 632J1							

Representative Classification of Stainless Steel

• Stainless Steel (Austenitic related)

JIS	
SUS201	SUS309S
SUS202	SUS310S
SUS301	SUS316
SUS302	SUS316L
SUS302B	SUS316N
SUS303	SUS317
SUS303Se	SUS317L
SUS304	SUS321
SUS304L	SUS347
SUS304N1	SUS384
SUS304N2	SUSXM7
SUS305	SUSXM15J1
SUS308	

• Stainless Steel (Ferritic related)

JIS
SUS405
SUS429
SUS430
SUS430F
SUS434
SUSXM27

• Stainless Steel (Martensitic related)

JIS
SUS403
SUS410
SUS410S
SUS416
SUS420J1
SUS420F
SUS431
SUS440A
SUS440B
SUS440C
SUS440F

• Stainless Steel (Precipitation Hardening)

JIS
SUS630
SUS631

Material Cross Reference Table

Steel

Classification	Japan	China	USA		UK	Germany	France	Russia
	JIS	GB	UNS	AISI	BS	DIN	NF	ГОСТ
Heat-Resisting Steel	SUH 31				331S42		Z35CNWS14-14	45Х14Н14В2М
	SUH 35				349S52		Z52CMN21-09Az	
	SUH 36	5Cr21Mn9Ni4N	S63008		349S54	X53CrMnNi21 9	Z55CMN21-09Az	55Х20 Г 9АН4
	SUH 37	2Cr21Ni12N	S63017		381S34			
	SUH 38							
	SUH 309	2Cr23Ni13	S30900	309	309S24		Z15CN24-13	
	SUH 310	2Cr25Ni20	S31000	310	310S24	CrNi2520	Z15CN25-20	20Х25Н20С2
	SUH 330	1Cr16Ni35	N08330	N08330			Z12NCS35-16	
	SUH 660	0Cr15Ni25Ti2MoAlVB	S66286				Z6NCTV25-20	
	SUH 661		R30155					
	SUH 21					CrAl1205		
	SUH 409		S40900	409	409S19	X6CrTi12	Z6CT12	
	SUH 409L						Z3CT12	
	SUH 446	2Cr25N	S44600	446			Z12C25	15Х28
	SUH 1	4Cr9Si2	S65007		401S45	X45CrSi9 3	Z45CS9	
	SUH 3	4Cr10Si2Mo					Z40CSD10	40Х10С2М
	SUH 4	8Cr20Si2Ni			443S65		Z80CSN20-02	
	SUH 11							40Х 9С2
	SUH 600	2Cr12MoVNbN						20Х12ВНМБФР
	SUH 616	2Cr12NiMoWV	S42200					

Representative Classification of Heat-Resisting Steel

- Heat-Resisting Steel (Austenitic related)

JIS
SUH31
SUH35
SUH36
SUH37
SUH38
SUH309
SUH310
SUH330
SUH660
SUH661

- Heat-Resisting Steel (Ferritic related)

JIS
SUH21
SUH409
SUH446

- Heat-Resisting Steel (Martensitic related)

JIS
SUH1
SUH3
SUH4
SUH11
SUH600
SUH616

● Steel

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/ASTM	BS	DIN	NF	ГОСТ
Carbon Tool Steel	SK140 (SK1)	T13				C140E3U	У13
	SK120 (SK2)	T12	W1-11½			C120E3U	У12
	SK105 (SK3)	T11	W1-10		C105W1	C105E2U	У11
	SK95 (SK4)	T10	W1-9			C90E2U	У10
	SK85 (SK5)	T8Mn T9	W1-8		C80W1	C90E2U C80E2U	У8Г У9
	SK75 (SK6)	T8			C80W1	C80E2U C70E2U	У8
	SK65 (SK7)	T7			C70W2	C70E2U	У7
High Speed Tool Steel	SKH2	W18Cr4V	T1	BT1		HS18-0-1	Р18
	SKH3	W18Cr4VCo5	T4	BT4	S18-1-2-5	HS18-1-1-5	Р18К5Ф2
	SKH4	W18Cr4V2Co8	T5	BT5		HS18-0-2-9	Р18К5Ф
	SKH10	W12Cr4V5Co5	T15	BT15	S12-1-4-5	HS12-1-5-5	
	SKH51	W6Mo5Cr4V2	M2	BM2	S6-5-2	HS6-5-2	Р6М5
	SKH52	CW6Mo5Cr4V2 W6Mo5Cr4V3	M3-1				Р6М5Ф3
	SKH53	CW6Mo5Cr4V3	M3-2		S6-5-3	HS6-5-3	Р6М5Ф3
	SKH54		M4	BM4		HS6-5-4	
	SKH55	W6Mo5Cr4V2Co5 W7Mo5Cr4V2Co5	M35 M41	BM35	S6-5-2-5	HS6-5-2-5HC	Р6М5К5
	SKH56		M36				
	SKH57			BT42	S10-4-3-10	HS10-4-3-10	
	SKH58	W2Mo9Cr4V2	M7			HS2-9-2	
	SKH59	W2Mo9Cr4VCo8	M42	BM42	S2-10-1-8	HS2-9-1-8	
Alloy Tool Steel	SKS11		F2				ХВ4
	SKS2				105WCr6	105WCr5	ХВГ
	SKS21	W					
	SKS5						
	SKS51		L6				
	SKS7						
	SKS8	Cr06				C140E3UCr4	13Х
	SKS4	5CrW2Si 6CrW2Si	S1				6ХВ2С 5ХВ2СФ
	SKS41	4CrW2Si	S1				4ХВ2С
	SKS43		W2-9½	BW2		100V2	
	SKS44		W2-8				
	SKS3	9CrWMn					9ХВГ
	SKS31	CrWMn			105WCr6	105WCr5	ХВГ
	SKS93						
	SKS94						
	SKS95	8MnSi					
	SKD1	Cr12	D3	BD3	X210Cr12	X200Cr12	Х12
	SKD10	Cr12Mo1V1	D2		X153CrMoV12		Х12МФ
	SKD11	Cr12MoV	D2	BD2	X153CrMoV12	X160CrMoV12	
	SKD12	Cr5Mo1V	A2	BA2		X100CrMoV5	
	SKD4					X32WCrV3	
	SKD5	3Cr2W8V	H21	BH21	X30WCrV9-3	X30WCrV9	
	SKD6	4Cr5MoSiV	H11	BH11	X38CrMoV51	X38CrMoV5	4Х5МФС
	SKD61	4Cr5MoSiV1	H13	BH13	X40CrMoV51	X40CrMoV5	4Х5МФ1С
	SKD62		H12	BH12		X35CrWMoV5	3Х3М3Ф
	SKD7	4Cr3Mo3SiV	H10	BH10	X32CrMoV33	32CrMoV12-18	
	SKD8		H19	BH19			
	SKT3					55CrNiMoV4	
	SKT4	5CrNiMo		BH224/5	55NiCrMoV6	55NiCrMoV7	5ХНМ

Material Cross Reference Table

● Steel

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/ASTM	BS	DIN	NF	ГОСТ
Spring Steel	SUP3		1075 1078				75 80 85
	SUP6	55Si2Mn			56SiCr7	60Si7	60С2
	SUP7	60Si2Mn 60Si2MnA	9260		61SiCr7	60Si7	60С2Г
	SUP9	55CrMnA	5155		55Cr3	55Cr3	
	SUP9A	60CrMnA	5160		55Cr3	60Cr3	
	SUP10	50CrVA	6150	735A51, 735H51	50CrV4	51CrV4	ХФА50ХГФА
	SUP11A	60CrMnBA	51B60		51CrV4		50ХГР
	SUP12		9254	685A57, 685H57	54SiCr6	54SiCr6	
	SUP13	60CrMnMoA	4161	705A60, 705H60	60CrMn3-2	60CrMo4	
Free Cutting Carbon Steel	SUM11		1110				
	SUM12	Y12	1108				
	SUM21		1212				
	SUM22	Y15	1213	(230M07)	9SMn28	S250	
	SUM22L	Y12Pb	12L13		9SMnPb28	S250Pb	
	SUM23		1215				
	SUM23L						
	SUM24L	Y15Pb	12L14		9SMnPb28	S250Pb	
	SUM25				9SMn36	S300	
	SUM31		1117		15S10		
	SUM31L						
	SUM32	Y20		210M15, 210A15		(13MF4)	
	SUM41	Y30 Y35	1137			(35MF6)	
	SUM42	Y40Mn	1141			(45MF6.1)	
	SUM43		1144	(226M44)		(45MF6.3)	
High Carbon Chromium Bearing Steel	SUJ1	GCr4	51100				
	SUJ2	GCr15	52100		100Cr6	100Cr6	ШХ15
	SUJ3	GCr15SiMn	ASTM A 485 Grade 1				
	SUJ4	GCr15SiMo					
	SUJ5	GCr18Mo					

● Cast Iron

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	AISI/SAE	BS	DIN	NF	ГОСТ
Gray Cast Iron	FC100	HT100	NO.20	100	GG10		СУ10
	FC150	HT150	NO.30	150	GG15	FGL150	СУ15
	FC200	HT200	NO.35	200	GG20	FGL200	СУ20
	FC250	HT250	NO.45	250	GG25	FGL250	СУ25
	FC300	HT300	NO.50	300	GG30	FGL300	СУ30
	FC350	HT350	NO.60	350	GG35	FGL350	СУ35
					GG40	FGL400	СУ40
Nodular Cast Iron	FCD400	QT400-18	60-40-18	400/17	GGG40	FGS370-17	ВУ40
	FCD450	QT450-10	65-45-12	420/12		FGS400-12	ВУ45
	FCD500	QT500-7	70-50-05	500/7	GGG50	FGS500-7	ВУ50
	FCD600	QT600-3	80-60-03	600/7	GGG60	FGS600-2	ВУ60
	FCD700	QT700-2	100-70-03	700/2	GGG70	FGS700-2	ВУ70
	FCD800	QT800-2	120-90-02	800/2	GGG80	FGS800-2	ВУ80
		QT900-2		900/2			ВУ100

● Non-ferrous Metals

Classification	Japan	China	USA	UK	Germany	France	Russia
	JIS	GB	ASTM	BS	DIN	NF	ГОСТ
Aluminum Alloys		1A99	1199		A199.99R		A99
		1A97			A199.98R		A97
		1A95					A95
	A1080	1A80		1080(1A)	A199.90	1080A	A8
	A1050	1A50	1050	1050(1B)	A199.50	1050A	A5
	A5052	5A02	5052	NS4	AlMg2.5	5052	Amg
		5A03		NS5			AMg3
	A5056	5A05	5056	NB6	AlMg5		AMg5V
	A5556	5A30	5456	NG61		5957	
	A2117	2A01	2036		AlCu2.5Mg0.5	2117	D18
	A2017	2A11		HF15	AlCuMg1	2017S	D1
	A2024	2A12	2124		AlCuMg2	2024	D16AVTV
		2B16	2319				
	A2N01	2A80					AK4
	A2018	2A90	2218				AK2
	A2014	2A14	2014		AlCuSiMn	2014	AK8
	A7075	7A09	7175		AlZnMgCu1.5	7075	V95P
Aluminum Alloy Casting	AC4C	ZAlSi7Mn	356.2	LM25	G-AlSi7Mg		
	AC3A	ZAlSi12	413.2	LM6	G-Al12	A-S12-Y4	AL2
		ZAlSi5Cu1Mg	355.2				AL5
	AC8A	ZAlSi2Cu2Mg1	413.0		G-Al12(Cu)		
		ZAlCu5Mn					AL19
		ZAlCu5MnCdVA	201.0				
		ZAlMg10	520.2	LM10	G-AlMg10	AG11	AL8
		ZAlMg5Si			G-AlMg5Si		AL13

Insert Grades Cross Reference Table

CVD Coated Carbide (Turning)

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P01	CA510 CA5505	JC110V	HG8010 HC5000 HG3305	UE6105 UE6005 UE6015		GC4305 GC4005 GC4205	TP0501 TP0500 TP1000	AC700G AC810P	T9005 T9105	KCP05B KCP05 KC9105	IC8150 IC9150
	P10	CA510 CA515 CA5505 CA5515	JC110V JC215V	GM10 GM20 GM8015 HG8010	MC6015 UE6105 UE6110 UE6005 UE6010 UE6020	CP2 CP5 CP7	GC4205 GC4015 GC3115 GC4215 GC4315	TP1501 TP1000 TP1500 TP100	AC700G AC2000 AC810P AC820P AC8015P AC8025P	T9005 T9105 T9015 T9115 T9215	KCK05 KCP10B KCP10 KC9010 KC9110	IC8150 IC9150 IC9250
	P20	CA025P CA525 CA5515 CA5525 CR9025	JC110V JC215V	GM20 GM8020 HG8025	MC6025 UC6010 UE6110 UE6020	CP2 CP5 CP7	GC4025 GC4215 GC4220 GC4225 GC4325	TP2501 TP2000 TP2500 TP200	AC2000 AC3000 AC820P AC830P AC8025P	T9015 T9115 T9025 T9125 T9225	KCP25B KCP25 KC9125 KC9225 KC9325	IC8250 IC9125 IC9250 IC9350
	P30	CA025P CA525 CA5525 CA530 CA5535 CR9025	JC215V JC325V	GM25 GM8035 HG8025	MC6025 UE6020 MC6035 UE6035 UH6400		GC4225 GC4230 GC4235 GC2135 GC4335	TP2501 TP3501 TP2500 TP2000 TP3500 TP200	AC3000 AC630M AC830P ACP100 AC8035P	T9125 T9035 T9135 T3130	KCP30B KCP30 KC9040 KC9140	IC635 IC8350 IC9350
	P40	CA530 CA5535	JC325V JC450V JC540V	GX30	MC6035 UE6035 UH6400		GC4035 GC4235 GC4240 GC4335	TP40	AC630M AC830P ACP100	T9035 T3130	KCP40B KCP40 KC9140 KC9240	IC635
M (Stainless Steel)	M10	CA6515	JC605X JC110V	GM10 HS9105	MC7015 US7020	CP2 CP5	GC2015 GC2220	TP1500 TP100	AC610M AC6020M	T9015 T9115	KCM15B KCM15 KC9010 KC9110 KC9210	IC8250 IC9250 IC9350 IC6015
	M20	CA6525	JC110V JC215V	GM8020 HG8025 HS9115	US7020 MC7025	CP2 CP5	GC1515 GC2015 GC2025 GC2220	TM2000 TP200	AC6020M AC6030M AC610M AC630M AC830P	T6020 T6120 T9115 T9125	KCM25B KCM25 KC9025 KC9125 KC9225	IC8350 IC9250 IC9350 IC6025
	M30		JC215V JC325V JC525X	GM25 GM8035	MC7025 US735		GC2040 GC235	TM4000 TP3501 TP300	AC6030M AC630M AC830P	T6030 T6130 T9125	KCM35B KCM35 KC9240	IC8350 IC9350 IC4050
	M40		JC525X	GX30	US735			TP40			KC9045 KC9245	IC635
K (Cast Iron)	K01	CA310 CA4505 CA5505	JC105V JC605W JC050W	HG3305 HG3315 HX3505 HX3515	MC5005 UC5105 UC5015	CP1	GC3205 GC3210	TK0501 TK1000 TK1001	AC405K AC410K AC300G AC4010K	T5105 T5010	KCPK05 KC9315 KCK05B KCK05	IC5005 IC428 IC9007 IC9150
	K10	CA310 CA315 CA4505 CA4515 CA5505	JC050W JC110V JC605W JC108W	GM8015 HX3515 HG8010 HG3315	UC5015 UC5105 UC5115 UE6010 MC5015	CP1 CP2 CP5	GC3205 GC3210 GC3215 GC3115	TK1000 TK2000 TK2001 MK1500	AC4010K AC410K AC415K AC700G AC4015K	T515 T5105 T5115 T5010	KC9110 KC9120 KC9315 KCK15B KCK15	IC5010 IC418 IC428 IC9015 IC9007
	K20	CA315 CA320 CA4515	JC110V JC215V JC108W JC605W	GM8020 HG8025	MC5015 MY5015 UE6010 UC5115 UE6110	CP2 CP5	GC4225 GC3215 GC3220 GC3225	TK2000 TX150 TP200	AC4015K AC420K AC700G AC820P	T515 T5115 T5125 T5020	KC9125 KC9320 KC9325 KCK20B KCK20	IC418 IC9015
	K30	CA320	JC215V	GM25	UE6110		GC3040 GC4335	TP2500 TP200		T5125 T9125	KCP25B KC9320	

PVD Coated Carbide (Turning)

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification	Symbol	Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
P (Steel)	P01	PR1705	JC5003						ACZ150		KC5510	
	P10	PR1705 PR930 PR1025 PR1115 PR1215 PR1225 PR1725	JC5003 JC5030	CY15 CY150 IP2000	MS6015 VP10MF	VM1 TM1 TA1 TAS DT4 DM4	GC1025	CP200	ACZ150 ACZ310 AC520U	AH710	KC5010 KC5510 KU10T	IC507 IC807 IC907
	P20	PR930 PR1025 PR1115 PR1215 PR1225 PR1625 PR1725	JC5015 JC5030 JC5040	CY150 IP2000	MS6015 VP10RT VP15TF VP20MF UP20M VP20RT	QM1 VM1 TA1 TAS	GC1020 GC1025 GC4125 GC1125	CP250	ACZ310 ACZ330 AC520U	AH7025 AH710 AH725 AH730 SH725 SH730	KC5025 KC5525 KC7215 KC7315 KU25T	IC507 IC907 IC908
	P30	PR1025 PR1225 PR1535	JC5015 JC5040	CY250 CY9020 HC844 IP3000	VP10RT VP15TF VP20MF UP20M	ZM3 QM3 TAS	GC1125 GC1145 GC1115 GC1105	CP500	ACZ330 ACZ350 AC530U AC1030U	GH330 AH120 AH740 AH9030	KC7015 KC7020 KC7235 KU25T	IC328 IC928 IC3028
	P40	PR1535	JC5040	CY250 HC844		ZM3 QM3 TAS	GC1145 GC2145	CP600	ACZ350	AH140 AH740 J740	KC7030 KC7040 KC7140	IC328 IC3028
M (Stainless Steel)	M10	PR1025 PR1215 PR1225	JC5003	IP050S JP9105	VP10MF VP10RT	VM1 TM1 TA1	GC1005 GC1025 GC1105 GC15	TS2000 CP200 CP250	EH510Z ACZ150 AC510U	AH710	KC5010 KC5510 KC6005 KCU10	IC507 IC520 IC807 IC907
	M20	PR930 PR1025 PR1125 PR1215 PR1725 PR1225 PR1515	JC5015 JC5030 JC5040 JC8015 JC5118	IP100S GX30 JP9115	VP10RT VP15TF VP20MF UP20M VP20RT	ST4 QM1 VM1 TA1 TAS DT4 DM4	H5D6 GC1025 GC1115 GC4125 GC1125 GC30	TTP2050 TS2500 CP200 CP250 CP500	EH520Z ACZ150 ACZ310 AC520U AC1030U	AH630 AH725 AH730 GH330 GH730 SH725 SH730	KC5025 KC5525 KC7020 KC7025 KCU25	IC308 IC507 IC907 IC908 IC3028
	M30	PR1125 PR1535	JC5015 JC5030 JC5040 JC5118	CY250 CY9020	VP15TF VP20MF UP20M MP7035	ST4 ZM3 QM3 TAS	GC1020 GC2035 GC2030	CP500	ACZ330 ACZ350 AC530U AC6040M	AH6030 AH120 AH725	KC7030 KC7225	IC908 IC1008 IC1028 IC3028
	M40	PR1535	JC5118		MP7035	ZM3 QM3 TAS	GC2145 GC1145	CP600	AC6040M ACZ350	J740 AH140 AH645		IC228 IC928 IC328
K (Cast Iron)	K01		JC5003						EH10Z	AH110	KC5515	IC910
	K10	PR905 PR1215	JC5003 JC5015	CY100H CY10H	VP05RT	TA1 TM1	GC1010	TS2000 CP200	EH10Z EH510Z AC510U	GH110 AH110	KC5010 KC7210	IC807 IC910 IC507 IC908
	K20	PR905 PR1215	JC5015	IP2000 CY9020	VP10RT VP15TF VP20RT	QM1 TA1	GC1020 GC1120	TS2500 CP200 CP250	EH20Z ACZ310 AC520U AC530U AC1030U	AH120 AH725	KC5025 KC5525 KC7015 KC7215 KC7315	IC508 IC908
	K30				VP15TF VP20RT	QM3 TA3	GC1030	CP500	ACZ310		KC7225	IC508 IC908
S (Difficult-to-Cut Material)	S01	PR005S	JC5003		MP9005 VP05RT					AH8005 AH905		IC804 IC806
	S10	PR005S PR015S	JC5015 JC8015	JP9105	MP9005 MP9015 VP10RT		GC1105 GC1005 GC1025	CP200 TS2000	AC510U AC5015S	AH8015 AH905 SH730 AH110	KC5010 KC5510 KCU10 KCS10	IC807 IC808 IC907 IC908
	S20	PR015S PR1535	JC5015 JC8015	JP9115	MP9015 MT9015 VP20RT MP9025		GC1025 GC1125	CP250 TS2500	AC510U AC520U AC5025S	AH8015 AH120 AH725	KC5025 KC5525 KCU25	IC806 IC808 IC908
	S30	PR1535			MP9025		GC1125		AC520U	AH725		IC3028

Insert Grades Cross Reference Table

Cermet (Turning)

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P01	TN610 **PV710**	LN10 CX50	CH350	**AP25N** **VP25N** NX1010	T3N T15 **Q15**			T110A T1000A	NS520 **GT530** **GT720** **J530**	KT1120 KT125 HTX	IC20N **IC520N**
	P10	TN610 TN620 TN6020 TN60 **PV710** **PV720** **CCX**	LN10 CX50 CX75 NIT **PX75**	CH350 **CZ25**	NX2525 **AP25N** **VP25N**	T15 **C7Z** **Z15**	CT5015 CT525	TP1020 CM CMP	**T1500Z** **T2000Z** T1200A T1500A	NS9530 NS520 **GT9530** **GT530** **GT730** **AT9530**	**KT315** KT175 HT2 **KTP10**	IC20N **IC520N** **IC530N** IC75T
	P20	**CCX** TN620 TN90 TN6020 **PV720**	CX50 CX75 CX90 NAT **PX90**	CH550 CH7030 **CZ1025** **CZ25**	**MP3025** NX2525 NX3035 **AP25N** **VP45N**	T15 C7X **C7Z**	CT525 CT530 **GC1525**	TP1020 C15M TP1030	T1200A T1500A **T2000Z** **T2500Z** **T3000Z**	NS9530 NS530/730 **GT9530** **GT530/730** **AT9530**	PS5 **KT5020**	IC20N **IC520N** **IC530N** IC75T IC30N
	P30	**PV730**	CX90 CX99 SUZ		NX4545 **VP45N**	N40 C7X	CT530 **GC1525**	TP1030	**T3000Z** T250A	NS740		IC75T IC30N
M (Stainless Steel)	M10	TN620 TN60 TN6020 **PV720**	LN10	CH350	NX2525 **AP25N** **VP25N**	T15 C7X **C7Z** **Z15**	CT5015 CT525	CM CMP	T110A T1000A **T2000Z**	NS520 **J530**	KT1120 **KT315** KT125	IC20N **IC520N**
	M20	TN620 TN90 TN6020 **PV720**	CX50 CX75 **PX75** NIT NAT	CH550 CH7030 **CZ1025**	NX2525 NX3025 **AP25N** **VP25N**	C7X **C7Z** **Q15**	CT530 **GC1525**	TP1020 C15M	T1500A **T2000Z**	NS530 NS730 **GT530** **GT730**	KT175 HT2 PS5 **KT5020**	IC30N **IC530N**
	M30	**PV730**	CX75 CX90 **PX90** CX99 SUZ	**CZ25**	NX4545	C7X		TP1030	**T3000Z** T250A	NS740		
K (Cast Iron)	K01	**PV7005** **CCX**	LN10		**AP25N** **VP25N**	T3N T15 **Q15**			T110A T1000A	NS520	KT1120	
	K10	TN610 **CCX** **PV710** **PV7005**	LN10	CH350	NX2525 **AP25N** **VP25N**	T15 C7X **C7Z** **Z15**	CT5015		T1200A T1500A **T2000Z**	NS530 NS730 **GT530** **GT730**	**KT315** HTX **KTP10**	
	K20		NIT	**CZ25**	NX2525 **AP25N** **VP25N**				**T3000Z**		**KT5020**	

· **Boldface** grade shows PVD Coated Cermet. (CCX is CVD Coated Cermet grade)

Carbide

Classification		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P10		SRT	WS10	STi10T		S1P		ST10P	TX10S	K2885	IC70
	P20		SRT DX30	EX35	STi20 UTi20T		SMA	S10M	ST20E	TX20 TX25	K125M	IC70 IC50M
	P30		SR30 DX30 DX35	EX35 EX40	UTi20T		SM30	S25M	A30N A30 ST30E	TX30 UX30	KMF	IC50M IC54
	P40		SR30 DX35	EX45			S6	S60M	ST40E	TX40	PVA	IC54
K (Cast Iron)	K01		KG03	WH02 WH05	HTi05T		H1P		H1 H2	TH03 KS05F	K68 K10	IC04
	K10	KW10 GW15	KG10 KT9	WH10	HTi10	KM1	H1P H10 HM	890	EH10 EH510	G1F TH10 H10T	KMI K8735 K313	IC20
	K20	GW25	CR1 KG20	WH20	HTi20T UTi20T	KM3	H13A	883 890 HX	G10E EH20 EH520	G2F KS15F KS20	KMF	IC20 IC10
	K30		KG30					883	G3 G10E	G3 UX30	THR	IC10 IC28
V (Wear and Shock Resistant Tool)	V40		G5 GD195	WH50	GTi30				G5	D40		
	V50	VW50	MH3 MH4 GD174 GD201	WH60	GTi35 GTi40 GTi30S				G6	D50		
	V60		MH5 MH7 MH8 GD206	WB60	GTi40S GTi50S				G7 G8	D60		

Coated Carbide (Milling / Drill)

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P10	PR1225	JC5003 JC5030 JC8003 DH103	JP4105 JX1020 JP4005	F7010		GC1025 GC1010		ACP100		KC715M	
	P20	PR1525 PR1225 PR1230 CA520D	DH108 DH110 DH115 JC8015 JC8118	JP4120 JS4045 JP4020 TB6020 JX1015 GX2140	MC7020 MP6120 F7030 UP20M MV1020	TM1 DT4 DM4	GC1130 GC1030 GC4220 GC4020 GC4030 GC4334	MP1500 T250M T25M T20M	ACP200 ACP2000 ACU2500	T313W AH725	KC522M KC525M KCPM20	IC330 IC250 IC520M IC950 IC5400 IC1008
	P30	PR1230 PR1535	JC6235 JC5015 JC5040 JC5240 JC8050 JC7550	CY250 CY9020 TB6045 JX1045 JM4060 GX2160	MP6130 F7030 VP15TF VP30RT	ZM3	GC1130 GC4040 GC4230 GC4330	MP2500 T250M T25M F25M F30M	AC230 ACP300 ACP3000	T3130 GH330 AH120 AH330 AH730 AH3135	KC994M KC725M KC792M KC530M KCPK30 KCPM40	IC330 IC328 IC635 IC830 IC908 IC928
	P40		JC7550 JC5040 JC7560	CY250 HC844 TB6060 JX1060	VP30RT		GC4040 GC4240 GC4340	MP3000 T350M T60M T25M	AC230 ACZ330 ACZ350	AH140	KC735M	IC635 IC928 IC4050
M (Stainless Steel)	M10	PR1225	DH108	CY9020 JX1020 JP4020	F7010		GC1025 GC1030		ACM100 ACM200 EH10Z		KC522M	
	M20	PR1525 PR1225	JC730U JC835S JC8118 JC5015 JC5030 JC5040	PN215 CY150 TB6020 JX1015 CY250	MC7020 MH515 F7030 VP15TF VP20RT MP7030 MP7130	DT4 DM4	GC2030 S30T GC2334 GC2044	MS2050 MP2500 T250M T25M F20M F25M F30M	ACM200 ACP200 EH20Z ACU2500	GH330 AH330 AH120 AH130 AH725 AH3135	KC730M KC525M	IC380 IC908 IC928
	M30	CA6535 PR1535	JC835S JC8015 JC5015 JC5118 JC8050	JM4160 JM4060 TB6045 JX1045 GX2160	F7030 VP30RT MP7140	ZM3	GC1040 GC2040 S40T	T350M T250M F40M	ACM300 ACP300 ACZ350	T3130 AH130	KC994M KC725M KCPK30	IC380 IC328 IC330
	M40		JC7560		VP30RT			MM4500	ACZ350	AH140		IC830
K (Cast Iron)	K01		DH202 DH102	TB6005				MH1000	ACK100	AH110		IC5100 IC4100
	K10	PR1510 PR905 PR1210	DH103 JC8015 JC610 JC605W JC8118	JP4005 CY10H CY100H CY9020	MP8010 MC5020 VP10RT MV1020		GC1010 GC3220 K15W	MK1500 T150M F15M	ACK2000 ACK200 AC211 ACU2500	T1015 T1115 AH110 T1215	KCK15 KC915M	IC5100 IC4010 IC910 DT7150 IC810
	K20	CA420M PR905 PR1210 CA415D	JC605X JC610 JC5015 JC8015 JC8118	TH315 CY150 TB6020 JX1015	VP15TF VP20RT		GC1020 GC3020 K20W/K20D GC3330 GC3334	MP1500 T150M T250M MK2000 MK2050	EH20Z ACZ310 ACK300 ACK3000	AH120 AH725 T1215	KC520M KC920M KC925M KC992M	IC810 IC910 IC928
	K30		JC5080 JC6235				GC3040 GC4040	MK3000 T250M		GH130	KC930M	IC928
S (Difficult-to-Cut Material)	S10	CA6535 PR1535 PR1210	DH202 DH102 DH103 JC7518	PCS08M PTH13S JS1025	MP9120 VP15TF		GC1030 GC1025 GC1010	MS2050	ACM100 ACM200 ACK300		KC510M	IC903 IC807 IC808 IC908
	S20	CA6535 PR1535 PR1210	JC8118 IC5015 JC8050 JC7560 JC7550	CY100H CY10H	MP9120 VP15TF MP9130 MP9030		GC1030 GC2030 S30T GC1130 GC4344	MP2050	ACU2500 ACM200		KC525M	IC903 IC807 IC808 IC908 IC830 IC928
	S30	PR1535	JC8050 JC7560		MP9140		GC2040 S40T	F40M	ACM300		KC725M KCSM40	IC328 IC330

Insert Grades Cross Reference Table

Cermet (Milling)

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
P (Steel)	P10	TN60 TN620M **PV60M**	NIT CX75	CH550 MZ1000	NX2525			C15M		NS530 NS730	KT530M KT195M	
	P20	TN620M TN100M TN60 **PV60M**	NAT CX75 CX90	CH570 CH7030	NX2525 MX3020	C7X C7Z	CT530	C15M MP1020	T2500A T250A T1500A	NS530 NS730 NS740	HT7 KT530M KT605M	IC30N
	P30		CX90 CX99 SC30	CH7035	NX4545 MX3030				T4500A	NS540		IC30N
M (Stainless Steel)	M10	TN60 TN620M **PV60M**		MZ1000	NX2525			C15M				
	M20	TN620M TN100M TN60 **PV60M**	NIT CX75 NAT	CH550 CH570 CH7030	NX2525		CT530	C15M	T2500A T250A	NS530	KT7 KT530M KT605M	IC30N
	M30		CX75 CX90 CX99 SC30		NX4545				T4500A	NS740 N308		
K (Cast Iron)	K01		LN10									
	K10	**PV60M**	LN10 CX75	MZ1000 CH550	NX2525							IC30N
	K20		NIT	CH7030 CH7035	NX2525							

· **Boldface** grade shows PVD Coated Cermet.

Ceramic

Classification		Kyocera	Dijet	Nippon Tungsten	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
K (Cast Iron)	K01	KA30 A65 KT66 **PT600M** **CS7050** KS6015		NPC-H2 NPC-A2		SE1 HC1 HC2 HC5 HC6 HW2	CC620 CC650		NB90S NB90M WX120	TZ120	KW80 KY1615 AC5	IN11 IS6
	K10	KS6015 A65 KT66 **A66N** **PT600M** **CS7050** KS6050		NX **NXA** Whiskal WIN		WA1 HC2 HC6 HC7	CC6090 CC6190 **GC1690**		WX120 **NS260C**	LX11 LX21	KYK10 **KYK25** KB90 KY1320 KY3000 **KY3400**	IN420 IN22 IN23 IS80
	K20	KS6050				SX6 SX9 **SP9**	CC6090 CC6190 **GC1690**		WX120	WG300 FX105 CX710	KYK35 **KY3400** KY3500	IS8
S (Difficult-to-Cut Material)	S01						CC650				KY2100	
	S10	CF1 KS6030 KS6040	CA200	Whiskal WIN		JX1 JP2 WA1 WA5 SX3 SX7 SX9	CC670 CC6060 CC6065 CC6160		WX120	WG300	**KYS25** KY4300 KY1525 KY1540	IS25 IS9
	S20					JX3	CC6220 CC6230		WX120		KYS30	IS35 IW7
H (Hard Materials)	H01	A65 KT66 **A66N** **PT600M**		NPC-A2		HC4 HC7 **ZC7**	CC650 CC670 CC6050		**NB100C**	LX11 LX21	**KY4400**	
	H10	A65 KT66 **A66N** **PT600M**		NPC-A2 Whiskal WIN		**ZC7** WA1 WA5	CC670			WG300	KY4300	

· **Boldface** grade shows PVD Coated Ceramic.

CBN

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
K (Cast Iron)	K01	KBN475	JBN795		**BC5110**	B20 B22 B30	CB7525 CB50 CB7050	**CBN050C** **CBN300P**	BN500 **BNC500**	BX910 BX930 BX950		IB50 IB85
	K10	**KBN60M** **KBN900**	JBN330	BH200	MB710 MB5015 MB4020	B22 B23	CB50 CB7050	CBN20 CBN200 CBN300	BN600 BN700 BN7000	BX950 **BXC90** BX470	KB1630 KB1345 **KB9610**	IB55 IB90
	K20	**KBN900**		BH250	MB4120 MBS140 **BC5030**	B16 B40		CBN350 CBN500 CBN600	BN7000 BNS800	BX950 **BXC90** BX90S	**KB9640**	
H (Hard Materials)	H01	KBN510 **KBN05M** **KBN10M**	DH102		**BC8105** **BC8110** **MBC010** MB810	B24 B52 **B5K**	CB20	**CBN050C** CBN010 CBN10 CBN100	BN1000 BNX10 **BNC100** **BNC160** **BNC2010**	BXA30 BX310 **BXC30** **BXM10**	KB1610	IB20H **IB25HC** IB50
	H10	KBN510 KBN525 **KBN05M** **KBN10M** **KBN25M**	JC6102 JC8003 JBN500 JBN300 JBN330	BH200	**BC8120** **MBC020** **BC8020** MB8025 MB825	B24 B36 B54 B52 **B5K**	CB7015 CB7050 CB50 **CB7105**	CBN150 CBN060K CBN200 **CBN160C**	**BNC160** BNX20 BN2000 **BNC200** **BNC2020**	**BXM10** BXA40 BX330 BX360 **BXC50** **BXA20**	KBH10 **KBH10B** KB1615 KB1625 KB5610 **KB9610**	**IB10HC** IB50
	H20	**KBN25M** **KBN35M** **KBN900**	JC8003 JC5015 JBN245	BH250	**BC8120** **MBC020** **BC8020** MB8025	B22 B36 **B6K**	CB7025 CB7525 **CB7115**	CBN350 **CBN300P** **CBN400C** CBN500 **CH2540**	BNX25 BN350 **BNC300**	BX380 **BXC50** **BXM20** **BXA20**	KBH20 **KBH20B** KB1340 **KB5625** **KB9640**	IB55 **IB25HA**
	H30	**KBN35M** **KBN900**	JBN245	BH250	MB835 **BC8130**	B40 **B6K**	**CB7125** CB7525 **CB7135**	**CH3515**	**BNC300** BN350	BX380 **BXC50** **BXM20** **BXA20**	KB5630 **KB9640**	IB55 **IB25HA**
Sintered Steel	-	KBN65B KBN570 **KBN65M** **KBN70M**	JBN795 JBN500		MB4120 MB4020			CBN200	BN350 BN7000 BN7500	BX450 BX470 BX480	**KB5630**	IB05S IB10H IB10S

· **Boldface** grade shows PVD Coated CBN.

PCD

Classification		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Classification	Symbol											
N (Non-ferrous Metals)	N01	KPD001	JDA30 JDA735		MD205	PD1	CD05 CD10	PCD05 PCD10	DA90 DA1000 DA2200	DX180 DX160	PD100 KD1400 KD1405	
	N10	KPD001 KPD010 KPD230 KPD250	JDA40 JDA745		MD220	PD2	CD10	PCD10 PCD20	DA150 DA1000 DA2200	DX140	KD100 KD1400 KD1415	ID5
	N20	KPD001 KPD010 KPD230 KPD250	JDA10 JDA715		MD230			PCD30 PCD30M	DA1000 DA2200	DX110 DX120	KD1425	

Molded Chipbreaker Cross Reference Table

Negative Inserts

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Cutting Range		Kyocera		Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
		General Chipbreaker	Chipbreaker for Sticky Material / Soft Steel										
Carbon Steel / Alloy Steel	Finishing (With Wiper Edge)	WF WP	-	-	-	SW	-	WL WF	W-FF2 W-MF2	SEW LUW	AFW FW	FW	WF
	Finishing - Medium (With Wiper Edge)	WE WQ	-	-	-	MW	-	WM WMX	W-M3 W-M5	GUW	ASW SW	MW	WG
	Finishing	DP GP PP	XF XP	F1 FA FT PF	BE BH FE	F FH FS FY PK FP	UL WM ZF1	XF QF	FF1	FP FB FE SP FA FL LU	TF 01 AS TSF	FF UF FS LF	F3P SF PF
	Finishing - Medium	HQ PQ CQ CJ VC VF	XQ	UA UT	AB B CE CT	SH C SA LP SY	WV WR	LC PF	FF2 MF2	SU EX SJ SX UJ SE	TS NS CB 11 17 27 ZF	K RP FN FM	NF SM
	Medium - Roughing	PG GS PS	XS	UR UB	AE DE AH	MV MP MA MH	Z5 ZW1	XM QM SM SMC PM PMC	M3 MF3	UA UG GE GU	AM DM NM TM ZM	MN	M3P TF PP
	Medium - Roughing High Feed Rate	PT GT	-	GC PQ	AR AY	GH RP	GS	MR XMR	M5 MR5 MR6	MU UX ME	TH 32Y 32 37	RP RN	R3P NR
	Roughing	Standard PH	-	GG LG GQ	RE	MT Standard	G	Standard 23 HM	MR7	MC MU MX UZ	31 33 F-K THS	PR MG	GN
	Roughing Single-sided High Feed Rate	PX	-	GS RM UC UP UD	H HX HE TE UE	HV HR HX HZ HL HM	-	QR PR HR	R4 R5 R6 R7 RR6 R57 RP	HG HP MP HF	TU TRS 57 65 TUS	RP RH RM RW	TNM NM
Stainless Steel, Difficult-to-Cut Material	Finishing	MQ SQ	-	SF	BH MP	FS SH FJ LM LS	ZF1	MF	M1	SU EF	SF SS	FP	F3M VL F3S
	Medium - Roughing	MS MU TK SG SX	-	GP SZ	DE SE PV VI	MS MA GM MJ MM ES MH GH GJ RM RS	ZP WS	MM MMC MR XMR SM SMR SF SGF SMC MRR	MF1 MF3 A3 A5 M5 56 R8 RR9 MF4	EG EX MU UP EM	HMM SM SA S SH HRM HPF	P MP MS UP	TF PP M3M R3M
Cast Iron	Medium	KQ KG C Standard	-	-	AH VA VY	LK MF Standard	-	KF KM	-	UZ UX UJ	Standard 33 CF	FN	GN
	Roughing	KH GC ZS	-	-	-	GH RK	-	KR KRR	MR9	GZ	CM CH	RP UN	NR
Non-ferrous Metals	Medium - Roughing	AH	-	-	-	-	-	AL	95	AG	P	GP MS	PP

Positive Inserts

Cutting Range		Kyocera		Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
		General Chipbreaker	Chipbreaker for Sticky Material / Soft Steel										
Carbon Steel / Alloy Steel	Minute ap	CF	-	-	-	-	-	-	-	-	01	-	-
	Finishing (With Wiper Edge)	WP	-	-	-	SW	-	WF WK	W-F1 W-F2	LUW SDW	SW	FW	WF
	Finishing	PF DP GP PP VF	XP	ASF	-	FV SQ FP SMG	AZ3 AMX AZ7	PF UF XF	FF1	FB GU FC FK FP LU	PF PSF 23	11 GF UF FP	PF SM
	Finishing - Medium (1)	HQ	XQ	ACB FT	JE	MQ MV LP	AF1	PM UM SMC	F1 M3	LB SF SU SS	PS PSS 24	LF	14
	Finishing - Medium (2)	GK	-	BM	JQ	No Indication	QD CL	PF PMC XM	MF2 M5	US GU	-	-	F3P
	Medium	Standard	-	-	J	MP Standard	AM3	PR UR KM XR	F2	MU SC	PM	GM MP MR	Standard
Stainless Steel, Difficult-to-Cut Material	Finishing - Medium	MQ	-	-	MP	FM FV SV LM LS MS	-	MF MMC SM MR	-	LU	PSS JS PF PSF PS PM	FW FP MW	PF WF F2M
Non-ferrous Metals	Finishing - Medium	AP AH	-	ALU	-	AZ	-	AL	AL	AG AW	AL	HP	AF AS

Positive Inserts (for Automatic Lathe)

Cutting Range		Kyocera	Dijet	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy	Kennametal	Iscar
Carbon Steel / Alloy Steel	Minute ap	CF	-	-	-	-	-	-	-	01	-	-
	Finishing	PF CK GF SKS	ASF	JQ	FP FV SMG LS-P	AZ7 AMX ZR	PF XF	FF1	SI FC	PF	11 UF FP	PF SM
	Finishing - Medium	GQ SK	ACB FT	JE	LP AM MV	AM3 YL	PM XM	F1 MF2	SU	PS	LF	14
	Medium	GK	-	J	MP Standard	QD CL	PR	F2	SC	PM	MF MP	Standard
Stainless Steel	Finishing	MQ	-	MP	FM FV SV LM	-	MF	-	LU	JS PF PSF	FW FP MW	WF
Non-ferrous Metals	Finishing - Medium	AP AH	ALU	-	AZ	-	AL	AL	AG AW	AL	HP	AF AS

Milling Insert Description Cross Reference Table

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

Kyocera	Class	Applications	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	Sandvik	Sumitomo	Tungaloy	Iscar
SDMR1203AUER-H SDKR1203AUEN-S	M K	Steel	SDKR42TN	(SDNR1203AEEN-JS)		SDMR1203AEEN SDMR1203AETN	SDMR1203AETN-MJ SDKR1203AESR-MJ SDKR1203AETN-MJ SDKR1203AEPN-MS SDKR42ZSR-MJ SDKR42ZPN-MS	SDKR1203AUTR-HS SDKR1203AUN-76
SDKN1203AUTN	K		SDK42TN-C9	SDKN1203AEN SDKN1203AETN (SDNN1203AETN1)		SDKN42MT (SDNN1203AETN)	SDKN1203AETN-12 SDKN42ZTN	SDKN1203AETN
SDKN1203AUFN	K	Cast Iron	SDK42FN-C9			SDKN42M (SDNN1203AEEN)	SDKN1203AEFN-12 SDKN42ZFN	
		Non-ferrous Metals				SDKN42M	(SDCN1203AEFN-D) (SDCN42ZFN-DIA)	
SDKN1504AUTN	K	Steel	SDK53TN-C9	SDKN1504AEN SDKN1504AETN		SDKN53MT	SDKN1504AETN SDKN53ZTN	SDKN1504AETN
SEMR1203AFER-H SEKR1203AFEN-S	M K	Steel	SEKR42TN	(SEER1203AFEN-JS)	SEKR1203AZ-WM (SEER1203AZ-WL)	SEMR1203AFEN (SEER1203AFEN)	SEMR1203AFTN-MJ SEKR1203AFSR-MJ SEKR1203AFTN-MJ SEKR1203AFPN-MS	SEKR1203AFTR-HS SEKR1203AFR-HS SEKR1203AFN-76 SEKR1203AF-N-42
SEEN1203AFTN	E		SEE42TN-C9	SEEN1203AFTN1		SEEN42MT	SEEN1203AFTNCR-14	
SEKN1203AFTN	K		SEK42TN-C9	SEKN1203AFTN1 (SENN1203AFTN1)	SEKN1203AZ (SEMN1203AZ)	SEKN42MT (SENN1203AFTN)	SEKN1203AFTN SEKN1203AFTN-16 SEKN42AFTN SEKN42AFTN16	
SEKN1203AFFN	K	Cast Iron	SEK42FN-C9	(SEEN1203AFFN1)	SEKN1203AZ (SEMN1203AZ)	SEKN42M (SENN1203AFEN)	SEKN1203AFFN SEKN42AFFN	
SEEN1203AFFN	E	Non-ferrous Metals	SEE42FN-C9	(SECN1203AFFR1)				
SEKN1203EFTR	K	Steel	SEK42TR-G3	SEKN1203EFTR1	(SECN1203EER)		SEKN1203EFTR (SECN1203EFTR) (SEEN1203EFTR) (SECN42EFTRCR) (SEEN42EFTRCR)	
SEKN1504AFTN	K	Steel	SEK53TN-C9		SEKN1504AZ	SEKN53MT		SEKN1504AFTN
SPEN1203EESR	E	Cast Iron	(SPK42FR-A3E)	SPEN42EFSR1 SPEN1203EESR1 SPEN1203EEER1 (SPNN1203EEER1)				
SPMR1203EDER-H SPKR1203EDER-S	M K	Steel		(SPER1203EDER-JS)	SPKN1203EDR-WH		SPKR1203EDSR-MJ SPKR42SSR-MJ	SPKR1203EDR-76 SPKR1203EDTR-HS
SPCN1203EDTR	C			(SPEN1203EDR)	(SPAN1203EDR)	SPCH42TR-R	SPCN1203EDTR SPCN42STR	
SPKN1203EDTR	K		SPK42TR-A3	SPKN1203EDR	SPKN1203EDR	(SPCH42TR) (SPCH42TR-R)	SPKN1203EDTR SPKN42STR (SPEN1203EDTR) (SPEN42STR)	SPKN1203EDTR SPKN1203EDTR-42
SPKN1203EDFR	K	Cast Iron	SPK42FR-A3		SPKN1203EDR	(SPCH42R)	SPKN1203EDFR SPKN42SFR	SPKN1203EDFR
SPKN1504EDTR	K	Steel	SPK53TR-A3	SPKN1504EDR	SPKN1504EDR	(SPCH53TR-R)	SPKN1504EDTR SPKN53STR (SPCN1504EDTR) (SPCN53STR)	SPKN1504EDTR
SPKN1504EDFR	K	Cast Iron	SPK53FR-A3			(SPCH53R-R) (SPCH53TR-R)	SPKN1504EDFR SPKN53SFR	SPKN1504EDFR

Note 1. Tolerance class is different for description in ( ).

2. Since edge shape of Milling insert is slightly different by each maker, please adjust edges (Z-axis direction) during operation.

Milling Insert Description Cross Reference Table

· This table is Kyocera's own estimation based on publications and is not authorized by companies mentioned in it.

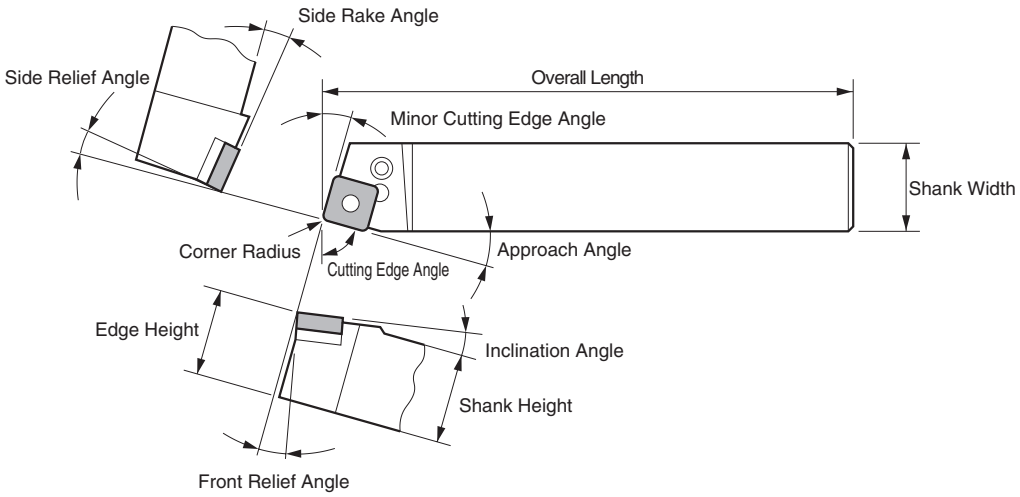
Kyocera	Class	Applications	MOLDINO (Mitsubishi Hitachi Tool)	Mitsubishi	Sandvik	Sumitomo	Tungaloy	Iscar
SPCN1203XPTR	C	Steel	SPC42TR-A5				SPCN1203ZPTR SPCN42ZTR	
SPKN1203XPTR	K	Steel	SPK42TR-A5				SPKN1203ZPTR SPKN42ZTR (SPEN1203ZPTR) (SPEN42ZTR)	
SPKN1203XPFR	K	Cast Iron	SPK42FR-A5				SPKN1203ZPFR SPKN42ZFR	
SPKN1504XETR	K	Steel		SPK53C2SR				
TPMR1603PDER-H	M	Steel		(TPER1603PPER-JS)	(TPKN1603PPR-WH)			(TPKR1603PPTR-HS)
TPKN1603PDTR	K	Steel	TPK32TR-E0 TPK32TR-G0	TPKN1603PPR (TPEN1603PPR)	TPKN1603PPR	TPKN32TR		TPKN1603PPTR
TPKN1603PDFR	K	Cast Iron	TPK32FR-E0		TPKN1603PPR	TPKN32R		TPKN1603PPFR
TPMR2204PDER-H **TPKR2204PDER-S**	M K	Steel		(TPER2204PDER-JS)	TPKN2204PDR-WH		TPMR2204PDSR-MJ TPKR2204PDSR-MJ TPKR43ZSR-MJ	TPKR2204PDTR-HS TPKR2204PD-R-76
TPKN2204PDTR	K	Steel	TPK43TR-E0 TPK43TR-G0	TPKN2204PDR (TPEN2204PDR)	TPKN2204PDR	(TPCH43TR)	TPKN2204PPTR TPKN43ZTR (TPCN2204PPTR) (TPCN43ZTR)	TPKN2204PDTR TPKN2204PDTR-42
TPKN2204PDFR	K	Cast Iron	TPK43FR-E0			(TPCH43R)	TPKN2204PPFR TPKN43ZFR (TPCN2204PPFR) (TPCN43ZFR) (TPEN2204PPTR-16) (TPEN43ZTR)	TPKN2204PDFR
TEMR1603PTER-H	M	Steel		(TEER1603PEER-JS)			(TEKR1603PEPR-MS)	
TEKN1603PTTR	K	Steel	TEK32TR-G0 (TEE32TR-G0)	(TEEN1603PETR1)		TEKN32TR	(TECN1603PETR) (TEEN1603PETR) (TECN32ZTR) (TEEN32ZTR)	
TEKN1603PTFR	K	Cast Iron	TEK32FR-G0 (TEE32FR-G0)	(TEEN1603PEFR1)		TEKN32R	(TEEN1603PEFR) (TEEN32ZFR)	
TEEN1603PTFR	E	Non-ferrous Metals		(TECN1603PEFR1)		TEEN32R	(TECN1603PEFR-D) (TECN32ZFR-DIA)	
TEMR2204PTER-H **TEKR2204PTER-S**	M K	Steel		(TEER2204PEER-JS)			TEKR2204PEPR-MS	
TEEN2204PTTR	E	Steel	TEE43TR-G0E (TEK43TR-G0E)	TEEN2204PETR1		TEEN43TR	TEEN2204PETR (TECN2204PETR) TEEN43ZTR (TECN43ZTR)	
TEKN2204PTTR	K	Steel	TEK43TR-G0E	TEKN2204PETR1		TEKN43TR	(TEEN2204PETR) (TECN2204PETR) (TEEN43ZTR) (TECN43ZTR)	
TEKN2204PTFR	K	Cast Iron	TEK43FR-G0E	(TEEN2204PEFR1)		TEKN43R	(TEEN2204PEFR) (TEEN43ZFR)	
		Non-ferrous Metals		(TECN2204PEFR1)		(TEEN43R)	(TECN2204PEFR-D) (TECN43ZFR-DIA)	
SNCN1204XNTN	C	Steel	SNC43TN-D5	SNC43B2S		(CSN43MT)	SNCN1204ZNTN SNCN43ZTN	
SNKN1204XNTN	K	Steel	SNK43TN-D5	SNK43B2S		(CSN43MT)	SNKN1204ZNTN SNKN43ZTN	
SNMF1204XNTN	M	Steel	(SNKF43TN-D5)	(SNKF43B2S)		(CSNB43MT)	(SNKF1204ZNTN) (SNKF43ZFN)	

Note 1. Tolerance class is different for description in ( ).

2. Since edge shape of Milling insert is slightly different by each maker, please adjust edges (Z-axis direction) during operation.

Terms and Angles of Toolholder

Terms and Angles of Turning Toolholder



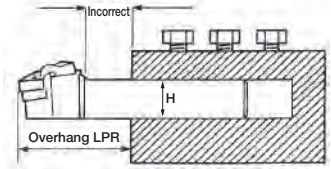
Function of Tool Angle

Tool Angle	Name	Function	Effect
Rake Angle	Side Rake Angle	· Affects cutting force, cutting heat, chip evacuation and tool life.	· If it is positive (+) angle, sharper cutting performance is obtained. (less cutting force, less edge strength) · Positive (+) angle is recommended for easy to machine workpieces or thin workpieces. · Smaller rake angle or negative (-) angle is recommended when a stronger edge is required like scale machining or interrupted machining.
	Inclination Angle		
Relief Angle	Front Relief Angle Side Relief Angle	· Prevents the tool's contact to the workpiece surface, except the cutting edge.	· When it is small, the cutting edge becomes strong, but the wear at relief faces may shorten the tool life.
Cutting Edge Angle	Cutting Edge Angle	· Affects chip control and the direction of cutting force.	· When it is large, chip thickness becomes thick and chip control improves.
	Approach Angle	· Affects chip control and the direction of cutting force.	· When it is large, chip thickness becomes thin and chip control worsens, but cutting force is dispersed and edge strength improves. · When it is small, chip control ability improves.
	Minor Cutting Edge Angle	· Prevents friction between cutting edge and workpiece surface.	· When it is large, edge strength deteriorates.

Toolholder Rigidity

1. Flexure of Toolholder

$$\delta = \frac{4 \times F \times (LPR)^3}{E \times B \times H^3} = \frac{4 \times k \times ap \times f \times (LPR)^3}{E \times B \times H^3}$$



Symbol	Name	Unit
δ (Delta)	Deflection	mm
B	Shank Width	mm
H	Shank Height	mm
E	Young ratio	N/mm²
ap	Depth of Cut	mm
f	Feed Rate	mm/rev
k	Specific Cutting Force	N/mm²
LPR	Overhang	mm
F	Cutting Force	N

(F = k x ap x f)

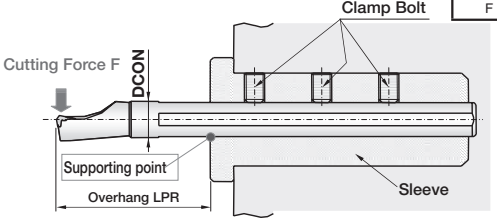
The flexural strength of toolholder will decrease by increasing of shank height by third root and will decrease of reducing overhang by third root. Minimizing toolholder shank overhang as much as possible is important as well as shank's sectional square measure.

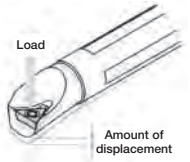
2. Flexure of Boring Bar

$$\delta = \frac{64 \times F \times (LPR)^3}{3 \times E \times \pi \times (DCON)^4} = \frac{64 \times k \times ap \times f \times (LPR)^3}{3 \times E \times \pi \times (DCON)^4}$$

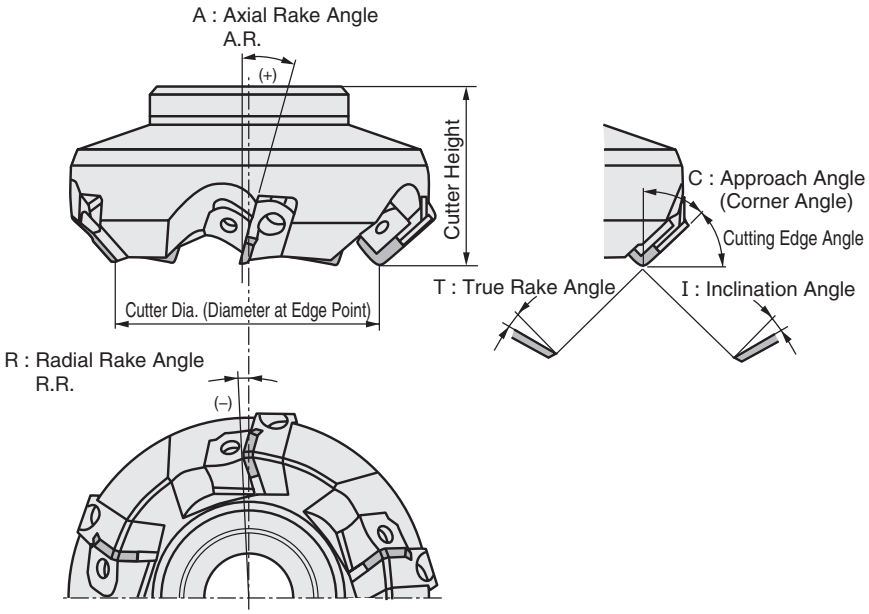
Symbol	Name	Unit
δ (Delta)	Deflection	mm
DCON	Shank Dia.	mm
E	Young ratio	N/mm²
ap	Depth of Cut	mm
f	Feed Rate	mm/rev
k	Specific Cutting Force	N/mm²
LPR	Overhang	mm
F	Cutting Force	N

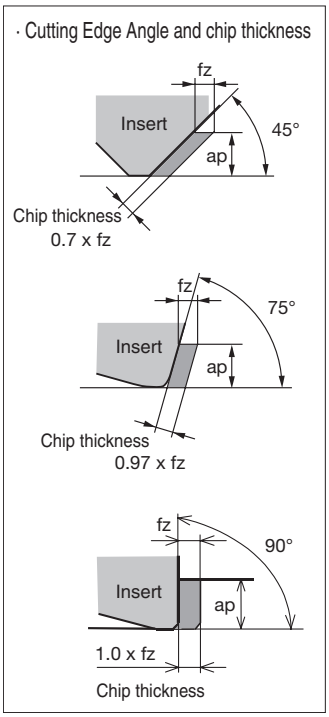
(F = k x ap x f)





Terms and Angles of Milling Cutter





Function of Tool Angle

Symbol	Name	Function	Effect
A	Axial Rake Angle (A.R.)	Controls chip flow direction and cutting force	When it is positive ··· Good cutting performance and less chip welding
R	Radial Rake Angle (R.R.)	Controls chip flow direction and cutting force	When it is negative ··· Good chip evacuation
C	Approach Angle	Controls chip thickness and chip flow direction	When it is large ··· Thinner chip thickness Lower cutting load
T	True Rake Angle	Actual rake angle	When it is positive ··· Good cutting performance and less chip welding, but lower edge strength When it is negative ··· Higher edge strength but easier to weld
I	Inclination Angle	Controls chip flow direction	When it is positive ··· Good chip evacuation Less cutting force Lower edge stability of the corner part

The Formula for True Rake Angle : $\tan T = \tan R \times \cos C + \tan A \times \sin C$

The Formula for Inclination Angle : $\tan I = \tan A \times \cos C - \tan R \times \sin C$

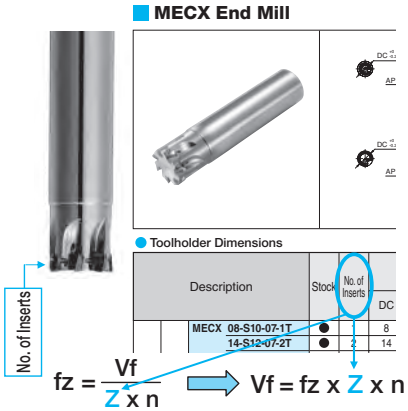
No. of Inserts (Z)

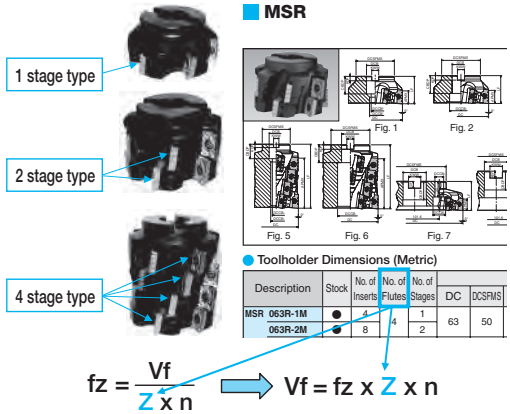
1) If the number of stages is one

If the number of stages is one, it is not indicated on the catalogue. Please use "No. of inserts" of the catalogue for "Z" of the formula to calculate cutting conditions.

2) If the number of stages is more than two

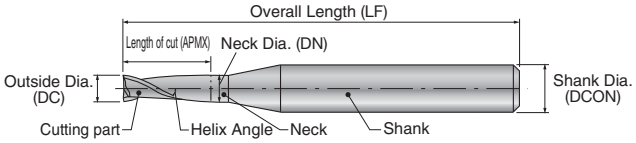
If the number of stages is more than two, it is indicated on the catalogue. Please use "No. of flutes" of the catalogue for "Z" of the formula to calculate cutting conditions.



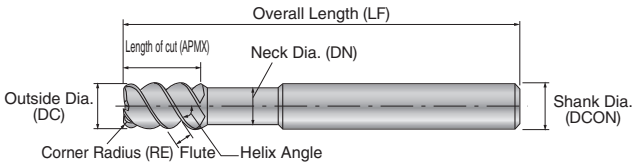


Terms of Solid End Mill

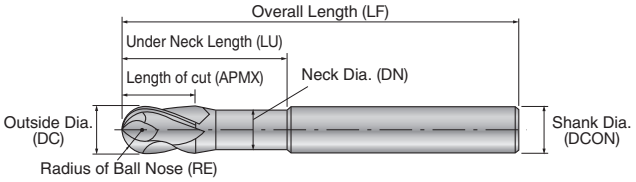
●Square



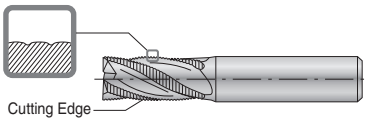
●Radius



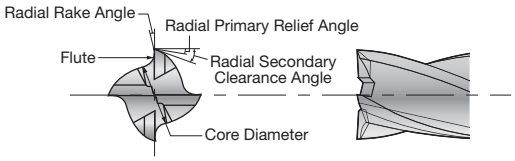
●Ball-nose



●Cutting edge shape



●Cutting Edge Profile



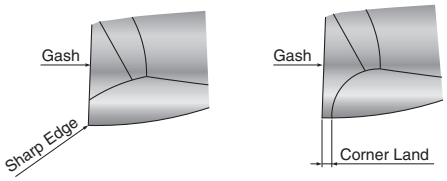
* The illustration shows squared 4 flutes tool

●Core diameter rate (%)=Core Diameter ÷ Outside Dia. x 100

●Cutting Edge With Corner Land

Advanced Fracture Resistance with Corner Land

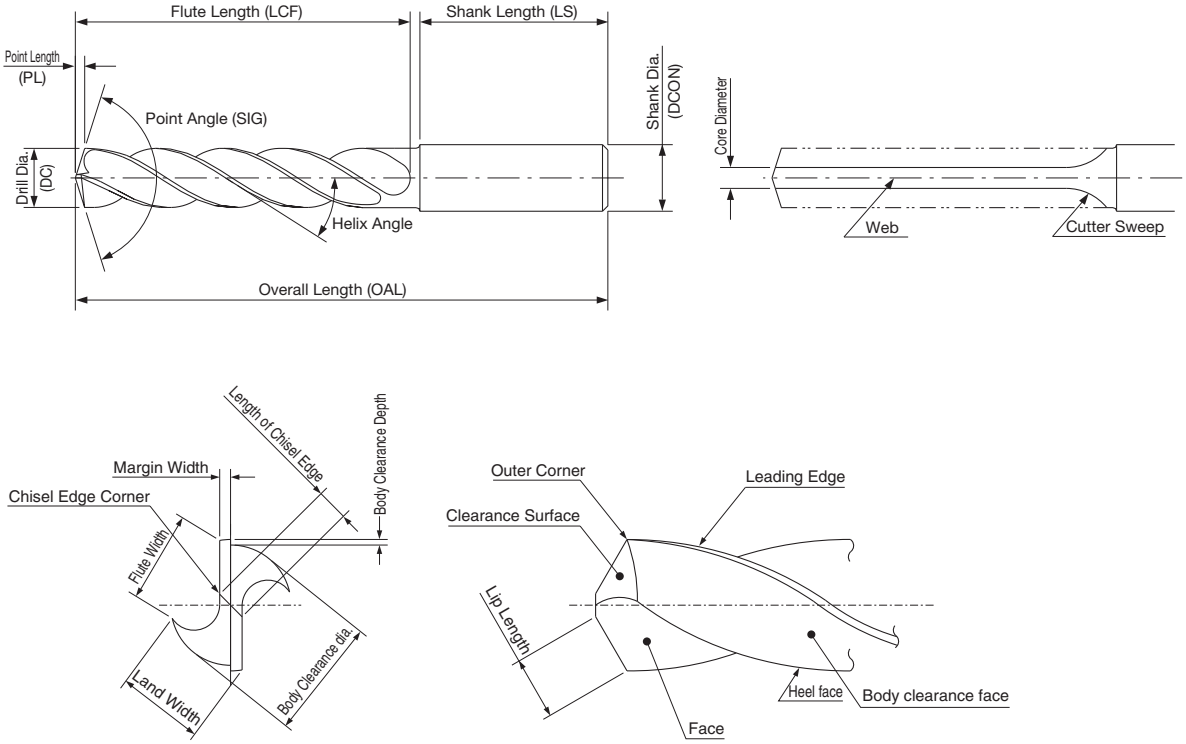
【General】 【With Corner Land】



Trouble shooting of Solid End Mill

Trouble	Trouble Item	Check Item / Countermeasures	Cutting Conditions: Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: fz (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: ap (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: Cutting Direction	Cutting Conditions: Low Pick Feed	Cutting Conditions: Compressed Air	Cutting Conditions: Coolant: Increase Volume	Cutting Conditions: Coolant: Oil Based Coolant	Cutting Conditions: Coolant: Wet working	Tool Geometry: Helix Angle (Larger ↑ More Smaller ↓ Less)	Tool Geometry: No. of Blades (Larger ↑ More Smaller ↓ Less)	Tool Geometry: Diameter (Larger ↑ More Smaller ↓ Less)	Tool Geometry: Tool Rigidity Enhancement	Tool Geometry: Large Chip Pocket	Setting: Workpiece / Tool Installation	Setting: Shorten Tool Overhang	Machine: Power, Rigidity
Edge Damage	Cutting Edge Wear	Unsuitable Cutting Conditions	●↓							●									
		Less Number of Blades											●↑						
		Up Cut				Down-cut													
	Chipping of Cutting Edge	Unsuitable Cutting Conditions		●↓	●↓														
		Lack of Cutting Edge Strength													●				
		Insufficient Clamping Force														●	●	●	
	Fracture Occurs	Unsuitable Cutting Conditions			●↓														
		Lack of Tool Rigidity												●↑	●				
		Chip Packing							●							●			
Cutting Accuracy	Poor Finished Surface on Walls	Unsuitable Cutting Conditions	●↓		●↓														
		Chip Jamming						●	●		●								
		Cutting edge wear	●↓																
	Poor Finished Surface on Faces	Large Pick Feed					●												
	Out of Vertical	Unsuitable Cutting Conditions		●↓	●↓														
		Lack of Tool Rigidity										●↑	●↑	●↑	●				
		Cutting Edge Wear	●↓																
	Poor Dimensional Accuracy	Unsuitable Cutting Conditions	●↓	●↓	●↓														
		Insufficient Clamping Force															●	●	●
Others	Heavy Chattering, Vibration	Unsuitable Cutting Conditions	●↓	●↓															
		Lack of Tool Rigidity										●↑	●↑	●↑	●				
		Insufficient Clamping Force															●	●	●
	Chip Jamming	Unsuitable Cutting Conditions		●↓	●↓														
		Improper tool geometry											●↓			●			

Terms of Solid Drill



Trouble shooting of Solid Drill

Trouble	Trouble Item	Check Item / Countermeasures	Cutting Conditions: Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: fz (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: Lower Feed at Initial Cutting	Cutting Conditions: Lower Feed when Breaking Through	Cutting Conditions: Step Feed	Cutting Conditions: Coolant: Increase Volume	Cutting Conditions: Coolant: Increase Pressure	Tool Geometry: Chisel Width (Larger ↑ More Smaller ↓ Less)	Tool Geometry: Honing Width (Larger ↑ More Smaller ↓ Less)	Tool Geometry: Core Diameter (Larger ↑ More Smaller ↓ Less)	Tool Geometry: Shorten Flute Length	Tool Geometry: Use Internal Coolant Type Tool	Setting: Improve Tool Installation Accuracy	Setting: Flat Workpiece Face	Setting: Shorten Tool Overhang	Machine: Power, Rigidity
Edge Damage	Fracture Occurs	Unsuitable Cutting Conditions		● ↓														
		Poor Rigidity of Drill										● ↑	●					
		Sloping Machine Face														●		
	Large Peripheral Cutting Edge and Margin Land Wear	Unsuitable Cutting Conditions	● ↓															
		High Cutting Heat at the Cutting Edge Point						●						●				
		Poor Run-out Accuracy													●			
	Chipping on Peripheral Cutting Edge	Unsuitable Cutting Conditions		● ↓			●											
		Large Deflection of Tool Holder													●			●
		Chattering Occurs (Vibration)									● ↓						●	●
	Chipping on Chisel	Too Wide Chisel Width								● ↓								
		Poor Entry			●													
		Chattering Occurs (Vibration)									● ↓						●	●
Cutting Accuracy	Enlarge Hole Diameter	Unsuitable Cutting Conditions	● ↑															
		Poor Rigidity of Drill										● ↑	●					
	Reduce Hole Diameter	Unsuitable Cutting Conditions	● ↓															
		High Cutting Heat at Cutting Edge Point						●						●				
	Poor Straightness	Poor Rigidity of Drill										● ↑	●					
		Large Deflection of Tool Holder													●			●
	Poor Hole Position Accuracy, Roundness, Straightness, Surface Roughness	Unsuitable Cutting Conditions			●													
		Poor Rigidity of Drill										● ↑	●					
		Large Deflection of Tool Holder													●			●
		Insufficient Clamping Force																
Burr	Large Burrs at Hole Exit	Unsuitable Cutting Conditions				●												
		Improper Tool Geometry									● ↓							
Chip Control	Long Chips	Unsuitable Cutting Conditions		● ↑														
		Poor Chip Disposal						●	●			● ↓		●				
	Chip Packing	Unsuitable Cutting Conditions	● ↓	● ↓														
		Poor Chip Disposal						●	●					●				

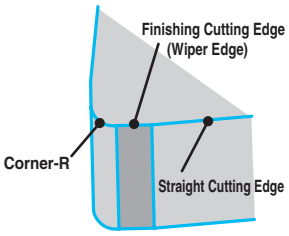
Precautions when Using Wiper Inserts

About Wiper Inserts

A wiper insert is designed with a wiper edge that is located between corner radius and straight cutting edge shown as right figure.

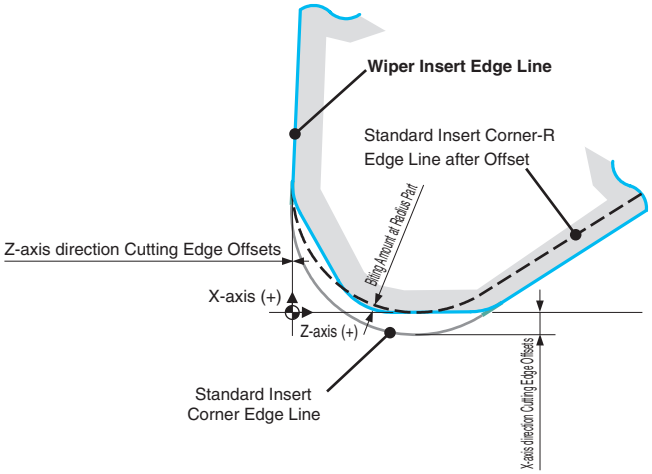
Advantages

- A wiper edge geometry provides improved surface finish quality even at increased feed rate
- Improved machining efficiency : Reduced cutting time with higher feed rate as well as consolidation of roughing and finishing provide high machining efficiency
- Longer tool life : Reduced cutting time with higher feed rate leads to increase part production
- Excellent chip control : Higher feed rate makes chips thicker, which provides easier-to-break chips



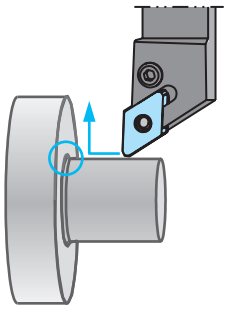
Precautions when using WF / WE Chipbreaker (Negative Insert)

Tip of Corner-R (DNMX, TNMX)



Cautions when Machining Inside Corner-R

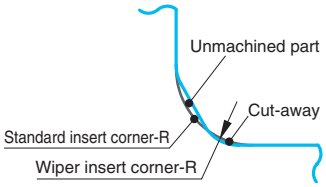
Do not use this wiper insert if a precise inside corner-R is required when such a machining in the figure below.



* From external turning to up facing without arc complement
(A wiper edge does not work during up facing)

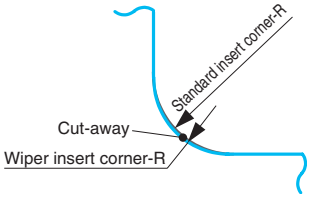
DNMX / TNMX
WF Chipbreaker

- More incomplete cutting and excessive cutting during machining with this chipbreaker than the machining with a standard insert
- The inside corner-R dimension become smaller than the requirement.



CNMG / WNMG
WF / WE Chipbreaker

- The inside corner-R dimension would be smaller than the requirement (Cutting excessively).



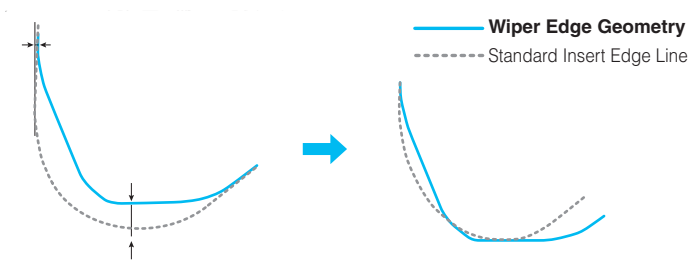
Precautions when using WF / WE Chipbreaker (Negative Insert)

WF / WE Chipbreaker (Negative Insert) Edge Position Offset Adjustment

For DNMX type and TNMX type, cutting edge offsets are required.

Cutting Edge Offsets (mm)					
DNMX150404WF DNMX150604WF		DNMX150408WF DNMX150608WF		DNMX150412WF DNMX150612WF	
X-axis direction	Z-axis direction	X-axis direction	Z-axis direction	X-axis direction	Z-axis direction
0.24	0.02	0.14	0.01	0.11	0.01

Cutting Edge Offsets (mm)					
TNMX160404WF		TNMX160408WF		TNMX160412WF	
X-axis direction	Z-axis direction	X-axis direction	Z-axis direction	X-axis direction	Z-axis direction
0.24	0.01	0.16	0.00	0.11	0.00

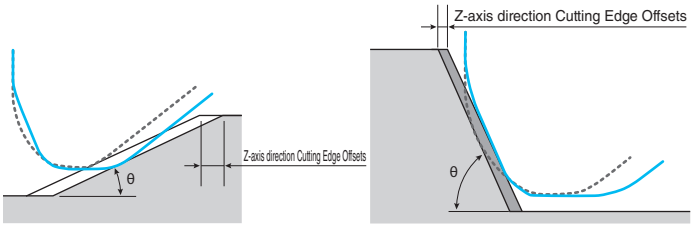


For D type and T type inserts, program corrections are required for ramping and up facing.

Program corrections for tapered part of workpiece (Z-axis direction Cutting Edge Offsets)

DNMX1504 / DNMX1506 type

Corner-R(RE) (mm)	Ramping Angle θ					
	0°	5°	10°	15°	20°	25°
0.4	0.00	−0.34	−0.35	−0.36	−0.36	−0.36
0.8	0.00	−0.26	−0.26	−0.25	−0.24	−0.22
1.2	0.00	−0.15	−0.17	−0.16	−0.15	−0.15



Corner-R(RE) (mm)	Up Facing Angle θ																		
	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
0.4	0.00	−0.02	−0.03	−0.03	−0.04	−0.05	−0.06	−0.07	−0.08	−0.09	−0.10	−0.11	−0.12	−0.10	−0.08	−0.06	−0.04	−0.02	0.00
0.8	0.00	0.13	0.12	0.11	0.09	0.07	0.05	0.04	0.02	0.00	−0.02	−0.05	−0.07	−0.06	−0.04	−0.02	−0.01	−0.01	0.00
1.2	0.00	0.36	0.34	0.31	0.27	0.24	0.20	0.16	0.13	0.09	0.05	0.00	−0.04	−0.04	−0.03	−0.02	−0.01	−0.01	0.00

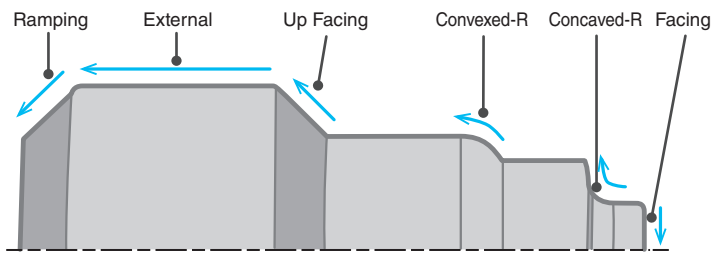
TNMX1604 type

Corner-R(RE) (mm)	Ramping Angle θ					
	0°	5°	10°	15°	20°	25°
0.4	0.00					
0.8	0.00					
1.2	0.00					

Do not use TNMX1604 type insert for ramping.

Corner-R(RE) (mm)	Up Facing Angle θ																		
	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
0.4	0.00	−0.06	−0.05	−0.05	−0.06	−0.07	−0.08	−0.08	−0.09	−0.10	−0.11	−0.12	−0.13	−0.12	−0.10	−0.07	−0.05	−0.02	0.00
0.8	0.00	0.11	0.11	0.10	0.08	0.06	0.04	0.02	0.00	−0.02	−0.04	−0.06	−0.08	−0.08	−0.06	−0.04	−0.02	−0.01	0.00
1.2	0.00	0.34	0.32	0.29	0.25	0.22	0.19	0.15	0.14	0.08	0.04	0.00	−0.05	−0.05	−0.03	−0.01	0.00	0.00	0.00

Caution (Finished Edge Line)

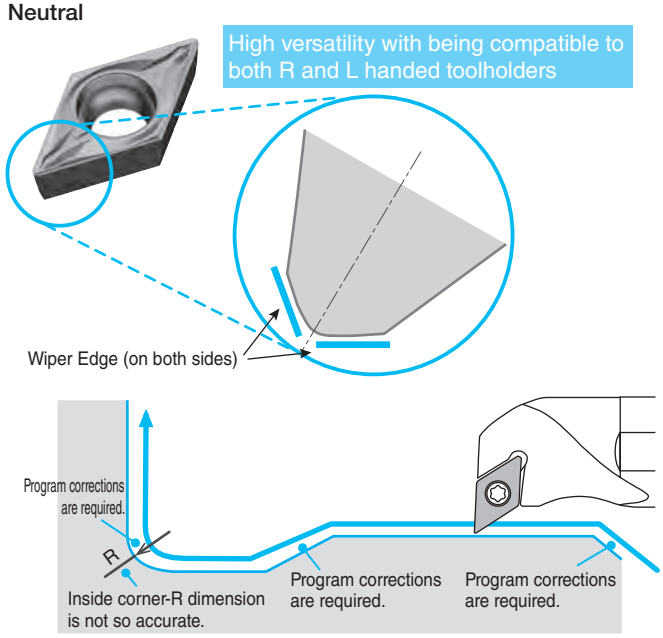


Applications	Caution
External / Facing	Toolholders for D type and T type would not be able to provide sufficient performance depending on a toolholder. Please use an applicable toolholder.
Up Facing Ramping	For D type and T type inserts, program corrections on Z-axis direction are required.
Convexed-R / Concaved-R	Do not use wiper insert if a precise R shape is needed.

Precautions when using WP Chipbreaker (Positive Insert)

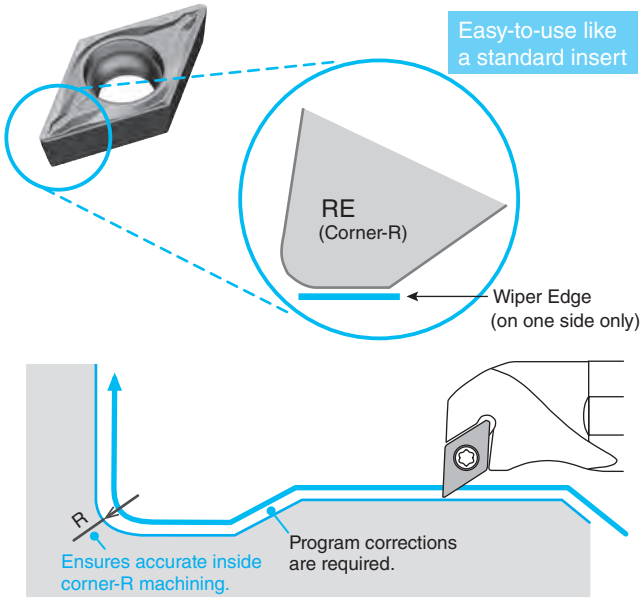
Proper Use for a Neutral Insert and a Handed Insert

Neutral



When use a neutral type insert,
- you need to correct programs for three areas.
- it should be used for machining which does not require inside corner-R accuracy.

Handed (Left-hand shown)

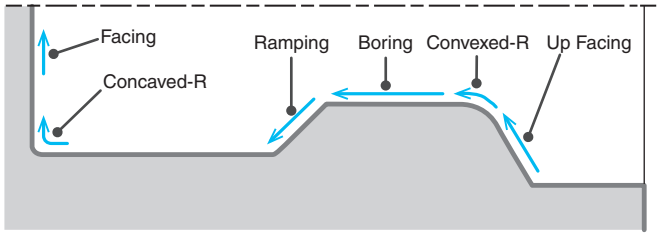


When use a handed insert,
- you need to correct program for ramping.
- it provides accurate inside corner-R machining.

Less program correction is required as well as easy-to-use like a standard insert

* Position of cutting edge differs from a standard insert. Cutting edge adjustment is required.

Caution (Finished Edge Line)



Neutral

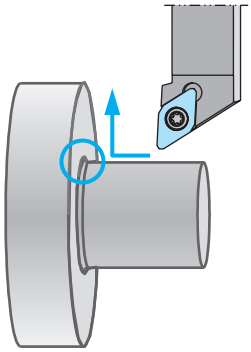
Applications	Caution
Boring / Facing	Toolholders for D type and T type would not be able to provide sufficient performance depending on a toolholder. Please use an applicable toolholder.
Up Facing / Ramping	For D type and T type inserts, program corrections on Z-axis direction are required.
Convexed-R / Concaved-R	Do not use wiper inserts if a precise R shape is needed.

Handed

Applications	Caution
Boring	Toolholders for D type and TP type cannot provide sufficient performance. Please use an applicable toolholder.
Ramping	For D type and TP type inserts, program corrections on Z-axis direction are required.
Convexed-R / Concaved-R	Surface finish quality is as standard insert is.
Up Facing	Surface finish quality is as standard insert is.
Facing	Surface finish quality is as standard insert is.

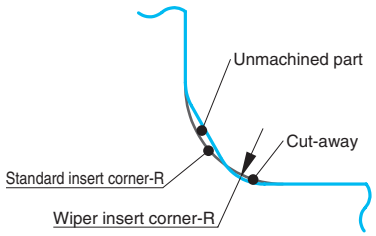
Cautions when Machining Inside Corner-R

Do not use this wiper insert if a precise inside corner-R is required when such a machining in the figure below.



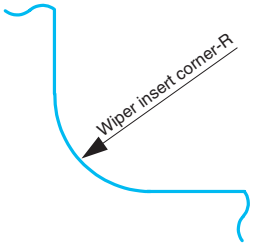
DCMX / TC(P)MX * Neutral
WP Chipbreaker

- More incomplete cutting and excessive cutting during machining with this chipbreaker than the machining with a standard insert
- The inside corner-R dimension become smaller



CCMT * Neutral
DCMX / TPMX * Handed
WP Chipbreaker

- No problem in the finished line on workpiece (Adjustments are required)



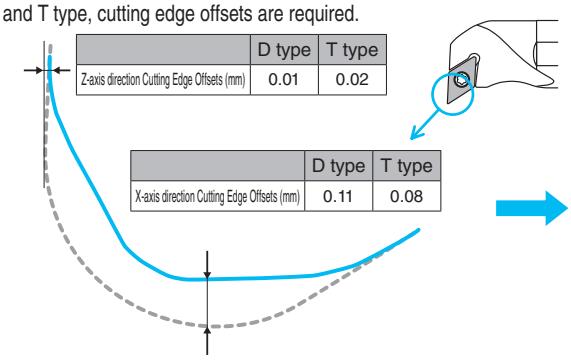
WP Chipbreaker (Positive Insert) Edge Position Offset Adjustment

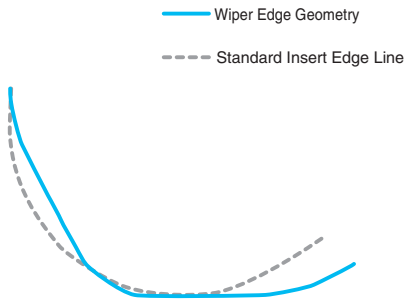
Neutral

For D type and T type, cutting edge offsets are required.

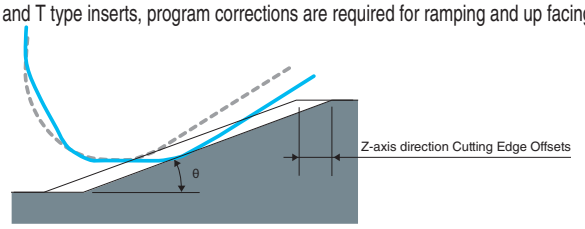
	D type	T type
Z-axis direction Cutting Edge Offsets (mm)	0.01	0.02

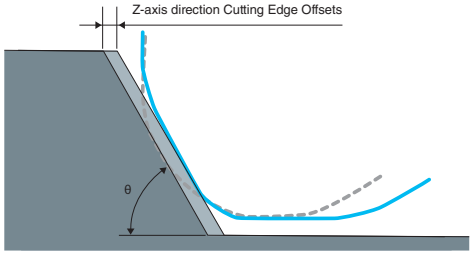
	D type	T type
X-axis direction Cutting Edge Offsets (mm)	0.11	0.08





For D type and T type inserts, program corrections are required for ramping and up facing.





Ramping Angle θ	0°	5°	10°	15°	20°	25°
Z-axis direction Cutting Edge Offsets (mm) D type	0	–0.14	–0.15	–0.16	–0.16	–0.17
Z-axis direction Cutting Edge Offsets (mm) T type	0	–0.16	–0.17	–0.17	–0.17	-

Profiling Angle θ	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°
Z-axis direction Cutting Edge Offsets (mm) D type	0.00	0.07	0.06	0.04	0.03	0.02	0.01	0.00	-	-	-
Z-axis direction Cutting Edge Offsets (mm) T type	0.00	0.07	0.06	0.05	0.05	0.04	0.03	0.02	0.01	0.01	0.00

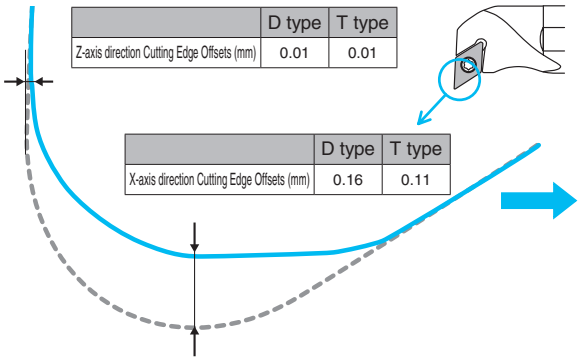
Profiling Angle θ	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
Z-axis direction Cutting Edge Offsets (mm) D type	–0.01	–0.02	–0.03	–0.04	–0.05	–0.05	–0.04	–0.03	–0.02	–0.01	0.00
Z-axis direction Cutting Edge Offsets (mm) T type	-	-	-	–0.01	–0.02	–0.03	–0.04	–0.03	–0.02	–0.01	0.00

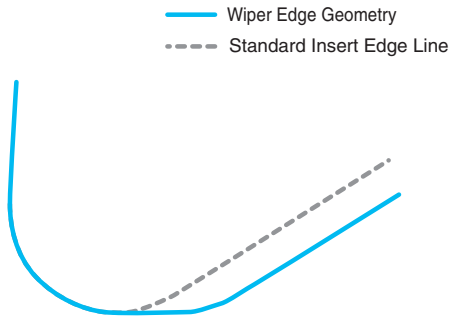
Handed

For D type and T type, cutting edge offsets are required.

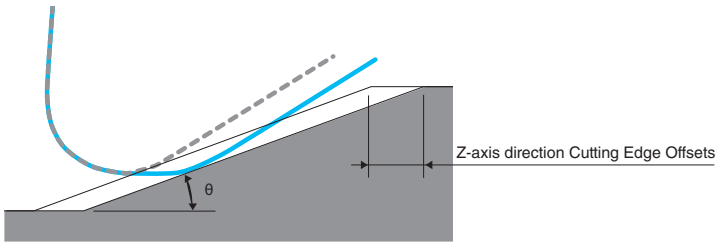
	D type	T type
Z-axis direction Cutting Edge Offsets (mm)	0.01	0.01

	D type	T type
X-axis direction Cutting Edge Offsets (mm)	0.16	0.11





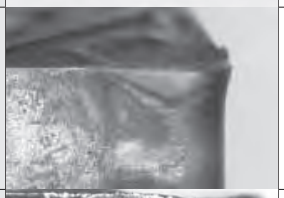
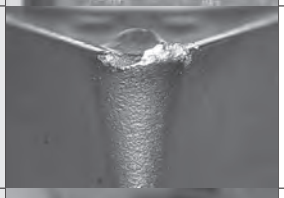
For D type and T type inserts, program corrections are required for ramping.



Ramping Angle θ	0°	5°	10°	15°	20°	25°
Z-axis direction Cutting Edge Offsets (mm) D type	0	–0.22	–0.24	–0.24	–0.25	–0.25
Z-axis direction Cutting Edge Offsets (mm) T type	0	–0.24	–0.24	–0.25	–0.24	-

Trouble shooting

Cutting Edges Figuration and Countermeasures

Typical Cutting Edge Figuration		Observation	Causes	Countermeasures
Nose wear		· Deterioration of surface roughness and dimensional accuracy	· Too high Vc · End of tool life	· Reduce Vc · Change to higher wear resistant grade
Notching		· Burr formation · Cutting force increase	· Too high f and Vc	· Sharper cutting performance · Reduce Vc · Change to higher heat resistant grade
Crater wear		· Chip control deterioration · Surface finish deterioration (peeled surface)	· Too high Vc	· Reduce Vc · Change to high speed type like Cermet or Al_2O_3 coated insert grade
Plastic Deformation		· Workpiece dimension changes · Crack at nose	· Too high cutting load · Inappropriate insert grade	· Change to harder grade · Reduce f and ap
Crack from Wear		· Surface finish's sudden deterioration · Workpiece dimension changes	· Too high Vc	· Change the tool earlier · Change to higher wear resistant grade
Chipping		· Cutting force increase · Surface roughness deterioration	· Too high f · Chattering · Lack of insert toughness	· Reduce f and ap · Change to more rigid toolholder · Change to tougher grade
Crack from Welding or Built-up Edge		· Surface finish deterioration · Cutting force increase	· Too low Vc	· Increase Vc · Improve sharp cutting performance (rake angle, chamfer)
Mechanical Fracture		· Sudden cracking · Unstable tool life	· Too high f and ap · Chattering	· Change to tougher grade · Enlarge chamfer · Enlarge Corner-R(RE) · Change to more rigid toolholder
Fracture from Thermal Crack		· Cracking by heat cycle · Possible in interrupted machining and milling	· Too high Vc and f	· Reduce f · Reduce Vc · Change to dry cutting
Flaking		· Possible in hard materials machining · Possible in machining with chattering	· Lack of insert toughness · Poor rigidity of toolholder	· Change to tougher grade (TiC-base ceramic to CBN.) · Change to more rigid toolholder · Change edge preparation

Turning

Trouble	Trouble Item	Countermeasures	Change to Harder Grade	Change to Tougher Grade	Change to More Thermal Shock Resistant Grade	Change to More Welding Resistant Grade	Vc	f	ap	Tool Path Review	Coolant: Wet	Coolant: Dry	Chipbreaker Review	Rake Angle	Corner-R(RE)	Approach Angle	Edge Strength / Honing	Change to Higher Tolerance (M→G)	Toolholder Rigidity	Workpiece / Tool Installation	Overhang Length	Power, Rigidity
		Check Item	Insert Grades				Cutting Conditions						Tool Geometry							Setting		Machine
							Higher (Larger) ↑ Lower (Smaller) ↓						Larger ↑ Smaller ↓									
Unstable Dimension	Unstable Workpiece Dimension	Unsuitable Insert Tolerance																●				
		Tool and Workpiece Evacuation											●	●↑	●↓	●↓			●	●	●	●
	Frequent Offset during Machining	Flank Wear Increase	●												●↑							
		Unsuitable Cutting Conditions					●↓	●↑														
		Built-up Edge				●	●↑															
Surface roughness deterioration	Poor Surface Roughness	Poor Cutting by Tool Wear	●			●	●↓				●		●	●↑	●↑		●↓	●				
		Chipping		●				●↓	●↓				●		●↑		●↑			●	●	●
		Welding, Built-up Edge				●	●↑				●		●	●↑			●↓	●				
		Unsuitable Cutting Conditions					●↑	●↓	●↓		●											
		Unsuitable Tool Geometry											●		●↑		●↓	●				
		Vibration, Chattering		●			●↓	*1 ●↓	●↓				●	●↑	●↓	●↓	●↓		●	●	●	●
Heat	Deterioration of Accuracy or Tool Life by Cutting Heat	Unsuitable Cutting Conditions					●↓	●↓	●↓		●											
		Unsuitable Insert Grades and Tool Geometry	●										●	●↑			●↓					
Burr, Workpiece Chip Off and Scuffing	Burr	Unsuitable Cutting Conditions					●↓	●↑		●	●											
		Unsuitable Insert Grades and Tool Geometry	●										●	●↑	●↓	●↓	●↓					
	Workpiece Chip Off	Unsuitable Cutting Conditions						●↓	●↓	●												
		Unsuitable Insert Grades and Tool Geometry	●										●	●↑	●↑	●↑	●↓		●	●	●	●
	Scuffing	Unsuitable Cutting Conditions					●↑	*2 ●↓			●											
		Unsuitable Insert Grades and Tool Geometry	●			●							●	●↑			●↓					
Edge Damage	Wear Increase at Relief Face, Rake Face	Flank Wear	●				●↓				●		●	●↑	●↑		●↓					
		Rake Face Wear	●				●↓	●↓	●↓		●		●	●↑		●↑						
	Notching	Notching				●	●↓				●											
	Chipping	Vibration, Chattering		●				●↓	●↓				●			●↑	●↑		●	●	●	●
	Crack	Unsuitable Insert Grades and Cutting Conditions		●	●			●↓	●↓				●		●↑	●↑	●↑		●	●	●	●
	Thermal Crack	Work Hardness, Unsuitable Insert Grades and Cutting Conditions			●		●↓	●↓	●↓			●	●	●↑			●↓					
	Edge Nose Deformation	Edge Nose Deformation during Interrupted machining	●				●↓	●↓	●↓				●	●↓	●↑	●↑	●↑					
	Built-up Edge	Work Hardness, Unsuitable Insert Grades and Cutting Conditions				●	●↑	●↑			●		●	●↑			●↓	●				
Chip Control	Long, Tangling Chips	Unsuitable Cutting Conditions					*3 ●↓	●↑	●↑	●		●										
		Unsuitable Tool Geometry											●		●↓	●↓						
	Chips scattering	Unsuitable Cutting Conditions						●↓	●↓			●										
		Unsuitable Tool Geometry											●		●↑	●↑						

*1) To prevent chattering, the higher f may be suitable.
*2) To prevent scuffing, the higher f may be suitable.
*3) When using X chipbreaker insert for soft steel and low carbon steel, the higher Vc cuts chips short.

Trouble shooting

Milling

Trouble	Trouble Item	Check Item / Countermeasures	Insert Grades: Change to Harder Grade	Insert Grades: Change to Tougher Grade	Insert Grades: Change to More Thermal Shock Resistant Grade	Insert Grades: Change to More Welding Resistant Grade	Cutting Conditions: Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: fz (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: ap (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: Cutter Dia. Cutting Width Review	Cutting Conditions: Tool Path Review	Cutting Conditions: Coolant: Usage of Mist	Cutting Conditions: Coolant: Dry	Tool Geometry: Insert with Chipbreaker	Tool Geometry: Relief Angle (Larger ↑ Smaller ↓)	Tool Geometry: Corner Angle (Larger ↑ Smaller ↓)	Tool Geometry: Edge Strength / Honing (Larger ↑ Smaller ↓)	Tool Geometry: No. of Inserts (More ↑ Less ↓)	Tool Geometry: Chip pocket (Larger ↑ Smaller ↓)	Tool Geometry: Wiper Edge (Relief Angle) Review	Tool Geometry: Insert Runout Check	Tool Geometry: Cutter Rigidity	Setting: Workpiece / Tool Installation	Setting: Overhang Length	Machine: Power, Rigidity
Edge Damage	Flank Wear Increase	Unsuitable Cutting Conditions					●↓					●													
		Unsuitable Tool Geometry	●												●↑		●↓			●					
	Rake Face Wear Increase	Unsuitable Cutting Conditions					●↓	●↓	●↓			●													
		Unsuitable Tool Geometry	●												●↑	●↑	●↓								
	Chipping, Cracking	Unsuitable Cutting Conditions						●↓	●↓	●	●														
		Unsuitable Tool Geometry		●											●↓	●↑	●↑			●	●	●	●	●	●
	Edge Breakage by Thermal Shock	Unsuitable Cutting Conditions					●↓	●↓	●↓				●												
		Unsuitable Tool Geometry			●										●↑		●↓								
	Built-up Edge	Unsuitable Cutting Conditions					●↑	●↑				●													
		Unsuitable Tool Geometry				●									●↑		●↓								
Cutting Accuracy	Poor Surface Finish	Unsuitable Cutting Conditions					●↑	●↓	●↓			●													
		Unsuitable Tool Geometry	●			●											●↓	●↓		●	●		●	●	●
	Burr formation	Unsuitable Cutting Conditions					●↓	●↓	●↓	●	●														
		Unsuitable Tool Geometry													●↑	●↓	●↓			●					
	Workpiece Chip Off	Unsuitable Cutting Conditions						●↓	●↓		●														
		Unsuitable Tool Geometry													●↑	●↑	●↓	●↑		●					
	Poor Planeness / Parallelism	Tool and Workpiece Evacuation						●↓	●↓			*5 ●		●	●↑	●↓	●↓	●↓		●	●	●	●	●	●
Others	Heavy Chattering, Vibration	Unsuitable Cutting Conditions, Installation					●↓	*1 ●↓	*2 ●↓	●	*4 ●			●	●↑	●↓	●↓	●↓					●	●	●
	Chip Jamming	Unsuitable Cutting Conditions					●↑	*3 ●↓		●		*6 ●	●												
		Unsuitable Tool Geometry												●	●↑			●↓	●↑						

*1) To prevent chattering, the higher fz may be suitable.
*2) To prevent chattering, the larger ap may be suitable.
*3) Higher fz may be suitable.
*4) Down-cut method is recommended for helical end milling.
*5) If the surface is warped by cutting heat.
*6) Compressed air is recommended.

Drilling (Magic Drill Series)

Trouble	Trouble Item	Change to Harder Grade	Change to Tougher Grade	Vc: Higher (Larger) ↑ Lower (Smaller) ↓	fz: Higher (Larger) ↑ Lower (Smaller) ↓	Coolant Discharge Condition	Chipbreaker Review	Inner Edge's Center Height Check (Core Dia. Check): Larger ↑ Smaller ↓	Toolholder Rigidity Improvement (Short Type)	Workpiece / Tool Installation	Insert Installation	Offset Check	Adjustable Sleeve Usage	Power, Rigidity
Edge Damage	Unusual Wear													
	Unsuitable Cutting Speed (too high)	●		●↓										
	Unsuitable Cutting Speed (too low)		●	●↑										
	Unsuitable Coolant Discharge					●								
	Poor Rigidity of Machine / Workpiece									●				●
	Small Hole Dia.											*1 ●	●	
	Unsuitable Insert Grade	●												
	Inner Edge Cracking													
	No core, Too Small Core							●↑						
	Poor Rigidity of Machine / Workpiece								●	●				●
	Unstable Drilling Start				●↓									
	High Hardness Workpiece	●		●↓	●↓									
	Clogged Chips			●↑				●↓						
	Unstable Insert Installation										●			
	Outer Edge Cracking													
	Poor Rigidity of Machine / Workpiece									●				●
	Unstable Drilling Start				●↓									
	High Hardness Workpiece	●		●↓	●↓									
	Poor Chip Control		●	●↑										
	Unstable Insert Installation										●			
Toolholder, Others	Scratches on Tool Body													
	Poor Rigidity of Machine / Workpiece									●				●
	Inaccurate Tool Installment											*1 ●	●	
	Clogged Chips			●↑	●↓									
	Unstable Drilling Start				●↓									
	Poor Hole Dia. Accuracy / Surface Finish													
	Poor Rigidity of Machine / Workpiece									●				●
	Poor Rigidity of Toolholder								●		●			
	Inaccurate Tool Installment											*1 ●	●	
	Clogged Chips			●↑	●↓			●↓						
	Large Core Dia.							●↓						
	Unstable Drilling Start				●↓									
	Unsuitable Coolant Discharge					●								
	Large Vibration / Chattering	Unsuitable Cutting Conditions, Installation			●↑	●↓				●	●				●
	Long Chips													
	Unsuitable Cutting Conditions				●↑									
	Unsuitable Chipbreaker						●							
	Machine Failure	Lack of Machine Power			●↓	●↓		●							●

*1) For lathe operation

Basic Formulas

Turning

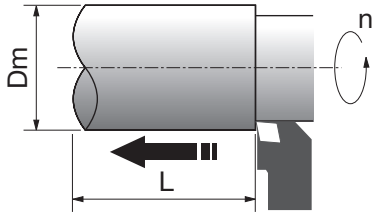
Cutting Speed

$$Vc = \frac{\pi \times Dm \times n}{1{,}000}$$

Vc : Cutting Speed [m/min]

Dm : Workpiece Dia. [mm]

n : Spindle Revolution [min^{-1}]



Power Requirement

$$Pc = \frac{Ks \times Vc \times ap \times f}{6{,}120 \times \eta}$$

$$P_{HP} = \frac{Ks \times Vc \times ap \times f}{4{,}500 \times \eta}$$

Pc : Power Requirement [kW]

P_{HP} : Power Requirement (Horse Power) [HP]

Vc : Cutting Speed [m/min]

ap : Depth of Cut [mm]

f : Feed Rate [mm/rev]

K_S : Specific Cutting Force [kgf/mm^2]

η : Mechanical Efficiency (0.7 ~ 0.8)

Ks [kgf/mm^2]	
Low Carbon Steel	190
Medium Carbon Steel	210
High Carbon Steel	240
Low Alloy Steel	190
High Alloy Steel	245
Cast Iron	93
Malleable Cast Iron	120
Bronze, Brass	70

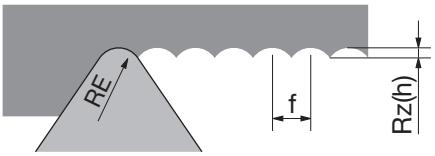
Theoretical Surface Roughness

$$Rz(h) = \frac{f^2}{8 \times RE} \times 1{,}000$$

Rz(h) : Theoretical Surface Roughness [μm]

f : Feed Rate [mm/rev]

RE : Corner Radius of Insert [mm]



Chip Removal Volume

$$Q = Vc \times ap \times f$$

Q : Chip Removal Volume [$cm^3/min=cc/min$]

Vc : Cutting Speed [m/min]

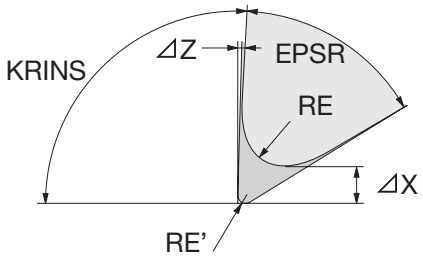
ap : Depth of Cut [mm]

f : Feed Rate [mm/rev]

Edge Position Compensation when Changing Corner-R(RE)

$$\Delta X = (RE - RE') \times \left\{ \frac{\cos\left(\frac{EPSR}{2} + (KRINS - 90°)\right)}{\sin\frac{EPSR}{2}} - 1 \right\}$$

$$\Delta Z = (RE - RE') \times \left\{ \frac{\sin\left(\frac{EPSR}{2} + (KRINS - 90°)\right)}{\sin\frac{EPSR}{2}} - 1 \right\}$$



ΔX : X-axis direction Cutting Edge Offsets [mm]

ΔZ : Z-axis direction Cutting Edge Offsets [mm]

RE : Corner-R before Change [mm]

RE' : Corner-R after Change [mm]

EPSR : Insert Corner Angle [°]

KRINS : Toolholder's Cutting Edge Angle [°]

Toolholder Type	Insert Corner Angle EPSR	Cutting Edge Angle KRINS	ΔX	ΔZ
DCLN/PCLN	80°	95°	0.100 x (RE-RE')	0.100 x (RE-RE')
DTGN/PTGN	60°	91°	0.714 x (RE-RE')	0.030 x (RE-RE')
DDJN/PDJN	55°	93°	0.866 x (RE-RE')	0.099 x (RE-RE')
DDHN/PDHN	55°	107.5°	0.531 x (RE-RE')	0.531 x (RE-RE')
DVLN/PVLN	35°	95°	2.072 x (RE-RE')	0.273 x (RE-RE')
DVPN/PVPN	35°	117.5°	1.351 x (RE-RE')	1.351 x (RE-RE')
DSBN/PSBN	90°	75°	0.225 x (RE-RE')	-0.293 x (RE-RE')

Example : Compensation when changing corner-R from 0.8 to 0.4, using PCLN toolholder,

ΔX=0.100 x (0.8-0.4)=0.04(mm)

ΔZ=0.100 x (0.8-0.4)=0.04(mm)

Turning (Cutting Time)

Cutting Time (External Turning Case 1: 1 Pass machining)

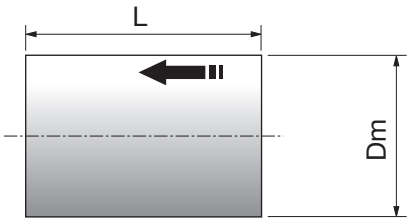
· At Constant Revolution

$$T = \frac{60 \times L}{f \times n}$$

· At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times Dm}{1{,}000 \times f \times Vc}$$

T : Cutting Time [sec]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
Dm : Workpiece Dia. [mm]
Vc : Cutting Speed [m/min]



Cutting Time (External Turning Case 2: Multi-Pass machining)

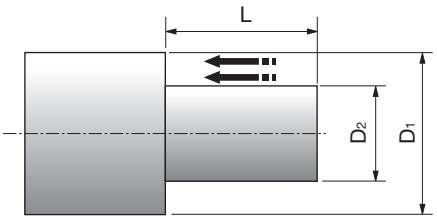
· At Constant Revolution

$$T = \frac{60 \times L}{f \times n} \times N$$

· At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times (D_1 + D_2)}{2 \times 1{,}000 \times f \times Vc} \times N$$

T : Cutting Time [sec]
L : Cutting Length per Pass [mm]
ap : Depth of Cut per Pass [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_2 : Min. Dia. of Workpiece [mm]
Vc : Cutting Speed [m/min]
N : Number of Passes = (D_1 - D_2) / ap / 2 (if it is indivisible, obtain integer by rounding up one place of decimals.)



Cutting Time (Facing)

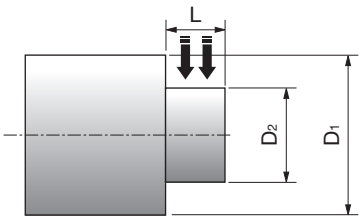
· At Constant Revolution

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n} \times N$$

· At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2) \times (D_1 - D_2)}{4{,}000 \times f \times Vc} \times N$$

T : Cutting Time [sec]
T_1 : Cutting Time before reaching Max. Spindle Revolution [sec]
L : Cutting Length [mm]
ap : Depth of Cut per Pass [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_2 : Min. Dia. of Workpiece [mm]
Vc : Cutting Speed [m/min]
N : Number of Passes = L / ap (if it is indivisible, obtain integer by rounding up one place of decimals.)



Cutting Time (Grooving)

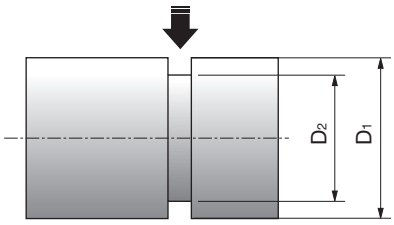
· At Constant Revolution

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n}$$

· At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2) \times (D_1 - D_2)}{4{,}000 \times f \times Vc}$$

T : Cutting Time [sec]
T_1 : Cutting Time before reaching Max. Spindle Revolution [sec]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_2 : Min. Dia. of Workpiece [mm]
Vc : Cutting Speed [m/min]



Cutting Time (Cut-off)

· At Constant Revolution

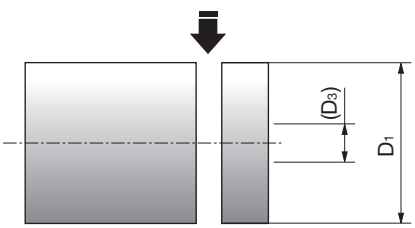
$$T = \frac{60 \times D_1}{2 \times f \times n}$$

· At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_3) \times (D_1 - D_3)}{4{,}000 \times f \times Vc}$$

$$T_3 = T_1 + \frac{60 \times D_3}{2 \times f \times n_{max}}$$

T : Cutting Time [sec]
T_1 : Cutting Time before reaching Max. Spindle Revolution [sec]
T_3 : Cutting Time when reaching Max. Spindle Revolution [sec]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
n_{max} : Max. Spindle Revolution [min^{-1}]
D_1 : Max. Dia. of Workpiece [mm]
D_3 : Diameter when reaching Max. Spindle Revolution [mm]
Vc : Cutting Speed [m/min]



Basic Formulas

Milling

Cutting Speed

$$Vc = \frac{\pi \times DC \times n}{1{,}000}$$

Vc : Cutting Speed [m/min]

DC : Cutter Dia. [mm]

n : Spindle Revolution [min^{-1}]

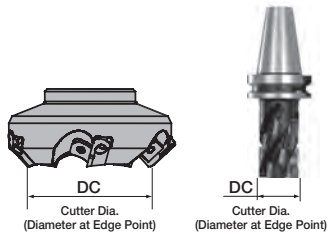


Table Feed & Feed per Tooth

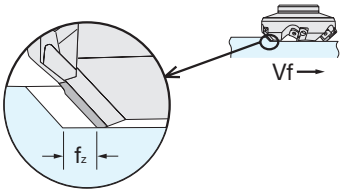
$$f_z = \frac{Vf}{Z \times n}$$

f_z : Feed per Tooth [mm/t]

Vf : Table Feed [mm/min]

Z : No. of Inserts

n : Spindle Revolution [min^{-1}]



Power Requirement

$$Pc = \frac{K_s \times Q}{6{,}120 \times \eta} = \frac{K_s \times ae \times Vf \times ap}{6{,}120{,}000 \times \eta}$$

$$= \frac{K_s \times ae \times f_z \times Z \times n \times ap}{6{,}120{,}000 \times \eta}$$

$$P_{HP} = \frac{6{,}120}{4{,}500} \times Pc$$

Pc : Power Requirement [kW]

P_{HP} : Power Requirement (Horse Power) [HP]

ae : Width of Cut [mm]

Vf : Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : No. of Inserts

n : Spindle Revolution [min^{-1}]

ap : Depth of Cut [mm]

K_s : Specific Cutting Force [kgf/mm^2]

η : Mechanical Efficiency (0.7 ~ 0.8)

Q : Chip Removal Volume [cm^3/min=cc/min]

Ks [kgf/mm^2]	
Low Carbon Steel	190
Medium Carbon Steel	210
High Carbon Steel	240
Low Alloy Steel	190
High Alloy Steel	245
Cast Iron	93
Malleable Cast Iron	120
Bronze, Brass	70

Chip Removal Volume

$$Q = \frac{ae \times Vf \times ap}{1{,}000} = \frac{ae \times f_z \times Z \times n \times ap}{1{,}000}$$

Q : Chip Removal Volume [cm^3/min=cc/min]

ae : Width of Cut [mm]

Vf : Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : No. of Inserts

n : Spindle Revolution [min^{-1}]

ap : Depth of Cut [mm]

Cutting Time

$$T = \frac{60 \times L'}{Vf} = \frac{60 \times L'}{f_z \times Z \times n}$$

T : Cutting Time [sec]

L' : Total Table Transfer Length [mm]
(=L+DC+2α)

L : Workpiece Length [mm]

DC : Cutter Dia. [mm]

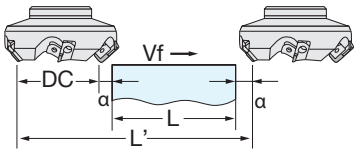
α : Idling Distance [mm]

Vf : Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : No. of Inserts

n : Spindle Revolution [min^{-1}]



True Rake Angle

$$\tan T = \tan R \times \cos C + \tan A \times \sin C$$

Inclination Angle

$$\tan I = \tan A \times \cos C - \tan R \times \sin C$$

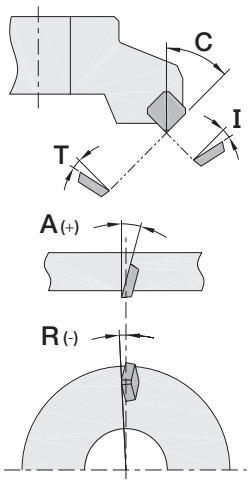
A (GAMP) : Axial Rake Angle (A.R.) [°] (-90° < A < 90°)

R (GAMF) : Radial Rake Angle (R.R.) [°] (-90° < R < 90°)

C (KAPR) : Approach Angle [°] (0° < C < 90°)

T (GAMN) : True Rake Angle [°] (-90° < T < 90°)

I (GAMO) : Inclination Angle [°] (-90° < I <90°)



Ball-Nose End Mill Cutting Speed & Revolution

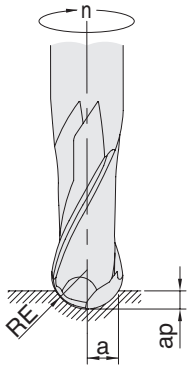
$$n = \frac{1{,}000 \times V_a}{2 \times \pi \times \sqrt{a(2RE-ap)}}$$

n : Revolution [min^{-1}]

RE : Radius of Ball-Nose End Mill (Ball Part's radius [mm])

ap : Depth of Cut [mm]

V_a : Cutting Speed at Point "a" [m/min]



Drilling (Magic Drill Series)

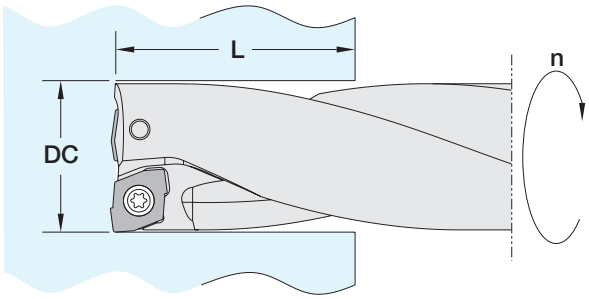
Cutting Speed

$$Vc = \frac{\pi \times DC \times n}{1{,}000}$$

Vc : Cutting Speed [m/min]

DC : Drill Dia. [mm]

n : Spindle Revolution [min^{-1}]



Feed Rate (Milling)

$$Vf = fz \times Z \times n$$

Vf : Table Feed [mm/min]

fz : Feed per Tooth [mm/t]

Z : No. of Inserts (No. of Insert = 1)

n : Spindle Revolution [min^{-1}]

Cutting Time

$$T = \frac{60 \times L}{f \times n} = \frac{60 \times \pi \times DC \times L}{1{,}000 \times Vc \times f}$$

T : Cutting Time [sec]

L : Drilling Depth [mm]

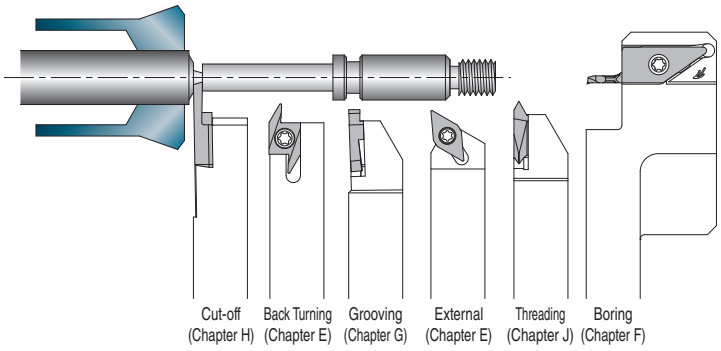
f : Feed Rate [mm/rev]

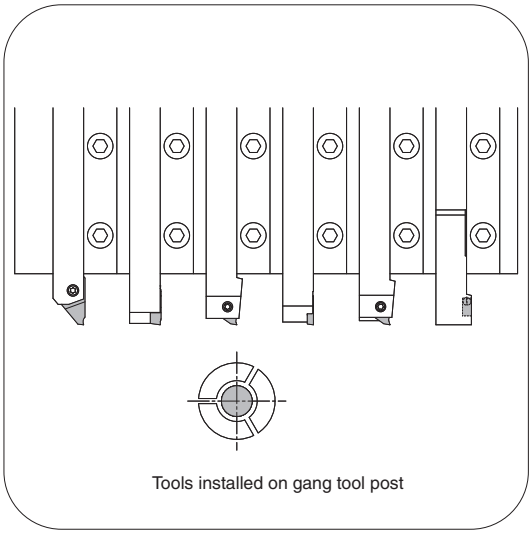
n : Spindle Revolution [min^{-1}]

DC : Drill Dia. [mm]

Vc : Cutting Speed [m/min]

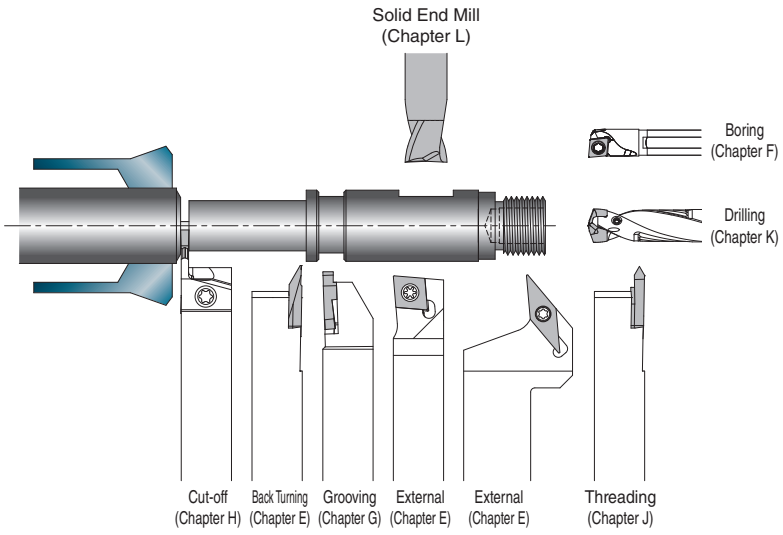
Tooling Example (1) CNC Automatic lathe (Gang Type)

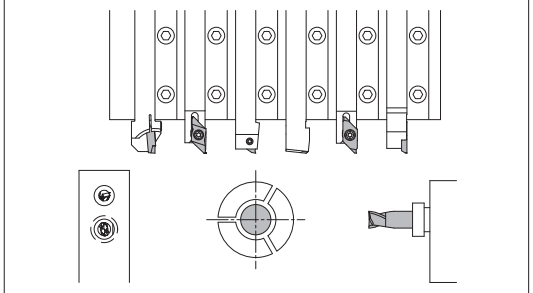




Tools installed on gang tool post

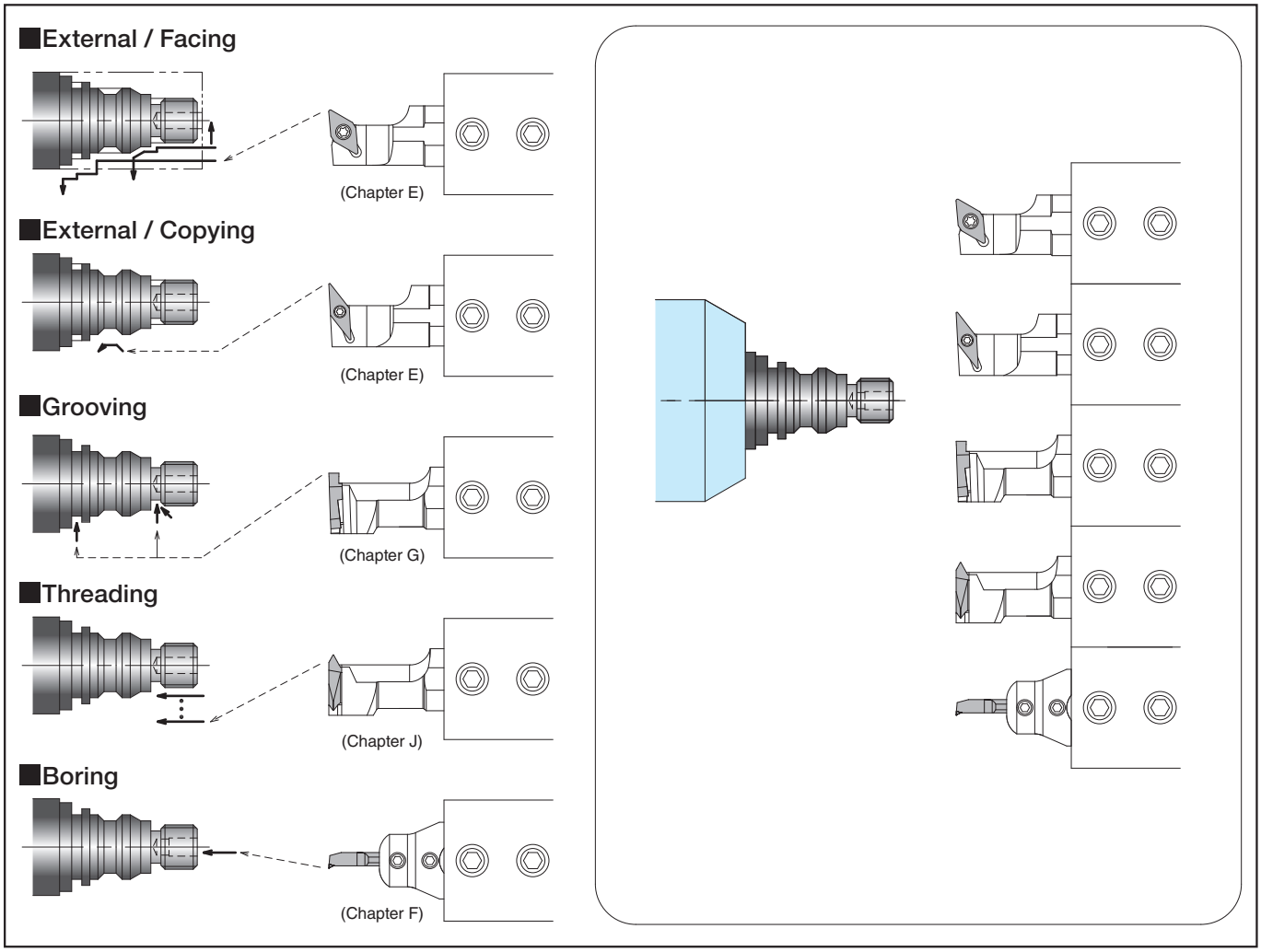
Tooling Example (2) CNC Automatic lathe (Gang Type)



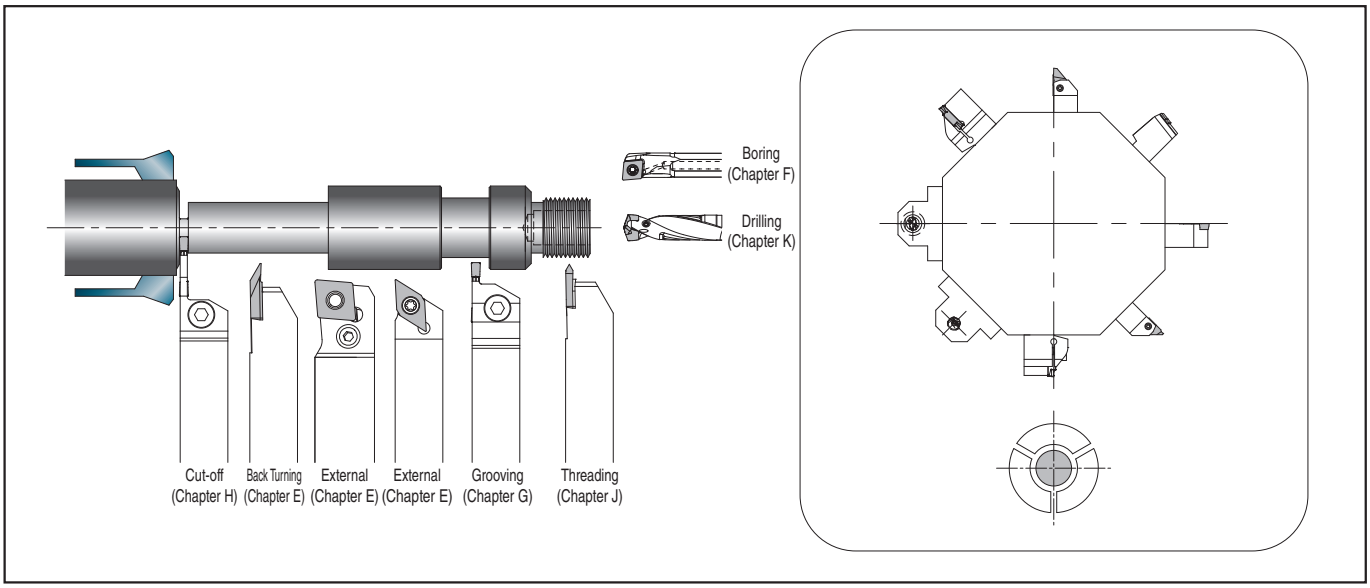


Tools installed on gang tool post + milling toolholder

Tooling Example (3) CNC Automatic lathe (Opposed Gang Type)



Tooling Example (4) CNC Automatic lathe (Turret Type)



For Tooling Layout and Automatic Lathe List by Manufacturer, See Page R46~R54

Citizen Machinery (Cincom Products)

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Max. Cutting Dia.	Remarks
A12/16	10 x 10 x 100	5			ø19.05/ø20	ø12/ø16	
A20	12(13) x 12(13) x 120 * Cut-off toolholder : □16mm	6			ø25.4	ø20	
A20Ⅶ	12(13) x 12(13) x 120 * Cut-off toolholder : □16mm	6			ø25.4	ø20	
A32	16 x 16 x 150	6			ø25.4	ø32	
B12	10 x 10 x 100	5			ø19.05/ø20	ø12	
B12E/B16E	10 x 10 x 120(60)	5			ø19.05(ø20^{OP})	ø12/ø16	
B20	12(13) x 12(13) x 120	6			ø19.05/ø20	ø20	
BL12	10 x 10 x 60 ~ 120	5			ø20(ø19.05)	ø12	
BL20/25	12(13) x 12(13) x 120	4 ~ 7			ø20(ø19.05)	ø20/ø25	
C12/16	10 x 10 x 120	6			ø19.05	ø12/ø16	
C32	16 x 16 x 130	5			ø25.4	ø32	
D25	16 x 16 x 150 * Cut-off toolholder : □19mm				ø25.4	ø25	
F10			10 x 10 x 60	10	ø19.05	ø10	
F12			10 x 10 x 60	10	ø19.05	ø12	
F16			10 x 10 x 60	10	ø19.05	ø16	
F20			16(19) x 16(13) x 90	10	ø25.4	ø20	
F25			16(19) x 16(13) x 90	10	ø25.4	ø25	
FL25			16 x 16 x 90	12		ø25	
FL42			16 x 16 x 90	12		ø42	
G32			16(19) x 16(19) x 90	10	-	ø32	
K12/16	12(10) x 12(10) x 100	6(7)			ø19.05/ø20	ø12/ø16	
K12E/K16E	12 x 12 x 120	6			ø19.05/ø20	ø12/ø16	
L10	8 x 8 x 100 ~ 130	5			ø15.875	ø10	
L12	10 x 10 x 100	6			ø19.05	ø12	
L16	12(10) x 12(10) x 130	5			ø19.05	ø16	
L20,L20E	12 x 12 x 130 * Cut-off toolholder : □16mm	5			ø19.05	ø20	
L20X,L220	12(13,16) x 12(13,16) x 120 * Cut-off toolholder : □16mm	5 ~ 7			ø19.05/ø25	ø20	
L25	16 x 16 x 130	5			ø25.4	ø25	
L32	16 x 16 x 130	5			ø25.4	ø32	
M12	10 x 10 x 120	5	10 x 10 x 60	10 + α	ø19.05	ø12	
M16	10 x 10 x 120	5	10 x 10 x 60	10 + α	ø19.05	ø16	
M20	16 x 16 x 130	5	16 x 16 x 90	10 + α	ø25.4	ø20	
M32	16 x 16 x 130	5	16 x 16 x 90	10 + α	ø25.4	ø32	
MC20	13 x 13 x 120	2 + 2 + 2			ø19.05/ø20.0	ø20.0	
MSL12	10 x 10 x 120				-	ø12	
R04	8 x 8 x 120	5			ø15.875	ø4	
R07	8 x 8 x 120	5			ø15.875	ø7	
RL01	10(8) x 10(8) x 90				ø16(ø20)	ø10	
RL02	16 x 16 x 90				ø20	ø20	
RL21	10(12) x 10(12) x 90				ø19.05	ø35	

Manufacturers are in no particular order.

Citizen Machinery (Miyano Products)

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
ABX-51SY2			20 x 20 x 125(100)	24	ø25	48	ø51	
ABX-51SYY2			20 x 20 x 125(100)	24	ø25	48	ø51	
ABX-51TH5			20 x 20 x 125(100)	36	ø25	72	ø51	
ABX-51THY2			20 x 20 x 125(100)	36	ø25	72	ø51	
ABX-64SY2			20 x 20 x 125(100)	24	ø25	48	ø64	
ABX-64SYY2			20 x 20 x 125(100)	24	ø25	48	ø64	
ABX-64TH5			20 x 20 x 125(100)	36	ø25	72	ø64	
ABX-64THY2			20 x 20 x 125(100)	36	ø25	72	ø64	
BNA-34C			20 x 20 x 125(100)	8(16)	ø25	24	ø34	
BNA-34DHY			20 x 20 x 125(100)	14(22)	ø25	27	ø34	
BNA-34S			20 x 20 x 125(100)	8(16)	ø25	24	ø34	
BNA-42C/C2			20 x 20 x 125(100)	8(16)	ø25	24	ø42	
BNA-42DHY			20 x 20 x 125(100)	14(22)	ø25	27	ø42	
BNA-42DHY2			20 x 20 x 125(100)	14(22)	ø25	27	ø42	
BNA-42DHY3			20 x 20 x 125(100)	14(22)	ø25	27	ø42	
BNA-42GTY	20 x 20 x 125(100)	3	20 x 20 x 125(100)	8(16)	ø25	24(7)	ø42	
BNA-42MSY2			20 x 20 x 125(100)	8(16)	ø25	24	ø42	
BNA-42S/S2			20 x 20 x 125(100)	8(16)	ø25	24	ø42	
BNA-42C5/SY5			20 x 20 x 125(100)	12(24)	ø25	24	ø42	
BNC-42C7			20 x 20 x 125(100)	8(16)	ø25	24	ø42	
BND-51C2			20 x 20 x 125(100)	12	ø25	24	ø51	
BND-51S2			20 x 20 x 125(100)	12	ø25	24	ø51	
BND-51SY2			20 x 20 x 125(100)	12	ø25	24	ø51	
BNE-42S6			20 x 20 x 125(100)	24	ø25	48	ø42	
BNE-42SY6			20 x 20 x 125(100)	24	ø25	48	ø42	
BNE-51S6			20 x 20 x 125(100)	24	ø25	48	ø51	
BNE-51SY6			20 x 20 x 125(100)	24	ø25	48	ø51	
BNE-51MSY			20 x 20 x 125(100)	24	ø25	48	ø51	
BNJ-34S3/S5			20 x 20 x 125(100)	18	ø25	30	ø34	
BNJ-34SY3/SY5			20 x 20 x 125(100)	18	ø25	30	ø34	
BNJ-42S3/S5			20 x 20 x 125(100)	18	ø25	30	ø42	
BNJ-42S6			20 x 20 x 125(100)	20	ø25	40	ø42	
BNJ-42SY3/SY5			20 x 20 x 125(100)	18	ø25	30	ø42	
BNJ-42SY5			20 x 20 x 125(100)	18	ø25	30	ø42	
BNJ-42SY6			20 x 20 x 125(100)	20	ø25	40	ø42	
BNJ-51S3/S5			20 x 20 x 125(100)	18	ø25	30	ø51	
BNJ-51SY3/SY5			20 x 20 x 125(100)	18	ø25	30	ø51	
BNJ-51SY6			20 x 20 x 125(100)	20	ø25	40	ø51	
GN-3200	12(16) x 12(16) x 70 ~ 120	4 ~ 5			ø20	4 ~ 5	ø40	
GN-3200W	12(16) x 12(16) x 70 ~ 120	4 ~ 5			ø20	4 ~ 5	ø40	
GN-4200	12(16) x 12(16) x 70 ~ 120	7 ~ 8			ø20	7 ~ 8	ø40	
LX-06E2			20 x 20 x 125(100)	8	ø32	8		6 inch power chuck
LX-06E3			20 x 20 x 125(100)	8	ø32	8		6 inch power chuck
LX-08C			25 x 25 x 150	10	ø40	10		8 inch power chuck
LX-08E2			25 x 25 x 150	8	ø40	8		8 inch power chuck
LX-08E3			25 x 25 x 150	8	ø40	8		8 inch power chuck
LX-08R			20 x 20 x 125(100)	10	ø25	20		8 inch power chuck
LZ-01R2			20 x 20 x 125(100)	12	ø25	24		6 inch power chuck
LZ-01RY2			20 x 20 x 125(100)	12	ø25	24		6 inch power chuck
LZ-02R2			20 x 20 x 125(100)	10	ø25	20		8 inch power chuck
LZ-02RY2			20 x 20 x 125(100)	10	ø25	20		8 inch power chuck
RL01Ⅲ	10 x 10 x 70 ~ 120	2 ~ 3			ø16	2 ~ 3	ø10	
RL01Ⅴ	10 x 10 x 70 ~ 120	2 ~ 3			ø16	2 ~ 3	ø10	
RL03	12(16) x 12(16) x 70 ~ 120	4 ~ 5			ø20	4 ~ 5	ø40	
VC03	12(16) x 12(16) x 70 ~ 120	4 ~ 5			ø20	4 ~ 5	ø40	

* Number of tools shown in parentheses is the maximum number of toolholder mountable including ø25 sleeves.

Manufacturers are in no particular order.

Star Micronics

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
ECAS-12	10 x 10 x 95 ~ 150	6			ø22	4/4	ø13	
ECAS-20T			16 x 16 x 60 ~ 78(80 ~ 88)		ø22/ø32		ø20	
ECAS-32T			16 x 16 x 60 ~ 78(80 ~ 88)	10	ø22/ø32		ø32	
JNC-10			8 x 8 x 65	6			ø10	
JNC-16			10 x 10 x 80	6			ø16	
JNC-25/32			10 x 10 x 78 ~ 120	10	ø22		ø25/ø32	
KJR-16B/25B			16 x 16 x 78	12/16	ø22/ø32		ø16/ø25	
KNC-16/20			16 x 16 x 68	16	ø22		ø16/ø20	
KNC-25Ⅱ/32Ⅱ			16 x 16 x 78	20	ø22/ø32		ø25/ø32	
RNC-10	10 x 10 x 80 ~ 120	5			ø22		ø10/ø10	
RNC-16	10 x 10 x 80 ~ 120	5			ø22		ø16	
SA-16R	10 x 10 x 95 ~ 120	6			ø22	4/4	ø16	
SB-16 (A/C/D/E)	12 x 12 x 95 ~ 130	5			ø22/(ø22)	4/4	ø16	Only D/E for back clamp sleeves
	12(10) x 12(10) x 95 ~ 130	6			ø22/(ø22)	4/4	ø16	
SB-12Ⅱ (C/E)	12 x 12 x 95 ~ 130	6			ø22/(ø22)	4/4	ø13	Only E for back clamp sleeves
SB-16Ⅱ (C/E)	12(10) x 12(10) x 95 ~ 130	6			ø22/(ø22)	4/4	ø16	
SB-20 A/C/E	12 x 12 x 95 ~ 130	6			ø22/ø22	4/4	ø20	
SB-12R typeG	12 x 12 x 95 ~ 130	6			ø22/ø22	4/4	ø13	
	10 x 10 x 95 ~ 130	7			ø22/ø22	4/4		
SB-16Ⅲ	12 x 12 x 95 ~ 130	5			ø22/ø22	4/4	ø16	
	10 x 10 x 95 ~ 130	6			ø22/ø22	4/4	ø16	
SB-16R/20R typeN	12 x 12 x 95 ~ 130	6			ø22/ø22	4/4	ø16/ø23	
	10 x 10 x 95 ~ 130	7			ø22/ø22	4/4		
SB-16R/20R typeG	12 x 12 x 95 ~ 130	6			ø22/ø22	4/4	ø16/ø23	
	10 x 10 x 95 ~ 130	7			ø22/ø22	4/4		
SB-16R/20R typeGB	12 x 12 x 95 ~ 130	6			ø22/ø22	4/4	ø16/ø23	
	10 x 10 x 95 ~ 130	7			ø22/ø22	4/4		
SC20	12 x 12 x 95 ~ 130	5			ø22/-	4/4	ø20	
	10 x 10 x 95 ~ 130	6				4/4	ø20	
SE-12B/16B	10 x 10 x 95 ~ 120	5			ø22	3/3	ø13/ø16	
SG-42			16 x 16 x 84 ~ 88(71 ~ 82)		ø22/ø32		ø42	
			20 x 20 x 84 ~ 88					
SH-7	8 x 8 x 95 ~ 120	5			ø22	3	ø7	
SH-12/16	10 x 10 x 95 ~ 120	5			ø22	3	ø13/ø16	
SR-10J	8 x 8 x 67 ~ 110 (Spacer is needed)	6			ø16	4	ø10	
SR-20RⅡ	12 x 12 x 100 ~ 135	6			ø22/ø22	4/4	ø23	
SR-20RⅢ	12 x 12 x 95 ~ 135	6			ø22/ø22	6/4	ø23	Toolpost for 2 toolholders (deep boring) on the front side
SR-20J typeC	12 x 12 x 95 ~ 135	6			ø22/ø22	6/4	ø23	
SR-20J typeN	12 x 12 x 95 ~ 135	6			ø22/ø22	6/4	ø23	
SR-20JⅡ typeA	12 x 12 x 100 ~ 135	6			ø22/ø22	7/4	ø23	
SR-20JⅡ typeB	12 x 12 x 100 ~ 135	6			ø22/ø22	7/8	ø23	
SR-20Ⅳ typeA	12 x 12 x 100 ~ 130	7			ø22/ø22	6/8	ø23	
SR-20Ⅳ typeB	12 x 12 x 100 ~ 130	7			ø22/ø22	6/8	ø23	
SR-25J/32J	16 x 16 x 95 ~ 155	6			ø22+ø32/ø22	4/4	ø32	
SR-32JⅡ typeA	16 x 16 x 95 ~ 165	6			ø22+ø32/ø22	5/8	ø34	
SR-32JⅡ typeB	16 x 16 x 95 ~ 165	6			ø22+ø32/ø22	5/8	ø34	
SR-38typeA	16 x 16 x 95 ~ 135	4			ø22+ø32	5/8	ø38	
	16 x 16 x 100	2						
	20 x 20 x 105 ~ 135(Cut-off)	1						
SR-38typeB	16 x 16 x 95 ~ 135	4			ø22+ø32	5/8	ø38	
	16 x 16 x 100	2						
	20 x 20 x 105 ~ 135(Cut-off)	1						
SR-38J	16 x 16 x 95 ~ 135	4			ø22+ø32	5/4	ø38	
	16 x 16 x 95 ~ 135(Optional)	3						
	20 x 20 x 105 ~ 135(Cut-off)	1						
ST-20			12 x 12 x 73 ~ 79		ø22/ø32		ø20	
			12 x 12 x 65 ~ 73(Cut-off)					
			16 x 16 x 64 ~ 73					
			16 x 16 x 65 ~ 73(Cut-off)					
ST-38			16 x 16 x 83 ~ 88		ø22/ø32		ø38	
			16 x 16 x 71 ~ 82					
			16 x 16 x 84 ~ 88(Cut-off)					
			20 x 20 x 84 ~ 88					
			20 x 20 x 84 ~ 88(Cut-off)					
SV-20R	12 x 12 x 95 ~ 135	7	12 x 12 x 70 ~ 78		ø22/ø32	- / 8	ø23	
	16 x 16 x 95 ~ 135	6	16 x 16 x 65 ~ 70					
SV-38R	16 x 16 x 105 ~ 135	4	16 x 16 x 84 ~ 88		ø22/ø32	- / 8	ø38	
	20 x 20 x 115 ~ 135(Cut-off)	1	16 x 16 x 71 ~ 82					
			20 x 20 x 84 ~ 88					

Manufacturers are in no particular order.

Star Micronics

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
SX-38typeA	16 x 16 x 95 ~ 135	4	16 x 16 x 84 ~ 88		ø22/ø32	- / 8	ø38	
	20 x 20 x 105 ~ 135(Cut-off)	1	16 x 16 x 71 ~ 82					
			20 x 20 x 84 ~ 88					
SX-38typeB	16 × 16 × 95 ~ 135	4	16 x 16 x 84 ~ 88		ø22/ø32	- / 8	ø38	
	20 x 20 x 105 ~ 135(Cut-off)	1	16 x 16 x 71 ~ 82					
			20 x 20 x 84 ~ 88					
SV-12/20	12 x 12 x 95 ~ 135	5	12 x 12 x 70 ~ 78		ø22/ø32		ø12/ø20	
	16 x 16 x 95 ~ 135	4	16 x 16 x 65 ~ 70					
SV-32	16 x 16 x 95 ~ 135	4	16 x 16 x 60 ~ 78(80 ~ 88)		ø22/ø32		ø32	
SW-7	8 x 8 x 80 ~ 120	6				4/4	ø7	
SW-12RII	10 x 10 x 95 ~ 115	7			ø16/ø16+ø22	4/8	ø13	
SW-20	12 x 12 x 80 ~ 150	6			ø22	4/8	ø23	
	16 x 16 x 80 ~ 144							

Manufacturers are in no particular order.

Eguro

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
EBN-10EX	12 x 12	6			ø20		ø25.5	
NUCBOY-8EX	12 x 12	6			ø20		ø20	
NUCLET-10EX/EL	16 x 16	6			ø20/ø25		ø25.5	
NUCPAL-10EX/EL	16 x 16	6			ø20/ø25		ø25.5	
NUCLET-10vv	16 x 16	6			ø20/ø25		ø25.5	
SANAX-6	12 x 12	10			ø16		ø15	
SANAX-10	16 x 16	10			ø25/ø30		ø25.5	
SANATURN-6	12 x 12	5			ø16		ø15	
SANATURN-10	16 x 16	5			ø25/ø30		ø25.5	
NUCBOY-8LL	12 x 12	2			ø20		ø20	
NUCLET-10LL	16 x 16	3			ø20/ø25		ø25.5	
NUCROBO-8EX	12 x 12	6			ø20		ø20	
NUCROBO-101	16 x 16	6			ø20/ø25		ø25.5	
NUCROBO-202	16 x 16	6			ø20/ø25		ø25.5	
GL-120	12 x 12	4			-		ø20	
EB-8	10 x 10	2			-		ø20	
EB-10	10 x 10	2			-		ø25.5	
LB-6	8 x 8	2			-		ø15	

Manufacturers are in no particular order.

Tsugami

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
B073-Ⅲ	8 x 8 x 85	9	-	-	ø20/-	4/-	ø7	
B074/075-Ⅲ	8 x 8 x 85	9	-	-	ø20/ø20	4/4(8)	ø7	
B0123-Ⅲ	12 x 12 x 85	9	-	-	ø20/-	4/-	ø12	
B0124/125/126-Ⅲ	12 x 12 x 85	9	-	-	ø20/ø20	4/4(8)	ø12	
B0128W	12 x 12 x 85	9	-	-	ø20/ø20	4/8	ø12	
B0203-Ⅲ	12 x 12 x 85	9	-	-	ø20/-	4/-	ø20	
B0204/205/206-Ⅲ	12 x 12 x 85	9	-	-	ø20/ø20	4/4(8)	ø20	
B0208W	12 x 12 x 85	9	-	-	ø20/ø20	4/8	ø20	
BM163-Ⅲ	12 x 12 x 85	9	-	-	ø20/-	4/-	ø16	
BM164/165-Ⅲ	12 x 12 x 85	9	-	-	ø20/ø20	4/4(8)	ø16	
BW127J-Ⅰ / Ⅱ	12 x 12 x 85	7	-	-	ø20/ø20	3/9	ø20	
BW128J-Ⅰ / Ⅱ	12 x 12 x 85	7	-	-	ø20/ø20	3/9	ø20	
BW128ZJ-Ⅰ / Ⅱ	12 x 12 x 85	7	-	-	ø20/ø20	3/9	ø20	
BW129ZJ-Ⅰ / Ⅱ	12 x 12 x 85	7	-	-	ø20/ø20	3/9	ø20	
BW207J-Ⅰ / Ⅱ	12 x 12 x 85/16 x 16 x 85	5/2	-	-	ø20/ø20	3/9	ø20	
BW208J-Ⅰ / Ⅱ	12 x 12 x 85/16 x 16 x 85	5/2	-	-	ø20/ø20	3/9	ø20	
BW208ZJ-Ⅰ / Ⅱ	12 x 12 x 85/16 x 16 x 85	5/2	-	-	ø20/ø20	3/9	ø20	
BW209ZJ-Ⅰ / Ⅱ	12 x 12 x 85/16 x 16 x 85	5/2	-	-	ø20/ø20	3/9	ø20	
B0265/265B/266-Ⅱ	16 x 16 x 100	12	-	-	ø25/ø25	5/4	ø26	
B0325/325B/326-Ⅱ	16 x 16 x 100	12	-	-	ø25/ø25	5/4	ø32	
B0385/385L	20 x 20 x 125	8	-	-	ø32/ø32	3/5	ø38	
B0265/266-Ⅲ, B0266/326-Ⅲ	16 x 16 x 100	12	-	-	ø25/ø25	5/4	ø26/ø32	
B0265/325V-Ⅲ, B0266/326V-Ⅲ	16 x 16 x 100	6	-	-	ø25/ø25	5/4	ø26/ø32	
B0385/6 (L)-Ⅲ	16 x 16 x 100/20 x 20 x 125	11/1	-	-	ø32,ø25/ø32	3-2/5	ø38	
B0385/6 (L)V-Ⅲ	16 x 16 x 100/20 x 20 x 125	5/1	-	-	ø32,ø25/ø32	3-2/5	ø38	
B038T	-	-	20 x 20 x 125	St.8	ø32/ø25		ø38	
BH20/BH20Z	12 x 12 x 85	4	12 x 12 x 85	St.12	ø25/ø32		ø20	
BH38	16 x 16 x 125	5	20 x 20 x 125	St.12	ø25/ø32		ø38.1	
C150/CH154	12 x 12 x 60 ~ 100	4 ~ 6	-	-	-		ø80	
C180	12 x 12 x 60 ~ 100	4 ~ 6	-	-	-		ø120	
C220/220T	12 x 12 x 60 ~ 100	6 ~ 8	-	-	-		ø120	
C300-Ⅳ	16 x 16 x 100 ~ 130	6 ~ 10	-	-	-		ø165	
C300H	16 x 16 x 100 ~ 130	6 ~ 10	-	-	-		ø165	
P013	8 x 8 x 100 ~ 120	6	-	-	ø16/-	3/-	ø1	
P014	8 x 8 x 100 ~ 120	6	-	-	ø16/ø16	3/3	ø1	
P033	8 x 8 x 100 ~ 120	6	-	-	ø16/-	3/-	ø3	
P034	8 x 8 x 100 ~ 120	6	-	-	ø16/ø16	3/3	ø3	
S205/206	12 x 12 x 100	8	-	-	ø22/ø20	5/4	ø20	
S205/206-Ⅱ	12 x 12 x 100	9	-	-	ø25/ø25	7/4(8)	ø20	
SS207/SS207-5AX	12 x 12 x 100	8	-	-	ø22/ø20	4/4	ø20	
SS26	16 x 16 x 100	7	-	-	ø22/ø20	5/3	ø26	
SS32/32L	16 x 16 x 100	7	-	-	ø22/ø20	5/3	ø32	
SS267/SS267-5AX	16 x 16 x 100	8	-	-	ø25/ø25	4/4	ø26	
SS327/SS327-5AX	16 x 16 x 100	8	-	-	ø25/ø25	4/4	ø32	
BW269ZJ	16 x 16 x 100	7	-	-	ø25/ø25	5/(8)	ø26	
BW329ZJ	16 x 16 x 100	7	-	-	ø25/ø25	5/(8)	ø32	
MB25	-	-	20 x 20 x 90	2 x St.8	ø20/ø32	5/4	ø25	
M06JC-Ⅱ		-	20 x 20 x 125	St.8	ø25		ø220/ø42	
M06J-Ⅱ		-	25 x 25 x 150	St.8	ø32/ø40		ø260/ø51	
M08J-Ⅱ		-	25 x 25 x 150	St.8	ø32/ø40		ø280/ø65	
M08JL5-Ⅱ		-	25 x 25 x 150	St.8	ø32/ø40		ø280/ø65	
M08JL8-Ⅱ		-	25 x 25 x 150	St.8	ø32/ø40		ø280/ø65	
M06D-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø260/ø51	
M08D-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø280/ø65	
M06DY-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø260/ø51	
M08DY-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø280/ø65	
M06SJ-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø260/ø51	
M08SJ-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø280/ø65	
M06SD-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø260/ø51	
M08SD-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø280/ø65	
M06SY-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø260/ø51	
M08SY-Ⅱ		-	25 x 25 x 150	St.12	ø40		ø280/ø65	
TMU1	20 x 20 x 100 ~ 125	1	20 x 20 x 125	St.16	ø32/ø32		ø38	
TMB2	20 x 20 x 100 ~ 125	1	20 x 20 x 125	St.16	ø32/ø32		ø51	
TMA8F	20 x 20 x 100 ~ 125	1			ø32/ø32		ø65	
TMA8J	20 x 20 x 100 ~ 125	1			ø32/ø32		ø65	
TMA8H	20 x 20 x 100 ~ 125	1			ø32/ø32		ø65	

Manufacturers are in no particular order.

Nomura DS

Model	Toolholder Dimensions (Gang tool post)	Number of tools	Toolholder Dimensions (Turret tool post)	Number of tools	Sleeve Dia. (Horizontal/Opposed)	Number of tools	Max. Cutting Dia.	Remarks
NN-10C	10 x 10 x 130	6			ø17		ø10	
NN-10CS	10 x 10 x 130	5			ø17	4	ø10	
NN-10SⅡ	10 x 10 x 130	5			ø23		ø10	
NN-10T	10 x 10 x 130	7			ø23		ø10	
NN-10SB5	10 x 10 x 130	5			ø23		ø13	
NN-10EX2	10 x 10 x 120	6			ø16	4	ø10	
NN-10EX2	10 x 10 x 80	7			ø16	4	ø10	
NN-16SB5	10 x 10 x 130	5			ø23		ø16	
NN-16SB6 Type1	12.7 x 12.7 x 130	7			ø17(ø22)	4	ø16	
NN-16SB6 Type2	12.7 x 12.7 x 130	5			ø17(ø22)	4	ø16	
NN-16SB6 Type2.5	12.7 x 12.7 x 130	6			ø17(ø22)	5	ø16	
NN-16SB6 Type3	12.7 x 12.7 x 130	5			ø17(ø22)	4	ø16	
NN-16SB7	12.7 x 12.7 x 130	5			ø16	4	ø16	
NN-16HⅢ	12 x 12 x 130	6			ø23		ø16	
NN-20HⅢ	12 x 12 x 130	6			ø23		ø20	
NN-16UⅢ	12 x 12 x 130	5			ø23		ø16	
NN-20UⅢ	12 x 12 x 130	5			ø23		ø20	
NN-20CS	12.7 x 12.7 x 130	5(6)			ø22	4	ø20(ø25)	
NN-20U5	12.7 x 12.7 x 150	5(6)			ø22	4	ø20(ø25)	
NN-32U5	16 x 16 x 130	2			ø22	3	ø32	
	12.7 x 12.7 x 150	3(4)			ø32	1		
NN-16UB5	12 x 12 x 130	5			ø23		ø16	
NN-20UB5	12 x 12 x 130	5			ø23		ø20	
NN-20UB7	12 x 12 x 130	6			ø23		ø20	
NN-20UB8	12.7 x 12.7 x 150	5(6)			ø22	4	ø20(ø25)	
NN-32UB8	16 x 16 x 130	2			ø22	3	ø32	
	12.7 x 12.7 x 150	3(4)			ø32	1		
NN-20YB	12 x 12 x 130	6			ø23		ø20	
NN-25YB/32YB	16 x 16 x 130	5			ø23/ø32		ø25/ø32	
NN-32YB5	16 x 16 x 130	5			ø22/ø32	4	ø32	
NN-32YB5 XB	16 x 16 x 130	6			ø22/ø32	5/1	ø32	
NN-16J	12.7 x 12.7 x 130	6			ø23		ø16	
NN-20J	12.7 x 12.7 x 130	6			ø23		ø20	
NN-20J2	12.7 x 12.7 x 130	6			ø22	4	ø20	
NN-20J5	12.7 x 12.7 x 130	6			ø22	4	ø20	
NN-20J5 XB	12.7 x 12.7 x 130	5			ø22	4	ø20	
NN-32DB	16 x 16 x 130	8			ø22	4	ø32	
					ø32	1		

Manufacturers are in no particular order.

List of Instruments and Applicable Small Parts Machining and Toolholders

List of Instruments and Applicable Small Parts Machining and Toolholders

Models of major machine tool manufacturers				Applicable Toolholders
Manufacturer	Model (Automatic Lathe)	Toolholder Size	Total Length of Attached Toolholder (MAX.)	
Citizen Machinery	A12,A16,B12,L12,RL01,RL21	10 x 10	100	…1010F-..
	K12,K16	12 x 12		…1212F-..
	RL02	16 x 16		…1616H-..
	B12E,B16E,BL12,C12,C16,M12,M16 MSL12	10 x 10	120	…1010JX-..
	A20,A20Ⅶ,B20,BL20,BL25,K12E,K16E L20X,L220,MC20	12 x 12		…1212JX-..
	L16,L20,L20E	12 x 12	130	…1212JX-..
	C32,L25,L32,M20,M32	16 x 16		…1616JX-..
	A32,D25		150	
Star Micronics	RNC-10,RNC-16,SA-16R,SE-12B/16B SH-12/16,SW-12RⅡ	10 x 10	120	…1010JX-..
	SB-16A,SB-16C,SB-16D,SB-12Ⅱ,SB-16Ⅱ SB-12R/16R/20R,SR-20Ⅳ,SB-20A/C/E,SC20	12 x 12	130	…1212JX-..
	SR-20RⅡ,SR-20Ⅲ,SV-12,SV-20,SR-20J	12 x 12	135	…1212JX-..
	SV-20R,SV-32,SV-38R,SR-38J,SX-38	16 x 16		…1616JX-..
	ECAS-12	10 x 10	150	…1010JX-..
	ECAS-20	12 x 12		…1212JX-..
	SR-25J,SR-32J,SW-20	16 x 16		…1616JX-..
Tsugami	B0,BH20,BM,BW2	12 x 12	85	…1212F-..
	C150,C180,C220,S205,S206,SS207	12 x 12	100	…1212F-..
	BH38,B0265,B0266,B0325,B0326 SS26,SS32/32L,SS267,SS327	16 x 16		…1616H-..
Nomura DS	NN-10C,NN-10CS,NN-10EX2,NN-10SⅡ NN-10SB5,NN-10T,NN-16SB5	10 x 10	130	…1010JX-..
	NN-16HⅢ,NN-16UB5,NN-16UⅢ NN-20HⅢ,NN-20UⅢ,NN-20UB5,NN-20YB	12 x 12		…1212JX-..
	NN-25YB,NN-32YB5	16 x 16		…1616JX-..

Manufacturers are in no particular order.

Parts Compatibility of Lever Lock Toolholders

1) For better usability of lever lock toolholders, some levers, lock screws and shims are modified.
2) It is highly recommended to use only new parts. However, they are compatible with conventional parts and can be used together with them.
3) It is possible to use new parts only with a toolholder which has been in use.
4) When purchasing replacements, order them stating the new numbers.
5) Some of the shims remain unmodified.

Classification	See Page	Toolholder Description		Spare Parts					
				Lever		Lock Screw		Shim	
				New No.	Conventional	New No.	Conventional	New No.	Conventional
External Turning Toolholders	D9	PCLNR/L	....-09	LL-1N	LL-1	LS-1N	LS-1	LC-32N	LC-32
			....-12	LL-2N	LL-2	LS-2N	LS-2	LC-42N	LC-42
			....-16	LL-5N	LL-5	LS-4N	LS-4	LC-53N	LC-53
	D13	PDJNR/L	....-11	LL-1DN	LL-1D	LS-1N	LS-1	LD-32N	LD-32
			....-15	LL-3N	LL-3	LS-2N	LS-2	LD-42	
	D14	PSBNR/L	....-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			....-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
		PSKNR/L	....-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			....-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
	D15	PSSNR/L	....-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			....-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
		PSDNN	....-09	LL-1N	LL-1	LS-1N	LS-1	LS-32	
			....-12	LL-2N	LL-2	LS-2N	LS-2	LS-42	
	D17	PTGNR/L	1212F-11	LL-03N	LL-03	LS-03N	LS-03	-	
			....-11	LL-03TN	LL-03T	LS-03SN	LS-03S	-	
			....-16	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
			....-22	LL-2N	LL-2	LS-2N	LS-2	LT-42N	LT-42
		PTFNR/L	1212F-11	LL-03N	LL-03	LS-03N	LS-03	-	
			....-11	LL-03TN	LL-03T	LS-03SN	LS-03S	-	
			....-16	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
			....-22	LL-2N	LL-2	LS-2N	LS-2	LT-42N	LT-42
	D23	PRGCR/L	....-12	LL-1CN	LL-1C	LS-1N	LS-1	LR-12C	
		PRXCR/L	....-12						
		PRGNR/L	....-09	LL-1N	LL-1	LS-1N	LS-1	LR-80	
			....-12	LL-2N	LL-2	LS-2N	LS-2	LR-81	
	D25	PWLNR/L	....-06	LL-1N	LL-1	LS-1N	LS-1	LW-32N	LW-32
			....-08	LL-2N	LL-2	LS-2N	LS-2	LW-42N	LW-42
Boring Bars	F70	□16M- PCLNR/L	09-20	LL-03SN	LL-03S	LS-03SN	LS-03S	-	
		□20Q-	09-27	LL-1N	LL-1	LS-1SN	LS-1S	LC-32N	LC-32
		□25R-	09-32						
		....- PCLNR/L	12-..	LL-2N	LL-2	LS-2N	LS-2	LC-42NR/L	LC-42R/L
	F71	....- PDUNR/L	11-..	LL-1DN	LL-1D	LS-1SN	LS-1S	LD-32N	LD-32
	F77	....- PTUNR/L	11-..	LL-03TN	LL-03T	LS-03SN	LS-03S	-	
		S25R- PTUNR/L	16-30	LL-03SN	LL-03S	LS-03SN	LS-03S	-	
		S32S-	16-40	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
		S40T-	16-50						
	F78	□16M- PWLNR/L	06-20	LL-03SN	LL-03S	LS-03SN	LS-03S	-	
		□20Q-	06-27	LL-1N	LL-1	LS-1SN	LS-1S	LW-32N	LW-32
		□25R-	06-32						
	F80	....- PWLNR/L	08-..	LL-2N	LL-2	LS-2N	LS-2	LW-42NR/L	LW-42R/L
Turning Mill	N15	T63H- PCLNR/L	-DX12	LL-2N	LL-2	LS-2N	LS-2	LC-42N	LC-42
		T63H- PCMNN	-□12						
		T63H- PDJNR/L	-DX15	LL-3N	LL-3	LS-2N	LS-2	LD-42	
	N16	T63H- PDNNN	-□15						
		T63H- PTGNR/L	-DX16	LL-1N	LL-1	LS-1N	LS-1	LT-32N	LT-32
	N17	T63H- PWLNR/L	-DX08	LL-2N	LL-2	LS-2N	LS-2	LW-42N	LW-42



Index

T1~T21

Index Descriptions of the products described in this book are listed in alphabetic order.

Description Index

○ : Figure, □ : Alphabet

Description		Page	Category
Numeric (Threading Insert)			
06IR	○○○○(○)	**J17,J19**	Insert (Threading)
08IR	○○○○(○)	**J17,J19**	Insert (Threading)
11IR	○○BSPT	**J13**	Insert (Threading)
11IR	○○BSPT-TF	**J13**	Insert (Threading) / TF series
11IR	○○BSPT-TQ	**J13**	Insert (Threading) / TQ series
11IR/L	○○○ISO	**J7**	Insert (Threading)
11IR	○○○ISO-TF	**J7**	Insert (Threading) / TF series
11IR	○○○ISO-TQ	**J7**	Insert (Threading) / TQ series
11IR	○○○○○	**J17,J19**	Insert (Threading)
11IR	A○○	**J17,J19**	Insert (Threading)
16ER	○○BSPT	**J12**	Insert (Threading)
16ER	○○BSPT-TF	**J12**	Insert (Threading) / TF series
16ER	○○BSPT-TQ	**J12**	Insert (Threading) / TQ series
16ER	○○(.○)NPT	**J14**	Insert (Threading)
16ER	○○UN	**J8**	Insert (Threading)
16ER	○○UN-TF	**J8**	Insert (Threading) / TF series
16ER	○○UN-TQ	**J8**	Insert (Threading) / TQ series
16ER	○○W	**J10**	Insert (Threading)
16ER	○○W-TF	**J10**	Insert (Threading) / TF series
16ER	○○W-TQ	**J10**	Insert (Threading) / TQ series
16ER/L	○○○ISO	**J6**	Insert (Threading)
16ER	○○○ISO-TF	**J6**	Insert (Threading) / TF series
16ER	○○○ISO-TQ	**J6**	Insert (Threading) / TQ series
16ER	○○○TR	**J18**	Insert (Threading)
16ER	○○○○	**J16,J18**	Insert (Threading)
16ER	A○○	**J16,J18**	Insert (Threading)
16ER	AG○○	**J16,J18**	Insert (Threading)
16ER	G○○	**J16,J18**	Insert (Threading)
16ER	A○○-TF	**J16,J18**	Insert (Threading) / TF series
16ER	A○○-TQ	**J16,J18**	Insert (Threading) / TQ series
16ER	AG○○-TF	**J16,J18**	Insert (Threading) / TF series
16ER	AG○○-TQ	**J16,J18**	Insert (Threading) / TQ series
16ER	G○○-TF	**J16,J18**	Insert (Threading) / TF series
16ER	G○○-TQ	**J16,J18**	Insert (Threading) / TQ series
16IR	○○BSPT	**J13**	Insert (Threading)
16IR	○○BSPT-TF	**J13**	Insert (Threading) / TF series
16IR	○○BSPT-TQ	**J13**	Insert (Threading) / TQ series
16IR	○○(.○)NPT	**J15**	Insert (Threading)
16IR	○○UN	**J9**	Insert (Threading)
16IR	○○UN-TF	**J9**	Insert (Threading) / TF series
16IR	○○UN-TQ	**J9**	Insert (Threading) / TQ series
16IR	○○W	**J11**	Insert (Threading)
16IR	○○W-TF	**J11**	Insert (Threading) / TF series
16IR	○○W-TQ	**J11**	Insert (Threading) / TQ series
16IR/L	○○○ISO	**J7**	Insert (Threading)
16IR	○○○ISO-TF	**J7**	Insert (Threading) / TF series
16IR	○○○ISO-TQ	**J7**	Insert (Threading) / TQ series
16IR	○○○TR	**J19**	Insert (Threading)
16IR	○○○○(○)	**J17,J19**	Insert (Threading)
16IR	A○○	**J17,J19**	Insert (Threading)
16IR	AG○○	**J17,J19**	Insert (Threading)
16IR	G○○	**J17,J19**	Insert (Threading)
22ER	○○UN	**J8**	Insert (Threading)
22ER	○○○ISO	**J6**	Insert (Threading)
22ER	○○○TR	**J18**	Insert (Threading)
22ER	N○○	**J16,J18**	Insert (Threading)
22IR	○○UN	**J9**	Insert (Threading)
22IR	○○○ISO	**J7**	Insert (Threading)
22IR	○○○TR	**J19**	Insert (Threading)
22IR	N○○	**J17,J19**	Insert (Threading)
Numeric (Solid Tools)			
2FEKM	○○○-○○○-○○	**L12**	Solid End Mill
2FEKS	○○○-○○○-○○	**L12**	Solid End Mill
2FESL	○○○-○○○-○○	**L11**	Solid End Mill
2FESM	○○○-○○○-○○	**L10,L11**	Solid End Mill
2FESS	○○○-○○○-○○	**L10**	Solid End Mill
2FESW	○○○-○○○-○○(A)	**L14**	Solid End Mill (for Automatic Lathes)
2SEB	○○○-○○○-R○○	**L35**	Solid End Mill (Ball-nose)
2ZDF	○○○○○-KCD	**L47**	Solid Drill (Diamond Coated)
2ZDK	○○○	**L62**	Flat Bottom Drill
2ZDK	○○○HP-1.5D	**L50,L51**	Flat Bottom Drill
2ZDK	○○○HP-1.5D-LS	**L52,L53**	Flat Bottom Drill
2ZDK	○○○HP-3D	**L54,L55**	Flat Bottom Drill
2ZDK	○○○HP-3D-OH	**L56,L57**	Flat Bottom Drill
2ZDK	○○○S	**L60,L61**	Flat Bottom Drill
2ZDK	○○○S-P	**L60**	Flat Bottom Drill
3AFK	○○○-○○○(-○○○)	**L42,L43**	Solid End Mill
3FESW	○○○-○○○-○○(A)	**L14**	Solid End Mill (for Automatic Lathes)
3NESM	○○○-○○○-○○	**L44**	Solid End Mill
3RDSL	○○○-○○○-○○	**L32**	Solid End Mill
3RDSM	○○○-○○○-○○	**L32**	Solid End Mill
3UEBS	○○○-○○○-○○	**L36**	Solid End Mill (Ball-nose)
3UFSM	○○○-○○○-○○	**L25**	Solid End Mill
3ZFKM	○○○-○○○-○○	**L23**	Solid End Mill
3ZFKS	○○○-○○○-○○	**L23**	Solid End Mill
4FCX	○○○-○○○-KCD	**L47**	Solid End Mill (Diamond Coated)
4FEKM	○○○-○○○-○○	**L13**	Solid End Mill
4FESM	○○○-○○○-○○	**L13**	Solid End Mill
4FESW	○○○-○○○-○○	**L15**	Solid End Mill (for Automatic Lathes)
4HFSM	○○○-○○○-○○	**L37**	Solid End Mill
4HFSS	○○○-○○○-○○	**L37**	Solid End Mill
4JER	○○○-○○○-R○○	**L29**	Solid End Mill
4JER	○○○-○○○-R○○-XT	**L29**	Solid End Mill
4MFK	○○○-○○○(-○○○)	**L18**	Solid End Mill
4MFR	○○○-○○○-R○○	**L19**	Solid End Mill
4RDSL	○○○-○○○-○○	**L32**	Solid End Mill
4RDSM	○○○-○○○-○○	**L32**	Solid End Mill
4RFH	○○○-○○○	**L31**	Solid End Mill
4RFSM	○○○-○○○-○○	**L33**	Solid End Mill
4TFK	○○○-○○○	**L21**	Solid End Mill
4TFR	○○○-○○○-R○○	**L21**	Solid End Mill
4TFR	○○○-○○○-R○○-XT	**L21**	Solid End Mill
4YEBM	○○○-○○○-○○	**L36**	Solid End Mill (Ball-nose)
5DERM	○○○-○○○-○○-R○○○	**L24**	Solid End Mill
5HFSM	○○○-○○○-○○	**L37**	Solid End Mill
5HFSS	○○○-○○○-○○	**L37**	Solid End Mill
5RDSL	○○○-○○○-○○	**L32**	Solid End Mill
5RDSM	○○○-○○○-○○	**L32**	Solid End Mill
5RFH	○○○-○○○	**L31**	Solid End Mill
6HFSM	○○○-○○○-○○	**L37**	Solid End Mill
6HFSS	○○○-○○○-○○	**L37**	Solid End Mill
6PDRS	○○○-○○○-○○	**L38**	Solid End Mill
6PFK	○○○-○○○(○)	**L27**	Solid End Mill
6RFH	○○○-○○○(○)	**L31**	Solid End Mill
6RFSM	○○○-○○○-○○	**L33**	Solid End Mill
7HFSM	○○○-○○○-○○	**L37**	Solid End Mill
7HFSS	○○○-○○○-○○	**L37**	Solid End Mill
8HFSM	○○○-○○○-○○	**L37**	Solid End Mill
8PFK	○○○-○○○(○)	**L27**	Solid End Mill
Numeric			
556C R/L		**D27,P8**	Spare Parts (Shim)
A			
A○○□-	DCLN R/L○○-○○	**F69**	Boring Bars (Double Clamp)
A○○□-	DDUN R/L○○-○○	**F72**	Boring Bars (Double Clamp)
A○○□-	DSKN R/L○○-○○	**F75**	Boring Bars (Double Clamp)

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Description		Page	Category
A○○□-	DTFN$^{R}_{L}$○○-○○	**F76**	Boring Bars (Double Clamp)
A○○□-	DWLN$^{R}_{L}$○○-○○	**F79**	Boring Bars (Double Clamp)
A○○□-	PCLNR○○-○○	**F70**	Boring Bars
A○○□-	PDUNR○○-○○	**F71**	Boring Bars
A○○□-	PTUNR○○-○○	**F77**	Boring Bars
A○○□-	PWLNR○○-○○	**F78**	Boring Bars
A○○□-	SCLC$^{R}_{L}$○○-○○AE	**F41**	Boring Bars (Dynamic Bar)
A○○□-	SCLC$^{R}_{L}$○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
A○○□-	SCLP$^{R}_{L}$○○-○○AE	**F43**	Boring Bars (Dynamic Bar)
A○○□-	SCLP$^{R}_{L}$○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
A○○□-	SDQC$^{R}_{L}$○○-○○AE	**F46**	Boring Bars (Dynamic Bar)
A○○□-	SDUC$^{R}_{L}$○○-○○AE	**F45**	Boring Bars (Dynamic Bar)
A○○□-	SDZC$^{R}_{L}$○○-○○AE	**F47**	Boring Bars (Dynamic Bar)
A○○□-	STLC$^{R}_{L}$○○-○○AE	**F49**	Boring Bars (Dynamic Bar)
A○○□-	STLP$^{R}_{L}$○○-○○AE	**F51**	Boring Bars (Dynamic Bar)
A○○□-	STUP$^{R}_{L}$○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
A○○□-	SVJB$^{R}_{L}$○○-○○AE	**F54**	Boring Bars (Dynamic Bar)
A○○□-	SVJC$^{R}_{L}$○○-○○AE	**F54**	Boring Bars (Dynamic Bar)
A○○□-	SVJP$^{R}_{L}$○○-○○AE	**F54**	Boring Bars (Dynamic Bar)
A○○□-	SVPB$^{R}_{L}$○○-○○AE	**F56**	Boring Bars (Dynamic Bar)
A○○□-	SVPC$^{R}_{L}$○○-○○AE	**F56**	Boring Bars (Dynamic Bar)
A○○□-	SVUB$^{R}_{L}$○○-○○AE	**F59**	Boring Bars (Dynamic Bar)
A○○□-	SVUC$^{R}_{L}$○○-○○AE	**F59**	Boring Bars (Dynamic Bar)
A○○□-	SVZB$^{R}_{L}$○○-○○AE	**F59**	Boring Bars (Dynamic Bar)
A○○□-	SVZC$^{R}_{L}$○○-○○AE	**F59**	Boring Bars (Dynamic Bar)
A○○□-	SWUB$^{R}_{L}$○○-○○AE	**F61**	Boring Bars (Dynamic Bar)
A○○□-	SWUP$^{R}_{L}$○○-○○AE	**F61**	Boring Bars (Dynamic Bar)
AABSR	○○○○□(□)-○○F	**E21,E52,P21**	Toolholder (Back Turning)
AABWR	○○○○□(□)-○○F	**E22,E23,E52,P21**	Toolholder (Back Turning)
ABS	○○R○○○○	**B102,E21**	Insert (Back Turning)
ABS	○○R○○○○M	**B102,E21**	Insert (Back Turning)
ABW	○○R○○○○	**B102,E22,E23**	Insert (Back Turning)
ABW	○○R○○○○M	**B102,E22,E23**	Insert (Back Turning)
ACLC$^{R}_{L}$	○○○○□-○○F	**E52,P21**	Toolholder (Turning / Discontinued Description)
ACLC$^{R}_{L}$	○○○○□□-○○FF	**E26**	Toolholder (Turning)
AD○○□		**F68**	Boring Bars (AD Bar Adaptor)
ADJC$^{R}_{L}$	○○○○□-○○F	**E52,P21**	Toolholder (Turning / Discontinued Description)
ADJC$^{R}_{L}$	○○○○□□-○○FF	**E28**	Toolholder (Turning)
AD-MFF		**M172**	Spare Parts (Clamp)
ADNCR	○○○○□-○○F	**E52,P21**	Toolholder (Turning / Discontinued Description)
AJ-	○(○)×○○(-○.○)	**K17,K33,P2**	Spare Parts (Adjustment Screw / Chamfering Attachment)
AJ-519TR		**M47,P2**	Spare Parts (Adjustment Screw)
AJ-4170		**M137**	Spare Parts (Adjustment Screw)
AJM5F		**N24,N25,N26**	Spare Parts (Axial adjustment screw)
AJM6		**N24**	Spare Parts (Axial adjustment screw)
AP-1416		**M198,M199**	Spare Parts (Cam Pin)
AP-1820		**M198,M199**	Spare Parts (Cam Pin)
APMT	○○○○○○E$^{R}_{L}$-NB○	**M22**	Insert (Milling)
APMT	○○○○○○ER-NB○P	**M22**	Insert (Milling)
AVJB$^{R}_{L}$	○○○○□-○○F	**E52,P21**	Toolholder (Turning / Discontinued Description)
AVJB$^{R}_{L}$	○○○○□□-○○FF	**E36**	Toolholder (Turning)
AVVB$^{R}_{L}$	○○○○□-○○F	**E52,P21**	Toolholder (Turning / Discontinued Description)
B			
BB-G1/8		**D11,G27,H43**	Spare Parts (Banjo Bolt)
BB-M10X1.5		**D11,G27,H43**	Spare Parts (Banjo Bolt)
BCS	-○	**H40,P13**	Spare Parts (Clamp Set)
BDGT	○○○○○○FR	**C36,M29**	Insert (Milling)
BDGT	○○○○○○FR-JA	**M22**	Insert (Milling)
BDGT	○○○○○○FR-LE	**C36,M29**	Insert (Milling)
BDMT	○○○○○○ER-JS	**M22**	Insert (Milling)
BDMT	○○○○○○ER-JT	**M22,M23**	Insert (Milling)
BDMT	○○○○○○ER-N○	**M23**	Insert (Milling)
BDMT	○○○○○○FR	**C36,M29**	Insert (Milling)
BGIAR	○○-○	**G72**	Blade (Grooving)

Description		Page	Category
BH3X6		**F81,P2**	Spare Parts (Screw)
BH3X12		**D33,D34,D35,P2**	Spare Parts (Screw)
BH6X10TR		**G30,G31,G32,G86, G90,G91,H25,P2**	Spare Parts (Screw)
BH6X25		**G11,P2**	Spare Parts (Screw)
BNP6		**K17**	Spare Parts (Plunge Screw)
BT○○K-	M○○-○○	**M60,M82**	BT Arbor (for Modular End Mill)
C			
C○○□-	SCLC$^{R}_{L}$○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
C○○□-	SCLC$^{R}_{L}$○○-○○A	**F90,P24**	Boring Bars (Discontinued Description)
C○○□-	SCLC$^{R}_{L}$○○-○○AN	**F41**	Boring Bars (Dynamic Bar)
C○○□-	SCLC$^{R}_{L}$○○-○○-AS	**F87**	Boring Bars (Assembly(AS) / Discontinued Description)
C○○○□-	SCLCR○○-○○○EZ	**P23**	Boring Bars (EZ Bar PLUS / Discontinued Description)
C○○○□-	SCLCR○○-○○○EZP	**F23**	Boring Bars (EZ Bar PLUS)
C○○□-	SCLP$^{R}_{L}$○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
C○○□-	SCLP$^{R}_{L}$○○-○○-○/○	**F90,P24**	Boring Bars (Discontinued Description)
C○○□-	SDUC$^{R}_{L}$○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
C○○□-	SJLC$^{R}_{L}$○○-○○○	**F48**	Boring Bars
C○○□-	SJZC$^{R}_{L}$○○-○○○	**F48**	Boring Bars
C○○□-	STLB$^{R}_{L}$○○-○○A	**F90,P24**	Boring Bars (Discontinued Description)
C○○□-	STLB$^{R}_{L}$○○-○○AN	**F51**	Boring Bars (Dynamic Bar)
C○○○□-	STLBR○○-○○○EZP	**F24**	Boring Bars (EZ Bar PLUS)
C○○○□-	STLPR○○-○○○EZP	**F24**	Boring Bars (EZ Bar PLUS)
C○○□-	STUB$^{R}_{L}$○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
C○○□-	STUP$^{R}_{L}$○○-○○	**F90,F91,P24**	Boring Bars (Discontinued Description)
C○○□-	STUP$^{R}_{L}$○○-○○-○/○	**F90,F91,P24**	Boring Bars (Discontinued Description)
C○○□-	STUPR○○-○○-AS	**F87**	Boring Bars (Assembly(AS) / Discontinued Description)
C○○□-	STXB$^{R}_{L}$○○-○○○	**F53**	Boring Bars
C○○□-	STXP$^{R}_{L}$○○-○○	**F53**	Boring Bars
C○○□-	STZB$^{R}_{L}$○○-○○○	**F53**	Boring Bars
C○○□-	SWUB$^{R}_{L}$○○-○○	**F91,P25**	Boring Bars (Discontinued Description)
C○○□-	SWUB$^{R}_{L}$○○-○○A	**F91,P25**	Boring Bars (Discontinued Description)
C○○□-	SWUB$^{R}_{L}$○○-○○AN	**F61**	Boring Bars (Dynamic Bar)
C○○□-	SWUB$^{R}_{L}$○○-○○-AS	**F87**	Boring Bars (Assembly(AS) / Discontinued Description)
C○○□-	SWUB$^{R}_{L}$○○-○○-○/○	**F91,P25**	Boring Bars (Discontinued Description)
C○○○□-	SWUBR○○-○○○EZP	**F25**	Boring Bars (EZ Bar PLUS)
C○○□-	SWUP$^{R}_{L}$○○-○○	**F91,P25**	Boring Bars (Discontinued Description)
C○○□-	SWUP$^{R}_{L}$○○-○○-○/○	**F91,P25**	Boring Bars (Discontinued Description)
C08R		**M137,P15**	Spare Parts (Clamp)
C09N		**K17,M46,M47,P15**	Spare Parts (Clamp)
C17R		**P15**	Spare Parts (Clamp)
C20R		**P15**	Spare Parts (Clamp)
C25R		**P15**	Spare Parts (Clamp)
C90SD	○○○○-12$^{R}_{L}$	**M198,M199**	Spare Parts (Cartridge)
C90SP	○○○○-10$^{R}_{L}$	**M198,M199**	Spare Parts (Cartridge)
CB-11		**D29,D34,D35,P16**	Spare Parts (Chipbreaker)
CB-12		**D30,P16**	Spare Parts (Chipbreaker)
CB-13		**D30,P16**	Spare Parts (Chipbreaker)
CB-14		**D27,P16**	Spare Parts (Chipbreaker)
CB-15		**D27,P16**	Spare Parts (Chipbreaker)
CB-16		**D26,D27,F81,P16**	Spare Parts (Chipbreaker)
CB-17		**D26,P16**	Spare Parts (Chipbreaker)
CB-51		**D29,P16**	Spare Parts (Chipbreaker)
CB-S3220		**P16**	Spare Parts (Chipbreaker)
CB-S4220		**P16**	Spare Parts (Chipbreaker)
CBSN$^{R}_{L}$	○○○○□-○○	**D37**	Toolholder (Turning)
CBSN$^{R}_{L}$	○○○○B-12-A20	**F64,P26**	Boring Bars (for Bearing Machining)
CB-T2212		**P16**	Spare Parts (Chipbreaker)
CB-T3220		**P16**	Spare Parts (Chipbreaker)
CC-125-MFAH		**M136,P19**	Spare Parts (Coolant Cover)
CC-160-MFAH		**M136,P19**	Spare Parts (Coolant Cover)
CC-200-MFAH		**M136,P19**	Spare Parts (Coolant Cover)
CC-250-MFAH		**M136,P19**	Spare Parts (Coolant Cover)
CC-315-MFAH		**M136,P19**	Spare Parts (Coolant Cover)

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CCET	○○○○○○(○)MFR/L-J	B59	Insert (Turning)
CCET	○○○○○○(○)MFR/L-U	B57	Insert (Turning)
CCET	○○○○○○(○)MFR/L-USF	B57	Insert (Turning)
CCET	○○○○○○(○)MR/L-F	B56	Insert (Turning)
CCET	○○○○○○(○)MR/L-FSF	B55	Insert (Turning)
CCET	○○○○○○MR/L-P	B57	Insert (Turning)
CCET	○○○○○○(○)R/L-FSF	B55	Insert (Turning)
CCGT	○○○○○○	B54	Insert (Turning)
CCGT	○○○○○○AH	B60	Insert (Turning)
CCGT	○○○○○○AP	B60	Insert (Turning)
CCGT	○○○○○○ER/L-U	B59	Insert (Turning)
CCGT	○○○○○○(○)FR/L-U	B58	Insert (Turning)
CCGT	○○○○○○MER/L-U	B59	Insert (Turning)
CCGT	○○○○○○(○)MF	B55	Insert (Turning)
CCGT	○○○○○○MFP-GF	B53	Insert (Turning)
CCGT	○○○○○○MFP-GQ	B53	Insert (Turning)
CCGT	○○○○○○MFP-PF	B53	Insert (Turning)
CCGT	○○○○○○MFP-SK	B53	Insert (Turning)
CCGT	○○○○○○MFP-SKS	B53	Insert (Turning)
CCGT	○○○○○○(○)MFR/L-U	B58	Insert (Turning)
CCGT	○○○○○○MP-CF	B53	Insert (Turning)
CCGT	○○○○○○MP-CK	B53	Insert (Turning)
CCGT	○○○○○○(○)MR/L-F	B56	Insert (Turning)
CCGT	○○○○○○R/L-A3	B60	Insert (Turning)
CCGT	○○○○○○(○)R/L-F	B56	Insert (Turning)
CCGW	○○○○○○	B60,C24	Insert (Turning)
CCGW	○○○○○○NE	C24	Insert (Turning)
CCGW	○○○○○○SE	C24	Insert (Turning)
CCLNR/L	○○○○□-○○	D26,P20	Toolholder (Turning)
CCLNR/L	○○○○□-○○A	D32,P20	Toolholder (Turning)
CCLNR/L	○○○○□-○○GX	P20	Toolholder (Turning / Discontinued Description)
CCMT	○○○○○○	B54,C24	Insert (Turning)
CCMT	○○○○○○APD	C25	Insert (Turning)
CCMT	○○○○○○GK	B54	Insert (Turning)
CCMT	○○○○○○HQ	B54	Insert (Turning)
CCMT	○○○○○○MQ	B55	Insert (Turning)
CCMT	○○○○○○NE	C24	Insert (Turning)
CCMT	○○○○○○PP	B54	Insert (Turning)
CCMT	○○○○○○SE	C24	Insert (Turning)
CCMT	○○○○○○WP	B54	Insert (Turning)
CCMW	○○○○○○MEF	C14	Insert (Turning)
CCMW	○○○○○○S○○○○○MES	C14	Insert (Turning)
CCMW	○○○○○○S○○○○○MET	C14	Insert (Turning)
CCMW	○○○○○○S○○○○○SET	C14	Insert (Turning)
CCMW	○○○○○○T○○○○○ME	C14	Insert (Turning)
CCMW	○○○○○○T○○○○○SE	C14	Insert (Turning)
CCN-5		H43	Spare Parts (Coolant Supply Pipe)
CCP-4		H39	Spare Parts (Coolant Plug)
CCRNR/L	○○○○□-○○A	D32	Toolholder (Turning)
CDHNR/L	○○○○□-○○GX	P20	Toolholder (Turning / Discontinued Description)
CDJNR/L	○○○○□-○○	D27	Toolholder (Turning)
CDJNR/L	○○○○□-○○GX	P20	Toolholder (Turning / Discontinued Description)
CE-010		D26,D27,F81,P13	Spare Parts (Clamp Set)
CE-020		D29,D30,D34,D35,P13	Spare Parts (Clamp Set)
CE-030		D31,P13	Spare Parts (Clamp Set)
CE-030A		D29,D31,D32,D33, D34,D35,D36,P13	Spare Parts (Clamp Set)
CE-040		D29,D31,D35,P13	Spare Parts (Clamp Set)
CE-220		D26,D29,P13	Spare Parts (Clamp Set)
CE-320		P13	Spare Parts (Clamp Set)
CE-360S		F81,P13	Spare Parts (Clamp Set)
CE-410		P13	Spare Parts (Clamp Set)
CE-430		P13	Spare Parts (Clamp Set)
CELNR/L	○○○○□-○○	D27	Toolholder (Turning)

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CGA-4R/L		G47,P15	Spare Parts (Clamp)
CGA-5R/L		G47,P15	Spare Parts (Clamp)
CGBR/L		G11,P15	Spare Parts (Clamp)
CGH-1R/L		G46,G70,P15	Spare Parts (Clamp)
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CGIA-4R		G72,P15	Spare Parts (Clamp)
CGIA-5R		G72,P15	Spare Parts (Clamp)
CH0503-45		K56,K57	Insert (Drilling) / Chamfering
CH-20R		P15	Spare Parts (Clamp)
CINR/L	○○○○S-○○	J23	Toolholder (Threading)
CL63-1		N13,N14,N15,N16,N17, N18,N19,N20,P19	Spare Parts (Coolant Pipe)
CL100-1		N13,N14,N20,P19	Spare Parts (Coolant Pipe)
CNGA	○○○○○○	B21	Insert (Turning)
CNGA	○○○○○○ME4	C6	Insert (Turning)
CNGA	○○○○○○MEF	C6	Insert (Turning)
CNGA	○○○○○○S○○○○○	B106	Insert (Turning)
CNGA	○○○○○○S○○○○○ME	C6	Insert (Turning)
CNGA	○○○○○○S○○○○○MEH	C6	Insert (Turning)
CNGA	○○○○○○S○○○○○MEP	C6	Insert (Turning)
CNGA	○○○○○○S○○○○○MET	C6	Insert (Turning)
CNGA	○○○○○○S○○○○○MEW	C6	Insert (Turning)
CNGA	○○○○○○T○○○○○	B106	Insert (Turning)
CNGA	○○○○○○T○○○○○ME	C6	Insert (Turning)
CNGG	○○○○○○AH	B22	Insert (Turning)
CNGG	○○○○○○FP-TK	B19	Insert (Turning)
CNGG	○○○○○○HQ	B16	Insert (Turning)
CNGG	○○○○○○MFP-SK	B19	Insert (Turning)
CNGG	○○○○○○R/L	B22	Insert (Turning)
CNGG	○○○○○○R/L-25R	B22	Insert (Turning)
CNGG	○○○○○○R/L-A3	B22	Insert (Turning)
CNGG	○○○○○○R/L-S	B22	Insert (Turning)
CNGG	○○○○○○TK	B19	Insert (Turning)
CNGG	○○○○○○Z	B22	Insert (Turning)
CNGM	○○○○○○ME-H□	C7	Insert (Turning)
CNGM	○○○○○○S○○○○○BB○	C7	Insert (Turning)
CNGN	○○○○○○S○○○○○	B106	Insert (Turning)
CNGN	○○○○○○T○○○○○	B106	Insert (Turning)
CNGU	○○○○○○(○)MFR-F	B50	Insert (Turning)
CNGU	○○○○○○(○)MFR-U	B50	Insert (Turning)
CNGU	○○○○○○MFP-SK	B50	Insert (Turning)
CNMA	○○○○○○	B21	Insert (Turning)
CNMA	○○○○○○S○○○○○	B106	Insert (Turning)
CNMG	○○○○○○	B18	Insert (Turning)
CNMG	○○○○○○AH	B22	Insert (Turning)
CNMG	○○○○○○C	B21	Insert (Turning)
CNMG	○○○○○○CJ	B17	Insert (Turning)
CNMG	○○○○○○CQ	B17	Insert (Turning)
CNMG	○○○○○○GC	B21	Insert (Turning)
CNMG	○○○○○○GP	B16	Insert (Turning)
CNMG	○○○○○○GS	B17	Insert (Turning)
CNMG	○○○○○○GT	B18	Insert (Turning)
CNMG	○○○○○○HQ	B16	Insert (Turning)
CNMG	○○○○○○KG	B21	Insert (Turning)
CNMG	○○○○○○KH	B21	Insert (Turning)
CNMG	○○○○○○KQ	B21	Insert (Turning)
CNMG	○○○○○○MQ	B20	Insert (Turning)
CNMG	○○○○○○MS	B20	Insert (Turning)
CNMG	○○○○○○MU	B20	Insert (Turning)
CNMG	○○○○○○PG	B17	Insert (Turning)
CNMG	○○○○○○PH	B18	Insert (Turning)
CNMG	○○○○○○PP	B16	Insert (Turning)

Description	Page	Category
CNMG ○○○○○○PQ	**B16**	Insert (Turning)
CNMG ○○○○○○PS	**B17**	Insert (Turning)
CNMG ○○○○○○PT	**B18**	Insert (Turning)
CNMG ○○○○○○SG	**B20**	Insert (Turning)
CNMG ○○○○○○SQ	**B20**	Insert (Turning)
CNMG ○○○○○○TK	**B19**	Insert (Turning)
CNMG ○○○○○○TN-V	**B17**	Insert (Turning)
CNMG ○○○○○○WE	**B16**	Insert (Turning)
CNMG ○○○○○○WF	**B16**	Insert (Turning)
CNMG ○○○○○○WP	**B16**	Insert (Turning)
CNMG ○○○○○○WQ	**B16**	Insert (Turning)
CNMG ○○○○○○XF	**B19**	Insert (Turning)
CNMG ○○○○○○XP	**B19**	Insert (Turning)
CNMG ○○○○○○XQ	**B19**	Insert (Turning)
CNMG ○○○○○○XS	**B19**	Insert (Turning)
CNMG ○○○○○○ZS	**B21**	Insert (Turning)
CNMM ○○○○X$^{R}_{L}$-SX	**B21**	Insert (Turning)
CNMM ○○○○○○M	**C23**	Insert (Turning)
CNMM ○○○○○○M-NE	**C23**	Insert (Turning)
CNMM ○○○○○○M-SE	**C23**	Insert (Turning)
CNMM ○○○○○○PX	**B19**	Insert (Turning)
CNMN ○○○○○○S○○○○○	**C19**	Insert (Turning)
CNMN ○○○○○○T○○○○○	**B106**	Insert (Turning)
CNMU ○○○○○○E-GK	**B50**	Insert (Turning)
CP-2D	**D16,F76,N5,P16**	Spare Parts (Clamp)
CP-2D-$^{R}_{L}$-JCT	**D16,P16**	Spare Parts (Clamp)
CP-3D	**D8,D12,D14,D24, F69,F72,F75, F76,F79,P16**	Spare Parts (Clamp)
CP-3D-$^{R}_{L}$-JCT	**D8,D24,P16**	Spare Parts (Clamp)
CP-3D-S	**N3,N4,N7**	Spare Parts (Clamp)
CP-4D-$^{R}_{L}$-JCT	**D12,P16**	Spare Parts (Clamp)
CP-5D	**D19,P16**	Spare Parts (Clamp)
CP-5D-JCT	**D20,P16**	Spare Parts (Clamp)
CP-5D-S	**N5,N6**	Spare Parts (Clamp)
CP-8TE	**P16**	Spare Parts (Clamp)
CP-8W	**M129,P16**	Spare Parts (Clamp)
CP8X15TL	**P2**	Spare Parts (Screw)
CP8X23TL	**P2**	Spare Parts (Screw)
CP-CH○○	**K17**	Spare Parts (Clamp)
CPGB ○○○○○○S○○○○○MES	**C14**	Insert (Turning)
CPGB ○○○○○○S○○○○○MET	**C14**	Insert (Turning)
CPGB ○○○○○○S○○○○○SET	**C14**	Insert (Turning)
CPGB ○○○○○○T○○○○○ME	**C14**	Insert (Turning)
CPGB ○○○○○○T○○○○○SE	**C14**	Insert (Turning)
CPMB ○○○○○○	**B61**	Insert (Turning)
CPMH ○○○○○○	**B61,C25**	Insert (Turning)
CPMH ○○○○○○HQ	**B61**	Insert (Turning)
CPMH ○○○○○○NE	**C25**	Insert (Turning)
CPMH ○○○○○○$^{R}_{L}$-Y	**B61**	Insert (Turning)
CPMH ○○○○○○SE	**C25**	Insert (Turning)
CPMT ○○○○○○GP	**B61**	Insert (Turning)
CPMT ○○○○○○PP	**B61**	Insert (Turning)
CPMT ○○○○○○XP	**B61**	Insert (Turning)
CPMT ○○○○○○XQ	**B61**	Insert (Turning)
CP-RC$^{R}_{L}$	**D37,F64,P13**	Spare Parts (Clamp Set)
CPS-1	**F63,P14**	Spare Parts (Clamp Set)
CPS-2	**F62,F63,P14**	Spare Parts (Clamp Set)
CPS-2P	**P14**	Spare Parts (Clamp Set)
CPS-2S	**P14**	Spare Parts (Clamp Set)
CPS-2TR	**M131,P14**	Spare Parts (Clamp Set)
CPS-3	**F62,F63,P14**	Spare Parts (Clamp Set)
CPS-4V	**G65,N25,P14**	Spare Parts (Clamp Set)
CPS-5E	**P14**	Spare Parts (Clamp Set)
CPS-5F	**G65,M226,P14**	Spare Parts (Clamp Set)

Description	Page	Category
CPS-5$^{R}_{L}$	**D21,P14**	Spare Parts (Clamp Set)
CPS-5S	**J20,J23,N11, N19,P14**	Spare Parts (Clamp Set)
CPS-5S-R-JCT	**J21,P16**	Spare Parts (Clamp Set)
CPS-5V	**G65,G98,G100, G110,N25,P14**	Spare Parts (Clamp Set)
CPS-6F	**M226,P14**	Spare Parts (Clamp Set)
CPS-6M	**P14**	Spare Parts (Clamp Set)
CPS-6S	**J20,J23,N19,P14**	Spare Parts (Clamp Set)
CPS-6V	**G65,G100,G103, G110,M228,P14**	Spare Parts (Clamp Set)
CPS-8V	**G100,G103,G110,P14**	Spare Parts (Clamp Set)
CP-ST-R1/8	**H15**	Spare Parts (Coupling)
CRDNN ○○○○□-○○	**D31**	Toolholder (Turning)
CRDNN ○○○○□-○○A	**D33**	Toolholder (Turning)
CR-MFF	**M172**	Spare Parts (Cartridge)
CR-MFK70R	**M47**	Spare Parts (Cartridge)
CRSN$^{R}_{L}$ ○○○○□-○○	**D31**	Toolholder (Turning)
CRSN$^{R}_{L}$ ○○○○□-○○A	**D33**	Toolholder (Turning)
CS-2D	**D16,F76,N5,P2**	Spare Parts (Screw)
CS-3D	**D8,D12,D14,D24,F69, F72,F75,F76,F79,P2**	Spare Parts (Screw)
CS-3D-TR	**D8,D12,D16,D20,D24, N3,N4,N5,N6,N7,P2**	Spare Parts (Screw)
CS-5D	**D19,P2**	Spare Parts (Screw)
CSBP$^{R}_{L}$ ○○○○□-○○N	**P22**	Toolholder (Turning / Discontinued Description)
CSDNN ○○○○□-○○	**D29**	Toolholder (Turning)
CSDNN ○○○○□-○○A	**D35,P20**	Toolholder (Turning)
CSDNN ○○○○□-○○GX	**P20**	Toolholder (Turning / Discontinued Description)
CSDPN ○○○○□-○○N	**P22**	Toolholder (Turning / Discontinued Description)
CSKN$^{R}_{L}$ ○○○○□-○○	**D29,P20**	Toolholder (Turning)
CSKN$^{R}_{L}$ ○○○○□-○○A	**D34,P20**	Toolholder (Turning)
CSKN$^{R}_{L}$ ○○○○□-○○GX	**P20**	Toolholder (Turning / Discontinued Description)
CSKPR ○○○○□-○○N	**P22**	Toolholder (Turning / Discontinued Description)
CS-N$^{R}_{L}$ ○○○○□-○○	**D29,P20**	Toolholder (Turning)
CS-N$^{R}_{L}$ ○○○○□-○○GX	**P20**	Toolholder (Turning / Discontinued Description)
CSRN$^{R}_{L}$ ○○○○□-○○	**D29**	Toolholder (Turning)
CSRN$^{R}_{L}$ ○○○○□-○○A	**D34,P20**	Toolholder (Turning)
CSRN$^{R}_{L}$ ○○○○□-○○GX	**P20**	Toolholder (Turning / Discontinued Description)
CSSN$^{R}_{L}$ ○○○○□-○○	**D29,P20**	Toolholder (Turning)
CSSN$^{R}_{L}$ ○○○○□-○○A	**D35**	Toolholder (Turning)
CSSN$^{R}_{L}$ ○○○○□-○○GX	**P20**	Toolholder (Turning / Discontinued Description)
CSSP$^{R}_{L}$ ○○○○□-○○N	**P22**	Toolholder (Turning / Discontinued Description)
CSYN$^{R}_{L}$ ○○○○□-○○	**D29,P20**	Toolholder (Turning)
CSYN$^{R}_{L}$ ○○○○□-○○A	**P20**	Toolholder (Turning / Discontinued Description)
CSYN$^{R}_{L}$ ○○○○□-○○GX	**P20**	Toolholder (Turning / Discontinued Description)
CT○○T○ -45A	**K33**	Insert (Drilling) / Chamfering
CT○○T○ -45DA	**K16**	Insert (Drilling) / Chamfering
CTDPR ○○CA○○	**N25**	Toolholder (Cartridge)
CTEPR ○○CA○○	**N25**	Toolholder (Cartridge)
CTFPR ○○CA○○	**N25**	Toolholder (Cartridge)
CTFP$^{R}_{L}$ ○○○○□-○○N	**P22**	Toolholder (Turning / Discontinued Description)
CTGP$^{R}_{L}$ ○○○○□-○○N	**P22**	Toolholder (Turning / Discontinued Description)
CTJN$^{R}_{L}$ ○○○○□-○○	**D30**	Toolholder (Turning)
CTJN$^{R}_{L}$ ○○○○□-○○A	**D36**	Toolholder (Turning)
CTTP$^{R}_{L}$ ○○○○□-○○N	**P22**	Toolholder (Turning / Discontinued Description)
CTUN$^{R}_{L}$ ○○○○□-○○	**D30**	Toolholder (Turning)
CTUN$^{R}_{L}$ ○○○○□-○○A	**P20**	Toolholder (Turning / Discontinued Description)
D		
DA ○○○○M-FTP	**K11**	Insert (Drilling)
DA ○○○○M-GM	**K8,K9,K10**	Insert (Drilling)
DA ○○○○M-HQP	**K7**	Insert (Drilling)
DA ○○○○M-KM	**K8,K9,K10**	Insert (Drilling)
DC-42	**F69,P8**	Spare Parts (Shim)
DC-44	**D8,N3,P8**	Spare Parts (Shim)
DC-44-C	**D8,N3,P8**	Spare Parts (Shim)

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Description		Page	Category
DC	○○○○M-SC	**K26,K27,K28**	Insert (Drilling)
DCET	○○○○○○(○)F$^{R}_{L}$-JSF	**B70**	Insert (Turning)
DCET	○○○○○○(○)FR-U	**B68**	Insert (Turning)
DCET	○○○○○○(○)F$^{R}_{L}$-USF	**B68**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}_{L}$-J	**B70**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}_{L}$-JSF	**B70**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}_{L}$-U	**B68**	Insert (Turning)
DCET	○○○○○○(○)MF$^{R}_{L}$-USF	**B68**	Insert (Turning)
DCET	○○○○○○(○)M$^{R}_{L}$-F	**B66**	Insert (Turning)
DCET	○○○○○○(○)M$^{R}_{L}$-FSF	**B66**	Insert (Turning)
DCET	○○○○○○(○)$^{R}_{L}$-FSF	**B66**	Insert (Turning)
DCGT	○○○○○○	**B64**	Insert (Turning)
DCGT	○○○○○○AH	**B71**	Insert (Turning)
DCGT	○○○○○○AP	**B71**	Insert (Turning)
DCGT	○○○○○○CF	**B62**	Insert (Turning)
DCGT	○○○○○○CK	**B62**	Insert (Turning)
DCGT	○○○○○○(○)E$^{R}_{L}$-J	**B71**	Insert (Turning)
DCGT	○○○○○○E$^{R}_{L}$-U	**B69**	Insert (Turning)
DCGT	○○○○○○(○)F$^{R}_{L}$-J	**B70**	Insert (Turning)
DCGT	○○○○○○(○)F$^{R}_{L}$-U	**B68**	Insert (Turning)
DCGT	○○○○○○(○)M	**B64**	Insert (Turning)
DCGT	○○○○○○(○)ME$^{R}_{L}$-J	**B71**	Insert (Turning)
DCGT	○○○○○○ME$^{R}_{L}$-U	**B69**	Insert (Turning)
DCGT	○○○○○○(○)MF	**B64**	Insert (Turning)
DCGT	○○○○○○MFP-GF	**B62**	Insert (Turning)
DCGT	○○○○○○MFP-GQ	**B63**	Insert (Turning)
DCGT	○○○○○○MFP-SK	**B62**	Insert (Turning)
DCGT	○○○○○○MFP-SKS	**B62**	Insert (Turning)
DCGT	○○○○○○(○)MF$^{R}_{L}$-J	**B70**	Insert (Turning)
DCGT	○○○○○○(○)MF$^{R}_{L}$-U	**B69**	Insert (Turning)
DCGT	○○○○○○MP-CF	**B62**	Insert (Turning)
DCGT	○○○○○○MP-CK	**B62**	Insert (Turning)
DCGT	○○○○○○(○)M$^{R}_{L}$-F	**B67**	Insert (Turning)
DCGT	○○○○○○$^{R}_{L}$-A3	**B71**	Insert (Turning)
DCGT	○○○○○○(○)$^{R}_{L}$-F	**B67**	Insert (Turning)
DCGW	○○○○○○	**B71**	Insert (Turning)
DCLN$^{R}_{L}$	○○○○□-○○	**D8**	Toolholder (Turning)
DCLN$^{R}_{L}$	○○○○□-○○JCT	**D8**	Toolholder (Turning)
DCMT	○○○○○○	**B64,C25**	Insert (Turning)
DCMT	○○○○○○APD	**C25**	Insert (Turning)
DCMT	○○○○○○GK	**B64**	Insert (Turning)
DCMT	○○○○○○GP	**B63**	Insert (Turning)
DCMT	○○○○○○HQ	**B64**	Insert (Turning)
DCMT	○○○○○○MQ	**B65**	Insert (Turning)
DCMT	○○○○○○NE	**C25**	Insert (Turning)
DCMT	○○○○○○PP	**B63**	Insert (Turning)
DCMT	○○○○○○$^{R}_{L}$-NE	**C25**	Insert (Turning)
DCMT	○○○○○○SE	**C25**	Insert (Turning)
DCMT	○○○○○○XP	**B65**	Insert (Turning)
DCMT	○○○○○○XQ	**B65**	Insert (Turning)
DCMW	○○○○○○MEF	**C15**	Insert (Turning)
DCMW	○○○○○○S○○○○○MES	**C15**	Insert (Turning)
DCMW	○○○○○○S○○○○○MET	**C15**	Insert (Turning)
DCMW	○○○○○○S○○○○○SET	**C15**	Insert (Turning)
DCMW	○○○○○○T○○○○○ME	**C15**	Insert (Turning)
DCMW	○○○○○○T○○○○○SE	**C15**	Insert (Turning)
DCMX	○○○○○○$^{R}_{L}$-WP	**B63**	Insert (Turning)
DCMX	○○○○○○WP	**B63**	Insert (Turning)
DD-42		**F72,P8**	Spare Parts (Shim)
DD-42-16		**F72,P8**	Spare Parts (Shim)
DD-43		**D12,N4,P8**	Spare Parts (Shim)
DD-44		**D12,N4,P8**	Spare Parts (Shim)
DDJN$^{R}_{L}$	○○○○□-○○○○	**D12**	Toolholder (Turning)
DDJN$^{R}_{L}$	○○○○□-○○JCT	**D12**	Toolholder (Turning)

Description		Page	Category
DDHN$^{R}_{L}$	○○○○□-○○○○	**D12**	Toolholder (Turning)
DMC	○○○	**M130,P32**	End Mill
DMC	○○○H	**M132**	End Mill
DMC	○○○-S○○	**M130,P32**	End Mill
DMC	○○○SX	**M131**	End Mill
DMC	○○○SX-○○○	**M131**	End Mill
DMC	○○○SXT	**M131**	End Mill
DN10		**F69,F72,F75, F76,F79,P19**	Spare Parts (Nozzle)
DN20		**F69,F72,F75, F76,F79,P19**	Spare Parts (Nozzle)
DNGA	○○○○○○ME4	**C8**	Insert (Turning)
DNGA	○○○○○○MEF	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○○	**B107**	Insert (Turning)
DNGA	○○○○○○S○○○○○ME	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○MEH	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○MEP	**C8**	Insert (Turning)
DNGA	○○○○○○S○○○○○MET	**C8**	Insert (Turning)
DNGA	○○○○○○T○○○○○	**B107**	Insert (Turning)
DNGA	○○○○○○T○○○○○ME	**C8**	Insert (Turning)
DNGG	○○○○○○AH	**B30**	Insert (Turning)
DNGG	○○○○○○FP-TK	**B27**	Insert (Turning)
DNGG	○○○○○○MFP-SK	**B27**	Insert (Turning)
DNGG	○○○○○○$^{R}_{L}$	**B30**	Insert (Turning)
DNGG	○○○○○○$^{R}_{L}$-A3	**B30**	Insert (Turning)
DNGG	○○○○○○$^{R}_{L}$-S	**B30**	Insert (Turning)
DNGG	○○○○○○TK	**B27**	Insert (Turning)
DNGM	○○○○○○ME-H□	**C9**	Insert (Turning)
DNGM	○○○○○○S○○○○○BB○	**C9**	Insert (Turning)
DNGN	○○○○○○S○○○○○	**B107**	Insert (Turning)
DNGN	○○○○○○T○○○○○	**B107**	Insert (Turning)
DNGU	○○○○○○MER-U	**B51**	Insert (Turning)
DNGU	○○○○○○MFP-SK	**B51**	Insert (Turning)
DNGU	○○○○○○(○)MFR-F	**B51**	Insert (Turning)
DNGU	○○○○○○(○)MFR-U	**B51**	Insert (Turning)
DNMA	○○○○○○	**B30**	Insert (Turning)
DNMG	○○○○○○	**B26**	Insert (Turning)
DNMG	○○○○○○AH	**B30**	Insert (Turning)
DNMG	○○○○○○C	**B29**	Insert (Turning)
DNMG	○○○○○○CJ	**B24**	Insert (Turning)
DNMG	○○○○○○CQ	**B24**	Insert (Turning)
DNMG	○○○○○○GC	**B29**	Insert (Turning)
DNMG	○○○○○○GP	**B23**	Insert (Turning)
DNMG	○○○○○○GS	**B24**	Insert (Turning)
DNMG	○○○○○○GT	**B25**	Insert (Turning)
DNMG	○○○○○○HQ	**B24**	Insert (Turning)
DNMG	○○○○○○KG	**B29**	Insert (Turning)
DNMG	○○○○○○KH	**B29**	Insert (Turning)
DNMG	○○○○○○KQ	**B29**	Insert (Turning)
DNMG	○○○○○○MQ	**B27**	Insert (Turning)
DNMG	○○○○○○MS	**B28**	Insert (Turning)
DNMG	○○○○○○MU	**B28**	Insert (Turning)
DNMG	○○○○○○PG	**B25**	Insert (Turning)
DNMG	○○○○○○PH	**B26**	Insert (Turning)
DNMG	○○○○○○PP	**B23**	Insert (Turning)
DNMG	○○○○○○PQ	**B23**	Insert (Turning)
DNMG	○○○○○○PS	**B25**	Insert (Turning)
DNMG	○○○○○○PT	**B25**	Insert (Turning)
DNMG	○○○○○○R-LD	**B27**	Insert (Turning)
DNMG	○○○○○○SG	**B28**	Insert (Turning)
DNMG	○○○○○○SQ	**B28**	Insert (Turning)
DNMG	○○○○○○TK	**B27**	Insert (Turning)
DNMG	○○○○○○TN-V	**B24**	Insert (Turning)
DNMG	○○○○○○XF	**B26**	Insert (Turning)
DNMG	○○○○○○XP	**B26**	Insert (Turning)

Description		Page	Category
DNMG	○○○○○○XQ	**B26**	Insert (Turning)
DNMG	○○○○○○XS	**B26**	Insert (Turning)
DNMG	○○○○○○ZS	**B29**	Insert (Turning)
DNMM	○○○○○○M	**C23**	Insert (Turning)
DNMM	○○○○○○M-NE	**C23**	Insert (Turning)
DNMM	○○○○○○M-SE	**C23**	Insert (Turning)
DNMM	○○○○○○PX	**B26**	Insert (Turning)
DNMU	○○○○○○E-GK	**B51**	Insert (Turning)
DNMX	○○○○○○WF	**B23**	Insert (Turning)
DPET	○○○○○○(○)F$^{R}_{L}$-USF	**B72**	Insert (Turning)
DPET	○○○○○○(○)MF$^{R}_{L}$-USF	**B72**	Insert (Turning)
DPET	○○○○○○(○)M$^{R}_{L}$-FSF	**B72**	Insert (Turning)
DPET	○○○○○○(○)$^{R}_{L}$-FSF	**B72**	Insert (Turning)
DR12CR-IN		**K75**	Cartridge (Drill)
DR12CR-OUT		**K75**	Cartridge (Drill)
DR20CR-IN		**K75**	Cartridge (Drill)
DR20CR-OUT		**K75**	Cartridge (Drill)
DR	○○-○○(□)	**M182**	Spare Parts (Drive Ring)
DR	○○○○-○○○○(□)	**M183**	Spare Parts (Drive Ring)
DRV-	CH○○	**K56**	Toolholder (Chamfering Attachment / DRV)
DS-42		**F75,P8**	Spare Parts (Shim)
DS-44		**D14,P8**	Spare Parts (Shim)
DS	○○○	**K65**	Insert (Drilling)
DSBN$^{R}_{L}$	○○○○□-○○	**D14**	Toolholder (Turning)
DT-7		**G60,G61,K66,K68, K70,K72,M222,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-8		**K68,K70,K72,M174, M178,M206,M224,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-9		**K33**	Spare Parts (Torx Wrench / Screwdriver type)
DT-10		**K93,M174,M178,M206, M220,M222,M224,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-15		**K33,K68,K70,K72,K74,M53, M121,M124,M125,M174, M178,M206,M224,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-20		**K69,K70,K71,K72,K73, K74,K75,K83,K85,K87, K88,M206,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-25		**K69,K71,K75,K83, K85,K87,K88,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DT-32		**D16,F76,N5,P8**	Spare Parts (Shim)
DT-42		**F76,P8**	Spare Parts (Shim)
DTGN$^{R}_{L}$	○○○○□-○○	**D16**	Toolholder (Turning)
DTGN$^{R}_{L}$	○○○○□-○○JCT	**D16**	Toolholder (Turning)
DTM-6		**K82,K84,K86,K88,M74, M75,M174,M178,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-7		**K82,K84,K86,K88,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-8		**K82,K84,K86,K88, M64,M65,M66,M67, M90,M91,M93,M99,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-10		**K82,K84,K86,K88,M172,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTM-15		**K17K83,K84,K86,K88,M31, M41,M65,M66,M67M90,M91, M93,M99,M103,M117,P17**	Spare Parts (Torx Wrench / Screwdriver type)
DTP-6		**K12,K13,K14,K15,K18, K19,K20,K21,K22,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTP-7		**K12,K13,K14,K15,K18, K19,K20,K21,K22,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTP-9		**M198,M199,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTP-15		**M50,M198,M199,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTP-20		**P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTPM-8		**K46,K48,K50,K52,K54,M57, M58,M87,M88,M107,M108, M137,M158,M217,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTPM-10		**F66,K46,K48,K50,K52, K54,M80,M215,M217,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DTPM-15		**F65,F66,K46,K48,K50,K52, K54,M35,M36,M57,M58,M87, M88,M111,M112,M144,M151, M153,M154,M210,M211, M215,M217,P17**	Spare Parts (Torx Plus Wrench / Screwdriver type)
DV-33		**D19,D20,N5,N6,P8**	Spare Parts (Shim)
DVLN$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
DVLN$^{R}_{L}$	○○○○□-○○JCT	**D20**	Toolholder (Turning)
DVPN$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
DVPN$^{R}_{L}$	○○○○□-○○JCT	**D20**	Toolholder (Turning)
DVVNN	○○○○□-○○	**D19**	Toolholder (Turning)
DVVNN	○○○○□-○○JCT	**D20**	Toolholder (Turning)
DW-42		**F79,N7,P8**	Spare Parts (Shim)
DW-44		**D24,P8**	Spare Parts (Shim)
DWLN$^{R}_{L}$	○○○○□-○○	**D24**	Toolholder (Turning)
DWLN$^{R}_{L}$	○○○○□-○○JCT	**D24**	Toolholder (Turning)
E			
E○○□-	SCLC$^{R}_{L}$○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
E○○□-	SCLC$^{R}_{L}$○○-○○A	**F41,F90,P24**	Boring Bars (Dynamic Bar)
E○○□-	SCLC$^{R}_{L}$○○-○○A-○/○	**F41,F90,P24**	Boring Bars (Dynamic Bar)
E○○□-	SCLC$^{R}_{L}$○○-○○AN	**F41**	Boring Bars (Dynamic Bar)
E○○□-	SCLCR○○-○○AN○/○	**F41**	Boring Bars (Dynamic Bar)
E○○□-	SCLP$^{R}_{L}$○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
E○○□-	SCLP$^{R}_{L}$○○-○○A	**F43,F90,P24**	Boring Bars (Dynamic Bar)
E○○□-	SCLP$^{R}_{L}$○○-○○A-○/○	**F43,F90,P24**	Boring Bars (Dynamic Bar)
E○○□-	SCLP$^{R}_{L}$○○-○○AN	**F43**	Boring Bars (Dynamic Bar)
E○○□-	SCLPR○○-○○AN○/○	**F43**	Boring Bars (Dynamic Bar)
E○○□-	SDQC$^{R}_{L}$○○-○○A	**F46**	Boring Bars (Dynamic Bar)
E○○□-	SDQC$^{R}_{L}$○○-○○A-○/○	**F46**	Boring Bars (Dynamic Bar)
E○○□-	SDUC$^{R}_{L}$○○-○○A	**F45**	Boring Bars (Dynamic Bar)
E○○□-	SDUC$^{R}_{L}$○○-○○A-○/○	**F45**	Boring Bars (Dynamic Bar)
E○○□-	SDZC$^{R}_{L}$○○-○○A	**F47**	Boring Bars (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○A	**F51,F90,P24**	Boring Bars (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○A-○/○	**F51,F90,P24**	Boring Bars (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○AN	**F51**	Boring Bars (Dynamic Bar)
E○○□-	STLPR○○-○○AN○/○	**F51**	Boring Bars (Dynamic Bar)
E○○□-	STUP$^{R}_{L}$○○-○○	**F91,P24**	Boring Bars (Discontinued Description)
E○○□-	SVPBR○○-○○A	**F56**	Boring Bars (Dynamic Bar)
E○○□-	SVPCR○○-○○A	**F56**	Boring Bars (Dynamic Bar)
E○○□-	SVUBR○○-○○A	**F59**	Boring Bars (Dynamic Bar)
E○○□-	SVUCR○○-○○A	**F59**	Boring Bars (Dynamic Bar)
E○○□-	SWUB$^{R}_{L}$○○-○○A	**F91,P25**	Boring Bars (Discontinued Description)
E○○□-	SWUB$^{R}_{L}$○○-○○A-○/○	**F91,P25**	Boring Bars (Discontinued Description)
E○○□-	SWUB$^{R}_{L}$○○-○○AN	**F61**	Boring Bars (Dynamic Bar)
E○○□-	SWUBR○○-○○AN○/○	**F61**	Boring Bars (Dynamic Bar)
E○○□-	SWUP$^{R}_{L}$○○-○○A	**F61**	Boring Bars (Dynamic Bar)
E○○□-	SWUP$^{R}_{L}$○○-○○A-○/○	**F61**	Boring Bars (Dynamic Bar)
ENET	○○○○PAER-□	**M138**	Insert (Milling)
ENGN	○○○○○○S○○○○○	**B107**	Insert (Turning)
ENGN	○○○○○○T○○○○○	**B107**	Insert (Turning)
EZBFR	○○○○○○-○○○	**F19**	EZ Bars (Boring)
EZBR	○○○○○○-○○○NB	**C21,C34,F17**	EZ Bars (Boring)
EZBR	○○○○○○HP-○○○F	**F15**	EZ Bars (Boring)
EZB$^{R}_{L}$	○○○○○○HP-○○○H	**F14**	EZ Bars (Boring)
EZBR	○○○○○○HP-○○○H-LT	**F14**	EZ Bars (Boring)
EZBR	○○○○○○ST-○○○F	**F16**	EZ Bars (Boring)
EZBR	○○○○○○ST-○○○H	**F16**	EZ Bars (Boring)
EZBTR	○○○○○○-○○○	**F22**	EZ Bars (Boring)
EZFG$^{R}_{L}$	○○○○○○-○○○	**G78**	EZ Bars (Internal Face Grooving)
EZG$^{R}_{L}$	○○○○○○-○○○	**G51**	EZ Bars (Internal Grooving)
EZGR	○○○○○○-○○○S	**G51**	EZ Bars (Internal Grooving)
EZTR	○○○○○○-○○-○○○	**J32**	EZ Bars (Internal Threading)
EZH	○○○○○(.○)CT-○○○	**F26,F27,F82**	Sleeve
EZH	○○○○○(.○)HP-○○○	**F28,F29,F82**	Sleeve
EZH	○○○○○(.○)ST-○○○	**F30,F31,F82**	Sleeve
EZVBR	○○○○○○-○○○	**F20**	EZ Bars (Boring / Internal Facing / Copying)
F			
FDM-	○○○M(1)	**K97,K98**	Fine Micro Drill
FGG$^{R}_{L}$	○○○○-○○	**G39**	Insert (Grooving)

Description Index

○ : Figure, □ : Alphabet

Description		Page	Category
FH-2		**P17**	Spare Parts (Hexagon Wrench / Flag type)
FH-2.5		**P17**	Spare Parts (Hexagon Wrench / Flag type)
FMM	○○-○○	**G107**	Insert (Grooving)
FMN	○	**G107**	Insert (Grooving)
FP-12		**D8,D12,D16,D20,D24,J21**	Spare Parts (Pipe Connection)
FS-	○○	**K33**	Spare Parts (Drill Fitting Screw for Chamfering Attachment)
FT-6		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-7		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-8		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-10		**P17**	Spare Parts (Torx Wrench / Flag type)
FT-15		**P17**	Spare Parts (Torx Wrench / Flag type)
FTK	○	**G109**	Insert (Face Grooving)
FTP-5		**K12,K13,K14,K15,K18, K19,K20,K21,K22,P17**	Spare Parts (Torx Plus Wrench / Flag type)
FTP-6		**K46,K48,K50,K52, K54,M164,M165,P17**	Spare Parts (Torx Plus Wrench / Flag type)
G			
GA	○○	**G47**	Insert (Grooving)
GBA	○○R/L○○○-○○○	**C20,C30,G6,G8**	Insert (Grooving)
GBA	○○R/L○○○-○○○F	**G7**	Insert (Grooving)
GBA	○○R/L○○○-○○○GM	**G7**	Insert (Grooving)
GBA	○○R/L○○○-○○○MY	**G7**	Insert (Grooving)
GBA	○○R/L○○○-○○○R	**G8**	Insert (Grooving)
GBA	○○R/L○○○-○○○RF	**G8**	Insert (Grooving)
GBF	○○R/L○○○-○○○	**G14**	Insert (Grooving)
GBF	○○R/L○○○-○○○F	**G14**	Insert (Grooving)
GBF	○○R○○○-○○○GL	**G14**	Insert (Grooving)
GC	○○R/L○○○-○○○	**G56**	Insert (Grooving)
GDFM	○○○○N-○○○DM	**G85**	Insert (Face Grooving)
GDFM	○○○○N-○○○GH	**G85**	Insert (Face Grooving)
GDFM	○○○○N-○○○GM	**G85**	Insert (Face Grooving)
GDFM	○○○○N-○○○R-CM	**G85**	Insert (Face Grooving)
GDFMS	○○○○N-○○○DM	**G85**	Insert (Face Grooving)
GDG	○○○○N-○○○GS	**G22,G68**	Insert (Grooving)
GDG	○○○○N-○○○PG	**H18**	Insert (Cut-off)
GDG	○○○○R-○○○PG-○○D	**H18**	Insert (Cut-off)
GDGS	○○○○N-○○○NB	**C20,C31,G23**	Insert (Grooving)
GDM	○○○○N-○○○GL	**G22**	Insert (Grooving)
GDM	○○○○N-○○○GM	**G22**	Insert (Grooving)
GDM	○○○○N-○○○GMI	**G68**	Insert (Grooving)
GDM	○○○○N-○○○PF	**H18**	Insert (Cut-off)
GDM	○○○○N-○○○PH	**G22,H19**	Insert (Grooving / Cut-off)
GDM	○○○○N-○○○PM	**H19**	Insert (Cut-off)
GDM	○○○○N-○○○PQ	**H18**	Insert (Cut-off)
GDM	○○○○N-○○○R-CM	**G22,G68**	Insert (Grooving)
GDM	○○○○R/L-○○○PF-○○D	**H18**	Insert (Cut-off)
GDM	○○○○R-○○○PM-○D	**H19**	Insert (Cut-off)
GDM	○○○○R-○○○PQ-○○D	**H18**	Insert (Cut-off)
GDMS	○○○○N-○○○GM	**G22**	Insert (Grooving)
GDMS	○○○○N-○○○PH	**G22,H19**	Insert (Grooving / Cut-off)
GDMS	○○○○N-○○○PM	**H19**	Insert (Cut-off)
GDMS	○○○○R-○○○PM-○D	**H19**	Insert (Cut-off)
GER/L	○○○-○○○□	**G58,G59**	Insert (Grooving)
GER	○○○-○○○□□	**G58,G59**	Insert (Grooving)
GFVR/L	○○○○□-○○○(○)□	**G100**	Toolholder (Face Grooving)
GFVSR/L	○○○○□-○○AA	**G98,P28**	Toolholder (Face Grooving)
GFVSR/L	○○○○□-○○○(○)□	**G102,G103**	Toolholder (Face Grooving)
GFVSR/L	○○○○□-H□	**G102**	Toolholder (Face Grooving)
GFVTR/L	○○○○□-○○AA	**G98,P28**	Toolholder (Face Grooving)
GFVTR/L	○○○○□-○○○(○)□	**G102,G103**	Toolholder (Face Grooving)
GFVTR/L	○○○○□-H□	**G102**	Toolholder (Face Grooving)
GH	○○○○(○)-○○	**B115,G47,G70**	Insert (Grooving)
GHU	○○-○○	**G47,G70**	Insert (Grooving)
GIA	○○	**G72**	Insert (Grooving)

Description		Page	Category
GIFVR/L	○○○○B-○○○□	**G110,P28**	Toolholder (Face Grooving)
GIVR/L	○○○○-○□(□)	**G65**	Toolholder (Internal Grooving)
GMG	○○○○-○○○MG	**G38,G71,G108**	Insert (Grooving)
GMG	○○○○-○○○MS	**G38**	Insert (Grooving)
GMG	○○○○-○○○R	**G38**	Insert (Grooving)
GMG	○○○○-○○○RU	**G38**	Insert (Grooving)
GMGA	○○○○-○○○R	**G39,G71,G108**	Insert (Grooving)
GMM	3014-04	**G39**	Insert (Grooving)
GMM	3014-15R	**G39**	Insert (Grooving)
GMM	○○○○-MT	**G40,H30**	Insert (Grooving)
GMM	○○○○-NB	**G40,H30**	Insert (Grooving)
GMM	○○○○R/L-MT-15D	**G40,H30**	Insert (Grooving)
GMM	○○○○R/L-TK-8D	**G40,H30**	Insert (Grooving)
GMM	○○○○R/L-TMR-6D	**H30**	Insert (Grooving)
GMM	○○○○-TK	**G40,H30**	Insert (Grooving)
GMM	○○○○-TMR	**H30**	Insert (Grooving)
GMM	○○○○-○○○MS	**G38**	Insert (Grooving)
GMM	○○○○-○○○MW	**G38,G71,G108**	Insert (Grooving)
GMM	○○○○-○○○R	**G38**	Insert (Grooving)
GMM	○○○○-○○○V	**G73**	Insert (Grooving)
GMN	○(.○)	**C20,C30,G40,G41,H30**	Insert (Grooving)
GMN	○-TK	**G40,H30**	Insert (Grooving)
GMR/L	○-TK-8D	**G40,H30**	Insert (Grooving)
GMR/L	○(.○)-○(○)D	**G40,H30**	Insert (Grooving)
GMGW	○○○○-○○R	**C31,G48**	Insert (Grooving)
GMGW	○○○○-○○R-HR	**C31,G48**	Insert (Grooving)
GOMT	○○○○○○ER-D	**M23**	Insert (Milling)
GP-1		**E27,E29,E36,E41, G17,G29,H13,H23, K68,K70,K72,P19**	Spare Parts (Plug)
GP-2		**K68,K69,K70,K71, K72,K73,K74,P19**	Spare Parts (Plug)
GR	-○○○	**H40**	Spare Parts (O-ring)
GS-50		**G68,J30,J31,P2**	Spare Parts (Screw)
GVFR/L	○○○-○○○AA	**G99**	Insert (Grooving)
GVFR/L	○○○-○○○□	**C30,G105,M228**	Insert (Grooving)
GVFR/L	○○○-○○○□R	**G105**	Insert (Grooving)
GVR/L	○○○-○○○□(□)	**C30,G63,M227**	Insert (Grooving)
H			
HA○○	PCLNR/L12-○○	**F65**	Boring Bars (AD Bar Interchangeable Head)
HA○○	PDUNR/L15-○○	**F66**	Boring Bars (AD Bar Interchangeable Head)
HA○○	PTFNR/L16-○○	**F66**	Boring Bars (AD Bar Interchangeable Head)
HA○○	SCLCR/L09-○○	**F67**	Boring Bars (AD Bar Interchangeable Head)
HA○○	SDUCR/L11-○○	**F67**	Boring Bars (AD Bar Interchangeable Head)
HF16X40S		**P2**	Spare Parts (Screw)
HF16X44HC		**M136,P19**	Spare Parts (Screw with Coolant Hole)
HF16X48HC		**M136,P19**	Spare Parts (Screw with Coolant Hole)
HF20X53H		**M66,P2**	Spare Parts (Screw with Coolant Hole)
HF20X53HA		**M136,P2**	Spare Parts (Screw with Coolant Hole)
HF24X60H		**P2**	Spare Parts (Screw with Coolant Hole)
HF24X60HA		**M136,P2**	Spare Parts (Screw with Coolant Hole)
HH3X6		**F85,P2**	Spare Parts (Screw)
HH3X12		**D32,D33,D34, D35,D36,F85,P2**	Spare Parts (Screw)
HH4X12		**G103,K75,P3**	Spare Parts (Screw)
HH4X16		**P2**	Spare Parts (Screw)
HH5X15		**G72,P2**	Spare Parts (Screw)
HH5X15L		**M172**	Spare Parts (Screw)
HH5X16		**D27,G24,G25,G26,G42, G43,G92,H20,H24,H27, H32,H33,N10,P2**	Spare Parts (Screw)
HH5X20		**F68,G106,G107,P2**	Spare Parts (Screw)
HH5X25		**G24,G26,G42,G43,G44, G45,G106,G107,H24, H27,H32,H33,H40,P2**	Spare Parts (Screw)
HH5X30		**F68,N28,P2**	Spare Parts (Screw)

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HH6X16A	**P2**	Spare Parts (Screw)
HH6X18	**K56,P2**	Spare Parts (Screw)
HH6X18A	**P2**	Spare Parts (Screw)
HH6X20	**F68,G47,G71,N25,N26,P2**	Spare Parts (Screw)
HH6X25	**G24,G42,G46,G48, G70,G108,H32,P2**	Spare Parts (Screw)
HH6X30	**F68,H40,P2**	Spare Parts (Screw)
HH8X20	**K56,P2**	Spare Parts (Screw)
HH8X25	**M47,M50,M57,M80,M88, M91,M137,M215,N24,P2**	Spare Parts (Screw)
HH8X25H	**M66,M75,P3**	Spare Parts (Screw with Coolant Hole)
HH8X30	**N24**	Spare Parts (Screw)
HH10X25	**P3**	Spare Parts (Screw)
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HH10X30H	**M66,M75,M144,P3**	Spare Parts (Screw with Coolant Hole)
HH10X30S	**M50,P3**	Spare Parts (Screw)
HH10X35	**M187,P3**	Spare Parts (Screw)
HH10X35HK	**P3**	Spare Parts (Screw with Coolant Hole)
HH10X40	**M91,P3**	Spare Parts (Screw)
HH12X35	**M31,M35,M41,M46, M47,M50,M52,M53, M57,M88,M91,M92, M93,M103,M107,M111, M117,M121,M124,M137, M151,M187,M198, M199,M210,M215,P3**	Spare Parts (Screw)
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HH12X35HC	**M136,P19**	Spare Parts (Screw with Coolant Hole)
HH12X35HK	**P3**	Spare Parts (Screw with Coolant Hole)
HH12X40	**M92,M93,M99,M124,P3**	Spare Parts (Screw)
HH12X50	**M99**	Spare Parts (Screw)
HH12X65	**M99**	Spare Parts (Screw)
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HH16X45	**M88,M91,M121,M124,P3**	Spare Parts (Screw)
HH16X52H	**M66,P3**	Spare Parts (Screw with Coolant Hole)
HH16X65	**M99**	Spare Parts (Screw)
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HS-G1/8-G1/8-○○○	**H15**	Spare Parts (Hose)
HS-ST-AN-○○○	**D11,G27,H43**	Spare Parts (Hose)
HS-ST-ST-○○○	**D11,G27,H43**	Spare Parts (Hose)
J		
J-AN-R1/8-G1/8	**H15**	Spare Parts (Joint)
JCET ○○○○○○MR/L-F	**B73**	Insert (Turning)
JCET ○○○○○○MR/L-FSF	**B73**	Insert (Turning)
JCET ○○○○○○R/L-FSF	**B73**	Insert (Turning)
JCGT ○○○○○○R/L-F	**B73**	Insert (Turning)
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K		
KCGT ○○○○○○FR-AL	**M15**	Insert (Milling)
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KGBFR ○○○○□-○○FJCT	**G17**	Toolholder (Grooving)
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LNEU	○○○○-○○S(-○)	M188	Insert (Milling)
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LNGX	○○○○○○R-TT	M15	Insert (Milling)
LOGT	○○○○○○FR-AM	M16	Insert (Milling)
LOGU	○○○○○○ER-GH	M15	Insert (Milling)
LOGU	○○○○○○ER-GM	M15	Insert (Milling)
LOGU	○○○○PAER-GM	M15	Insert (Milling)
LOMU	○○○○○○ER-GH	M16	Insert (Milling)
LOMU	○○○○○○ER-GM	M16	Insert (Milling)

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LOMU ○○○○○○ER-SM	**M16**	Insert (Milling)
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LP-6S	**D22,P7**	Spare Parts (Lock Pin)
LPA-11	**E21,E22,E23,P7**	Spare Parts (Anchor Pin)
LPA-13	**E21,E22,E23,P7**	Spare Parts (Anchor Pin)
LPA-17	**E21,E22,E23,P7**	Spare Parts (Anchor Pin)
LPF-11	**E26,E28,E36,P7**	Spare Parts (Anchor Pin)
LPF-13	**E26,E28,P7**	Spare Parts (Anchor Pin)
LPF-17	**E26,E28,P7**	Spare Parts (Anchor Pin)
LPF-1113	**E36,P7**	Spare Parts (Anchor Pin)
LPF-1117	**E36,P7**	Spare Parts (Anchor Pin)
LPGT ○○○○○○ER-GM	**M16**	Insert (Milling)
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LR-10C	**D23,P9**	Spare Parts (Shim)
LR-12C	**D23,D37,P9**	Spare Parts (Shim)
LR-16C	**P9**	Spare Parts (Shim)
LR-80	**D23,P9**	Spare Parts (Shim)
LR-81	**D23,P9**	Spare Parts (Shim)
LS-03N	**D17,N24,P4**	Spare Parts (Lock Screw)
LS-03SN	**D17,F70,F77,F78,P4**	Spare Parts (Lock Screw)
LS-05	**D23,P4**	Spare Parts (Lock Screw)
LS-1N	**D9,D13,D14, D15,D17,D23, D25,D37,E49, F77,N16,N24,P4**	Spare Parts (Lock Screw)
LS-1P	**F66,P4**	Spare Parts (Lock Screw)
LS-1SN	**F70,F71,F78,P4**	Spare Parts (Lock Screw)
LS-1T	**P4**	Spare Parts (Lock Screw)
LS-2N	**D9,D13,D14,D15, D17,D23,D25,E48, F70,F73,F80,N15, N16,N17,N24,P4**	Spare Parts (Lock Screw)
LS-2P	**F65,P4**	Spare Parts (Lock Screw)
LS-3	**D13,P4**	Spare Parts (Lock Screw)
LS-3P	**F66,P4**	Spare Parts (Lock Screw)
LS-4N	**D9,P4**	Spare Parts (Lock Screw)
LS-5	**D9,P4**	Spare Parts (Lock Screw)
LS-11	**D22,P4**	Spare Parts (Lock Screw)
LS-15	**D22,P4**	Spare Parts (Lock Screw)
LS-32	**D14,D15,P9**	Spare Parts (Shim)
LS-42	**D14,D15,N24,P9**	Spare Parts (Shim)
LSD-445R	**P12**	Spare Parts (Cartridge)
LSE-445R	**P12**	Spare Parts (Cartridge)
LSO-445R	**P12**	Spare Parts (Cartridge)
LSP-1	**D9,D13,D14,D15, D17,D23,D25,D37, E49,F70,F71,F77, F78,N16,N24,P7**	Spare Parts (Shim Pin)
LSP-2	**D9,D13,D14,D15, D17,D23,D25,E48, F70,F73,F80,N15, N16,N17,N24,P7**	Spare Parts (Shim Pin)
LSP-2K	**F66,P7**	Spare Parts (Shim Pin)
LSP-3	**D9,P7**	Spare Parts (Shim Pin)
LSP-3K	**F65,F66,P7**	Spare Parts (Shim Pin)
LSP-4	**D9,P7**	Spare Parts (Shim Pin)
LSP-415R	**P12**	Spare Parts (Cartridge)
LT-3K	**F66,P9**	Spare Parts (Shim)
LT-32N	**D17,E49,F77, N16,N24,P9**	Spare Parts (Shim)
LT-32N-20	**D17,E49,F77,N16,P9**	Spare Parts (Shim)
LT-42N	**D17,N24,P9**	Spare Parts (Shim)
LT-42N-20	**D17,P9**	Spare Parts (Shim)
LTE-490R	**P12**	Spare Parts (Cartridge)
LTK-5	**G109,H46,P18**	Spare Parts (Releasing Wrench)
LTW-8SS	**E47,P17**	Spare Parts (Torx Wrench / L-shaped type)
LTW-10S	**F34,F37,F38,F39, G82,G83,H16,P17**	Spare Parts (Torx Wrench / L-shaped type)
LTW-10SS	**E46,P17**	Spare Parts (Torx Wrench / L-shaped type)
LTW-15S	**G25,G29,G42,H20,H21, H23,H32,J20,J22,P17**	Spare Parts (Torx Wrench / L-shaped type)
LTW-20	**E27,F64,G10,G24,G25, G42,G43,G68,H20,H24, H32,H33,M220,P17**	Spare Parts (Torx Wrench / L-shaped type)
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LW-2.5	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-3	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-4	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-4.5	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-5	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-6	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-8	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
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LW-14	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-17	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-19	**P18**	Spare Parts (Hexagon Wrench / L-shaped type)
LW-32N	**D25,F78,P9**	Spare Parts (Shim)
LW-42N	**D25,N17,P9**	Spare Parts (Shim)
LW-42N$^{R}/_{L}$	**F80,P9**	Spare Parts (Shim)
M		
M3X8	**D26,D27,D29,D30, D31,D33,D34,D35, F81,N3,P4**	Spare Parts (Screw)
M3X12	**D26,D29,D30,D31, D33,D34,D35,P4**	Spare Parts (Screw)
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MEA ○○-S○○(-○○○)	**P32**	End Mill (MEA / Discontinued Description)
MEAL ○○-S○○	**P32**	End Mill (for Aluminum Machining / Discontinued Description)
MEAS ○○○R-○○-○T-M	**M144**	Face Mill (for Aluminum Machining)
MEAS ○○-S○○-○○-○T(-○○○)	**M144**	End Mill (for Aluminum Machining)
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MEC ○○-S○○-○○○-○○(-○)	**M65**	End Mill (MEC)
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MECH ○○○R-○○-○-○T(-M)	**M91**	Shell Mill (MECH)
MECH ○○○R○○-○-○T-BT50	**M91**	End Mill (MECH)
MECH ○○○R○○-○T-BT○○-A	**M92,M93**	End Mill (MECH)
MECH ○○○R○○-○T-BT○○SA	**M92,M93**	End Mill (MECH)
MECH ○○○R○○-○T-F	**M92,M93**	End Mill (MECH)
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MSTB	○○○○□□○○○-○T	**M186**	Slot Mill
MSTC	○○○□□○○○-○○○-○○	**M192,M194,M196**	Slot Mill
MSTC	○○○□□○○○○-○○-○(○)T	**M192,M193,M194, M195,M196,M197**	Slot Mill
MT-	○	**K33**	Spare Parts (Screw / Insert mounting screw)
MTE-42		**P10**	Spare Parts (Shim)
MTE	90○○	**P31**	Face Mill (with Shank / Discontinued Description)
MTE	90○○-32	**P31**	Face Mill (with Shank / Discontinued Description)
MTE	90○○(○)R	**P31**	Face Mill (Discontinued Description)
MTE	90○○○R-○T-SF	**P31**	Face Mill (Discontinued Description)

Description		Page	Category
MTES	○○○	**P32**	End Mill (Discontinued Description)
MTP	90○○	**M129**	Face Mill (with Shank)
MTPS	○○○	**P32**	End Mill (Discontinued Description)
MVG	○○○○	**M228,P34**	End Mill (Ring Grooving for M/C)
MVLN[R/L]	○○○○□-○○	**D21**	Toolholder (Turning)
MVN-32		**D21,P10**	Spare Parts (Shim)
MVVNN	○○○○□-○○	**D21**	Toolholder (Turning)
N			
NDCT	○○○○○○FR	**M24**	Insert (Milling)
NDCT	○○○○○○TR	**M24**	Insert (Milling)
NDCT	○○○○○○TRX	**M24**	Insert (Milling)
NDCW	○○○○○○FRX	**C36,M24,M29**	Insert (Milling)
NDCW	○○○○○○FRX-NE	**C36,M29**	Insert (Milling)
NDCW	○○○○○○TR	**M24**	Insert (Milling)
NDCW	○○○○○○TRX	**M24**	Insert (Milling)
NDMT	○○○○○○ER-D	**M24**	Insert (Milling)
NDMT	○○○○○○ER-DH	**M24**	Insert (Milling)
NEMT	○○○○○○ER-D	**M24**	Insert (Milling)
NEMT	○○○○○○ER-DH	**M24**	Insert (Milling)
O			
OFMR	○○○○○○EN-GT	**M25**	Insert (Milling)
OFMR	○○○○○○EN-SH	**M25**	Insert (Milling)
OFMT	○○○○○○EN-GT	**M25**	Insert (Milling)
OFMT	○○○○○○E□-SH	**M25**	Insert (Milling)
P			
P-03		**D17,N24,P7**	Spare Parts (Shim Pin)
P-03S		**D17,F70,F77,F78,P7**	Spare Parts (Shim Pin)
P-37		**M31,M35,M36,M41, M53,M57,M58,M67, M80,M87,M88,M90, M91,M93,M99,M103, M107,M108,M111, M112,M117,M121, M124,M125,M137, M144,M151,M153, M154,M158,M164, M165,M172,M174, M187,M198,M199, M206,M210,M211, M215,M217**	Spare Parts (Anti-seize Compound)
PC-1		**D9,D13,D14,D15, D17,D23,D25,D37, E49,F70,F71,F77, F78,N16,N24,P19**	Spare Parts (Punch)
PC-2		**D9,D13,D14,D15, D17,D23,D25,E48, F70,F73,F80,N15, N16,N17,N24,P19**	Spare Parts (Punch)
PC-2K		**F65,F66**	Spare Parts (Punch)
PCLN[R/L]	○○○○□-○○	**D9**	Toolholder (Turning)
PCLNR	○○○○□□-○○FF	**E48**	Toolholder (Double Sided Tooling)
PD-42		**F73,P10**	Spare Parts (Shim)
PDHN[R/L]	○○○○□-○○	**D13**	Toolholder (Turning)
PDJN[R/L]	○○○○□-○○	**D13**	Toolholder (Turning)
PDJN[R/L]	○○○○□-○○U	**D13**	Toolholder (Turning)
PH	○○○○-○○	**P26**	Sleeve (for Tip-Bars / Discontinued Description)
PKM	○○N-○○○PH	**H38**	Insert (Cut-off)
PKM	○○N-○○○PM	**H38**	Insert (Cut-off)
PKM	○○[R/L]-○○○PM-○D	**H38**	Insert (Cut-off)
PNEA	○○○○XNTN-T01020	**M17**	Insert (Milling)
PNEG	○○○○XNEN-GL	**M17**	Insert (Milling)
PNEG	○○○○XNER-W	**M17**	Insert (Milling)
PNEG	○○○○XNTR-T00515	**M17**	Insert (Milling)
PNEG	○○○○XNTR-T01015W	**M17**	Insert (Milling)
PNEU	○○○○ANEL-GL	**M18**	Insert (Milling)
PNEU	○○○○ANER-GL	**M18**	Insert (Milling)
PNEU	○○○○ANER-W	**M18**	Insert (Milling)

Description		Page	Category
PNMG	○○○○XNEN-GH	**M17**	Insert (Milling)
PNMG	○○○○XNEN-GM	**M17**	Insert (Milling)
PNMU	○○○○ANER-GH	**M18**	Insert (Milling)
PNMU	○○○○ANEL-GM	**M18**	Insert (Milling)
PNMU	○○○○ANER-GM	**M18**	Insert (Milling)
PNMU	○○○○ANER-SM	**M18**	Insert (Milling)
PNMU	○○○○XNER-GH	**M18**	Insert (Milling)
PNMU	○○○○XNER-GM	**M18**	Insert (Milling)
PNMU	○○○○XNER-SM	**M18**	Insert (Milling)
PP-4		**F73,P7**	Spare Parts (Lock Pin)
PRGC[R/L]	○○○○□-○○	**D23**	Toolholder (Turning)
PRGCR	○○○○□-○○BE	**D37,P21**	Toolholder (Turning)
PRGCR	○○○○□-○○BF	**P21**	Toolholder (Turning / Discontinued Description)
PRGN[R/L]	○○○○□-○○	**D23**	Toolholder (Turning)
PRXC[R/L]	○○○○□-○○	**D23**	Toolholder (Turning)
PSBN[R/L]	○○○○□-○○	**D14**	Toolholder (Turning)
PSDNN	○○○○□-○○	**D15**	Toolholder (Turning)
PSH	○○○○(.○)-○○(○)	**P23**	Sleeve (for 2-Edge Tip-Bars / Discontinued Description)
PSKNR	○○CA○○	**N24**	Toolholder (Cartridge)
PSKN[R/L]	○○○○□-○○	**D14**	Toolholder (Turning)
PSSNR	○○CA○○	**N24**	Toolholder (Cartridge)
PSSN[R/L]	○○○○□-○○	**D15**	Toolholder (Turning)
P-ST-RC1/8		**H15**	Spare Parts (Coupling)
PSYNR	○○CA○○	**N24**	Toolholder (Cartridge)
PTFNR	○○CA○○	**N24**	Toolholder (Cartridge)
PTFN[R/L]	○○○○□-○○	**D17,P20**	Toolholder (Turning)
PTGNR	○○CA○○	**N24**	Toolholder (Cartridge)
PTGN[R/L]	○○○○□-○○	**D17,P20**	Toolholder (Turning)
PTLNR	○○○○□□-○○FF	**E49**	Toolholder (Double Sided Tooling)
PTTNR	○○CA○○	**N24**	Toolholder (Cartridge)
PVLN[R/L]	○○○○□-○○Q	**D22**	Toolholder (Turning)
PVPN[R/L]	○○○○□-○○Q	**D22**	Toolholder (Turning)
PVVNN	○○○○□-○○Q	**D22**	Toolholder (Turning)
PWLN[R/L]	○○○○□-○○	**D25**	Toolholder (Turning)
R			
RBG	○○K○○○○○	**B114**	Insert (Turning)
RCGX	○○○○M0-AQ	**B74**	Insert (Turning)
RCGX	○○○○○○E○○○	**B114**	Insert (Turning)
RCGX	○○○○○○P○○○○○	**B114**	Insert (Turning)
RCGX	○○○○○○S○○○○○	**B114**	Insert (Turning)
RCGX	○○○○○○T○○○○○	**B114**	Insert (Turning)
RCMT	○○○○M0-BB	**B103**	Insert (Turning)
RCMX	○○○○M0	**B74**	Insert (Turning)
RDFG	○○FR	**M25**	Insert (Milling)
RDGT	○○○○M0ER-GM	**M19**	Insert (Milling)
RDGT	○○○○M0ER-SM	**M19**	Insert (Milling)
RDHX	○○○○M0T	**M25**	Insert (Milling)
RDMT	○○○○M0EN-GH	**M19**	Insert (Milling)
RDMT	○○○○M0ER-GM	**M19**	Insert (Milling)
RDMT	○○○○M0-H	**M25**	Insert (Milling)
RNGN	○○○○○○E○○○	**B108**	Insert (Turning)
RNGN	○○○○○○K○○○○○	**B108**	Insert (Turning)
RNGN	○○○○○○S○○○○○	**B108**	Insert (Turning)
RNGN	○○○○○○T○○○○○	**B108**	Insert (Turning)
RNMG	○○○○○○	**B31**	Insert (Turning)
RNMN	○○○○○○S○○○○○	**C19**	Insert (Turning)
ROMU	○○○○M0ER-GH	**M19**	Insert (Milling)
ROMU	○○○○M0ER-GM	**M19**	Insert (Milling)
ROMU	○○○○M0ER-SM	**M19**	Insert (Milling)
RPGN	○○○○○○E○○○	**B113**	Insert (Turning)
RPGN	○○○○○○T○○○○○	**B113**	Insert (Turning)
RPGT	○○○○M0ER-GM	**M19**	Insert (Milling)
RPGT	○○○○M0ER-SM	**M19**	Insert (Milling)

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○ : Figure, □ : Alphabet

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RPGX	○○○○○○E○○○	**B114**	Insert (Turning)
RPGX	○○○○○○T○○○○○	**B114**	Insert (Turning)
RPMT	○○○○M0	**M25**	Insert (Milling)
RPMT	○○○○M0-BB	**B103**	Insert (Turning)
RPMT	○○○○M0EN-GH	**M19**	Insert (Milling)
RPMT	○○○○M0ER-GM	**M19**	Insert (Milling)
RPMT	○○○○M0-H	**M25**	Insert (Milling)
S			
S○○-	CH○○	**K32**	Toolholder (Chamfering Attachment / DRC)
S○○-	CH○○-DRA	**K16**	Toolholder (Chamfering Attachment / DRA)
S○○-	DRS○○○○○	**K66**	Toolholder ("MagicDrill")
S○○-	DRV○○○M-○-○○	**K46,K47,K48, K49,K50,K51, K52,K53,K54**	Toolholder ("MagicDrill")
S○○-	DRW○○○○○M-○-06	**K92,K93**	Toolholder ("MagicDrill")
S○○-	DRX○○○M-○-○○	**K82,K83,K84,K85, K86,K87,K88**	Toolholder ("MagicDrill")
S○○-	DRZ○○○○(○○)-○○	**K68,K69,K70,K71, K72,K73,K74**	Toolholder ("MagicDrill")
S○○-	DRZ○○○○○-○○CR	**K75**	Toolholder ("MagicDrill")
S○○□-	CCLN^{R}/L○○-○○A	**P25**	Boring Bars (Discontinued Description)
S○○□-	CCLN^{R}/L○○-○○GX	**P26**	Boring Bars (Discontinued Description)
S○○□-	CDUN^{R}/L○○-○○GX	**P26**	Boring Bars (Discontinued Description)
S○○□-	CELNR○○-○○	**F81**	Boring Bars
S○○□-	CSKN^{R}/L○○-○○	**P26**	Boring Bars (Discontinued Description)
S○○□-	CSKN^{R}/L○○-○○A	**P25**	Boring Bars (Discontinued Description)
S○○□-	CSKN^{R}/L○○-○○GX	**P26**	Boring Bars (Discontinued Description)
S○○□-	CSKPR○○-○○	**F62,P25**	Boring Bars
S○○□-	CTUC^{R}/L○○-○○	**P25**	Boring Bars (Discontinued Description)
S○○□-	CTUNR○○-○○A	**F81**	Boring Bars
S○○□-	CTUP^{R}/L○○-○○	**F63,P25**	Boring Bars
S○○(.○)□-	KGBFL16	**G15**	Sleeve Holder (Grooving)
S○○(.○)□-	KTGFL16	**G19**	Sleeve Holder (Grooving)
S○○(.○)□-	KTNL16	**J22**	Sleeve Holder (Threading)
S○○(.○)□-	KTTXL16	**J28**	Sleeve Holder (Threading)
S○○□-	PCLN^{R}/L○○-○○	**F70**	Boring Bars
S○○□-	PDQN^{R}/L○○-○○	**F73**	Boring Bars
S○○□-	PDUN^{R}/L○○-○○	**F71,F73**	Boring Bars
S○○□-	PDZN^{R}/L○○-○○	**F73**	Boring Bars
S○○□-	PTUN^{R}/L○○-○○	**F77**	Boring Bars
S○○□-	PWLN^{R}/L○○-○○	**F78,F80**	Boring Bars
S○○(.○)□-	SCLCL○○	**E43**	Sleeve Holder (Turning)
S○○□-	SCLC^{R}/L○○-○○	**F89,P24**	Boring Bars (Discontinued Description)
S○○□-	SCLC^{R}/L○○-○○A	**F41**	Boring Bars (Dynamic Bar)
S○○□-	SCLC^{R}/L○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
S○○□-	SCLC^{R}/L○○-○○AE	**F41**	Boring Bars (Dynamic Bar)
S○○○□-	SCLCR○○-○○○EZ	**P23**	Boring Bars (EZ Bar PLUS / Discontinued Description)
S○○○□-	SCLCR○○-○○○EZP	**F23**	Boring Bars (EZ Bar PLUS)
S○○□-	SCLP^{R}/L○○-○○	**F89,P24**	Boring Bars (Discontinued Description)
S○○□-	SCLP^{R}/L○○-○○A	**F43**	Boring Bars (Dynamic Bar)
S○○□-	SCLP^{R}/L○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
S○○(.○)□-	SDLCL○○	**E44**	Sleeve Holder (Turning)
S○○□-	SDQC^{R}/L○○-○○A	**F46**	Boring Bars (Dynamic Bar)
S○○(.○)□-	SDUCL○○	**E44**	Sleeve Holder (Turning)
S○○□-	SDUC^{R}/L○○-○○	**F89,P24**	Boring Bars (Discontinued Description)
S○○□-	SDUC^{R}/L○○-○○A	**F45**	Boring Bars (Dynamic Bar)
S○○□-	SDUC^{R}/L○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
S○○□-	SDZC^{R}/L○○-○○	**F89,P24**	Boring Bars (Discontinued Description)
S○○□-	SDZC^{R}/L○○-○○A	**F47**	Boring Bars (Dynamic Bar)
S○○□-	SDZC^{R}/L○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
S○○□-	SSKPR○○-○○	**F62,P25**	Boring Bars
S○○□-	STLB^{R}/L○○-○○A	**F51**	Boring Bars (Dynamic Bar)
S○○□-	STLB^{R}/L○○-○○AE	**F51**	Boring Bars (Dynamic Bar)
S○○○□-	STLBR○○-○○○EZP	**F24**	Boring Bars (EZ Bar PLUS)
S○○□-	STLC^{R}/L○○-○○A	**F49**	Boring Bars (Dynamic Bar)

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S○○□-	STLP^{R}/L○○-○○A	**F51**	Boring Bars (Dynamic Bar)
S○○○□-	STLPR○○-○○○EZP	**F24**	Boring Bars (EZ Bar PLUS)
S○○□-	STUB^{R}/L○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
S○○□-	STUB^{R}/L○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
S○○□-	STUP^{R}/L○○-○○	**F90,P24**	Boring Bars (Discontinued Description)
S○○□-	STUP^{R}/L○○-○○E	**F88,P24**	Boring Bars (Discontinued Description)
S○○□-	STWPR○○-○○	**F52,J37**	Toolholder (Boring / Threading)
S○○□-	STWP^{R}/L○○-○○E	**F52,J37**	Toolholder (Boring / Threading)
S○○(.○)□-	STW^{R}/L15	**F38,G82**	Toolholder (for Twin Bars)
S○○□-	SVJB^{R}/L○○-○○A	**F54**	Boring Bars (Dynamic Bar)
S○○□-	SVJB^{R}/L○○-○○E	**F87,F88,P25**	Boring Bars (Discontinued Description)
S○○□-	SVJB^{R}/L○○-○○EN	**F88,P25**	Boring Bars (Discontinued Description)
S○○□-	SVJC^{R}/L○○-○○A	**F54**	Boring Bars (Dynamic Bar)
S○○□-	SVJC^{R}/L○○-○○E	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVJP^{R}/L○○-○○A	**F54**	Boring Bars (Dynamic Bar)
S○○□-	SVJP^{R}/L○○-○○E	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVNR12	**P23**	Toolholder (for System Tip-Bars / Discontinued Description)
S○○□-	SVNR12N	**F35**	Toolholder (for System Tip-Bars)
S○○(.○)□-	SVNR12S	**P23**	Toolholder (for System Tip-Bars / Discontinued Description)
S○○(.○)□-	SVNR12SN	**F35**	Toolholder (for System Tip-Bars)
S○○(.○)□-	SVNR12SXN	**F37**	Toolholder (for System Tip-Bars)
S○○□-	SVNR12XN	**F37,P23**	Toolholder (for System Tip-Bars)
S○○□-	SVPB^{R}/L○○-○○A	**F56**	Boring Bars (Dynamic Bar)
S○○□-	SVPB^{R}/L○○-○○E	**F87,F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVPB^{R}/L○○-○○EN	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVPC^{R}/L○○-○○A	**F56**	Boring Bars (Dynamic Bar)
S○○□-	SVPC^{R}/L○○-○○E	**F89,P25**	Boring Bars (Discontinued Description)
S○○(.○)□-	SVUBL○○	**E45**	Sleeve Holder (Turning)
S○○(.○)□-	SVUCL○○	**E45**	Sleeve Holder (Turning)
S○○□-	SVUB^{R}/L○○-○○A	**F59**	Boring Bars (Dynamic Bar)
S○○□-	SVUB^{R}/L○○-○○E	**F87,F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVUB^{R}/L○○-○○EN	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVUC^{R}/L○○-○○A	**F59**	Boring Bars (Dynamic Bar)
S○○□-	SVUC^{R}/L○○-○○E	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVZB^{R}/L○○-○○A	**F59**	Boring Bars (Dynamic Bar)
S○○□-	SVZB^{R}/L○○-○○E	**F87,F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVZB^{R}/L○○-○○EN	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SVZC^{R}/L○○-○○A	**F59**	Boring Bars (Dynamic Bar)
S○○□-	SVZC^{R}/L○○-○○E	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SWUB^{R}/L○○-○○	**F90,P25**	Boring Bars (Discontinued Description)
S○○□-	SWUB^{R}/L○○-○○A	**F61**	Boring Bars (Dynamic Bar)
S○○□-	SWUB^{R}/L○○-○○AE	**F61**	Boring Bars (Dynamic Bar)
S○○□-	SWUB^{R}/L○○-○○E	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SWUB^{R}/L○○-○○-○○	**F90,P25**	Boring Bars (Discontinued Description)
S○○○□-	SWUBR○○-○○○EZP	**F25**	Boring Bars (EZ Bar PLUS)
S○○□-	SWUP^{R}/L○○-○○A	**F61**	Boring Bars (Dynamic Bar)
S○○□-	SWUP^{R}/L○○-○○E	**F89,P25**	Boring Bars (Discontinued Description)
S○○□-	SYXP^{R}/L○○-○○E	**P25**	Boring Bars (Discontinued Description)
S○○□-	WWLN^{R}/L○○-○○E	**F80**	Boring Bars
SABSR	○○○○□(□)-○○F	**E21,E53,P21**	Toolholder (Turning)
SABWR	○○○○□(□)-○○F	**E22,E23,E53,P21**	Toolholder (Turning)
SB-1STR		**F53,P5**	Spare Parts (Screw)
SB-1TR		**F51,F53,P4**	Spare Parts (Screw)
SB-2TR		**F53,J23,P4**	Spare Parts (Screw)
SB-3STR		**F52,J37,P4**	Spare Parts (Screw)
SB-3TR		**F52,J37,N26,P4**	Spare Parts (Screw)
SB-3.5TR		**J20,J22,J23,P4**	Spare Parts (Screw)
SB-4TR		**F52,F62,F64, J30,J31,N26,P4**	Spare Parts (Screw)
SB-5TR		**G42,G43,G68, H32,H33,P4**	Spare Parts (Screw)
SB-1635TR		**F23,F41,F48,P5**	Spare Parts (Screw)
SB-1840TRP		**M164,M165,P5**	Spare Parts (Screw)
SB-2035TR		**F23,F24,F25, F41,F51,F61,P5**	Spare Parts (Screw)

Description	Page	Category
SB-2035TRG	**M74,P5**	Spare Parts (Screw)
SB-2037TRP	**K46,K48,K50, K52,K54,P5**	Spare Parts (Screw)
SB-2040TR	**J23,P5**	Spare Parts (Screw)
SB-2040TRG	**M174,M178,P5**	Spare Parts (Screw)
SB-2041TRP	**K46,K48,K50, K52,K54,P5**	Spare Parts (Screw)
SB-2042TRG	**K82,K84,K86,K88, M74,M75,P5**	Spare Parts (Screw)
SB-2045TR	**K68,K70,K72,K82, K84,K86,K88,P5**	Spare Parts (Screw)
SB-2045TRN	**G60,G61,P5**	Spare Parts (Screw)
SB-2050TR	**E35,E41,E42,E45, F54,F56,F59,F61, F73,F87,J23,P5**	Spare Parts (Screw)
SB-2060TR	**P5**	Spare Parts (Screw)
SB-2080TR	**K66,P5**	Spare Parts (Screw)
SB-2250TR	**F49,K82,K84,K86, K88,M222,P5**	Spare Parts (Screw)
SB-2255TR	**G60,G61,G62,P5**	Spare Parts (Screw)
SB-2260TR	**K68,K70,K72, M222,P5**	Spare Parts (Screw)
SB-2270T$^{R}/_{L}$	**G57,P5**	Spare Parts (Screw)
SB-2290TR	**K66,P4**	Spare Parts (Screw)
SB-2545TR	**F23,F24,F41, F47,F51,F61, M64,M130,P5**	Spare Parts (Screw)
SB-2555TRG	**M64,M65,M66, M67,M90,M91, M93,M99, M174,M178,P5**	Spare Parts (Screw)
SB-2555TRP	**K46,K48,K50,K52, K54,M217,P5**	Spare Parts (Screw)
SB-2560TR	**E43,E44,F45,F46, F47,F49,M224,P5**	Spare Parts (Screw)
SB-2570TR	**E25,E26,E27,E28, E29,E32,E33,E34, E35,E36,E37,E38, E39,E40,E41,E42, E43,E45,E47,F54, F56,F59,G60,G61, G62,K68,K70,K72, K82,K84,K86,K88, N8,N28,P5**	Spare Parts (Screw)
SB-3060TR	**F43,F51,M130, M220,M224,P5**	Spare Parts (Screw)
SB-3060TRP	**K46,K48,K50, K52,K54,P5**	Spare Parts (Screw)
SB-3065TRP	**M57,M58,M87,M88, M107,M108,M158,P5**	Spare Parts (Screw)
SB-3070T$^{R}/_{L}$	**G57,P5**	Spare Parts (Screw)
SB-3070TRG	**M174,M178,P5**	Spare Parts (Screw)
SB-3070TRP	**M215,M217,P5**	Spare Parts (Screw)
SB-3076TRP	**M80,P5**	Spare Parts (Screw)
SB-3080TR	**D16,E21,E22,E23, E35,E46,F34,F35, F37,F38,F39,F76, G60,G82,G83,K56, K82,K84,K86,K88, M222,N5,N26,P5**	Spare Parts (Screw)
SB-3573TRP	**K46,K48,K50, K52,K54,P5**	Spare Parts (Screw)
SB-3580TR	**F67,P5**	Spare Parts (Screw)
SB-3590TRP	**M198,M199,P5**	Spare Parts (Screw)
SB-3592TR	**K93,M172,P5**	Spare Parts (Screw)
SB-4050TRN	**H16,P5**	Spare Parts (Screw)
SB-4060TR	**M131,M132,P5**	Spare Parts (Screw)
SB-4065TR	**E43,F41,F43, F45,F46,F47, F51,F61,H39, M131,M132, M226,P5**	Spare Parts (Screw)
SB-4070TRG	**M174,M178,P5**	Spare Parts (Screw)
SB-4070TRN	**M65,M66,M67, M90,M91,M93, M99,P5**	Spare Parts (Screw)
SB-4070TRS	**G18,G19,J30,N28,P5**	Spare Parts (Screw)
SB-4070TRW	**G15,G16,G17, G18,J28,N28**	Spare Parts (Screw)
SB-4075TRP	**M144,M153,M154,P5**	Spare Parts (Screw)
SB-4082TPR	**M50,P5**	Spare Parts (Screw)
SB-4085TR	**D8,D12,D14,D19, D20,D24,E24,E26, E27,E28,E29,E30, E32,E33,E34,E44, F69,F72,F75,F76, F79,G10,G60,H43, J23,K68,K70,K72, K74,K83,K84,K86, K88,M224,M226,N3, N4,N5,N6,N7,N28,P5**	Spare Parts (Screw)
SB-4085TRP	**M210,M211,P5**	Spare Parts (Screw)
SB-4086TRP	**K46,K48,K50, K52,K54,P5**	Spare Parts (Screw)
SB-4090TRP	**M35,M36,M57,M58, M87,M88,M111, M112,M144,P5**	Spare Parts (Screw)
SB-4090TRPN	**M151,M215,M217,P5**	Spare Parts (Screw)
SB-4570TRN	**H11,P5**	Spare Parts (Screw)
SB-4590TRWN	**E13,H9,H13,J25**	Spare Parts (Screw)
SB-5070TR	**M220,P4**	Spare Parts (Screw)
SB-5085TR	**G10,K69,K70,K71, K72,K73,K74,K75,P5**	Spare Parts (Screw)
SB-5090TR	**E27,F64,K83,K85, K87,K88,M220,P4**	Spare Parts (Screw)
SB-25100TR	**K66,P4**	Spare Parts (Screw)
SB-40115TR	**F87,P4**	Spare Parts (Screw)
SB-40120TR	**G25,G29,H20, H21,H23,P5**	Spare Parts (Screw)
SB-40125TRN	**E37,E38,F54,F56, F59,N7,N8,N18,P5**	Spare Parts (Screw)
SB-40140TR	**G72,M41,M53, M117,M121, M124,M125,P5**	Spare Parts (Screw)
SB-40140TRN	**M31,M103,P5**	Spare Parts (Screw)
SB-45130TR	**P5**	Spare Parts (Screw)
SB-50120TR	**P4**	Spare Parts (Screw)
SB-50120TRP	**M151,M153, M215,M217,P5**	Spare Parts (Screw)
SB-50120TRPH	**K47,K49,K51, K53,K54,P5**	Spare Parts (Screw)
SB-50120TRS	**M50,P5**	Spare Parts (Screw)
SB-50137K	**P5**	Spare Parts (Screw)
SB-50140TR	**M31,M103,P5**	Spare Parts (Screw)
SB-50140TRP	**M210,M211,P5**	Spare Parts (Screw)
SB-60120TR	**G30,G31,G32,G86, G90,G91,H25,K69, K71,K75,K83,K85, K87,K88,M53,M121, M124,M125,P5**	Spare Parts (Screw)
SB-60130TRP	**K47,K49,K51, K53,K54,P5**	Spare Parts (Screw)
SB-60200TRP	**M41,M117,P5**	Spare Parts (Screw)
SC-30067	**M206,P6**	Spare Parts (Screw)
SC-35085	**M206,P6**	Spare Parts (Screw)
SC-40100	**M206,P6**	Spare Parts (Screw)
SC-50130	**M206,P6**	Spare Parts (Screw)
SC-60160	**M206,P6**	Spare Parts (Screw)
SC-60210	**M206,P6**	Spare Parts (Screw)
SCAC$^{R}/_{L}$ ○○○○□-○○	**E53,P22**	Toolholder (Turning / Discontinued Description)
SCAC$^{R}/_{L}$ ○○○○□-○○FF	**E53,P22**	Toolholder (Turning / Discontinued Description)
SCLC$^{R}/_{L}$ ○○○○□-○○	**E27,E53,P22**	Toolholder (Turning)
SCLC$^{R}/_{L}$ ○○○○□(□)-○○FF	**E26**	Toolholder (Turning)
SCLCR ○○○○□-○○FFJCT	**E27**	Toolholder (Turning)
SCLNR ○○○○□-○○FF	**E46**	Toolholder (for Small Double-Sided Tools)
SCMT ○○○○○○-GH-E	**K44**	Insert (Drilling)
SCMT ○○○○○○-GH-I	**K45**	Insert (Drilling)
SCMT ○○○○○○-GM-E	**K44**	Insert (Drilling)
SCMT ○○○○○○-GM-I	**K45**	Insert (Drilling)
SCMT ○○○○○○HQ	**B75**	Insert (Turning)

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SCMT	○○○○○○-SM-E	K44	Insert (Drilling)
SCMT	○○○○○○-SM-I	K45	Insert (Drilling)
SCMT	○○○○○○-XM-E	K44	Insert (Drilling)
SCMT	○○○○○○-XM-I	K45	Insert (Drilling)
SDCT	○○○○○□□-□□	M201	Insert (Milling)
SDCT	○○○○○□R/L-□□	M201	Insert (Milling)
SDET	○○○○○□□-□□	M201	Insert (Milling)
SDET	○○○○○□R/L-□□	M201	Insert (Milling)
SDJCR/L	○○○○□-○○	E29	Toolholder (Turning)
SDJCR/L	○○○○□-○○F	E53,P22	Toolholder (Turning / Discontinued Description)
SDJCR	○○○○□□-○○-F○○	E24	Toolholder (Goose-neck holder)
SDJCR	○○○○□-○○-F○○JCT	E29	Toolholder (Turning)
SDJCR/L	○○○○□(□)-○○FF	E28	Toolholder (Turning)
SDJCR	○○○○□-○○FFJCT	E29	Toolholder (Turning)
SDJCR	○○○○□□-○○FF-Y	E30	Toolholder (Turning)
SDLCR/L	○○○○□-○○FF	P22	Toolholder (Turning / Discontinued Description)
SDLNR	○○○○□-○○FF	E46	Toolholder (for Small Double-Sided Tools)
SDKN	○○○○AUFN	C36,M12,M29	Insert (Milling)
SDKN	○○○○AUFN-NE	C36,M29	Insert (Milling)
SDKN	○○○○AUTN	M12	Insert (Milling)
SDKR	○○○○AUEN-S	M12	Insert (Milling)
SDKW	○○○○AESN	M26	Insert (Milling)
SDKW	○○○○AETN	M26	Insert (Milling)
SDKW	○○○○○○FN	M26	Insert (Milling)
SDKW	○○○○○○TN	M26	Insert (Milling)
SDLCR/L	○○○○□(□)-○○FF	E32,E53	Toolholder (Turning)
SDLPR/L	○○○○□-○○F	E53,P22	Toolholder (Turning / Discontinued Description)
SDLPR/L	○○○○□(□)-○○FF	E34,E53	Toolholder (Turning)
SDMR	○○○○AUER-H	M12	Insert (Milling)
SDMT	○○T○○○C	M26	Insert (Milling)
SDMT	○○○○AESR-H	M26	Insert (Milling)
SDMT	○○○○○○E-K	M26	Insert (Milling)
SDNCN	○○○○□(□)-○○	E33,E53,P22	Toolholder (Turning)
SDNCR/L	○○○○□□-○○F	E33,E53,P22	Toolholder (Turning)
SDXCR/L	○○○○□(□)-○○	E32,E53,P22	Toolholder (Turning)
SE-3070TRP		M198,M199,P6	Spare Parts (Screw)
SE-40050TRN		M187,M188,M189,P6	Spare Parts (Screw)
SE-40055TR		M187,M188,M189,P6	Spare Parts (Screw)
SE-40068TR		M187,M188,M189,P6	Spare Parts (Screw)
SE-40080TR		M188,M189,P6	Spare Parts (Screw)
SE-40090TR		M187,M188,M189,P6	Spare Parts (Screw)
SE-40100TR		M188,M189,P6	Spare Parts (Screw)
SE-40120TR		G42,H32,P6	Spare Parts (Screw)
SE-50125TR		G24,G25,G42, H20,H24,H32,P6	Spare Parts (Screw)
SEEN	○○○○AFFN	C36,M29	Insert (Milling)
SEEN	○○○○AFFN-NE	C36,M29	Insert (Milling)
SEEN	○○○○AFFR-W	C36,M12,M29	Insert (Milling)
SEEN	○○○○AFTN	M12	Insert (Milling)
SEEN	○○○○AFTR-W	M12	Insert (Milling)
SEKN	○○○○AFFN	M12	Insert (Milling)
SEKN	○○○○AFTN	M12	Insert (Milling)
SEKN	○○○○EFTR	M12	Insert (Milling)
SEKR	○○○○AFEN-S	M12	Insert (Milling)
SEKT	○○○○AFEN-S	M26	Insert (Milling)
SEKW	○○○○AFTN	M26	Insert (Milling)
SEKW	○○○○○○FN	M26	Insert (Milling)
SEKW	○○○○○○TN	M26	Insert (Milling)
SEMR	○○○○AFER-H	M12	Insert (Milling)
SEMT	○○○○○○C	M26	Insert (Milling)
SF○○-	DRA○○○M-○(.○)(○)	K18,K19,K20, K21,K22	Toolholder ("MagicDrill")
SF○○-	DRC○○○M-○	K34,K35,K36	Toolholder ("MagicDrill")
SF22F-	KTGFL16-40P	N28	Flange holder (Grooving)
SF22F-	KTTXL16-40P	N28	Flange holder (Threading)

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SF22F-	SCLCL09-40P	N28	Flange holder
SF22F-	SDUCL11-40P	N28	Flange holder
SF22F-	SH○○-40P	N28	Flange holder (Sleeve Type)
SF22F-	SVUBL11-40P	N28	Flange holder
SFR/L-	○○○(○)□	G102,G103,G104	Blade (Grooving)
SH	○○○○-○○○	F85	Sleeve (for Boring Bar)
SH-50150TR		P6	Spare Parts (Cartridge Clump Screw)
SHA	○○○○(.○)-○○○	F84,G62	Sleeve (for Automatic Lathe SIGE)
SHC	○○○○-○○	F85	Coolant Sleeve (for Boring Bar)
SHE	○○○○-○○	K60	Adjustment Sleeve (for MagicDrill)
SHEM	○○○○-○○	K67	Adjustment Sleeve (for MagicDrill DRS)
SHL-	○	F85	Spare Parts (Back Cover)
SIGCR/L	○○○○-EH	G57	Toolholder (Internal Grooving)
SIGCR/L	○○○○-WH(-L○○(○))	G57	Toolholder (Internal Grooving)
SIGER/L	○○○○□-EH	G60	Toolholder (Internal Grooving)
SIGER/L	○○○○□-WH	G61	Toolholder (Internal Grooving)
SIGER	○○○○□-WH-90	G62	Toolholder (Internal Grooving / for Automatic Lathe)
SINR/L	○○○○S-○○(E)	J23	Toolholder (Threading)
SJS-	○	F86	Coolant Joint
SLT	○○-○○□□□	M184	Insert (Slot Mill MSTA)
SM○○○○A		N24,N25,N26	Spare Parts (Plate)
SM○○○○B		N24	Spare Parts (Plate)
SNCN	○○○○XNTN	M13	Insert (Milling)
SNGA	○○○○○○	B35	Insert (Turning)
SNGA	○○○○○○MEF	C10	Insert (Turning)
SNGA	○○○○○○S○○○○○	B109	Insert (Turning)
SNGA	○○○○○S○○○○ME	C10	Insert (Turning)
SNGA	○○○○○S○○○○MEH	C10	Insert (Turning)
SNGA	○○○○○S○○○○MEP	C10	Insert (Turning)
SNGA	○○○○○S○○○○MET	C10	Insert (Turning)
SNGA	○○○○○○T○○○○○	B109	Insert (Turning)
SNGA	○○○○○○T○○○○○ME	C10	Insert (Turning)
SNGG	○○○○○○R/L-25R	B35	Insert (Turning)
SNGG	○○○○○○R/L-B/C	B35	Insert (Turning)
SNGN	○○○○○○S○○○○○	B109	Insert (Turning)
SNGN	○○○○○○T○○○○○	B109,B110	Insert (Turning / Milling)
SNKN	○○○○XNTN	M13	Insert (Milling)
SNMA	○○○○○○	B35	Insert (Turning)
SNMA	○○○○○○S○○○○○	B109	Insert (Turning)
SNMF	○○○○XNTN	M13	Insert (Milling)
SNMF	○○○○○○-21	B103	Insert (Turning)
SNMG	○○○○○○	B32	Insert (Turning)
SNMG	○○○○○○C	B34	Insert (Turning)
SNMG	○○○○○○GC	B34	Insert (Turning)
SNMG	○○○○○○HQ	B32	Insert (Turning)
SNMG	○○○○○○KG	B34	Insert (Turning)
SNMG	○○○○○○KH	B34	Insert (Turning)
SNMG	○○○○○○MQ	B34	Insert (Turning)
SNMG	○○○○○○MS	B34	Insert (Turning)
SNMG	○○○○○○MU	B34	Insert (Turning)
SNMG	○○○○○○PG	B32	Insert (Turning)
SNMG	○○○○○○PH	B33	Insert (Turning)
SNMG	○○○○○○PQ	B32	Insert (Turning)
SNMG	○○○○○○PS	B32	Insert (Turning)
SNMG	○○○○○○PT	B32	Insert (Turning)
SNMG	○○○○○○SG	B34	Insert (Turning)
SNMG	○○○○○○R/L-C	B35	Insert (Turning)
SNMG	○○○○○○XP	B33	Insert (Turning)
SNMG	○○○○○○XQ	B33	Insert (Turning)
SNMG	○○○○○○XS	B33	Insert (Turning)
SNMG	○○○○○○ZS	B34	Insert (Turning)
SNMM	○○○○○○PX	B33	Insert (Turning)
SNMN	○○○○○○	B35,M13	Insert (Turning / Milling)
SNMN	○○○○○○S○○○○○	C19	Insert (Turning)

Description		Page	Category
SNMN	○○○○○○T○○○○○	**B110**	Insert (Turning)
SNMU	○○○○EN-GH	**M19**	Insert (Milling)
SNMU	○○○○EN-GM	**M19**	Insert (Milling)
SNMU	○○○○EN-SM	**M19**	Insert (Milling)
SOKN	13T3AXFN	**M12**	Insert (Milling)
SOKN	13T3AXTN	**M12**	Insert (Milling)
SOKN	○○○○AXFN-NE	**C36,M29**	Insert (Milling)
SOKR	13T3AXEN-J	**M12**	Insert (Milling)
SOMT	○○○○AXEN-J	**M26**	Insert (Milling)
SOMT	○○○○○○ER-FL	**M20**	Insert (Milling)
SOMT	○○○○○○ER-GH	**M20**	Insert (Milling)
SOMT	○○○○○○ER-GM	**M20**	Insert (Milling)
SOMT	○○○○○○ER-LD	**M20**	Insert (Milling)
SOMW	○○○○AXFN	**M26**	Insert (Milling)
SOMW	○○○○AXTN	**M26**	Insert (Milling)
SP-2D		**D16,F76,N5,P18**	Spare Parts (Spring)
SP-3D		**D8,D12,D14,D16, D20,D24,F69,F72, F75,F76,F79,N3, N4,N5,N6,N7,P18**	Spare Parts (Spring)
SP-5		**G72,P18**	Spare Parts (Spring)
SP-5D		**D19,P18**	Spare Parts (Spring)
SP-6		**G11,G46,G47, G70,P18**	Spare Parts (Spring)
SP3X4		**F34,F35,F37,P6**	Spare Parts (Screw)
SP3X6		**P6**	Spare Parts (Screw)
SP3X8		**D37,J20,J21,J23, M129,N11,N19,P6**	Spare Parts (Screw)
SP3X10		**F63,P6**	Spare Parts (Screw)
SP4X9		**P6**	Spare Parts (Screw)
SP8X35		**M66,P6**	Spare Parts (Mounting Bolt)
SP-129		**D34,D35,P10**	Spare Parts (Shim)
SP-130A		**P11**	Spare Parts (Shim)
SP-141		**D29,D34,D35,P10**	Spare Parts (Shim)
SP-141P		**P11**	Spare Parts (Shim)
SP-143		**D29,D34,D35,P10**	Spare Parts (Shim)
SP-143P		**P11**	Spare Parts (Shim)
SP-148		**D34,D35,P10**	Spare Parts (Shim)
SP-162		**D29,P10**	Spare Parts (Shim)
SP-210A		**F81,P11**	Spare Parts (Shim)
SP-219		**D36,P10**	Spare Parts (Shim)
SP-221		**D30,P10**	Spare Parts (Shim)
SP-223		**D30,P10**	Spare Parts (Shim)
SP-230P		**P11**	Spare Parts (Shim)
SP-341P		**F81,P11**	Spare Parts (Shim)
SP-342		**D27,P10**	Spare Parts (Shim)
SP-420A		**P11**	Spare Parts (Shim)
SP-429		**D32,P11**	Spare Parts (Shim)
SP-441		**D26,P10**	Spare Parts (Shim)
SP-441P		**N3,P11**	Spare Parts (Shim)
SP-441P-C		**N3**	Spare Parts (Shim)
SP-443		**D26,P10**	Spare Parts (Shim)
SP-443P		**P11**	Spare Parts (Shim)
SP-454		**D26,P10**	Spare Parts (Shim)
SP-521		**P11**	Spare Parts (Shim)
SP-521P		**P11**	Spare Parts (Shim)
SP-523		**P11**	Spare Parts (Shim)
SP-523P		**P11**	Spare Parts (Shim)
SP-541		**P11**	Spare Parts (Shim)
SP-543		**P11**	Spare Parts (Shim)
SP-826		**D33,P11**	Spare Parts (Shim)
SP-829		**D33,P11**	Spare Parts (Shim)
SP-841		**D31,D33,P11**	Spare Parts (Shim)
SP-843		**D31,D33,P11**	Spare Parts (Shim)
SP-849		**D33,P11**	Spare Parts (Shim)
SP-861		**D31,P11**	Spare Parts (Shim)

Description		Page	Category
SPCN	○○○○EDTR	**M13**	Insert (Milling)
SPCN	○○○○EETR1	**M13**	Insert (Milling)
SPCN	○○○○XPTR	**M13**	Insert (Milling)
SPCT	○○T○○○□□-□□	**M200**	Insert (Milling)
SPCT	○○T○○○□R/L-□□	**M200**	Insert (Milling)
SPEN	○○○○EEER	**M13**	Insert (Milling)
SPEN	○○○○EESR	**M13**	Insert (Milling)
SPET	○○T○○○□R/L-□□	**M200**	Insert (Milling)
SPGH	○○○○○○L	**B75**	Insert (Turning)
SPGN	○○○○○○	**B75,C29,M13**	Insert (Turning / Milling)
SPGN	○○○○○○NE	**C29**	Insert (Turning / Milling)
SPGN	○○○○○○S○○○○○	**B113**	Insert (Turning)
SPGN	○○○○○○T○○○○○	**B113**	Insert (Turning)
SPGR	○○○○○○R/L	**B75**	Insert (Turning)
SPKN	○○○○EDER	**M13**	Insert (Milling)
SPKN	○○○○EDFR	**M13**	Insert (Milling)
SPKN	○○○○EDTR/L	**M13**	Insert (Milling)
SPKN	○○○○XETR	**M13**	Insert (Milling)
SPKN	○○○○XPFR	**M13**	Insert (Milling)
SPKN	○○○○XPTR/L	**M13**	Insert (Milling)
SPKR	○○○○EDER-S	**M13**	Insert (Milling)
SPMN	○○○○○○	**B75,M13**	Insert (Turning / Milling)
SPMR	○○○○EDER-H	**M13**	Insert (Milling)
SPMR	○○○○○○	**B75**	Insert (Turning)
SPMR	○○○○○○G	**B75**	Insert (Turning)
SPMT	○○○○EDER-NB○	**M27**	Insert (Milling)
SPMT	○○○○EDER-NB○P	**M27**	Insert (Milling)
SPMT	○○○○EDER-V	**M27**	Insert (Milling)
SPMT	○○○○EDSR/L-NB○T	**M27**	Insert (Milling)
SPMT	○○○○○○EN-NB○	**M28**	Insert (Milling)
SPMT	○○○○○○EN-NB○P	**M28**	Insert (Milling)
SPMT	○○○○○○EN-V	**M28**	Insert (Milling)
SPMT	○○○○○○E-Z	**M28**	Insert (Milling)
SP-RC		**D37,P12**	Spare Parts (Shim)
SPW-6045		**P6**	Spare Parts (Screw)
SPW-7050		**M31,M103,P6**	Spare Parts (Screw)
SRCPR/L	○○○○B-○○-A○○	**F64,P26**	Boring Bars (for Bearing Machining)
SS-4N		**E37,E38,F54, F57,F59,N7, N8,N18,P6**	Spare Parts (Shim Screw)
SS○○-	DRA○○○M-○(.○)	**K12,K13,K14,K15**	Toolholder ("MagicDrill")
SS○○-	DRC○○○M-○	**K29,K30,K31**	Toolholder ("MagicDrill")
STDER	○○CA○○	**N26**	Toolholder (Cartridge)
STDPR	○○CA○○	**N26**	Toolholder (Cartridge)
STEER	○○CA○○	**N26**	Toolholder (Cartridge)
STEPR	○○CA○○	**N26**	Toolholder (Cartridge)
STFER	○○CA○○	**N26**	Toolholder (Cartridge)
STFPR	○○CA○○	**N26**	Toolholder (Cartridge)
STGCR/L	○○○○□-○○	**E35,E53,P22**	Toolholder (Turning)
STGPR/L	○○○○□-○○	**E35,E53,P22**	Toolholder (Turning)
STLNR	○○○○□-○○FF	**E47**	Toolholder (for Small Double-Sided Tools)
STWR/L	○○○○□-15	**F38,G82,P23**	Toolholder (for Twin Bars)
STWSR	○○○○□(□)-15T	**F39,G83,P23**	Toolholder (for Twin Bars)
SV-60136R		**P6**	Spare Parts (Screw)
SV-60136TR		**P6**	Spare Parts (Screw)
SVJBR/L	○○○○□-○○	**E37**	Toolholder (Turning)
SVJBR/L	○○○○□-○○F	**E54,P22**	Toolholder (Turning / Discontinued Description)
SVJBR/L	○○○○□-○○N	**E37**	Toolholder (Turning)
SVJBR/L	○○○○□□-○○FF	**E36**	Toolholder (Turning)
SVJBR	○○○○□-○○FRJCT	**E36**	Toolholder (Turning)
SVJCR/L	○○○○□(□)-○○FF	**E39**	Toolholder (Turning)
SVLCR/L	○○○○□(□)-○○FF	**E39**	Toolholder (Turning)
SVPCR	○○○○□(□)-○○FF	**E40**	Toolholder (Turning)
SVJPR/L	○○○○□(□)-○○FF	**E41**	Toolholder (Turning)
SVJPR	○○○○□-○○FRJCT	**E41**	Toolholder (Turning)

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Description		Page	Category
SVLP$^{R}/_{L}$	○○○○□-○○F	**E54,P22**	Toolholder (Turning)
SVLPR	○○○○□□-○○-F○○	**E25**	Toolholder (Goose-neck holder)
SVLP$^{R}/_{L}$	○○○○□(□)-○○FF	**E41,E54,P22**	Toolholder (Turning)
SVNR	○○○○□-12	**P23**	Toolholder (for System Tip-Bars / Discontinued Description)
SVNR	○○○○□-12N	**F34**	Toolholder (for System Tip-Bars)
SVN-32		**F87,P12**	Spare Parts (Shim)
SVN-32N		**E37,E38,F54, F57,F59,N7,N8, N18,P12**	Spare Parts (Shim)
SVN-32S		**E37,E38,F54,F57, F59,N7,N8,P12**	Spare Parts (Shim)
SVNSR	○○○○□-12-○○	**P23**	Toolholder (for System Tip-Bars / Discontinued Description)
SVNSR	○○○○□-12-○○N	**F34**	Toolholder (for System Tip-Bars)
SVNSR	○○○○□-12-○○XN	**F37**	Toolholder (for System Tip-Bars)
SVPB$^{R}/_{L}$	○○○○□(□)-○○	**E37,E54,P22**	Toolholder (Turning)
SVPB$^{R}/_{L}$	○○○○□-○○N	**E37,P22**	Toolholder (Turning)
SVPP$^{R}/_{L}$	○○○○□-○○	**E54,P22**	Toolholder (Turning / Discontinued Description)
SVPP$^{R}/_{L}$	○○○○□(□)-○○FF	**E42,P22**	Toolholder (Turning)
SVVBN	○○○○□(□)-○○	**E38,E54,P22**	Toolholder (Turning)
SVVBN	○○○○□-○○N	**E38,P22**	Toolholder (Turning)
SVVCN	○○○○□□-○○	**E40**	Toolholder (Turning)
SW-1.8		**N24,N25,N26**	Spare Parts (Axial screw driver)
SYXP$^{R}/_{L}$	○○○○□-○○F	**P22**	Toolholder (Turning / Discontinued Description)
T			
T63H-	BL○○○-○○○	**P34**	Toolholder (HSK Tooling / Discontinued Description)
T63H-	C○○-○○(○)	**N20**	Toolholder (HSK Tooling)
T63H-	KGBA$^{R}/_{L}$-16	**N19**	Grooving (HSK Tooling)
T63H-	KGBA$^{R}/_{L}$-22-○○	**N19**	Grooving (HSK Tooling)
T63H-	KTNR-○○	**N19**	Threading (HSK Tooling)
T63H-	N○○-○○(○)	**N20**	Toolholder (HSK Tooling)
T63H-	PCLN$^{R}/_{L}$-DX12	**N15**	Toolholder (HSK Tooling)
T63H-	PCMNN-□12	**N15**	Toolholder (HSK Tooling)
T63H-	PDJN$^{R}/_{L}$-DX15	**N15**	Toolholder (HSK Tooling)
T63H-	PDNNN-□15	**N16**	Toolholder (HSK Tooling)
T63H-	PTGN$^{R}/_{L}$-DX16	**N16**	Toolholder (HSK Tooling)
T63H-	PWLN$^{R}/_{L}$-DX08	**N17**	Toolholder (HSK Tooling)
T63H-	S2020R-105T	**N14**	Toolholder (HSK Tooling)
T63H-	S2525-○○(○)F	**N14**	Toolholder (HSK Tooling)
T63H-	S2525$^{R}/_{L}$-○○○	**N13**	Toolholder (HSK Tooling)
T63H-	SVLB$^{R}/_{L}$-DX16N	**N18**	Toolholder (HSK Tooling)
T63H-	SVVBN-□16N	**N18**	Toolholder (HSK Tooling)
T63H-	WTENN-□16	**N16**	Toolholder (HSK Tooling)
T63H-	WWMNN-□08	**N17**	Toolholder (HSK Tooling)
T100H-	C○○-○○(○)	**N20**	Toolholder (HSK Tooling)
T100H-	N○○-○○(○)	**N20**	Toolholder (HSK Tooling)
T100H-	S2525-○○○F	**N14**	Toolholder (HSK Tooling)
T100H-	S2525R-150T	**N14**	Toolholder (HSK Tooling)
T100H-	S2525$^{R}/_{L}$-○○○	**N13**	Toolholder (HSK Tooling)
TBET	○○○○○○(○)M$^{R}/_{L}$	**B76**	Insert (Turning)
TBGN	○○○○○○S○○○○○	**B113**	Insert (Turning)
TBGN	○○○○○○T○○○○○	**C18**	Insert (Turning)
TBGT	○○○○○○CF	**B76**	Insert (Turning)
TBGT	○○○○○○MFP-PF	**B76**	Insert (Turning)
TBGT	○○○○○○MP-CF	**B76**	Insert (Turning)
TBGT	○○○○○○(○)$^{R}/_{L}$	**B76**	Insert (Turning)
TBGW	○○○○○○	**B76,C26**	Insert (Turning)
TBGW	○○○○○○NE	**C26**	Insert (Turning)
TBMT	○○○○○○	**C26**	Insert (Turning)
TBMT	○○○○○○DP	**B76**	Insert (Turning)
TBMT	○○○○○○NE	**C26**	Insert (Turning)
TCET	○○○○○○(○)F$^{R}/_{L}$-USF	**B77**	Insert (Turning)
TCET	○○○○○○(○)MF$^{R}/_{L}$-USF	**B77**	Insert (Turning)
TCGN	○○○○○○	**B79**	Insert (Turning)
TCGN	○○○○○○T○○○○○	**B113**	Insert (Turning)
TCGR	○○○○○○L-F	**B79**	Insert (Turning)

Description		Page	Category
TCGT	○○○○○○E$^{R}/_{L}$-U	**B78**	Insert (Turning)
TCGT	○○○○○○(○)F$^{R}/_{L}$-U	**B78**	Insert (Turning)
TCGT	○○○○○○ME$^{R}/_{L}$-U	**B78**	Insert (Turning)
TCGT	○○○○○○(○)MF$^{R}/_{L}$-U	**B78**	Insert (Turning)
TCGT	○○○○○○$^{R}/_{L}$-A3	**B79**	Insert (Turning)
TCGW	○○○○○○	**B79,C26**	Insert (Turning)
TCGW	○○○○○○NE	**C26**	Insert (Turning)
TCGW	○○○○○○SE	**C26**	Insert (Turning)
TCMT	○○○○○○	**C26**	Insert (Turning)
TCMT	○○○○○○HQ	**B77**	Insert (Turning)
TCMT	○○○○○○NE	**C26**	Insert (Turning)
TCMT	○○○○○○SE	**C26**	Insert (Turning)
TCMX	○○○○○○WP	**B77**	Insert (Turning)
TEEN	○○○○PTFR	**C36,M29**	Insert (Milling)
TEEN	○○○○PTFR-NE	**C36,M29**	Insert (Milling)
TEEN	○○○○PTTR	**M14**	Insert (Milling)
TEKN	○○○○PTFR	**C36,M14,M29**	Insert (Milling)
TEKN	○○○○PTFR-NE	**C36,M29**	Insert (Milling)
TEKN	○○○○PTTR	**M14**	Insert (Milling)
TEKR	○○○○PTER-S	**M14**	Insert (Milling)
TEMR	○○○○PTER-H	**M14**	Insert (Milling)
TEMT	○○○○○○-AQ	**M28**	Insert (Milling)
TGF	○○$^{R}/_{L}$○○○-○○○	**C30,G19**	Insert (Grooving)
TH-3L		**M198,M199**	Spare Parts (Wrench)
TH-4		**P18**	Spare Parts (Hexagon Wrench / T-shaped type)
TH8X15		**P6**	Spare Parts (Screw)
TKN	○(.○)	**H44**	Insert (Cut-off)
TKN	○(.○)-P	**H44**	Insert (Cut-off)
TK$^{R}/_{L}$	○(.○)	**H44**	Insert (Cut-off)
TK$^{R}/_{L}$	○(.○)-P	**H44**	Insert (Cut-off)
TKF	○○L○○○-ASR	**C33,E20**	Insert (Grooving / Turning)
TKF	○○R○○○-AGT	**C32,E20**	Insert (Grooving / Turning)
TKF	○○$^{R}/_{L}$○○○-AS	**C33,E20**	Insert (Grooving / Turning)
TKF	○○R○○○-GTP	**E19**	Insert (Grooving / Turning)
TKF	○○$^{R}/_{L}$○○○-NB(○.○)	**C33,E20,H6,H7**	Insert (Grooving / Turning)
TKF	○○$^{R}/_{L}$○○○-NB-○○DR	**H6,H7**	Insert (Cut-off)
TKF	○○$^{R}/_{L}$○○○-S	**H6,H7**	Insert (Cut-off)
TKF	○○$^{R}/_{L}$○○○-S-○○DR	**H6,H7**	Insert (Cut-off)
TKF	○○$^{R}/_{L}$○○○-T	**H6,H7**	Insert (Cut-off)
TKF	○○$^{R}/_{L}$○○○-T-○○DR	**H6,H7**	Insert (Cut-off)
TKFB	○○L○○○○○MR	**B100,E13**	Insert (Back Turning)
TKFB	○○R○○○○○-GQ	**B101,E13**	Insert (Back Turning)
TKFB	○○R○○○○○M	**B100,E13**	Insert (Back Turning)
TKFB	○○R○○○○○P-GQ	**B101,E13**	Insert (Back Turning)
TKFS	○○$^{R}/_{L}$○○○-S	**H17**	Insert (Cut-off)
TKFT	12$^{R}/_{L}$□○○○○(○)	**J25**	Insert (Threading)
TN-32		**J20,J21,J23, N11,N19,P12**	Spare Parts (Shim)
TN-43		**J20,J23,N19,P12**	Spare Parts (Shim)
TNEG	○○○○○○$^{R}/_{L}$-SSF	**B42**	Insert (Turning)
TNGA	○○○○○○	**B40**	Insert (Turning)
TNGA	○○○○○○ME6	**C11**	Insert (Turning)
TNGA	○○○○○○MEF	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○	**B111**	Insert (Turning)
TNGA	○○○○○○S○○○○○ME	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○MEH	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○MEP	**C11**	Insert (Turning)
TNGA	○○○○○○S○○○○○MET	**C11**	Insert (Turning)
TNGA	○○○○○○T○○○○○	**B111**	Insert (Turning)
TNGA	○○○○○○T○○○○○ME	**C11**	Insert (Turning)
TNGG	○○○○○○AH	**B41**	Insert (Turning)
TNGG	○○○○○○FP-TK	**B39**	Insert (Turning)
TNGG	○○○○○○MFP-SK	**B38**	Insert (Turning)
TNGG	○○○○○○M-SK	**B38**	Insert (Turning)
TNGG	○○○○○○$^{R}/_{L}$	**B43**	Insert (Turning)

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TNGG	○○○○○○R/L-25R	**B43**	Insert (Turning)
TNGG	○○○○○○R/L-A3	**B41**	Insert (Turning)
TNGG	○○○○○○R/L-B/C	**B42,B43**	Insert (Turning)
TNGG	○○○○○○R/L-S	**B42**	Insert (Turning)
TNGG	○○○○○○TK	**B39**	Insert (Turning)
TNGM	○○○○○○S○○○○○BB○	**C11**	Insert (Turning)
TNGN	○○○○○○S○○○○○	**B111**	Insert (Turning)
TNGN	○○○○○○T○○○○○	**B111**	Insert (Turning)
TNGU	○○○○○○MER-U	**B52**	Insert (Turning)
TNGU	○○○○○○(○)MFR-F	**B52**	Insert (Turning)
TNGU	○○○○○○(○)MFR-U	**B52**	Insert (Turning)
TNMA	○○○○○○	**B40**	Insert (Turning)
TNMG	○○○○○○	**B37**	Insert (Turning)
TNMG	○○○○○○AH	**B41**	Insert (Turning)
TNMG	○○○○○○C	**B40**	Insert (Turning)
TNMG	○○○○○○CQ	**B36**	Insert (Turning)
TNMG	○○○○○○GC	**B40**	Insert (Turning)
TNMG	○○○○○○GP	**B36**	Insert (Turning)
TNMG	○○○○○○GS	**B36**	Insert (Turning)
TNMG	○○○○○○GT	**B37**	Insert (Turning)
TNMG	○○○○○○HQ	**B36**	Insert (Turning)
TNMG	○○○○○○KG	**B40**	Insert (Turning)
TNMG	○○○○○○KH	**B40**	Insert (Turning)
TNMG	○○○○○○KQ	**B40**	Insert (Turning)
TNMG	○○○○○○MQ	**B39**	Insert (Turning)
TNMG	○○○○○○MS	**B39**	Insert (Turning)
TNMG	○○○○○○MU	**B39**	Insert (Turning)
TNMG	○○○○○○PG	**B36**	Insert (Turning)
TNMG	○○○○○○PH	**B37**	Insert (Turning)
TNMG	○○○○○○PP	**B36**	Insert (Turning)
TNMG	○○○○○○PQ	**B36**	Insert (Turning)
TNMG	○○○○○○PS	**B37**	Insert (Turning)
TNMG	○○○○○○PT	**B37**	Insert (Turning)
TNMG	○○○○○○R/L-C	**B43**	Insert (Turning)
TNMG	○○○○○○R-LD	**B38**	Insert (Turning)
TNMG	○○○○○○R/L-ST	**B39**	Insert (Turning)
TNMG	○○○○○○SG	**B39**	Insert (Turning)
TNMG	○○○○○○TK	**B39**	Insert (Turning)
TNMG	○○○○○○XF	**B38**	Insert (Turning)
TNMG	○○○○○○XP	**B38**	Insert (Turning)
TNMG	○○○○○○XQ	**B38**	Insert (Turning)
TNMG	○○○○○○XS	**B38**	Insert (Turning)
TNMG	○○○○○○ZS	**B40**	Insert (Turning)
TNMM	○○○○○○M	**C23**	Insert (Turning)
TNMM	○○○○○○M-NE	**C23**	Insert (Turning)
TNMM	○○○○○○M-SE	**C23**	Insert (Turning)
TNMM	○○○○○○PX	**B38**	Insert (Turning)
TNMN	○○○○○○S○○○○○	**C19**	Insert (Turning)
TNMX	○○○○○○WF	**B36**	Insert (Turning)
TNW-32		**P12**	Spare Parts (Shim)
TOMT	○○○○○○ER-GM	**M20**	Insert (Milling)
TOMT	○○○○○○ER-SM	**M20**	Insert (Milling)
TPEH	○○○○○○M R/L-P	**B85**	Insert (Turning)
TPET	○○○○○○(○)F R/L-USF	**B86**	Insert (Turning)
TPET	○○○○○○(○)MF R/L-USF	**B86**	Insert (Turning)
TPET	○○○○○○(○)M R/L-FSF	**B85**	Insert (Turning)
TPET	○○○○○○(○)R/L-FSF	**B85**	Insert (Turning)
TPGB	○○○○○○(○)	**B86,C27,J37**	Insert (Turning / Threading)
TPGB	○○○○○○MEF	**C16**	Insert (Turning)
TPGB	○○○○○○NE	**C27**	Insert (Turning)
TPGB	○○○○○○SE	**C26**	Insert (Turning)
TPGB	○○○○○○S○○○○○MES	**C16**	Insert (Turning)
TPGB	○○○○○○S○○○○○MET	**C16**	Insert (Turning)
TPGB	○○○○○○S○○○○○SET	**C16**	Insert (Turning)

Description		Page	Category
TPGB	○○○○○○T○○○○○ME	**C16**	Insert (Turning)
TPGB	○○○○○○T○○○○○SE	**C16**	Insert (Turning)
TPGH	○○○○○○M R/L	**B83**	Insert (Turning)
TPGH	○○○○○○M R/L-H	**B84**	Insert (Turning)
TPGH	○○○○○○R/L	**B82**	Insert (Turning)
TPGH	○○○○○○R/L-H	**B84**	Insert (Turning)
TPGN	○○○○○○	**B88,C29,M14,M29**	Insert (Turning / Milling)
TPGN	○○○○○○NE	**C29**	Insert (Turning / Milling)
TPGN	○○○○○○SE	**C29**	Insert (Turning / Milling)
TPGN	○○○○○○S○○○○○	**B113**	Insert (Turning)
TPGN	○○○○○○S○○○○○SET	**C18**	Insert (Turning)
TPGN	○○○○○○T○○○○○	**B113**	Insert (Turning)
TPGN	○○○○○○T○○○○○ME	**C18**	Insert (Turning)
TPGN	○○○○○○T○○○○○SE	**C18**	Insert (Turning)
TPGR	○○○○○○R/L-A/B/C	**B88**	Insert (Turning)
TPGR	○○○○○○R/L-F	**B87**	Insert (Turning)
TPGT	○○○○○○AP	**B86**	Insert (Turning)
TPGT	○○○○○○CF	**B80**	Insert (Turning)
TPGT	○○○○○○MFP-PF	**B80**	Insert (Turning)
TPGT	○○○○○○MP-CF	**B80**	Insert (Turning)
TPGT	○○○○○○R/L-H	**B84**	Insert (Turning)
TPGW	○○○○○○S○○○○○MET	**C16**	Insert (Turning)
TPGW	○○○○○○T○○○○○ME	**C16**	Insert (Turning)
TPGW	○○○○○○T○○○○○SE	**C16**	Insert (Turning)
TPKN	○○○○PDFR	**M14**	Insert (Milling)
TPKN	○○○○PDTR	**M14**	Insert (Milling)
TPKR	○○○○PDER-S	**M14**	Insert (Milling)
TPMH	○○○○○○	**C27**	Insert (Turning)
TPMH	○○○○○○NE	**C27**	Insert (Turning)
TPMH	○○○○○○L-NE	**C28**	Insert (Turning)
TPMH	○○○○○○SE	**C27**	Insert (Turning)
TPMN	○○○○○○	**B88,M14**	Insert (Turning / Milling)
TPMR	○○○○PDER-H	**M14**	Insert (Milling)
TPMR	○○○○○○	**B87**	Insert (Turning)
TPMR	○○○○○○DP	**B87**	Insert (Turning)
TPMR	○○○○○○G	**B87**	Insert (Turning)
TPMR	○○○○○○GP	**B87**	Insert (Turning)
TPMR	○○○○○○HQ	**B87**	Insert (Turning)
TPMT	○○○○○○APD	**C28**	Insert (Turning)
TPMT	○○○○○○GP	**B81**	Insert (Turning)
TPMT	○○○○○○HQ	**B81**	Insert (Turning)
TPMT	○○○○○○PP	**B80**	Insert (Turning)
TPMT	○○○○○○XP	**B81**	Insert (Turning)
TPMT	○○○○○○XQ	**B81**	Insert (Turning)
TPMX	○○○○○○R/L-WP	**B80**	Insert (Turning)
TPMX	○○○○○○WP	**B80**	Insert (Turning)
TS-3S		**D21,P7**	Spare Parts (Lock Pin)
TT-15		**M46,M47,M187, M189,P18**	Spare Parts (Torx Wrench / T-shaped type)
TT-25		**M206,P18**	Spare Parts (Torx Wrench / T-shaped type)
TT-25L		**M53,M121,M124, M125,P18**	Spare Parts (Torx Wrench / T-shaped type)
TT-30		**M206,P18**	Spare Parts (Torx Wrench / T-shaped type)
TT	43ER○○○M	**J30**	Insert (Threading)
TT	○○R/L○○○○	**J30,J31**	Insert (Threading)
TTC-20		**P18**	Spare Parts (Torx Wrench / T-shaped type)
TTC-25		**P18**	Spare Parts (Torx Wrench / T-shaped type)
TTP-20		**K47,K49,K51,K53, K54,M41,M117,M151, M153,M210,M211, M215,M217,P18**	Spare Parts (Torx Plus Wrench / T-shaped type)
TTW-15		**M31,M103,M137, M172,P18**	Spare Parts (Torx Wrench / T-shaped type)
TTX	32R○○○○(○)	**J29**	Insert (Threading)
TTX	32R○○○○(○)S	**J29**	Insert (Threading)
TWBR	○○○○○-○○○	**F38**	Twin Bars (Turning)

Description Index

○ : Figure, □ : Alphabet

Description		Page	Category
TWBTR	○○○○○-○○○	**F39**	Twin Bars (Turning)
TWFGL	○○○	**G82**	Twin Bars (Face Grooving)
TWFGTR	○○○	**G83**	Twin Bars (Face Grooving)
V			
VBET	○○○○○○(○)M$^{R}_{L}$-F	**B90**	Insert (Turning)
VBET	○○○○○○(○)M$^{R}_{L}$-FSF	**B89**	Insert (Turning)
VBET	○○○○○○(○)M$^{R}_{L}$-Y	**B90**	Insert (Turning)
VBET	○○○○○○(○)$^{R}_{L}$-FSF	**B89**	Insert (Turning)
VBGT	○○○○○○(○)M$^{R}_{L}$-F	**B90**	Insert (Turning)
VBGT	○○○○○○(○)M$^{R}_{L}$-Y	**B91**	Insert (Turning)
VBGT	○○○○○○(○)$^{R}_{L}$-F	**B90**	Insert (Turning)
VBGT	○○○○○○(○)$^{R}_{L}$-Y	**B91**	Insert (Turning)
VBGW	○○○○○○MEF	**C17**	Insert (Turning)
VBGW	○○○○○○S○○○○○MES	**C17**	Insert (Turning)
VBGW	○○○○○○S○○○○○MET	**C17**	Insert (Turning)
VBGW	○○○○○○S○○○○○SET	**C17**	Insert (Turning)
VBGW	○○○○○○T○○○○○ME	**C17**	Insert (Turning)
VBGW	○○○○○○T○○○○○SE	**C17**	Insert (Turning)
VBMT	○○○○○○	**C28**	Insert (Turning)
VBMT	○○○○○○GP	**B89**	Insert (Turning)
VBMT	○○○○○○HQ	**B89**	Insert (Turning)
VBMT	○○○○○○NE	**C28**	Insert (Turning)
VBMT	○○○○○○PP	**B89**	Insert (Turning)
VBMT	○○○○○○SE	**C28**	Insert (Turning)
VBMT	○○○○○○VF	**B89**	Insert (Turning)
VCET	○○○○○○M$^{R}_{L}$-F	**B93**	Insert (Turning)
VCET	○○○○○○(○)M$^{R}_{L}$-Y	**B93**	Insert (Turning)
VCGT	○○○○○○AH	**B93**	Insert (Turning)
VCGT	○○○○○○AP	**B93**	Insert (Turning)
VCGT	○○○○○○MFP-GF	**B92**	Insert (Turning)
VCGT	○○○○○○MFP-SKS	**B92**	Insert (Turning)
VCGT	○○○○○○MP-CF	**B92**	Insert (Turning)
VCGT	○○○○○○$^{R}_{L}$-A3	**B93**	Insert (Turning)
VCGW	○○○○○○S○○○○○MET	**C17**	Insert (Turning)
VCGW	○○○○○○S○○○○○SET	**C17**	Insert (Turning)
VCGW	○○○○○○T○○○○○ME	**C17**	Insert (Turning)
VCGW	○○○○○○T○○○○○SE	**C17**	Insert (Turning)
VCMT	○○○○○○	**C28**	Insert (Turning)
VCMT	○○○○○○HQ	**B92**	Insert (Turning)
VCMT	○○○○○○NE	**C28**	Insert (Turning)
VCMT	○○○○○○PP	**B92**	Insert (Turning)
VCMT	○○○○○○SE	**C28**	Insert (Turning)
VCMT	○○○○○○VF	**B92**	Insert (Turning)
VNBR	○○○○-○○(○)	**F33**	System Tip-bars (Boring)
VNBR	○○○○-○○(○)NB	**C35,F33**	System Tip-bars (Boring)
VNBR	○○○○(○○)-○○(○)S	**F32**	System Tip-bars (Boring)
VNBTR	○○○○-○○(○)	**F33**	System Tip-bars (Boring)
VNBXR	○○○○(○)-○○(○)S	**F36**	System Tip-bars (Boring)
VNFGR	○○○○-○○	**G80**	System Tip-bars (Face Grooving)
VNFGR	○○○○-○○NB	**C35,G80**	System Tip-bars (Face Grooving)
VNGR	○○○○-○○	**G53**	System Tip-bars (Grooving)
VNGR	○○○○-○○NB	**C35,G53**	System Tip-bars (Grooving)
VNGA	○○○○○○	**B45**	Insert (Turning)
VNGA	○○○○○○ME4	**C12**	Insert (Turning)
VNGA	○○○○○○MEF	**C12**	Insert (Turning)
VNGA	○○○○○○S○○○○○	**B112**	Insert (Turning)
VNGA	○○○○○○S○○○○○ME	**C12**	Insert (Turning)
VNGA	○○○○○○S○○○○○MEH	**C12**	Insert (Turning)
VNGA	○○○○○○S○○○○○MEP	**C12**	Insert (Turning)
VNGA	○○○○○○S○○○○○MET	**C12**	Insert (Turning)
VNGA	○○○○○○T○○○○○	**B112**	Insert (Turning)
VNGA	○○○○○○T○○○○○ME	**C12**	Insert (Turning)
VNGG	○○○○○○MFP-SK	**B44**	Insert (Turning)

Description		Page	Category
VNGG	○○○○○○M-SK	**B44**	Insert (Turning)
VNGG	○○○○○○$^{R}_{L}$	**B45**	Insert (Turning)
VNGG	○○○○○○$^{R}_{L}$-S	**B45**	Insert (Turning)
VNMA	○○○○○○S○○○○○	**B112**	Insert (Turning)
VNMG	○○○○○○	**B44**	Insert (Turning)
VNMG	○○○○○○GP	**B44**	Insert (Turning)
VNMG	○○○○○○HQ	**B44**	Insert (Turning)
VNMG	○○○○○○KG	**B45**	Insert (Turning)
VNMG	○○○○○○KH	**B45**	Insert (Turning)
VNMG	○○○○○○MQ	**B45**	Insert (Turning)
VNMG	○○○○○○MS	**B45**	Insert (Turning)
VNMG	○○○○○○MU	**B45**	Insert (Turning)
VNMG	○○○○○○PP	**B44**	Insert (Turning)
VNMG	○○○○○○PQ	**B44**	Insert (Turning)
VNMG	○○○○○○$^{R}_{L}$-VC	**B44**	Insert (Turning)
VNMG	○○○○○○SG	**B45**	Insert (Turning)
VNMG	○○○○○○TN-V	**B44**	Insert (Turning)
VNMG	○○○○○○VF	**B44**	Insert (Turning)
VNMM	○○○○○○M	**C23**	Insert (Turning)
VNMM	○○○○○○M-NE	**C23**	Insert (Turning)
VNMM	○○○○○○M-SE	**C23**	Insert (Turning)
VNTR	○○○-○○	**J36**	System Tip-bars (Threading)
VPET	○○○○○○(○)F$^{R}_{L}$-USF	**B96**	Insert (Turning)
VPET	○○○○○○(○)M$^{R}_{L}$-F	**B95**	Insert (Turning)
VPET	○○○○○○(○)M$^{R}_{L}$-FSF	**B95**	Insert (Turning)
VPET	○○○○○○(○)MF$^{R}_{L}$-J	**B96**	Insert (Turning)
VPET	○○○○○○(○)MF$^{R}_{L}$-U	**B96**	Insert (Turning)
VPET	○○○○○○(○)MF$^{R}_{L}$-USF	**B96**	Insert (Turning)
VPET	○○○○○○(○)$^{R}_{L}$-FSF	**B95**	Insert (Turning)
VPGT	○○○○○○CF	**B94**	Insert (Turning)
VPGT	○○○○○○CK	**B94**	Insert (Turning)
VPGT	○○○○○○MFP-GF	**B94**	Insert (Turning)
VPGT	○○○○○○MFP-SKS	**B94**	Insert (Turning)
VPGT	○○○○○○MP-CF	**B94**	Insert (Turning)
VPGT	○○○○○○MP-CK	**B94**	Insert (Turning)
W			
W-6		**G46,G70,P18**	Spare Parts (Washer)
W5X13L		**M137**	Spare Parts (Screw)
W6-14		**P18**	Spare Parts (Washer)
W6X17		**P6**	Spare Parts (Screw)
W6X18		**M198,M199,P6**	Spare Parts (Wedge Screw)
W6X18N		**K17,M46,M47,M172,P6**	Spare Parts (Wedge Screw)
W6X20		**M198,M199,P6**	Spare Parts (Wedge Screw)
W8X16		**P6**	Spare Parts (Screw)
W8X18		**M129,P6**	Spare Parts (Screw)
W8X21		**P6**	Spare Parts (Wedge Screw)
W10X31		**M151,P6**	Spare Parts (Screw)
WB-5		**F86,P18**	Spare Parts (Washer)
WB-6		**F86,P18**	Spare Parts (Washer)
WB-8		**F86,P18**	Spare Parts (Washer)
WBET	○○○○○○(○)M$^{R}_{L}$-F	**B97**	Insert (Turning)
WBET	○○○○○○M$^{R}_{L}$-P	**B98**	Insert (Turning)
WBGT	○○○○○○MFP$^{R}_{L}$-PF	**B97**	Insert (Turning)
WBGT	○○○○○○MP$^{R}_{L}$-CF	**B97**	Insert (Turning)
WBGT	○○○○○○(○)$^{R}_{L}$-F	**B98**	Insert (Turning)
WBGW	○○○○○○L	**B98**	Insert (Turning)
WBGW	○○○○○○S○○○○○LSET	**C18**	Insert (Turning)
WBGW	○○○○○○T○○○○○L-SE	**C18**	Insert (Turning)
WBMT	○○○○○○L	**C29**	Insert (Turning)
WBMT	○○○○○○L-NE	**C29**	Insert (Turning)
WBMT	○○○○○○L-SE	**C29**	Insert (Turning)
WBMT	○○○○○○$^{R}_{L}$-DP	**B97**	Insert (Turning)
WC-	○○	**M198,M199**	Spare Parts (Wedge)

Description	Page	Category
WCMT ○○○○○○	**K93,K95**	Insert (Drilling)
WCS-1N	**D18,N16,P14**	Spare Parts (Clamp Set)
WCS-8	**D25,F80,N17,P14**	Spare Parts (Clamp Set)
WDRC○(○)	**K29,K30,K31,K34, K35,K36,K37**	Spare Parts (Wrench)
WN-1	**D18,D25,N16, N17,P19**	Spare Parts (Shim Nut)
WNEU ○○○○○○EN-GL	**M21**	Insert (Milling)
WNGA ○○○○○○MEF	**C13**	Insert (Turning)
WNGA ○○○○○○S○○○○○ME	**C13**	Insert (Turning)
WNGA ○○○○○○S○○○○○MET	**C13**	Insert (Turning)
WNGA ○○○○○○T○○○○○ME	**C13**	Insert (Turning)
WNGG ○○○○○○AH	**B49**	Insert (Turning)
WNGG ○○○○○○TK	**B48**	Insert (Turning)
WNGG ○○○○○○R/L	**B49**	Insert (Turning)
WNGG ○○○○○○R/L-S	**B49**	Insert (Turning)
WNGT ○○○○○○FN-AM	**M21**	Insert (Milling)
WNMA ○○○○○○	**B49**	Insert (Turning)
WNMG ○○○○○○	**B47**	Insert (Turning)
WNMG ○○○○○○C	**B49**	Insert (Turning)
WNMG ○○○○○○CJ	**B47**	Insert (Turning)
WNMG ○○○○○○CQ	**B47**	Insert (Turning)
WNMG ○○○○○○GC	**B49**	Insert (Turning)
WNMG ○○○○○○GP	**B46**	Insert (Turning)
WNMG ○○○○○○GS	**B47**	Insert (Turning)
WNMG ○○○○○○GT	**B47**	Insert (Turning)
WNMG ○○○○○○HQ	**B46**	Insert (Turning)
WNMG ○○○○○○KG	**B49**	Insert (Turning)
WNMG ○○○○○○KH	**B49**	Insert (Turning)
WNMG ○○○○○○KQ	**B49**	Insert (Turning)
WNMG ○○○○○○MQ	**B48**	Insert (Turning)
WNMG ○○○○○○MS	**B48**	Insert (Turning)
WNMG ○○○○○○MU	**B48**	Insert (Turning)
WNMG ○○○○○○PG	**B47**	Insert (Turning)
WNMG ○○○○○○PH	**B48**	Insert (Turning)
WNMG ○○○○○○PP	**B46**	Insert (Turning)
WNMG ○○○○○○PQ	**B46**	Insert (Turning)
WNMG ○○○○○○PS	**B47**	Insert (Turning)
WNMG ○○○○○○PT	**B47**	Insert (Turning)
WNMG ○○○○○○SG	**B48**	Insert (Turning)
WNMG ○○○○○○TK	**B48**	Insert (Turning)
WNMG ○○○○○○WE	**B46**	Insert (Turning)
WNMG ○○○○○○WF	**B46**	Insert (Turning)
WNMG ○○○○○○WP	**B46**	Insert (Turning)
WNMG ○○○○○○WQ	**B46**	Insert (Turning)
WNMG ○○○○○○XP	**B48**	Insert (Turning)
WNMG ○○○○○○XQ	**B48**	Insert (Turning)
WNMG ○○○○○○XS	**B48**	Insert (Turning)
WNMG ○○○○○○ZS	**B49**	Insert (Turning)
WNMM ○○○○○○M	**C23**	Insert (Turning)
WNMM ○○○○○○M-NE	**C23**	Insert (Turning)
WNMM ○○○○○○M-SE	**C23**	Insert (Turning)
WNMU ○○○○○○EN-GH	**M21**	Insert (Milling)
WNMU ○○○○○○EN-GM	**M21**	Insert (Milling)
WNMU ○○○○○○EN-SM	**M21**	Insert (Milling)
WP-1S	**D18,N16,P7**	Spare Parts (Shim Pin)
WP5X11	**F80,P7**	Spare Parts (Shim Pin)
WP5X15	**D25,N17,P7**	Spare Parts (Shim Pin)
WPGT ○○○○○○M R/L-Y	**B99**	Insert (Turning)
WPGT ○○○○○○R/L-Y	**B99**	Insert (Turning)
WPGW ○○○○○○	**B99**	Insert (Turning)
WPMT ○○○○○○	**C29**	Insert (Turning)
WPMT ○○○○○○GP	**B99**	Insert (Turning)
WPMT ○○○○○○HQ	**B99**	Insert (Turning)
WPMT ○○○○○○NE	**C29**	Insert (Turning)

Description	Page	Category
WPMT ○○○○○○SE	**C29**	Insert (Turning)
WS-10	**D11,G27,H43**	Spare Parts (Washer)
WSP-1	**D18,N16,P18**	Spare Parts (Spacer)
WTENN ○○○○□-○○N	**D18**	Toolholder (Turning)
WTJN R/L ○○○○□-○○N	**D18**	Toolholder (Turning)
WTKN R/L ○○○○□-○○N	**D18**	Toolholder (Turning)
WTN-33	**D18,N16,P12**	Spare Parts (Shim)
WTN-33-20	**D18,P12**	Spare Parts (Shim)
WWLN R/L ○○○○□-○○	**D25**	Toolholder (Turning)
WWN-42	**D25,N17,P12**	Spare Parts (Shim)
WWP-42	**F80,P12**	Spare Parts (Shim)
WWP-42-16	**F80,P12**	Spare Parts (Shim)
Z		
ZCMT ○○○○○○	**K65**	Insert (Drilling)
ZCMT ○○○○○○SP	**K65**	Insert (Drilling)
ZCMT ○○○○○○SU	**K65**	Insert (Drilling)
ZXMT ○○○○○○GH	**K80**	Insert (Drilling)
ZXMT ○○○○○○GH-E	**K80**	Insert (Drilling)
ZXMT ○○○○○○GM	**K80**	Insert (Drilling)
ZXMT ○○○○○○GM-E	**K80**	Insert (Drilling)
ZXMT ○○○○○○GM-I	**K80**	Insert (Drilling)
ZXMT ○○○○○○SM	**K80**	Insert (Drilling)
ZXMT ○○○○○○SM-E	**K80**	Insert (Drilling)

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