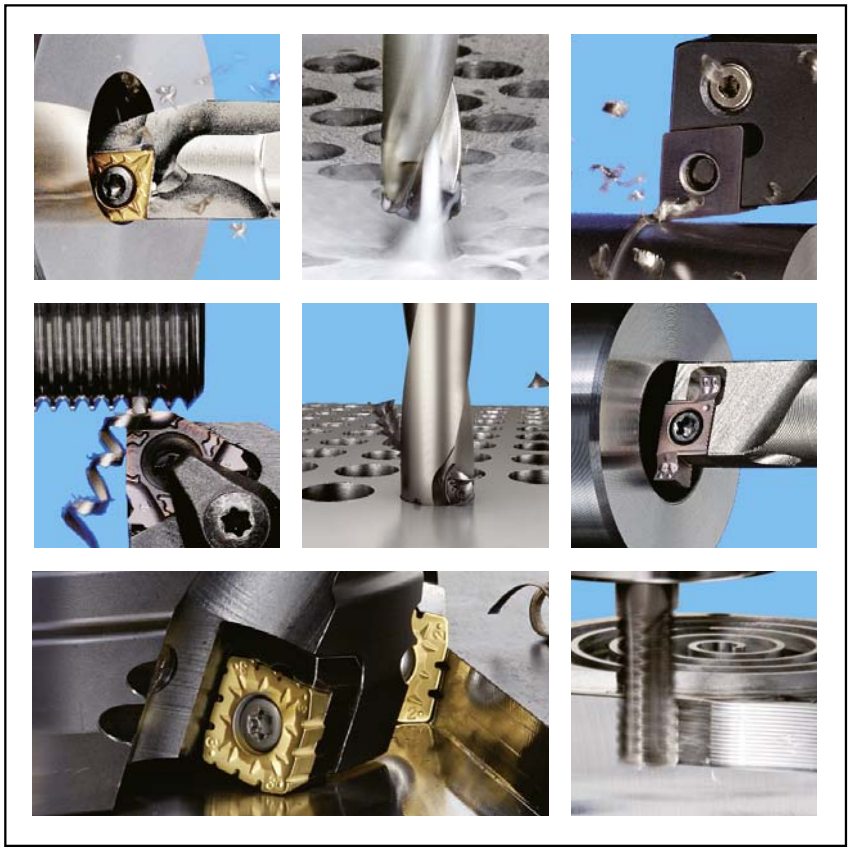
THE NEW VALUE FRONTIER

KYOCERA

2010-2011

KYOCERA

Cutting Tools



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Turning Inserts B
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Turning D
Small Tools E
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ADVANCING PRODUCTIVITY

TZZ00019

THE NEW VALUE FRONTIER

KYOCERA

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2010-2011
Kyocera Cutting Tools

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See the front pase of each section for details.

Safety Notes of Cutting Tools

1. Introduction

Kyocera has put “caution” or “warning” label on the package of cutting tool product, but it is not put on the tool itself.
Before using and handling any of cutting tool product and cutting tool material, make sure to read this guideline to use them 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 of Cutting Tool Material

2-1. Technical Terms

Cutting Tool Material: General term of 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 ingredient

2-2. Physical Property

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 in addition to these, metals such as Co, Ni, Cr, Mo is incouded for some.

3. Notes for Handling Cutting Tool Material

- These cutting tool materials are very hard,but also brittle. Therefore, they may be broken 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 from that of metal material.When brazing the cutting tool material, use the proper temperature to prevent the tool from breaking.

4. Notes for Machining Cutting Tool

- The cutting edge is very sharp; wear gloves when handling or installing tools to prevent injury.
- When machining, cutting tools may be broken due to shock, excessive tool wear or improper conditions. Use protective materials 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 machining, flying chips or metal pieces may be dangerous. Use protective materials such as safe guards and safety eyeglasses to prevent injury.

Safety Notes of 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 machining condition. See our catalog or instruction manuals.
	◎Excessive impact or heavy wear will increase cutting resistance 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 preffereable.
	◎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 become high temperature during cutting operation. Direct touch to the tools and materials shortly after machining 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 be sure of enough system for fire-prevention.
	◎Lack of dynamic balance in high-speed revolution cause tool-broken by vibration.	* 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 inserts or parts are not installed well, falling off or dispersion of them may occur and cause injury.	* 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 be broken.	* 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. For handling, please pay extra attention for safety.	* Please use in the range of our recommended machining 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, tools would cause vibraion and it may cause injury by dispersion of borken pieces.	* Please use in the range of our recommended machining condition. * Accuracy and balance of machine spindle should be checked and adjusted regularly to prevent from eccentric rotation or run out due to wear of bearing portion.
Drilling	◎When drilling through hole with running work, a disc sometimes flies out from the end of frilling with high speed. This is very dangerous since the disc has sharp edge.	* Please use safety items, such as safety glasses and protective gloves. Also attach a cover on a chuck part.
Brazed Tools	◎Dispersion of broken inserts or falling off may cause injury.	* Please check chips 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 becomes easy to be broken during cutting.	* Please do not use tools which are brazed several times. Since tool strength have been deteriorated.
	◎It is dangerous to use tools except for the fixed application. It may damage tools and machines.	* Please keep our recommended usage of tools.

Introduction

Preface

Thank you very much for using **“2010-2011 Kyocera Cutting Tools”**.

- This General Catalog contains major Kyocera cutting tools.
- This General Catalog is as of **December, 2009**.
- The stock status of products will be shown as follows:

● **mark･･･Std. Stock**	□ **mark･･･Deleted from the next catalog**
R mark･･･Right-hand Only	**None･･･No Stock**
L mark･･･Left-hand Only	
○ **mark･･･Check Availability**	

- 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 **Material Safety Data Sheet (MSDS)** of each Insert Grade, please refer to our machine tool homepage, **http://global.kyocera.com/prdct/tool/index.html**.

■ For inventory sales quantity

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 / Fine Micro Drill / Solid End Mill

Type	Sales piece per one box	Remarks
Twin Bar	5 pieces/box	TWB / TWBT / TWFG / TWFGT Insert
System Bar	5 pieces/box	VNB / VNBT / VNFG / VNG / VNT Insert
2 edges Tip-Bar	1 piece/box	HPB / HPBT / HPFG / HPG / HPT Insert
Tip-Bar	1 piece/box	PSB / PSBT / PSFG / PSG / PST Insert
CBN Inserts	1 piece/box	Insert Grades: KBN・・・
PCD Edge	1 piece/box	Insert Grades: KPD・・・
Threading Inserts	5 pieces/box	Insert Grades: PR930 / PR1115 / GW15 only
DC･･･M-SC type Insert	1 piece/box	Inserts for “Magic Drill DRC”
SEEN･･･W Inserts	5 pieces/box	Insert Grades: TN100M / KW10 only
RDFG Type Insert	2 pieces/box	MRF / MRFW Ball End Mill Insert
Fine Micro Drill	1 piece/box 10 pieces/box	① All descriptions are sold in “1 piece boxes”. ② Sales in “10 piece boxes” are also available depending on the descriptions. Target descriptions are described in the catalog.
Solid End Mill	1 piece/box	
Other than above inserts	10 pieces/box	

■ Due to changes of symbols indicating cutting conditions, changes are made as follows.

1) Turning

Item	New Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Rate	f	f	mm/rev
Depth of Cut	ap	d	mm
Edge Width	W	W	mm
Workpiece Dia.	Dm	D	mm
Cutting Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Theoretical Surface Roughness	h	Rz	μm
Corner Radius	rε	R	mm
Rotation Speed	n	N	min^{-1}

Note) Pronunciation of rε: r-epsilon

2) Milling

Item	New 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
Number of Edges	Z	Z	teeth
Axial Depth of Cut (Depth of Cut)	ap	d	mm
Radial Depth of Cut (Width of Cut)	ae	w	mm
Pick Feed	Pf	Pf	mm
Cutting Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Chip Evacuation Rate	Q	Q	cm^3/min
Rotation Speed	n	N	min^{-1}

3) Drilling

Item	New Symbol	(Previous Symbol)	Unit
Cutting Speed	Vc	V	m/min
Feed Speed	Vf	F	mm/min
Feed Rate	f	f	mm/rev
Diameter	Dc	D (Ds)	mm
Cutting Power	Pc	Pkw	kW
Specific Cutting Force	kc	Ks	MPa
Drilling Depth	H	d	mm
Rotation Speed	n	N	min^{-1}

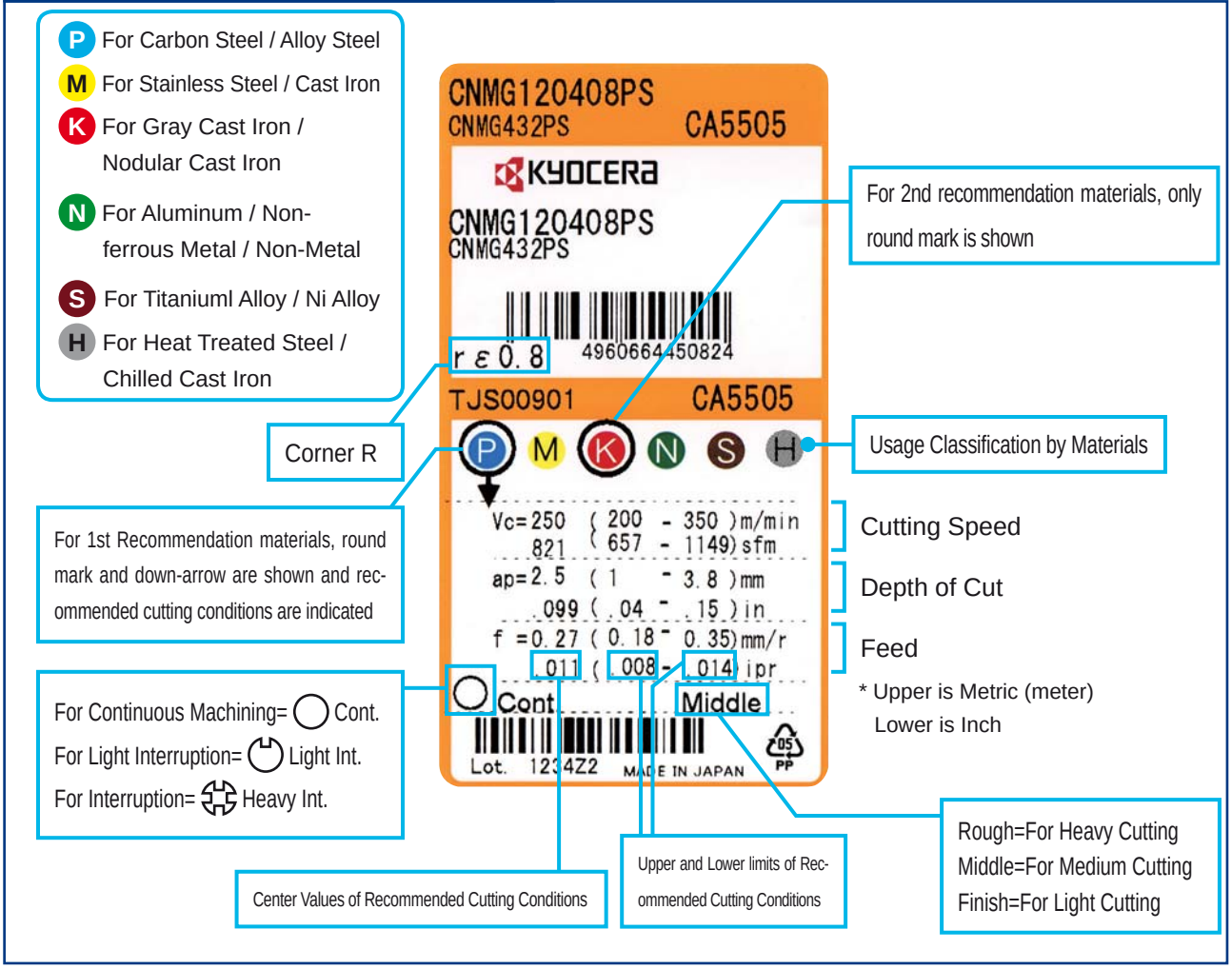
■ Change to New Label

❶ Indication of Cutting Conditions

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

* This will apply to only new insert grades temporarily.

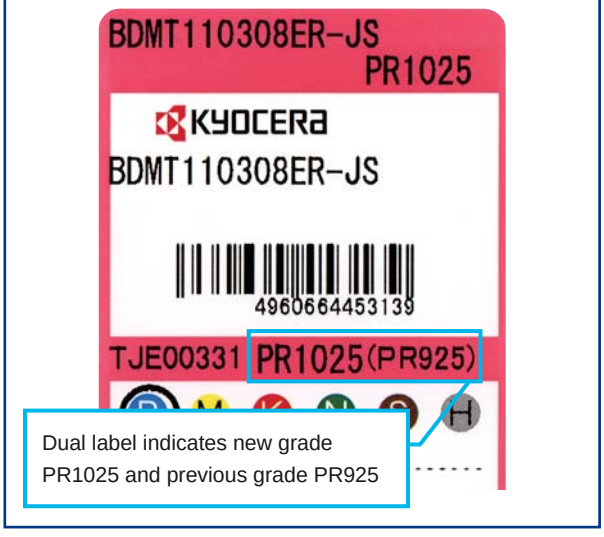
Indication of Cutting Conditions



❷ Dual labeling for the grade PR1025 (PR925)

TiCN PR925 grade changed to PR1025 and it is now classified correctly within the new PVD coated PR1000 series (TiCN) separate from the PR1100 series (TiAlN). For identification purposes, label indicates both previous and new names, as shown on right.

Dual grade indication

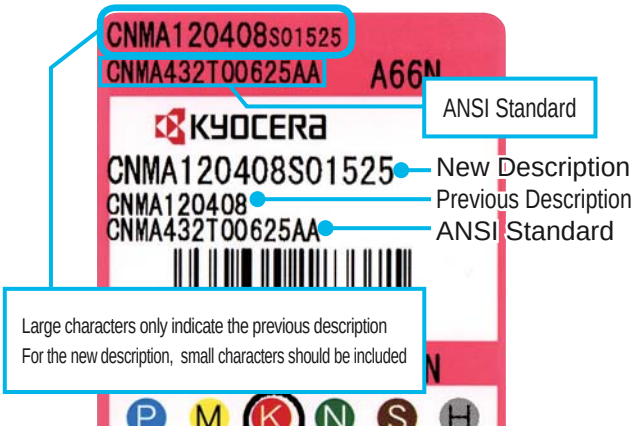


❸ Inclusion of New and Previous Descriptions

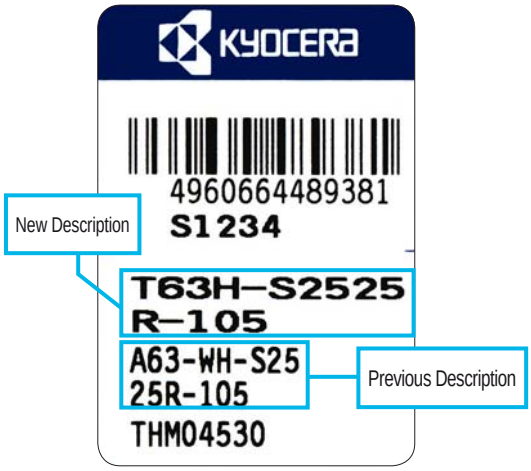
Descriptions of some products are changed to improve understandability and to standardize globally. As transitional measure in the course of this change, both New and Previous descriptions are included in the label.

Description Key

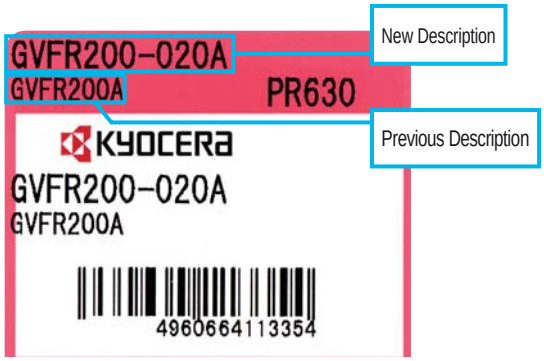
■ Ceramic / CBN description that includes Edge specification (2 types of descriptions shown on the side and 3 types shown at the bottom)



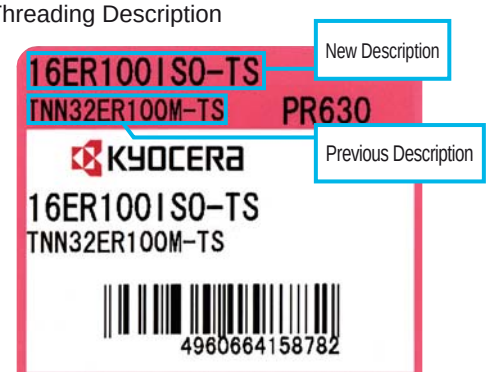
■ Tools for Turning Mill (HSK Tooling)



■ Grooving that Corner-R (rε) is included in Description



■ Standardize globally
Threading Description



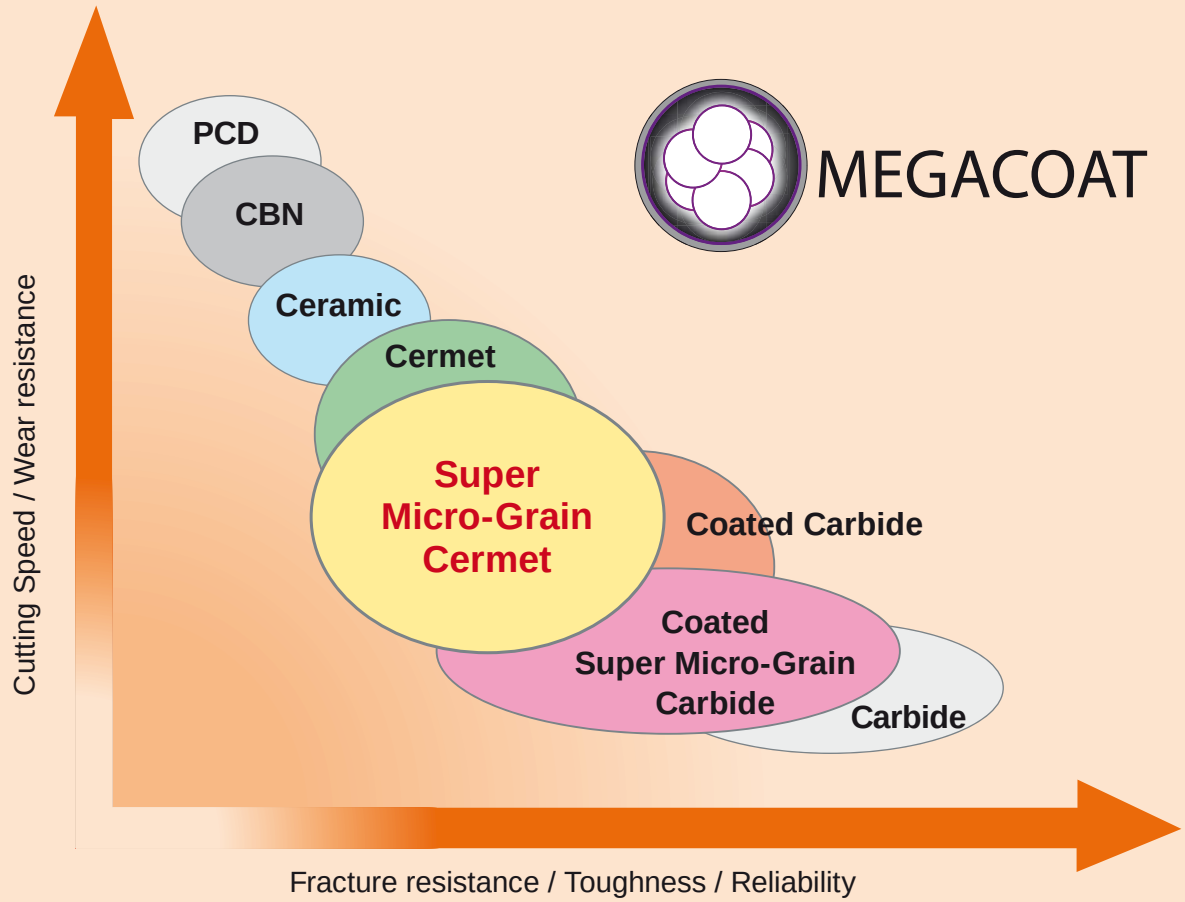
A

Insert Grades

A1~A15

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Carbide	A15



MEGACOAT

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.

PCD A8

Workpiece Material		Non-ferrous materials (Aluminum / Non-ferrous metals / Non-metals)				Titanium / Titanium alloys			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30
Turning Milling	PCD	KPD001 KPD010 KPD230				KPD001 KPD010 KPD230			

CBN A9

Workpiece Material		Hard materials (Hardened steel / Chilled cast iron)				Sintered steel				Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		H01	H10	H20	H30	01	10	20	30	K01	K10	K20	K30
Turning	CBN	KBN510 KBN525 KBN05M KBN10M KBN25M KBN30M KBN35M KBN900					KBN65M KBN70M			KBN60M KBN900			

Ceramic A10

Workpiece Material		Hard materials (Hardened steel / Chilled cast iron)				Heat-resistant alloys / Inconel				Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		H01	H10	H20	H30	S01	S10	S20	S30	K01	K10	K20	K30
Turning	Ceramic	A65 A66N PT600M				CF1				KA30 A65 A66N PT600M KS6000			

Cell Fiber A11

Workpiece Material		Hard materials (Hardened steel / Chilled cast iron)				Heat-resistant alloys / Inconel			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		H01	H10	H20	H30	S01	S10	S20	S30
Turning	Cell Fiber	KBN35M				CF1			

Cermet A12

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
Turning Milling	TN Series	TN6010 TN60 TN90 TN100M					TN6010 TN60 TN90 TN100M					TN60			
	TC Series	TC40 TC60					TC60					TC40			
	Super Micro-Grain Cermet	TN6020					TN6020								

PVD Coated Cermet A12

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
Turning	PV Series	PV7010 PV7020 PV60 PV90					PV7010 PV7020 PV60 PV90					PV7005			

CVD Coated Carbide A13

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
Turning	CA Series	CA5505	CA5515	CA5525	CA5535		CA6515		CA6525			CA4010	CA4115	CA4120	
												CA4505	CA4515		
	CR Series		CR9025					CR9025							

Workpiece Material		Non-ferrous materials (Aluminum / Non-ferrous metals / Non-metals)				Heat-resistant alloys / Inconel				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
Turning	CA Series						CA6515						
								CA6525					
	CR Series					CR7015							

PVD Coated Carbide A14, A15

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
Turning Milling Drilling	PR Series			PR630					PR630						
				PR660					PR660						
			PR730						PR730						
			PR830						PR830				PR905		
		PR1005													
			PR1025						PR1025						
			PR1115							PR1125					
			PR1230						PR1225				PR1210		

Workpiece Material		Non-ferrous materials (Aluminum / Non-ferrous metals / Non-metals)				Heat-resistant alloys / Inconel				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
Turning Milling Drilling	PR Series						PR660						
						PR915					PR1230		
								PR1125					

PVD Coated Carbide for High Precision Machining A14, A15

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
Turning	PR Series	PR915						PR915							
			PR930						PR930						
		PR1005													
			PR1025												
			PR1115							PR1125					

Carbide A15

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
Turning Milling Drilling	Carbide				PW30								KW10		
													GW15		

Workpiece Material		Non-ferrous materials (Aluminum / Non-ferrous metals / Non-metals)				Hard-to-machine materials (Titanium alloys / Heat-resistant 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
Turning Milling Drilling	Carbide		KW10				KW10						
			GW15										

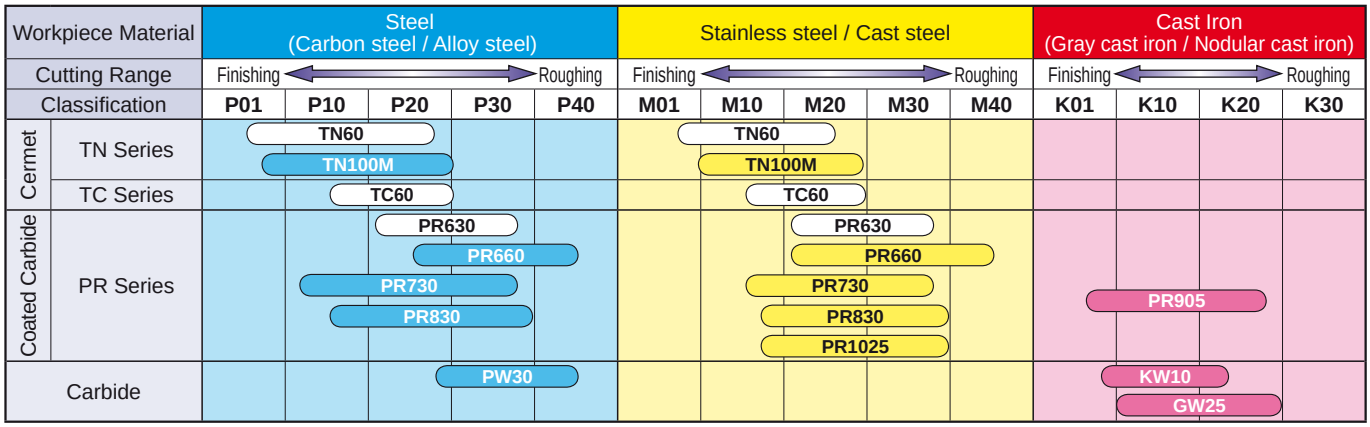
Summary of Insert Grades

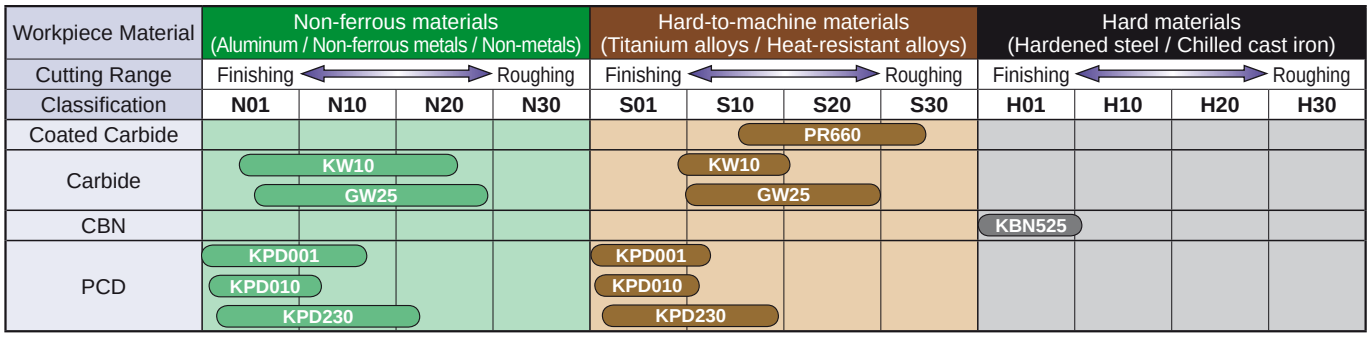
Turning

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	TN Series	TN6010, TN60, TN90					TN6010, TN60, TN90					TN60			
	TC Series	TC40N, TC60M					TC60M					TC40N			
	Super Micro-Grain Cermet	TN6020					TN6020								
	PV Series	PV7010, PV7020, PV60, PV90					PV7010, PV7020, PV60, PV90					PV7005			
Coated Carbide	CA Series	CA5505, CA5515, CA5525, CA5535					CA6515, CA6525					CA4010, CA4115, CA4120, CA4505, CA4515			
	CR Series	CR9025					CR9025								
	PR Series	PR630, PR660, PR915, PR930, PR1005, PR1025, PR1115					PR630, PR660, PR915, PR930, PR1025, PR1125								
Ceramic												KA30, A66N, PT600M, KS6000			
Carbide												KW10, GW15			
CBN												KBN60M, KBN900			

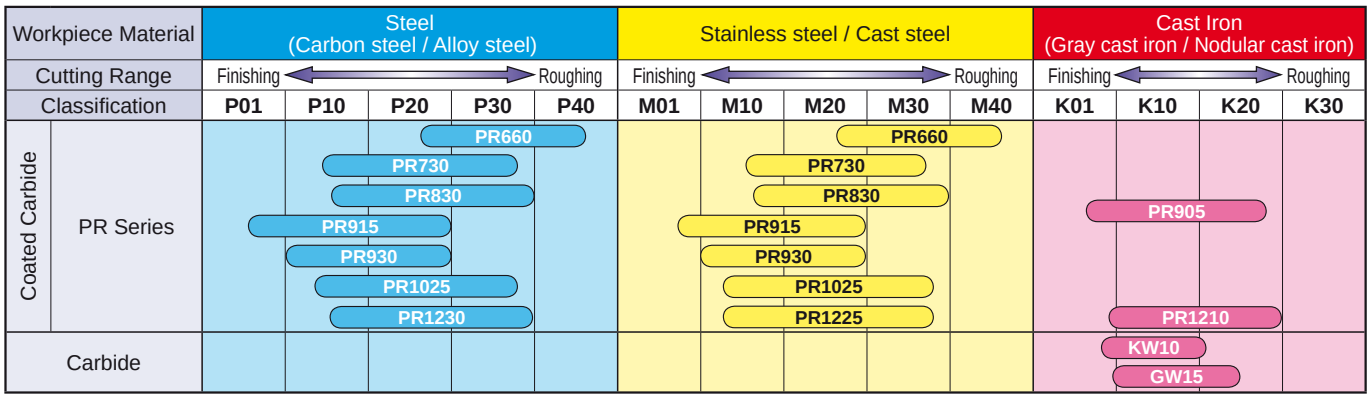
Workpiece Material		Non-ferrous materials (Aluminum / Non-ferrous metals / Non-metals)				Hard-to-machine materials (Titanium alloys / Heat-resistant alloys)				Hard materials (Hardened steel / Chilled cast iron)				Sintered steel			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Coated Carbide	CA Series						CA6515, CA6525										
	PR Series							PR1125							PR930		
Cermet														TN6010, TN60			
Ceramic							CF1			A65, A66N, PT600M							
Carbide			KW10, GW15				KW10										
CBN										KBN510, KBN525, KBN05M, KBN10M, KBN25M, KBN30M, KBN35M, KBN900					KBN65M, KBN70M		
PCD		KPD001, KPD010				KPD001, KPD010											

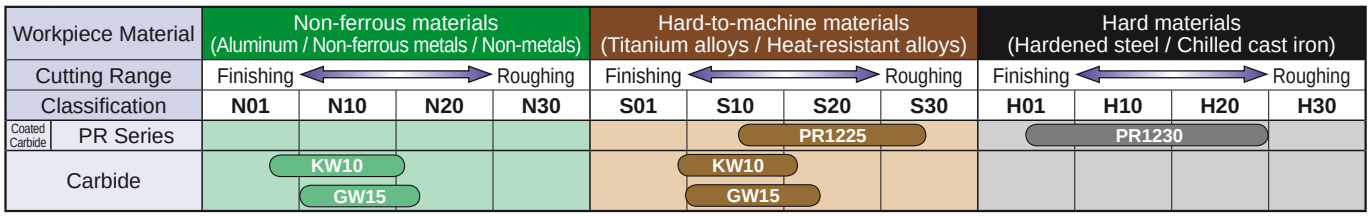
Milling





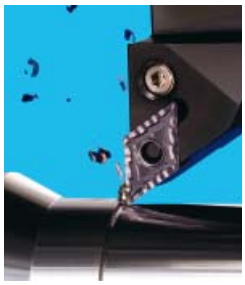
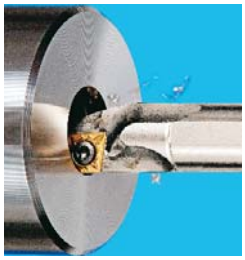
Drilling





Summary of Insert Grades

Insert 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	TN6010							A65	
										A66N	
			TN60	TN60	KA30	TN60				PT600M	
			TN6020	PV7020	KS6000	PV7005		CF1		KBN510	TN6010
			PV7010	CA6515	PV7005	CA5505	KPD001	KW10	KPD001	KBN525	TN60
			PV7020	CA5525	CA5505	CA4115	KPD010	CA6515	KPD010	KBN05M	PR930
			CA5505	CA5535	CA4010	CA4120	KW10	CA6525	KW10	KBN10M	KBN65M
			CA5515	CA6525	CA4505	CA4515		PR1125		KBN25M	KBN70M
			CA5525	PR1125	KBN60M			PR660		KBN30M	
			CA5535	PR660						KBN35M	
		Roughing								KBN900	
Small Tools		High Vc	TN6010								
			TN60	TN6020							
			TN6020	PV7020	CA4505					KBN510	
			PV7010	CA6515	CA4010	CA4515	KPD001	CA6515	KPD001	KBN525	TN6010
			PV7020	CA6525	CA4115	CA4115	KPD010	PR1125	KPD010	KBN05M	TN60
			CA5515	PR1005	CA4120	CA4120	KW10	PR660	KW10	KBN10M	PR930
			CA5525	PR930	KW10	KW10				KBN25M	KBN65M
			PR930	PR1025						KBN30M	KBN70M
			PR1025								
		Low Vc									
Boring		Wear Resistance	TN6010								
			TN60	TN60						PT600M	
			TN6020	PV7020	PV7005					KBN510	TN6010
			PV7010	CA6515	CA4010	PV7005				KBN525	TN60
			PV7020	CA5525	CA4505	CA4115	KPD001	CA6515	KPD001	KBN05M	PR930
			CA5515	CA6525	CA4115	CA4515	KPD010	CA6525	KPD010	KBN10M	KBN65M
			CA5525	PR930	CA4120	CA4120	KW10	PR1125	KW10	KBN25M	KBN70M
			CA5535	PR1125	KW10	KW10		PR660		KBN30M	
			PR930	PR1025	KBN60M						
		Toughness	PR1025								
Cut-off		Large									
			CR9025	CR9025							
			PR660	PR660	KW10	KW10	KW10	KW10	KW10	-	-
			PR930	PR930				PR660			
		Small	PR915	PR915							
Cut-off		(Depends on the workpiece material)			KW10	KW10	KW10	KW10	KW10	-	-
			PR1025	PR1025				PR1025			
Grooving		Wear Resistance	TC40	TC40							
			TN6020	TN6020							
			TN90	TN90						KBN510	
			TC60	TC60	PR905	PR905	KPD001	PR915	KPD001	KBN525	TC40N
			PR630	PR630	KW10	KW10	KW10	KW10	KW10	PT600M	PR930
			PR915	PR915	GW15	GW15					
			PR930	PR930							
		Toughness	PR1115	PR1115							
Threading		Wear Resistance									
			TC60	TC60							
			PR630	PR630							
			PR930	PR930	KW10	KW10	KW10	KW10	KW10	-	PR930
			PR1115	PR1115	GW15	GW15					
		Toughness									
Drilling		Wear Resistance									
			PR930								
			PR730	PR730	PR510	PR510		PR660			
			PR830	PR830	PR905	PR905	KW10	PR1025	KW10	-	-
			PR915	PR915	PR1210	PR1210		PR1230			
			PR1025	PR1025	KW10	KW10		KW10			
			PR1230	PR1225				GW15			
			PR660	PR660							
		Toughness									
Milling		Finishing									
			TN100M								
			PR630	PR630			KPD001	PR630	KPD001		
			PR730	PR730	PR905	PR905	KPD010	PR730	KPD010	-	-
			PR830	PR830	KW10	KW10	KW10	PR830	KW10		
			PR1025	PR1025			GW25	PR1025			
			PR660	PR660				PR660			
		Roughing									

• Highlighted materials are recommended choices.

Grade properties

Cermet

Symbol	Color	Main Component	Ratio	Hardness of Substrate		Fracture Toughness ($MPam^{1/2}$)	Transverse Strength (MPa)
				(HV)	(GPa)		
TN6010	Gray	TiCN	6.5	1,700	16.7	7.0	2,000
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
TC40	Gray	TiC+TiN	6.0	1,650	16.2	9.0	1,570
TC60	Gray	NbC	8.1	1,500	14.7	10.5	1,670

PVD Coated Cermet

Symbol	Color	Main Component	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPam^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
PV7005	Blackish red	MEGACOAT	Thin	6.0	1,650	16.2	8.5	1,470
PV7010	Blackish red	MEGACOAT	Thin	6.5	1,700	16.7	7.0	2,000
PV7020	Gold	TiAlN+TiN	Thin	6.4	1,500	14.7	10.0	2,500
PV60	Gold	TiN	Thin	6.6	1,600	15.7	9.0	1,760
PV90	Gold	TiN	Thin	6.4	1,450	14.2	10.0	1,960

CVD Coated Carbide

Symbol	Color	Main Component	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPam^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
CA4010	Gold	Columnar TiCN+Al_2O_3+TiN	Thick	14.8	1,670	16.4	10.0	3,000
CA4115	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick	14.7	1,550	15.2	12.0	2,750
CA4120	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick	14.7	1,550	15.2	12.0	2,750
CA4505	Blackish gray	Micro columnar TiCN+Al_2O_3	Thick	14.9	1,780	17.4	9.5	2,350
CA4515	Blackish gray	Micro columnar TiCN+Al_2O_3	Thick	14.9	1,570	15.4	12.0	2,780
CA5505	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick	14.7	1,730	17.0	10.0	2,540
CA5515	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick	14.7	1,550	15.2	12.0	2,750
CA5525	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick	14.5	1,400	13.7	12.0	2,780
CA5535	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thick	14.1	1,340	13.1	16.5	2,970
CA6515	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thin	14.7	1,530	15.0	12.0	2,780
CA6525	Gold	Micro columnar TiCN+Al_2O_3+TiN	Thin	14.7	1,580	13.5	16.0	3,100
CR9025	Gold	Columnar TiCN+TiN	Thick	14.5	1,400	13.7	12.0	2,780

PVD Coated Carbide

Symbol	Color	Main Component	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness ($MPam^{1/2}$)	Transverse Strength (MPa)
					(HV)	(GPa)		
PR630	Gold	TiN	Thin	12.5	1,500	14.7	11.0	2,160
PR660	Gold	TiN	Thin	13.7	1,450	14.2	12.0	2,250
PR730	Gold	TiAlN+TiN	Thin	13.7	1,450	14.2	12.0	2,250
PR830	Gold	TiAlN+TiN	Thin	13.7	1,450	14.2	12.0	2,250
PR905	Bluish purple	TiAlN	Thin	14.8	1,670	16.4	10.0	3,000
PR915	Bluish purple	TiAlN	Thin	14.1	1,700	16.7	11.0	4,140
PR930	Reddish gray	TiCN	Thin	14.1	1,700	16.7	11.0	4,140
PR1005	Reddish gray	TiCN	Thin	14.9	1,800	17.6	10.0	3,300
PR1025	Reddish gray	TiCN	Thin	14.5	1,600	15.8	13.0	3,400
PR1115	Purple red	TiAlN	Thin	14.7	1,700	17.2	11.0	3,000
PR1125	Purple red	TiAlN	Thin	14.5	1,600	15.8	13.0	3,400
PR1210	Blackish red	MEGACOAT	Thin	14.8	1,670	16.4	10.0	3,000
PR1225	Blackish red	MEGACOAT	Thin	14.5	1,600	15.8	13.0	3,400
PR1230	Blackish red	MEGACOAT	Thin	13.7	1,450	14.2	12.0	2,250

Carbide

Symbol	Color	Main Component	Ratio	Hardness of Substrate		Fracture Toughness ($MPam^{1/2}$)	Transverse Strength (MPa)
				(HV)	(GPa)		
PW30	Gray	WC+Co+TiC+TaC	12.5	1,500	14.7	12.0	2,160
KW10	Gray	WC+Co	15.0	1,650	16.2	10.0	1,470
GW15	Gray	WC+Co	14.7	1,700	17.2	11.0	3,000
GW25	Gray	WC+Co	14.5	1,600	15.8	13.0	3,400

Insert Grades

PCD



PCD

KYOCERA diamond material is a synthetic diamond sintered under high temperatures and pressures. PCD (Polycrystalline diamond) is ideal for non-ferrous metals and non-metals.

Features

- Applicable for non-ferrous metals, non-metals turning, milling and other various type of cutting
- Long tool life due to extreme hardness
- Capable of high cutting speeds which increases machining productivity
- Reduced edge build-up allows for high precision machining
- Diversified applications for machining of non-ferrous materials and non-metals
- Finished surface will be rainbow colored. (a mirror-like finished surface will not be obtained when single crystal diamond is used.)

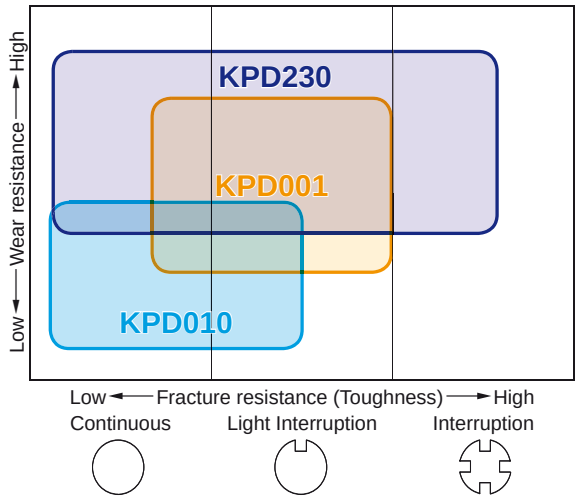
Features of PCD

Workpiece Material	Symbol	Av. grain size (μm)	Advantages
N Non-ferrous materials	KPD001	0.5	• Super Micro-Grain PCD features cutting edge strength, wear resistance, fracture resistance, good edge-sharpening performance and long, stable tool life. • Application: High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, fiberglass, carbide and ceramics.
	KPD010	10	• Good wear resistance and toughness, good grindability • Application: General purpose, high speed machining of aluminum alloys, non-ferrous metals and non-metals including plastics, fiberglass, carbide and ceramics.
	KPD230	2-30	• Superior abrasive wear resistance and toughness due to high density PCD with mixed rough and fine grains • Application: High speed milling of aluminum alloys, non-ferrous metals, plastics and fiberglass

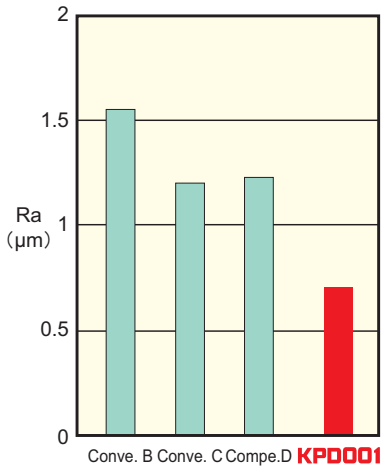
Applications

Workpiece Material		Non-ferrous materials (Aluminum / Non-ferrous metals / Non-metals)				Titanium / Titanium alloys			
Cutting Range		Finishing ⟷ Roughing				Finishing ⟷ Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30
Turning Milling	PCD	KPD001				KPD001			
		KPD010				KPD010			
		KPD230				KPD230			

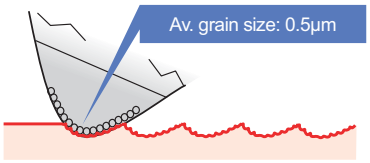
Application Map



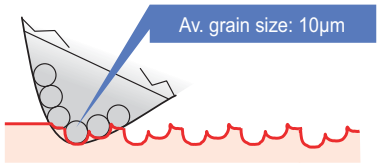
Surface Finish Roughness Comparison of Aluminum Cutting



Excellent surface finish provided by Super Micro-Grain KPD001



Surface finish of conventional PCD



(Grain size affects surface finish quality)

CBN



CBN

KYOCERA CBN is second only to diamond in hardness. CBN (Cubic Boron Nitride) is a synthetically produced material with high thermal conductivity which provides stable machining.

Features

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

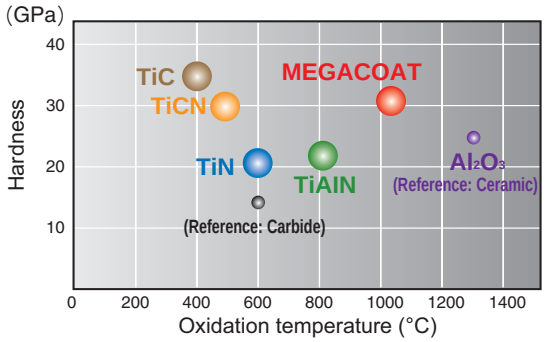
Features of CBN

Workpiece Material	Symbol	Color	Av. Grain Size (μm)	CBN Content Rate (%)	Hardness of Substrate (GPa)	Transverse Strength (MPa)	Advantages
H Hard Materials	**KBN510**	Black	2	50	28	1,000	• Excellent wear resistance and crack resistance, non-coated CBN • Application: Finishing and continuous machining of hardened die steel
	KBN525	Black	1 and under	45	25	1,250	• Good balance of toughness and wear resistance, non-coated CBN • Application: General grade for hardened steel, high stability at high speed and high feed machining
	KBN05M (MEGACOAT)	Blackish red	0.5-1.5	55	27	1,000	• Heat-resistant MEGACOAT on highly heat-resistant CBN substrate • Application: High speed finishing of hardened steel
	KBN10M (MEGACOAT)	Blackish red	2	50	28	1,000	• Heat-resistant MEGACOAT on CBN with hard binder phase, superior anti-crater wear resistance • Application: High speed finishing of hardened die steel
	KBN25M (MEGACOAT)	Blackish red	1 and under	45	25	1,250	• Heat-resistant MEGACOAT on micro-grain CBN with heat resistant binder phase • Application: Stable machining of hardened steel at high speed
	KBN30M (MEGACOAT)	Blackish red	1-4	65	30	1,350	• Heat-resistant MEGACOAT on tougher CBN • Application: Stable machining of hardened steel for continuous to interrupted cutting
Sintered Steel	**KBN65B**	Black	2	85	32	1,150	• Excellent wear resistance due to CBN with heat-resistant binder phase, non-coated CBN • Application: Stable machining of sintered steel (ferrous sintered alloy) at low speed
	KBN65M (MEGACOAT)	Blackish red	2	85	32	1,150	• Heat-resistant MEGACOAT on CBN with heat-resistant binder phase • Application: Stable machining of sintered steel (ferrous sintered alloy) at low speed
	KBN70M (MEGACOAT)	Blackish red	2-4	90	34	1,350	• Heat-resistant MEGACOAT on CBN rich substrate • Application: General machining of sintered steel (ferrous sintered alloy) at high speed
K Cast Iron	**KBN60M** (MEGACOAT)	Blackish red	0.5-6	80	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	90	31	1,050	• TiN coated solid CBN • Application: Heavy duty, interrupted cutting and finishing of hardened steel, hardened roll steel and cast iron

• For **KBN35M**, see page ➔**A11**.

MEGACOAT CBN

Properties of PVD coated layer



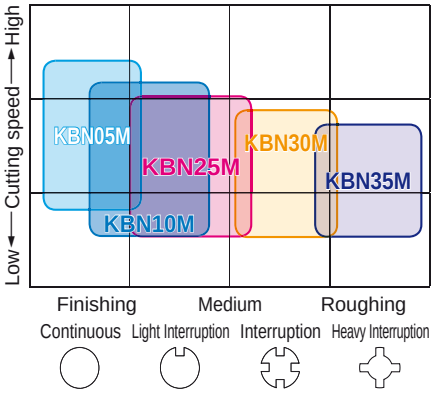
Advantages of MEGACOAT

MEGACOAT

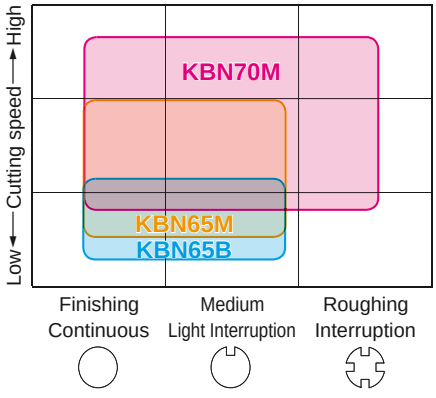
Improved Stability
Extended Tool Life
High Speed Machining

Application Map

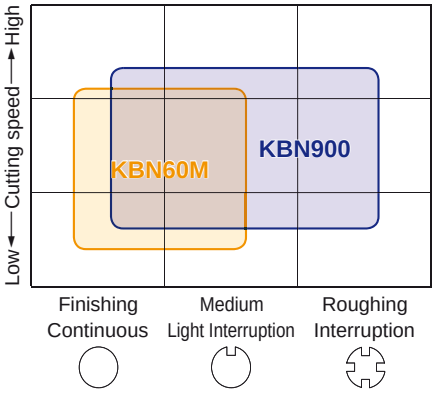
Hard Materials Machining



Sintered Steel Machining

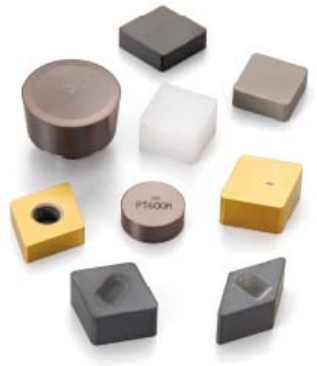


Cast Iron Machining



Insert Grades

Ceramic



Ceramic

Ceramics inserts are capable of running at high speeds, thus reducing expensive machining time. Hard turning of 38HRC to 64HRC hardened steels, or rough to finished turning of cast irons are recommended applications for ceramic inserts. KYOCERA's ceramic grades are designed to resist oxidation and maintain hardness at elevated temperatures.

Features

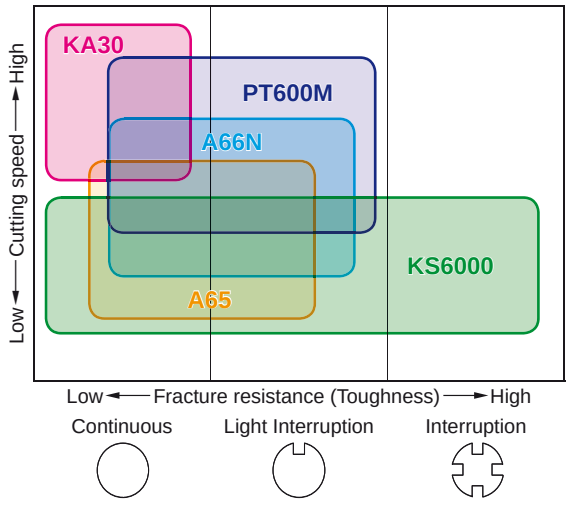
- Excellent wear resistance enables high cutting speeds
- Ceramic maintains good surface finishes due to the low affinity to workpiece materials
- Silicon nitride ceramic (KS6000) has improved thermal shock resistance allowing cast iron machining using coolants

Features of Ceramic

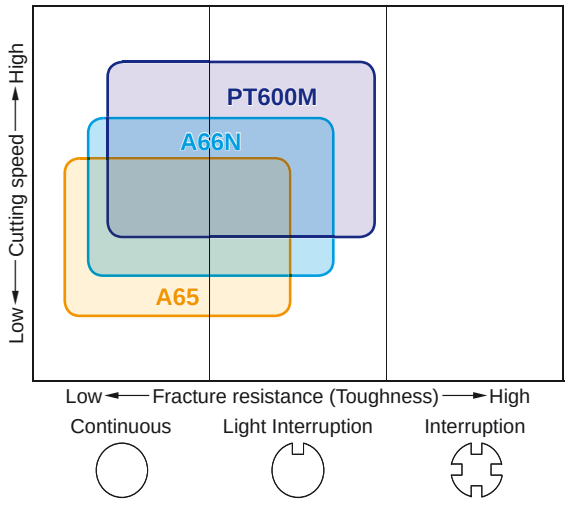
Workpiece Material	Symbol	Color	Main Component	Hardness of Coated Layer (GPa)	Hardness of Substrate (GPa)	Fracture Toughness ($MPa \cdot m^{1/2}$)	Transverse Strength (MPa)	Advantages
K Cast Iron	KA30	White	Al_2O_3	-	17.5	4.0	750	• Aluminum Oxide ceramic (Al_2O_3) • Application: Finishing of cast iron at high cutting speeds without coolant
K Cast Iron	KS6000	Gray	Si_3N_4	-	15.7	6.5	1230	• Silicon nitride ceramic (Si_3N_4) • Application: High feed and interrupted machining of cast iron (with or without coolant)
K Cast Iron	A65	Black	Al_2O_3+TiC	-	20.6	4.5	780	• Aluminum Oxide and Titanium Carbide ceramic (Al_2O_3+TiC) • Application: Semi-roughing to finishing of cast iron, and hardened materials.
K Cast Iron H Hard Materials	A66N (TiN coat)	Gold	Al_2O_3+TiC	20	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
H Hard Materials	PT600M (MEGACOAT)	Blackish red	Al_2O_3+TiC	30	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 roll materials

Application Maps

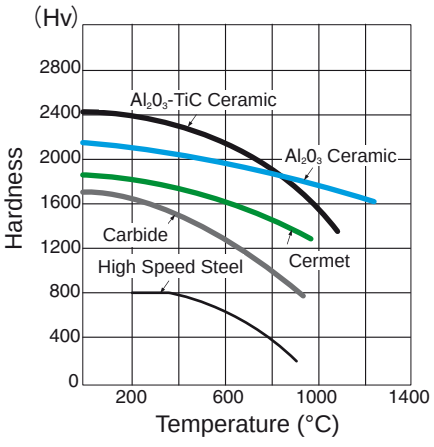
Cast Iron Machining



Hard Materials Machining

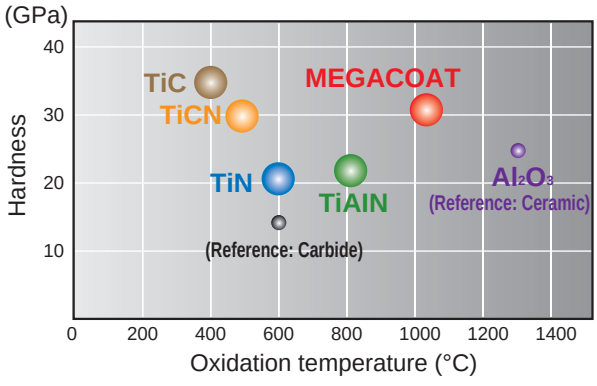


High-Temperature Hardness



Properties of PVD Coating

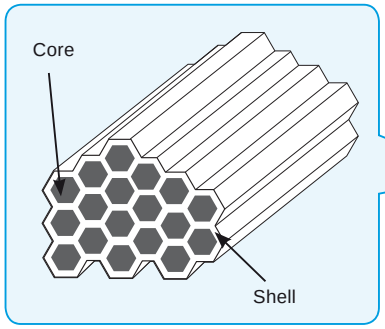
MEGACOAT

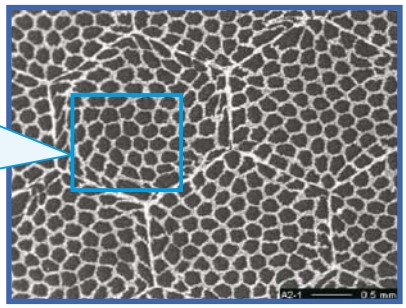


Cell Fiber

Cell Fiber

Cell Fiber is composite material consisting of a controlled fibrous core (gray portion) and shell (white portion).





Features

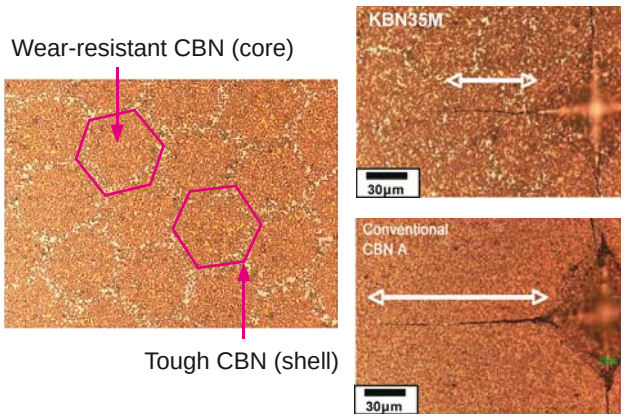
- Cell Fibers combine a hard, wear-resistant core and a tough shell into one insert.
- The tough shell stops cracks that form in the core.
- Characteristics of Cell Fiber are obtained through a combinations of materials and structures.

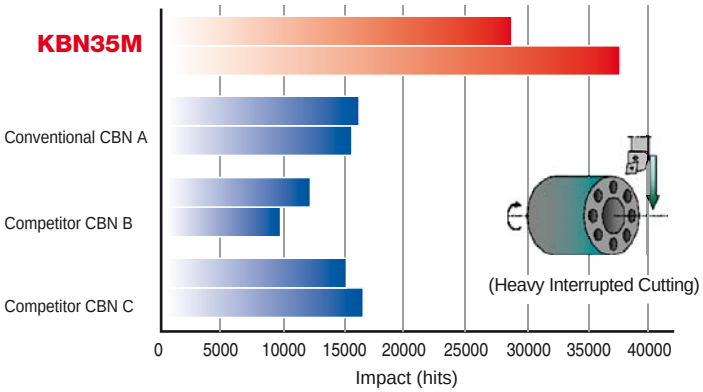
Features of Cell Fiber

Workpiece Material	Symbol	Color	Main Component	Advantages
H Hard Materials	KBN35M (MEGACOAT)	Blackish red	CBN	• Cell Fiber CBN composite material consisting of wear resistant CBN (core) and tough CBN (shell) • Heat-resistant MEGACOAT on tough Cell Fiber CBN • Application: Stable machining of hardened steel at interrupted range
S Heat-Resistant Alloys	CF1	Gray	Ceramic	• Cell Fiber ceramic composite material consisting of wear resistant ceramic (core) and tough ceramic (shell) • Application: Cutting of heat-resistant alloys like Inconel

KBN35M (MEGACOAT Cell Fiber CBN)

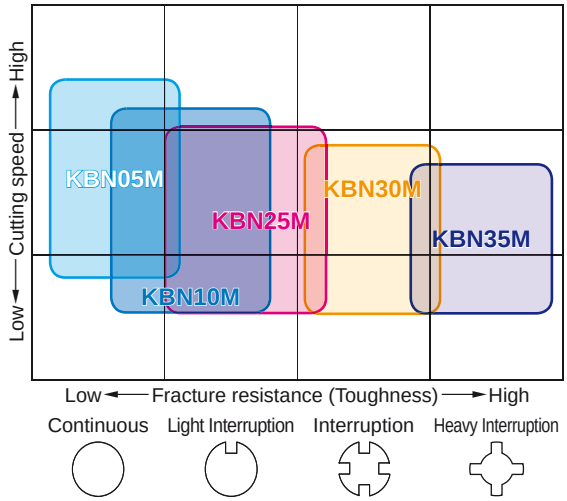
Tough CBN (shell) prevents crack growth



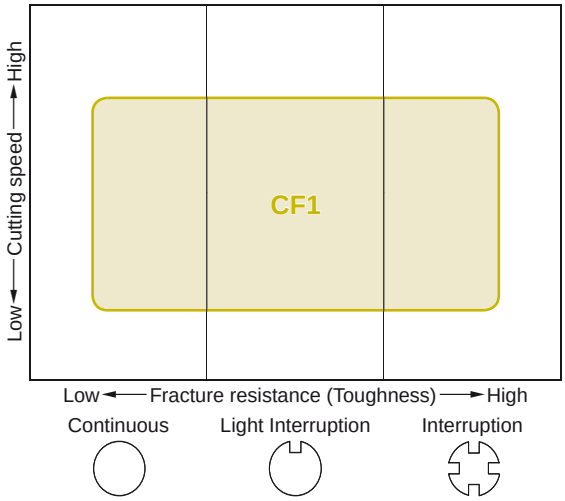


Application Map

Cast Iron Machining

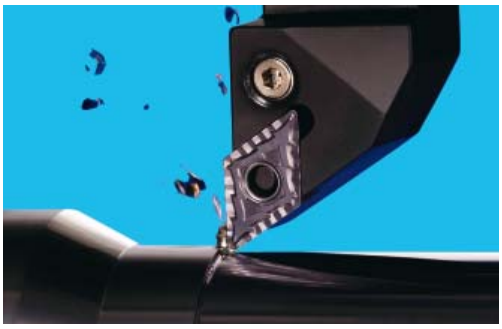


Heat-Resistant Alloys Machining



Insert Grades

Cermet



Cermet

KYOCERA is known as the leading manufacturer of cermets.
Cermet is composite word with Ceramic and Metal. Typical materials used in cermets are TiC, TiN, TiCN and NbC. Designed to provide long tool life and excellent surface finishes, cermets combine toughness with superior wear resistance.

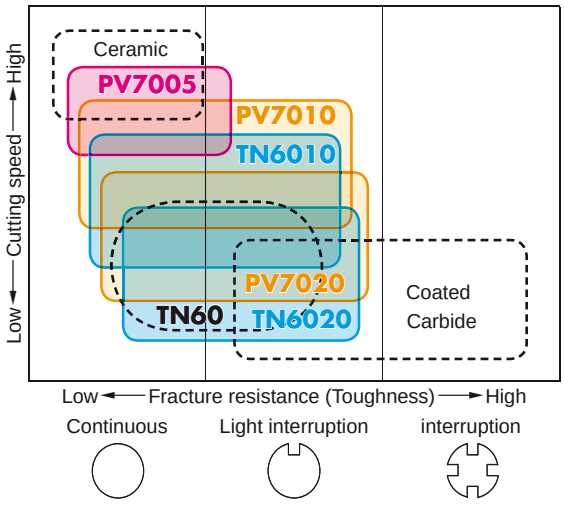
PVD Coated Cermet

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

Workpiece Material		Symbol	Color	Main Component (Coated Composition)	Advantages
P Steel	Cermet	**TN6010** (Super Micro-Grain)	Gray	TiCN	• Improved surface cermet with superior wear resistance and toughness • Application: Economical uncoated cermet for steel
		TN60	Gray	TiCN+NbC	• Typical choice cermet with superior wear resistance and toughness • Application: Machining of steel and stainless steel
		TN6020 (Super Micro-Grain)	Gray	TiCN	• Super micro-grain cermet with superior wear resistance and toughness • Application: First choice cermet for steel and stainless steel machining
		TN100M	Gray	TiCN+NbC	• Tough cermet with improved oxidation resistance and thermal shock resistance • Application: Milling of steel at high speed
		TC40	Gray	TiC+TiN	• Good balance of wear resistance and toughness • Application: Grooving and threading of steel
	PVD	**PV7010** (Super Micro-Grain)	Blackish red	TiCN (MEGACOAT)	• Heat-resistant MEGACOAT on improved surface cermet with excellent wear resistance and toughness • Application: Stable and improved tool life in steel cutting, excellent surface finish
		PV7020 (Super Micro-Grain)	Gold	TiCN (TiAlN+TiN)	• TiAlN base PVD coated on super micro-grain cermet • Application: First choice PVD coated cermet for steel cutting, good balance of superior wear resistance and toughness
K Cast Iron		**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



New Cermet: PV7010, PV7005, TN6010

MEGACOAT Cermet

- Improved tool life and high speed capability due to its 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

PV7010: MEGACOAT for Steel
PV7005: MEGACOAT for Cast Iron

MEGACOAT

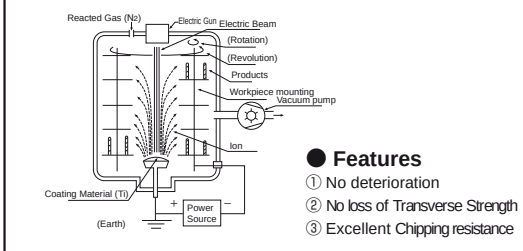
Improved Surface Cermet

- Hard surface and tougher inner phase
- Achieves balance between wear resistance and toughness
- Economical uncoated cermet

TN6010: Uncoated Cermet for Steel

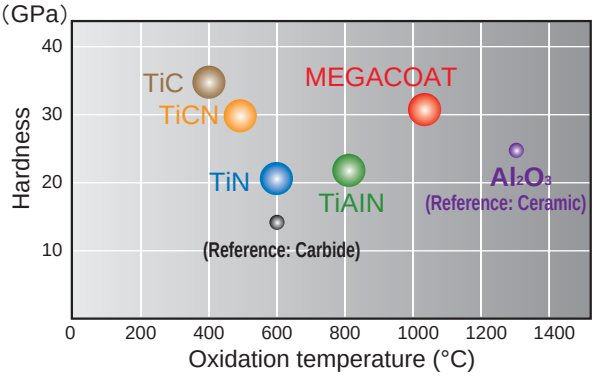
Features of PVD

PVD (Physical Vapor Deposition)



Processing temperature: 400~600°C

Properties of PVD Coating



CVD Coated Carbide



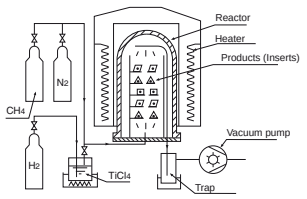
CVD Coated Carbide

KYOCERA's CVD coated carbide grades are based on ceramic thin film technology and provide stable, efficient machining at high speeds or 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
- Machining 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

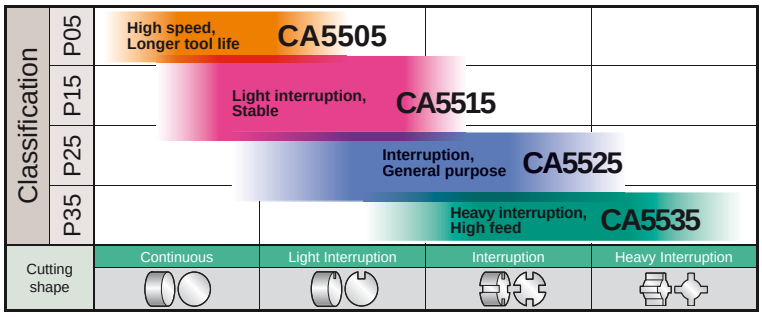
Processing temperature: 900~1100°C

Features of CVD Coated Carbide

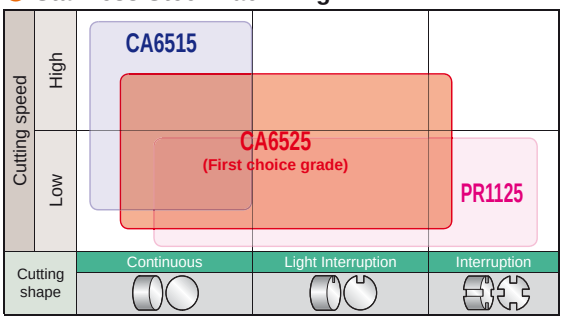
Workpiece Material	Symbol	Color	Coated Composition main Component	Advantages
P Steel	CA5505	Gold	Micro columnar TiCN+Al_2O_3+TiN	• Improved wear resistance due to hard carbide substrate and micro columnar structure of coated composition • Application: High speed continuous cutting of steel, continuous to light interrupted cutting of cast iron
	CA5515	Gold	Micro columnar TiCN+Al_2O_3+TiN	• Improved wear resistance and longer tool life due to micro columnar structure of coated composition • Application: High speed cutting of steel, continuous to light interruption
	CA5525	Gold	Micro columnar TiCN+Al_2O_3+TiN	• Improved toughness and wear resistance due to tougher carbide substrate and micro columnar structure of coated composition • Application: First choice for general cutting of steel, roughing to interruption
	CA5535	Gold	Micro columnar TiCN+Al_2O_3+TiN	• Improved toughness due to tougher carbide substrate • Application: Roughing to heavy interrupted cutting of steel
	CR9025	Gold	Columnar 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	Micro columnar TiCN+Al_2O_3+TiN	• Specialized carbide substrate for stainless steel cutting, excellent wear resistance • Application: Continuous to light interrupted cutting of stainless steel
	CA6525	Gold	Micro columnar TiCN+Al_2O_3+TiN	• Specialized carbide substrate for stainless steel cutting, excellent notching resistance and toughness • Application: First choice for general cutting of stainless steel, from finishing to roughing, continuous to interruption
K Cast Iron	CA4010	Gold	Columnar TiCN+Al_2O_3+TiN	• Excellent high temperature stability due to plastic deformation and oxidation wear resistance • Application: Continuous to light interrupted high speed cutting of cast iron
	CA4115	Gold	Micro columnar TiCN+Al_2O_3+TiN	• Improved wear resistance due to micro columnar structure of coated composition • Application: Nodular cast iron machining, continuous to light interruption
	CA4120	Gold	Micro columnar TiCN+Al_2O_3+TiN	• Improved toughness and wear resistance due to tougher carbide substrate and micro columnar structure of coated composition • Application: Roughing to heavy interrupted cutting of nodular cast iron
	CA4505	Blackish gray	Micro columnar TiCN+Al_2O_3	• Stable, long tool life due to improved bounding force of coated layers and special treatment on the surface of top coated layer • Application: For gray cast iron and nodular cast iron at high speed in continuous to light interrupted machining
	CA4515	Blackish gray	Micro columnar TiCN+Al_2O_3	• Stable, long tool life due to improved bounding force of coated layers and special treatment on the surface of top coated layer • Application: First choice for gray cast iron and nodular cast iron in light to heavy interrupted machining

Application Map

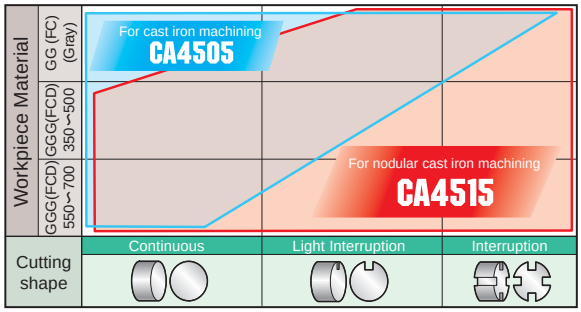
Steel machining

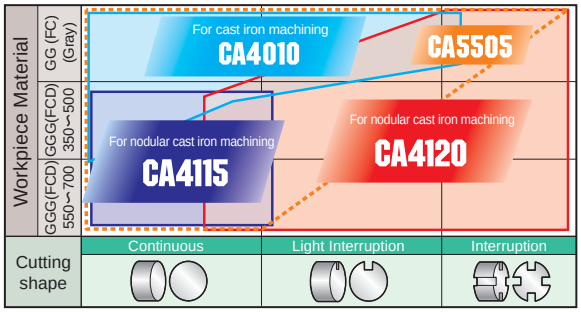


Stainless Steel machining



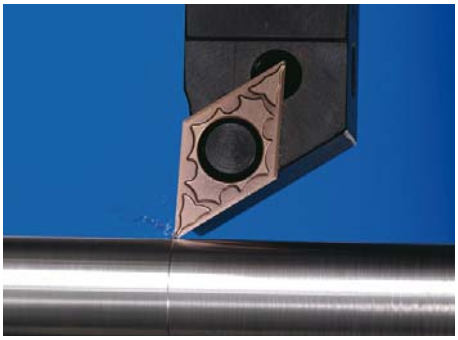
Cast Iron machining





Insert Grades

PVD Coated Carbide (for Turning)



PVD Coated Carbide

KYOCERA's PVD coated carbide grades are based on ceramic thin film coating and precise edging technologies and are good for precision machining, grooving, threading and cut-off. Very tough carbide substrate and innovative coating technology promote excellent wear resistance and strong coating adhesion for long tool life and stable machining.

Features

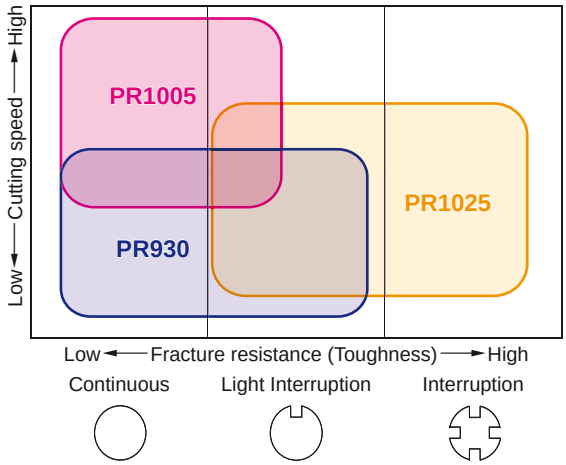
- Good for low to high speeds and finishing to heavy roughing machining
- Stable machining with excellent toughness
- Smooth fine surface of PVD coated carbide provides good surface finish and high precision machining

Features of PVD Coated Carbide

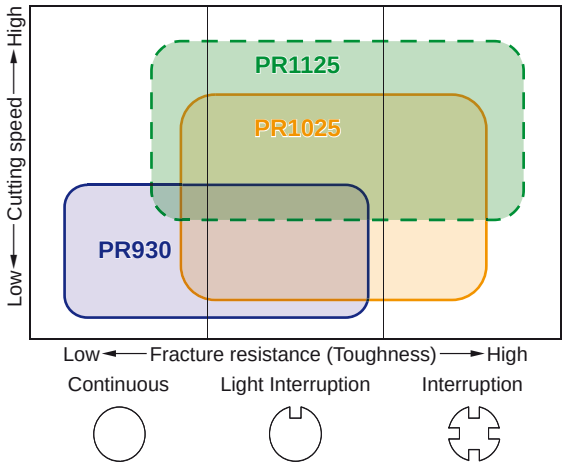
Workpiece Material	Symbol	Color	Main Component	Advantages
P Steel	**PR915** (Super Micro-Grain)	Bluish violet	TiAlN	• TiAlN base PVD coated on super micro-grain carbide, superior wear and oxidation resistance • Application: Stable and reliable high precision machining of steel
	PR930 (Super Micro-Grain)	Reddish gray	TiCN	• Hard TiCN base PVD coated on super micro-grain carbide • Application: Low cutting speed, precise machining with sharp cutting edge
	PR1005	Reddish gray	TiCN	• TiCN base PVD coated on hard micro-grain carbide • Application: Turning of free-cutting steel, long tool life achieved through anti-adhesion performance
	PR1025	Reddish gray	TiCN	• TiCN base PVD coated on micro-grain carbide • Application: General purpose machining of steel and stainless steel, stable and long tool life
	PR1115	Purple red	TiAlN	• Hard TiAlN base PVD coated on super micro-grain carbide • Application: Superior anti-oxidation performance with well balanced wear resistance and toughness
M Stainless Steel	**PR1125**	Purple red	TiAlN	• Hard TiAlN base PVD coated on super micro-grain carbide, superior toughness and heat resistance • Application: Finishing to interrupted machining of stainless steel
K Cast Iron	**PR905**	Bluish violet	TiAlN	• Smooth fine surface PVD coated on hard carbide with plastic deformation resistance • Application: Suitable for milling of gray and nodular cast iron and turning of high temperature alloys

Application Maps

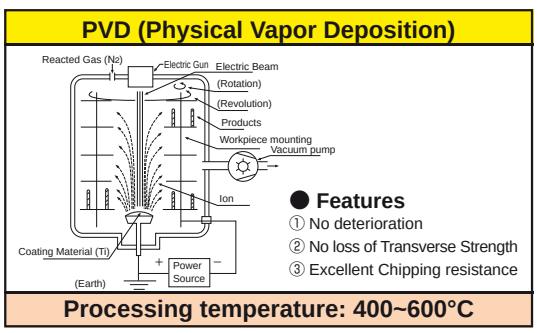
Steel machining



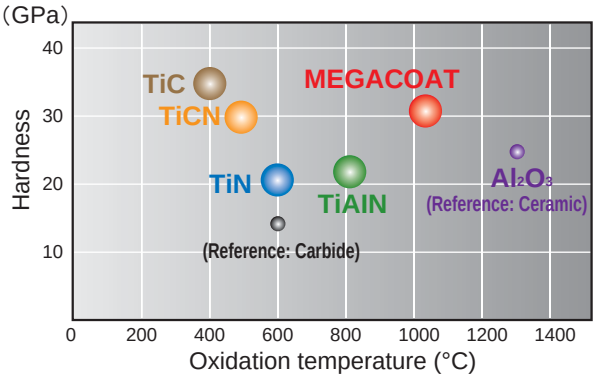
Stainless Steel / Hard-to-machine Materials machining



Features of PVD

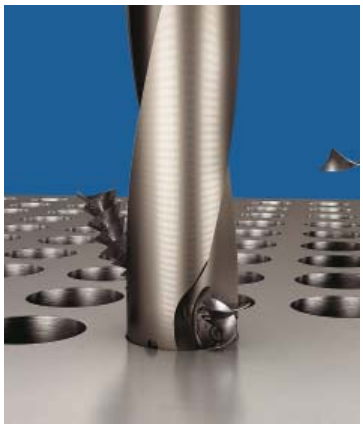


Properties of PVD Coating



PVD Coated Carbide for Milling and Drilling





PVD Coated Carbide

KYOCERA's PVD coated carbide for milling and drilling is coated on a very tough carbide substrate. Because of the low process temperature compared with CVD, it features no erosion of bending strength, less deterioration of coating and realizes superior long tool life and stable machining.

Features of PVD Coated Carbide for Milling and Drilling

Workpiece Material	Symbol	Color	Main Component	Advantages
P Steel	PR630	Gold	TiN	• TiN base PVD coated carbide • Application: General propose for milling, grooving and threading of steel
	PR730	Gold	TiAlN+TiN	• Superior oxidation resistance with well balanced wear resistance and toughness • Application: Stable and long tool life at high speed machining of steel
	PR830	Gold	TiAlN+TiN	• Improved high temperature stability and wear resistance by TiAlN base PVD coating • Application: Stable and long tool life for milling of steel
	PR1230	Blackish red	MEGACOAT	• Superior wear and oxidation resistant MEGACOAT on special tough carbide substrate • Application: Stable and high feed drilling of steel
M Stainless Steel	PR660	Gold	TiN	• Superior adhesion-resistant TiN base PVD coated carbide on special tough carbide substrate • Application: For steel, stainless steel, cast steel and heat-resistant alloys, low speed machining
	PR1025	Reddish gray	TiCN	• TiCN base PVD coated on micro-grain carbide • Application: Stable and long tool life milling of stainless steel
	PR1225	Blackish red	MEGACOAT	• Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate • Application: General and high feed drilling of steel and stainless steel
K Cast Iron	PR905	Bluish violet	TiAlN	• TiAlN base PVD coated on special tough carbide substrate for cast iron • Application: Highly efficient stable milling and drilling of gray and nodular cast iron
	PR1210	Blackish red	MEGACOAT	• Superior wear and oxidation resistant MEGACOAT on special carbide substrate for cast iron • Application: Highly efficient stable drilling of gray and nodular cast iron

Carbide



Carbide

Due to its superior mechanical features carbide is used in a variety of applications. KYOCERA produces a variety of carbides, including KW10 for non-ferrous materials and micro-grain carbides for precision machining.

Features

- Tough and hard
- Good thermal conductivity
- Suitable for machining non-ferrous metals and non-metals
- Stable machining at low cutting speeds, including milling operations

Features of Carbide

Workpiece Material	Symbol	Color	Main Component	Advantages
P Steel	PW30	Gray	WC+Co+TiC+TaC	• ISO identification symbol P carbide (K10 relevant) • Application: Milling of steel, stable wear resistance and toughness
N Non-ferrous materials	KW10	Gray	WC+Co	• ISO identification symbol K carbide (K10 relevant) • Application: Stable machining of cast iron, non-ferrous materials and non-metals
	GW15	Gray	WC+Co	• ISO identification symbol K carbide (equivalent to K10), tough micro-grain carbide • Application: High wear resistance and toughness for cast iron, non-ferrous materials and non-metals
	GW25	Gray	WC+Co	• ISO identification symbol K carbide (K30 relevant) • Application: Stable wear resistance and anti-chipping performance for milling operations of aluminum

B

Turning Indexable Inserts

B1~B90

Turning Indexable Inserts Identification System B2

Insert Color B3

Chipbreaker Selection B4~B13

Negative insert B4

Positive insert B10



Cermet / Coated Carbide / Carbide Lineup B14~B67

Negative Inserts	CN□□ ... 80° Diamond	B14
	DN□□ ... 55° Diamond	B19
	KN□□ ... 55° Parallelogram	B24
	RN□□ ... Round	B24
	SN□□ ... 90° Square	B25
	TN□□ ... 60° Triangle	B28
	VN□□ ... 35° Diamond	B33
	WN□□ ... 80° Trigon	B35
	Small Double Sided Tools	B38
Positive Inserts	CC□□, CP□□ ... 80° Diamond	B45
	DC□□, DP□□ ... 55° Diamond	B50
	JC□□ ... 70° Diamond	B57
	RC□□ ... Round	B57
	SC□□, SP□□ ... 90° Square	B58
	TB□□, TC□□, TP□□ ... 60° Triangle	B59
	VB□□, VC□□, VP□□ ... 35° Diamond	B66
	WB□□, WP□□ ... 80° Trigon	B70
	YP□□ ... 45° Diamond	B78
Inserts for Back Turning	TKFB	B72
	ABS15 / ABW15 / ABW23	B72
Inserts for Bearing Machining	R□MT-BB / SNMF	B73
Solid Tip-bars		B79

Ceramic Inserts Identification System B80



Ceramic Lineup B81~B90

Negative Inserts	CN□□ ... 80° Diamond	B81
	DN□□ ... 55° Diamond	B82
	EN□□ ... 75° Diamond	B83
	RN□□ ... Round	B83
	SN□□ ... 90° Square	B84
	TN□□ ... 60° Triangle	B86
	VN□□ ... 35° Diamond	B87
	WN□□ ... 80° Trigon	B87
Positive Inserts	SP□□ ... 90° Square	B88
	TB□□, TC□□, TP□□ ... 60° Triangle	B88
Inserts for Hardened Rolls	RBG / RCGX / RCMA / LNUN	B89
Grooving Inserts	GH / GS	B90

Turning Indexable Inserts Identification System

Symbol	Shape
H	120°Hexagon
O	135°Octagon
P	108°Pentagon
S	90°Square
T	60°Triangle
C	80°Diamond
D	55°Diamond
E	75°Diamond
F	50°Diamond
M	86°Parallelogram
V	35°Diamond
W	80°Trigon
L	90°Rectangle
A	85°Parallelogram
B	82°Parallelogram
K	55°Parallelogram
R	Round

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

①Shape Symbol

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

②Relief Angle Symbol

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.

③Tolerance Symbol

Symbol	Hole	Hole Shape	Inserts Chipbreaker	Shape
N	No	–	No	
R			One Side	
F			Two Sides	
A	With Hole	With Hole	No	
M			One Side	
G			Two Sides	
W		With Hole and One Countersink 40°~60°	No	
T			One Side	
Q		With Hole and Two Countersink 40°~60°	No	
U			Two Sides	
B		With Hole and One Countersink 70°~90°	No	
H			One Side	
C		With Hole and Two Countersink 70°~90°	No	
J			Two Sides	
X	–	–	–	–

④Hole / Chipbreaker Symbol

	①	②	③	④	⑤	⑥	⑦	⑧
ISO (metric)	C	N	M	G	12	04	08	PS
ANSI (inch)	C	N	M	G	4	3	2	PS

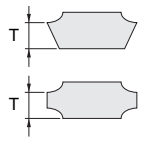
⑤Edge Length Symbol (ISO)

C	D	R	S	T	V	W	I.C. Size (mm)	⑤I.C. Size (ANSI) IC Size (inch)	Symbol
03	04		03	06			3.97	5/32	1.2
04	05		04	08	08		4.76	3/16	1.5
		05					5		
05	06		05	09		03	5.56	7/32	1.8
		06					6		
06	07		06	11	11	04	6.35	1/4	2
08	09		07	13		05	7.94	5/16	2.5
		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		

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

⑥Thickness Symbol

ISO Thickness (mm)	ISO Symbol	ANSI Thickness (inch)	ANSI Symbol
1.59	01	1/16	1(2)
2.38	02	3/32	1.5(3)
2.78	T2	–	–
3.18	03	1/8	2
3.97	T3	5/32	2.5
4.76	04	3/16	3
6.35	06	7/32	3.5
7.94	07	1/4	4
9.525	09	5/16	5



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

⑦Corner-R(rε) Symbol

ISO Corner-R (rε:mm)	ISO Symbol	ANSI Corner-R (rε:inch)	ANSI Symbol
Sharp Corner	00	.000	00
0.03	003	.001	0.1
0.1	01	.004	0.2
0.2	02	.008	0.5
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

⑧Manufacturer'sOption

Hand Symbol, Chipbreaker Symbol, etc.

Usage example of manufacture's option

CNGU070301M F R - U

- F: The cutting edge is sharp
- R: Insert Hand
- U: Chipbreaker Shape

CNGU070301M E R - U

- E: Cutting edge with honing
- R: Insert Hand
- U: Chipbreaker Shape

Minus tolerance for Corner-R(rε) dimension tolerance of G Class (Ground Class)

● M: Corner-R(rε) represents minus tolerance.
This is for convenience when drawing instruction R is "minus tolerance".

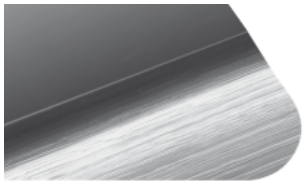
Corner-R(rε) = Drawing Instruction R

Features of insert with tolerance symbol of “E” Class

- High Quality Ground Insert “Super Fine”
  - Applicable for mechatronics, electronics and high precision machined parts
  - Sub-micron accuracy possible

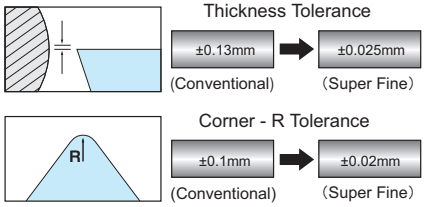
High Quality Ground Insert

- Reduced micro chipping during edge grounding
- Less adhesion • Long tool life



“E” Class Turning Insert

- Accuracy of index position after insert replacement



Insert Color

Cermet, **MEGACOAT** Cermet and **PVD** Coated Cermet

Insert Grade	Cermet						MEGACOAT Cermet		PVD Cermet		
	TN6010	TN6020	TN60	TN100M	TC40N	TC60M	PV7005	PV7010	PV7020	PV60	PV90
Insert Color											

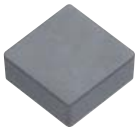
MEGACOAT (carbide substrate)

Insert Grade	MEGACOAT		
	PR1210	PR1225	PR1230
Insert Color			

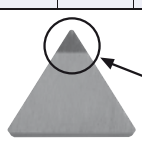
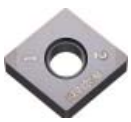
CVD Coated Carbide and **PVD** Coated Carbide

Insert Grade	CVD Coated Carbide					PVD Coated Carbide							
	CA45 Series	CA4010	CA41 Series	CA55 Series	CA65 Series	PR660	PR730	PR830	PR915	PR930	PR10 Series	PR11 Series	PR905
Insert Color													

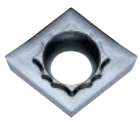
Ceramic

Insert Grade	Alumina Ceramic		Silicon Nitride Ceramic	Cell Fiber Ceramic	MEGACOAT Ceramic	PVD Coated Ceramic
	KA30	A65	KS6000	CF1	PT600M	A66N
Insert Color						

CBN and **PCD**

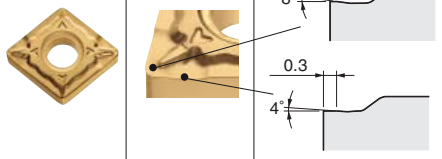
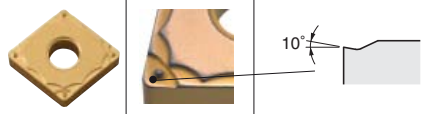
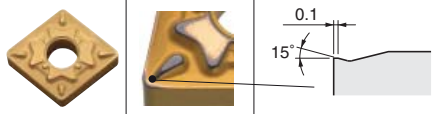
Insert Grade	CBN			PCD			MEGACOAT CBN	PVD Coated CBN
	KBN65B	KBN510	KBN525	KPD001	KPD010	KPD230	KBN••M	KBN900
Insert Color	 CBN•PCD							

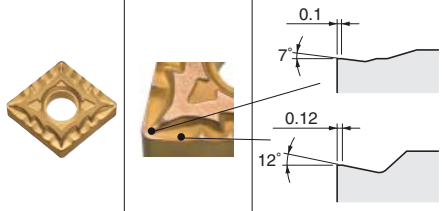
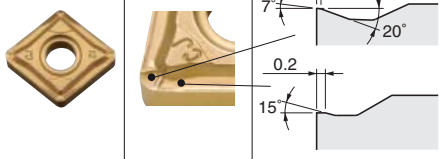
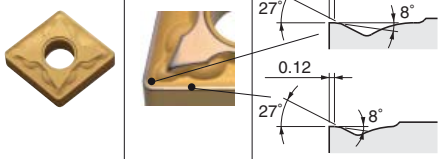
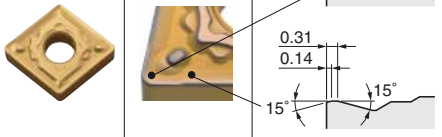
Carbide

Insert Grade	Carbide			
	GW15	GW25	KW10	PW30
Insert Color				

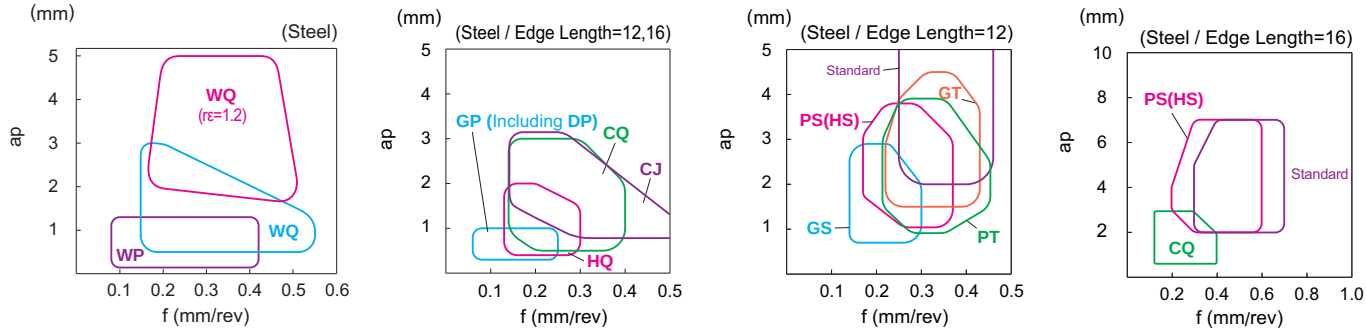
Steel

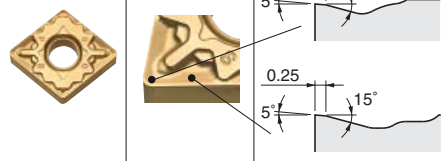
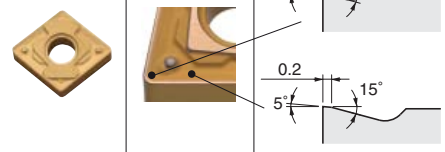
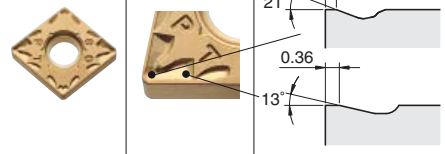
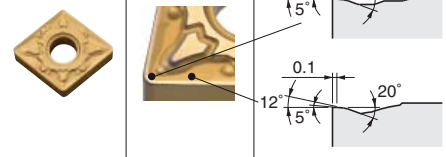
1 Molded Chipbreaker

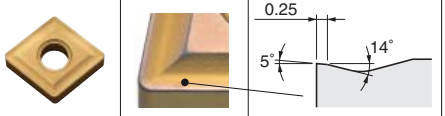
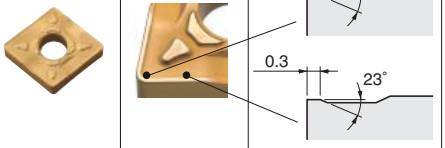
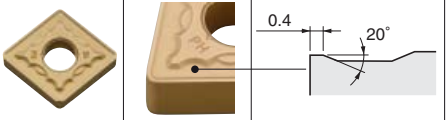
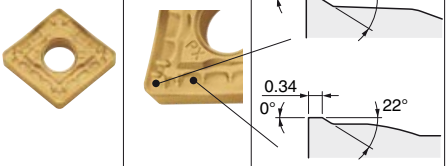
Cutting Range	Name	Design	Advantages
Finishing (With Wiper Edge)	WP		Wiper Insert. Double feed rate is available at finishing to light cutting, while maintaining a smooth finish.
Finishing-Medium (With Wiper Edge)	WQ		Wiper Insert. Double feed rate possible while maintaining a smooth finish. High efficiency and good chip control.
Finishing	GP		Finishing to light cutting. Good chip control.
Finishing-Medium	HQ		Sharp cutting performance and wide range chip control with 3-D rake angle and double projection design.

Cutting Range	Name	Design	Advantages
Finishing-Medium	CQ		Good chip control at varied ap such as copying. Applicable to up facing.
Finishing-Medium (Up Facing)	CJ		Improved chip curing at small cutting and high feed rate machining. Improved chip evacuation at copying and up facing.
Medium-Roughing	GS		Strong edge chipbreaker. Stable at continuous machining and light interrupted cutting.
Medium-Roughing	CS		Strong edge chipbreaker for general purpose machining. Stable at continuous machining and light interrupted cutting.

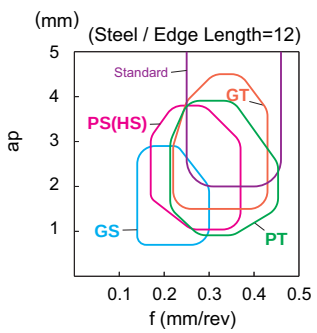
Applicable Chipbreaker Range

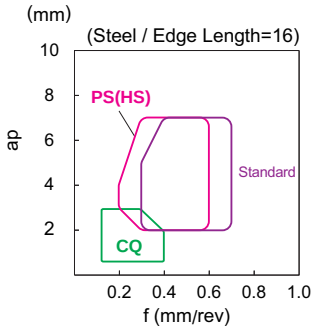


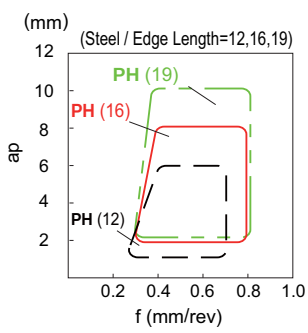
Cutting Range	Name	Design	Advantages
Medium-Roughing	PS		General purpose with wide application range. More stable due to large contact surface.
Medium-Roughing	HS		General purpose chipbreaker. Applicable to copying.
Medium-Roughing (High Feed)	PT		Low cutting force at high feed machining. Land support structure.
Medium-Roughing (High Feed)	GT		Strong edge chipbreaker. Wide land design and smooth chip control even at high feed rate machining.

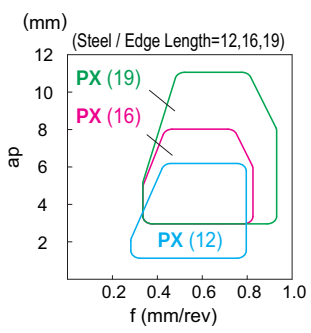
Cutting Range	Name	Design	Advantages
Roughing	Conventional (No Indication)		Low cutting force and suitable for large ap roughing.
Medium-Roughing (High Feed)	HT		Low cutting force at high feed rate machining. Strong edge and applicable to interrupted cutting.
Roughing	PH		For roughing of steel. Suitable for heavy interrupted cutting and for workpieces with scale due to strong cutting edge.
Single Sided Roughing (High Feed)	PX		Roughing and high feed rate operation. Low cutting force chipbreaker.

Applicable Chipbreaker Range



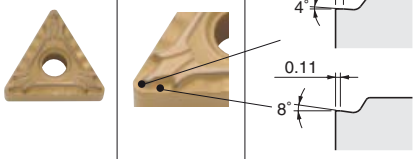
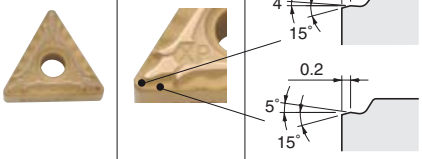


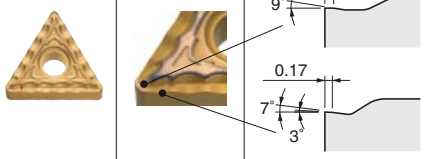
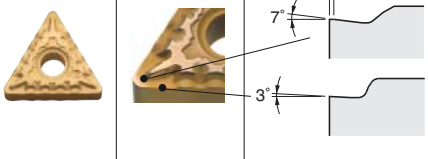




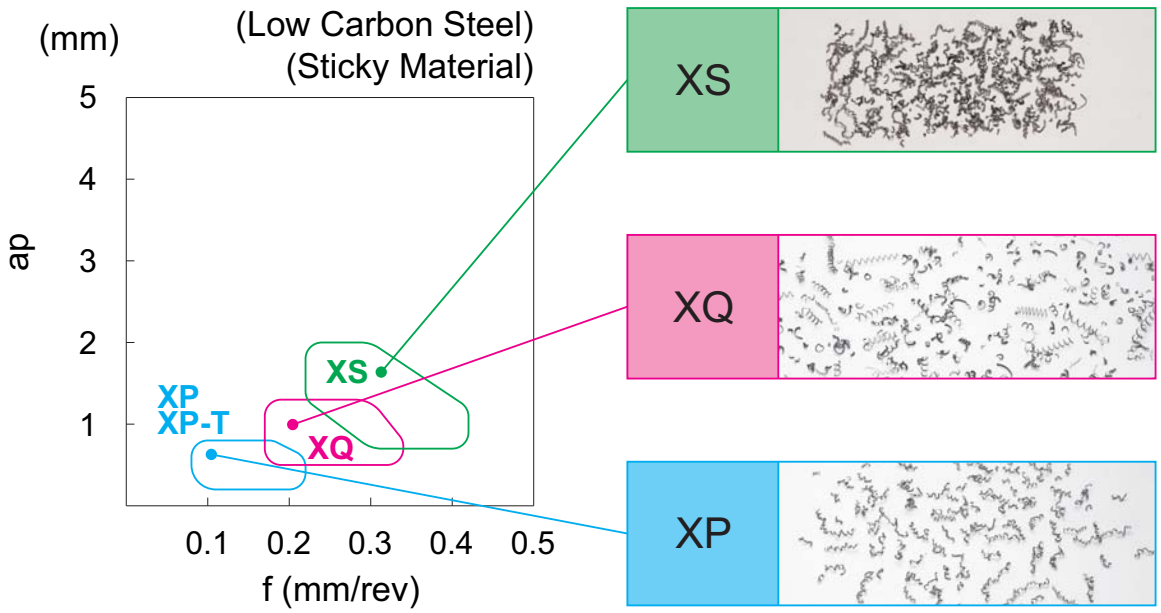
Chipbreaker Selection (Negative Insert)

Low Carbon Steel / Sticky Material

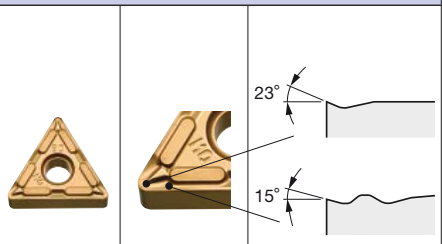
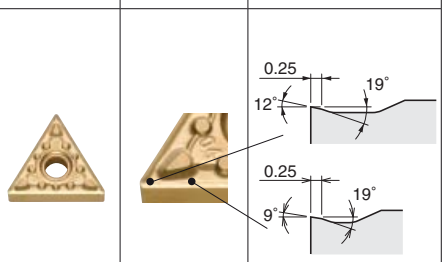
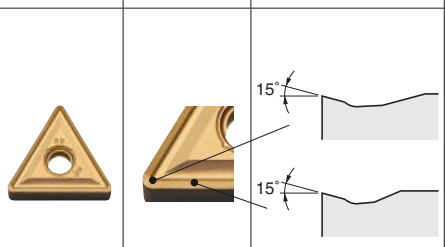
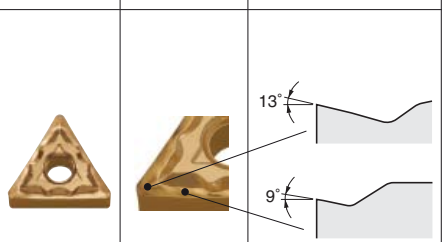
Cutting Range	Name	Design	Advantages
Finishing	XP		Consistent chip breaking performance when machining sticky materials.
Finishing	XP-T		Tough edge type of XP chipbreaker for finishing. Recommended for interrupted cutting and unstable finishing machining.

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

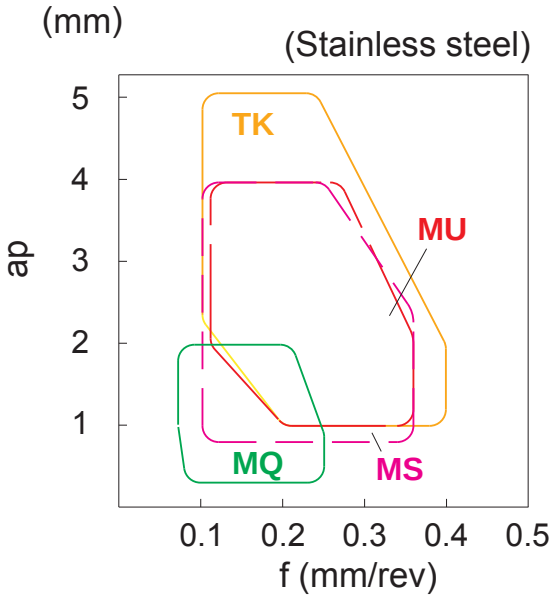
● Applicable Chipbreaker Range

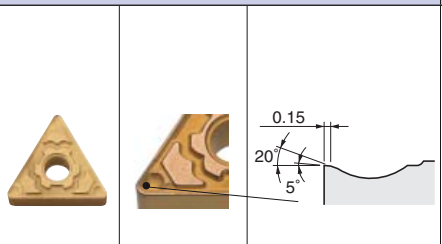
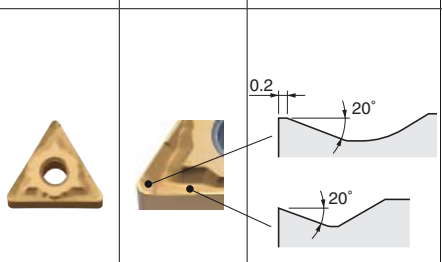
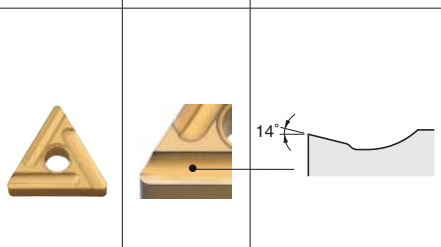


Stainless Steel

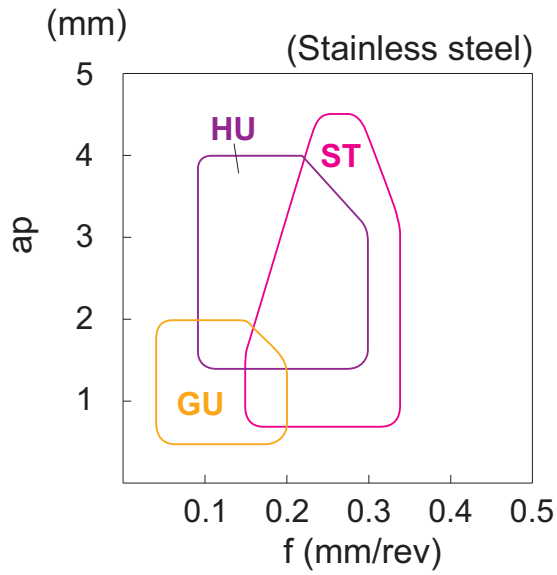
Cutting Range	Name	Design	Advantages
Finishing	MQ		Large rake angle and circular edge line. Low cutting force and good chip control.
Medium-Roughing	MS		Superior cutting edge sharpness and strength achieved by a positive land. Extra strength of cutting edge inhibits damage from wall shouldering.
Medium-Roughing	MU		Large rake angle reduces cutting force. Less burring achieved by diminishing damage from notching.
Medium-Roughing	TK		Smooth chip-breaker geom-etry improves chip flow with less adhesion. Large curled chips.

● Applicable Chipbreaker Range



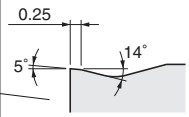
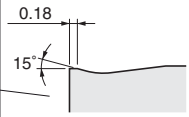
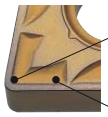
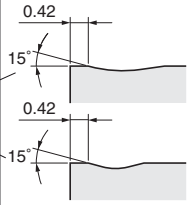
Cutting Range	Name	Design	Advantages
Finishing	GU		Sharp cutting performance and low cutting force due to 3-D rake angle. Applicable to small shaft machining.
Medium-Roughing	HU		Sharp cutting performance and strong edge due to 3-D rake angle. Applicable to small shaft machining.
Medium-Roughing	ST		Less cutting force due to large rake angle. Less notching by special design.

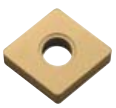
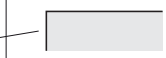
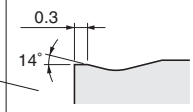
● Applicable Chipbreaker Range



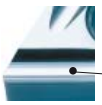
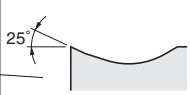
Chipbreaker Selection (Negative Insert)

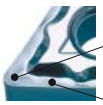
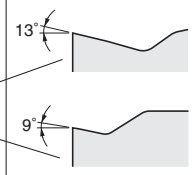
Cast Iron

Cutting Range	Name	Design	Advantages
Sharp Cutting Oriented	Standard	  	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. (High stability)

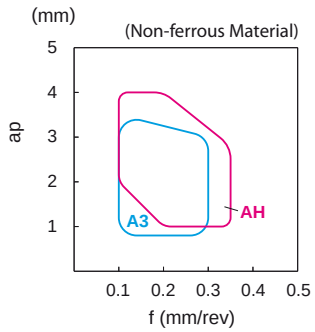
Cutting Range	Name	Design	Advantages
Stability Oriented	No Chipbreaker	  	High feed rate chipbreaker for light interrupted machining of cast iron.
	GC	  	Chipbreaker for heavy interrupted machininng of cast iron.

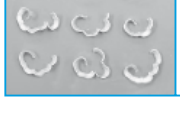
Non-ferrous Materials

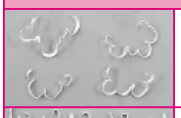
Cutting Range	Name	Design	Advantages
Finishing-Medium	A3	  	Large rake angle and smooth surface. Good chip control and less adhesion.

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

Applicable Chipbreaker Range

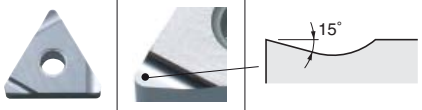
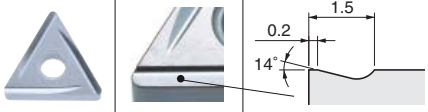
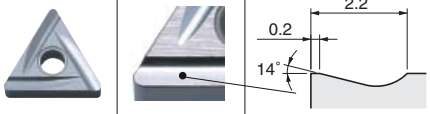


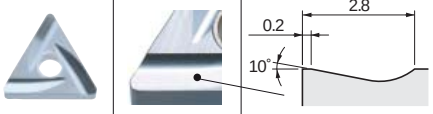
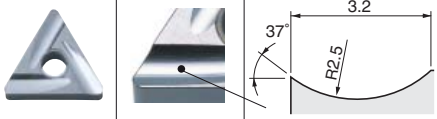
A3 Chipbreaker	
	ap=2mm f=0.2mm/rev
	ap=2mm f=0.3mm/rev

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

Steel

2 Ground Chipbreaker

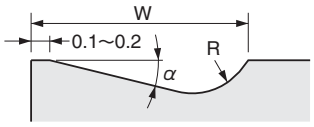
Cutting Range	Name	Design	Advantages
Finishing	S		Sharp edge and less cutting force. Good chip control and smooth chip evacuation.
Finishing-Medium	B		Suitable for general purpose machining at feed rate 0.15 to 0.25mm/rev.
Medium-Roughing	C		Suitable for general purpose machining at feed rate 0.20 to 0.35mm/rev.

Cutting Range	Name	Design	Advantages
Roughing	D		Suitable for general purpose machining at feed rate 0.30 to 0.45mm/rev.
Medium-Roughing / Low Cutting Resistance	25R		Applicable to sticky material such as low carbon steel. Large rake angle and suitable for stainless steel.

Effectiveness of ground chipbreaker

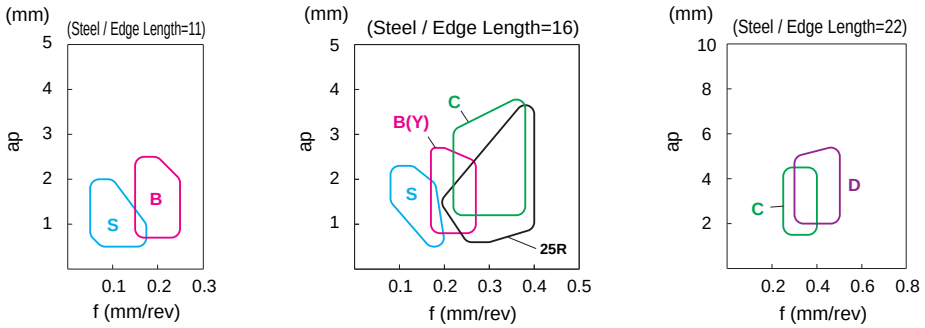
① Lower cutting force and improve edge
② Improved adhesion resistance
③ Improved dimension accuracy and finishing surface accuracy
④ Controlled chip evacuation direction

Specification of **B, C, D** and Parallel ground chipbreaker



Insert Type	Size	Chipbreaker Name	W	α	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
	16,22	D	2.8	10°	1.5
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

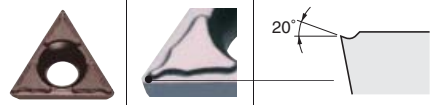
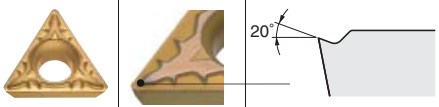
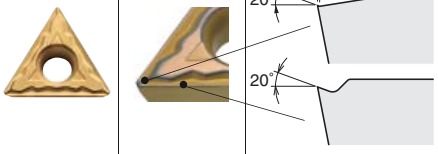
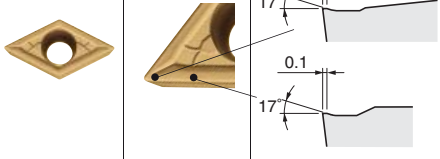
Applicable Chipbreaker Range

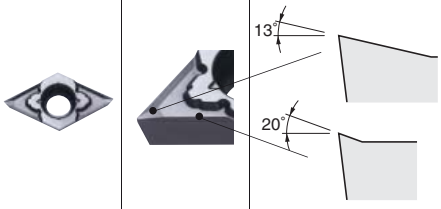
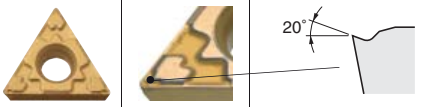
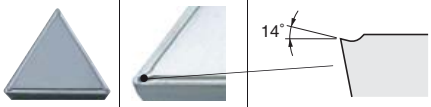
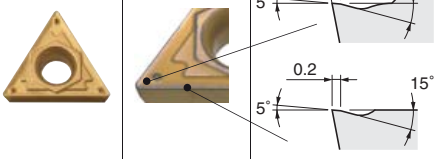
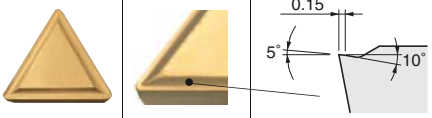
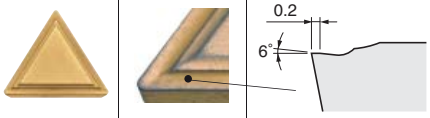


Chipbreaker Selection (Positive Inserts)

Steel

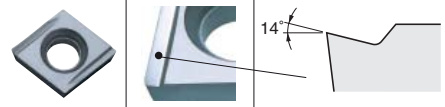
1 Molded Chipbreaker

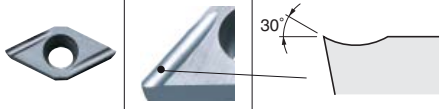
Cutting Range	Name	Design	Advantages
Minute ap	CF		Available for minute ap (0.02 to 0.2mm) finishing.
Finishing	GF		Dot located close to ridge line of cutting edge on corner. Chips fragmented in small pieces in cutting of small ap.
Finishing-Medium	GQ		Enables cutting over a wide range of conditions by using the optimum chipbreaker width according to the cutting depth.
Finishing	XP		Wide chip control range and sharp cutting performance. Suitable for low carbon steel and sticky material.
Finishing-Medium	XQ		Wide chip control range and sharp cutting performance. Suitable for low carbon steel and sticky material.
Finishing-Medium	GK		Good chip evacuation at wide range by breaker dot and wide chip pocket.

Cutting Range	Name	Design	Advantages
Finishing	CK		Good cutting performance. Applicable without hand for two direction cutting on automatic lathe.
Finishing	GP		Good chip control at finishing. Applicable to sticky material like low carbon steel, pipe material.
Finishing	DP		Consistent chip breaking performance for finishing.
Finishing-Medium	HQ		General purpose chipbreaker for medium cutting.
Medium	G		Chipbreaker for short chips at medium cutting.
Medium	Standard (Without Indication)		Strong edge chipbreaker for medium cutting range.

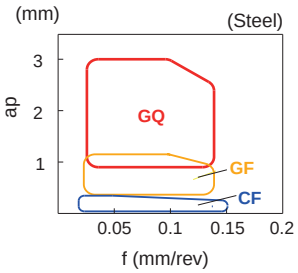
Steel

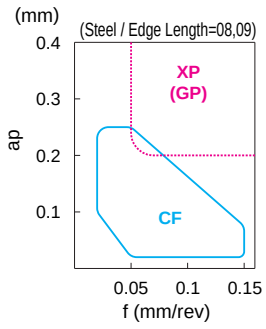
2 Ground Chipbreaker

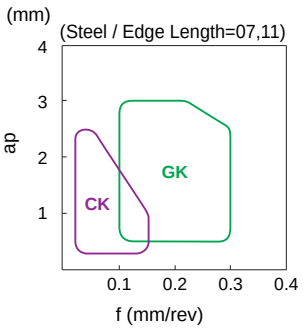
Cutting Range	Name	Design	Advantages
Finishing	Lead (Without Symbol)		Good chip control at finishing to light cutting with low cutting force.
Finishing	F		Good chip control at finishing to light cutting with low cutting force.
Medium	Y		Sharp cutting performance and good surface finish.

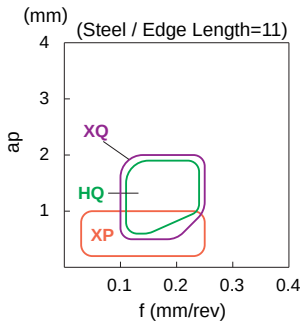
Cutting Range	Name	Design	Advantages
Low Feed	J		Slant chip-breaker width and chip control at various ap. Suitable for automatic lathes.
Low Feed	U		Good chip control at low feed rate and varied ap with low cutting force.

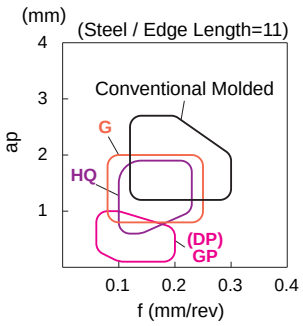
Applicable Chipbreaker Range

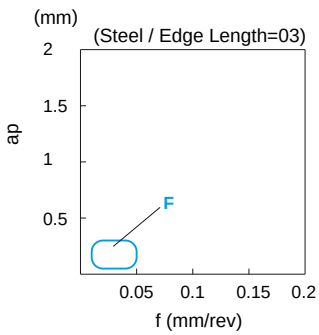


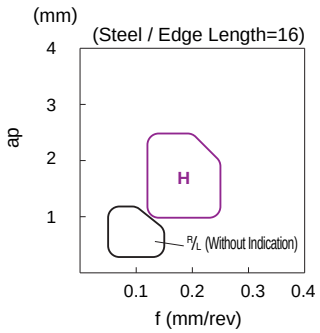


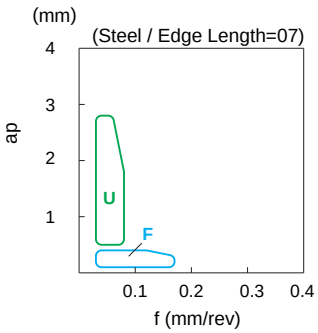


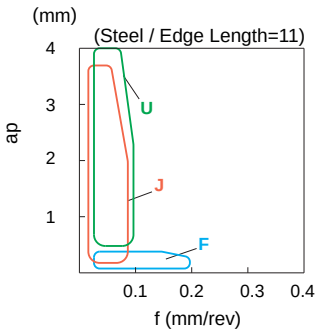








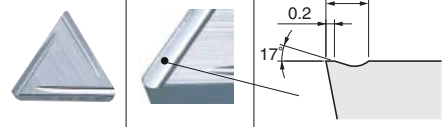
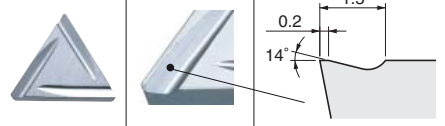
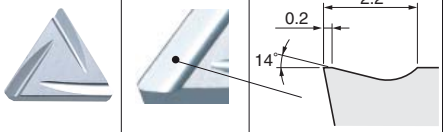
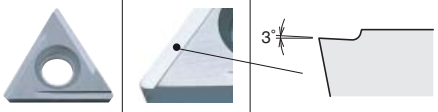




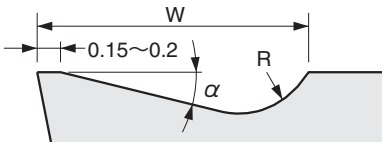
Chipbreaker Selection (Positive Inserts)

Steel

2 Ground Chipbreaker

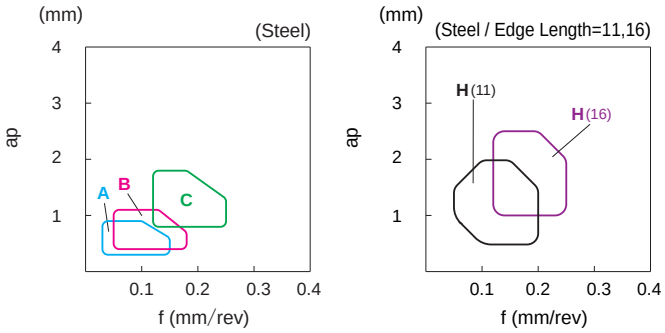
Cutting Range	Name	Design	Advantages
Finishing	A		Large rake angle and low cutting force. Narrow chip-breaker width and consistent chip control.
Finishing-Medium	B		General purpose for light cutting range. Good balance between chip control and sharp cutting.
Medium cutting	C		Applicable to high load cutting. Good chip flow and less resis-tance.
Medium cutting	H		Sharp cutting performance and small curled chips.

● Specification of **A, B, C** and Parallel ground chipbreaker

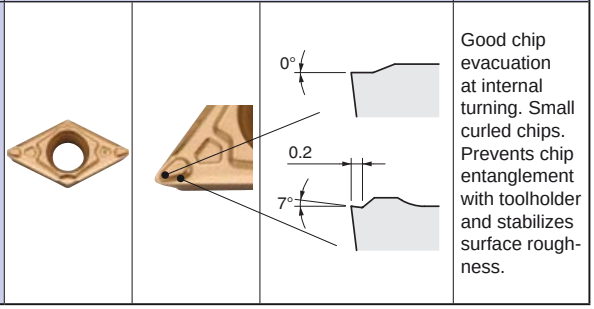


Insert Type	Size	Chipbreaker Name	W	α	R
TPGR	11	A	1.0	17°	0.5
	11,16	B	1.5	14°	0.5
	16	C	2.2	14°	1.0
SPGR	09	Without Indication (Similar to B)	1.5	14°	0.5
	12	Without Indication (Similar to C)	2.2	14°	1.0

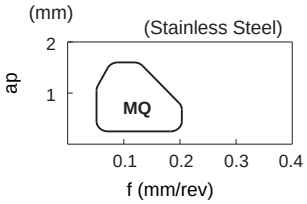
● Applicable Chipbreaker Range



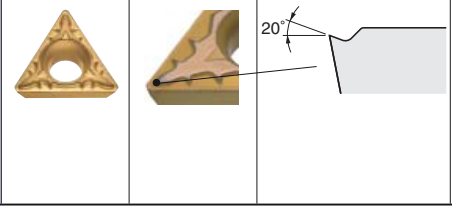
Stainless Steel

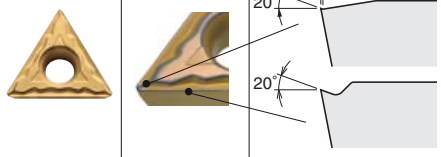
Cutting Range	Name	Design	Advantages
Finishing	MQ		Good chip evacuation at internal turning. Small curled chips. Prevents chip entanglement with toolholder and stabilizes surface rough-ness.

● Applicable Chipbreaker Range

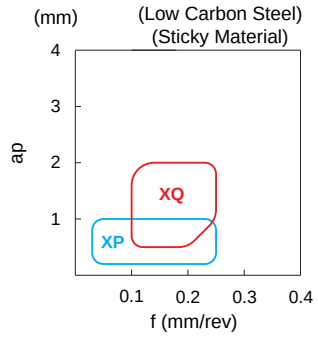


Low Carbon Steel / Sticky Material

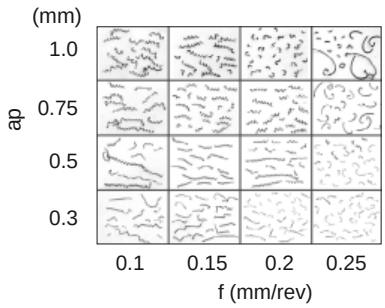
Cutting Range	Name	Design	Advantages
Finishing	XP		Consistent chip breaking performance even for low carbon steel and sticky material.

Cutting Range	Name	Design	Advantages
Finishing-Medium	XQ		Wide chip control range and sharp cutting performance. Applicable to low carbon steel and sticky material.

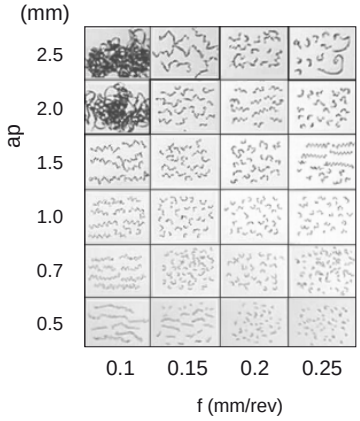
● Applicable Chipbreaker Range



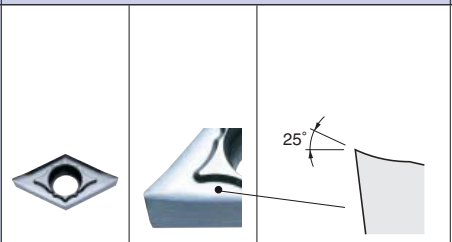
XP Chipbreaker

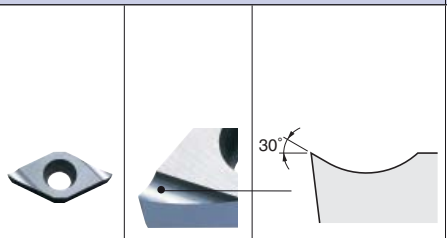


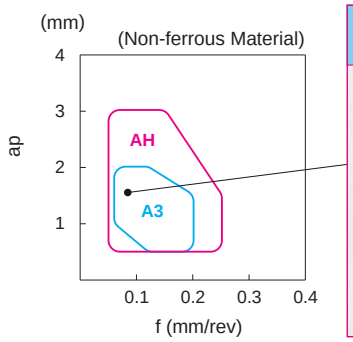
XQ Chipbreaker



Non-ferrous Materials

Cutting Range	Name	Design	Advantages
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. Sharp edge and good surface finish.



AH Chipbreaker



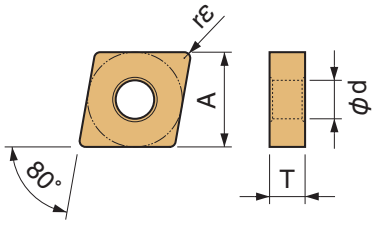
80°Diamond • Negative with Hole

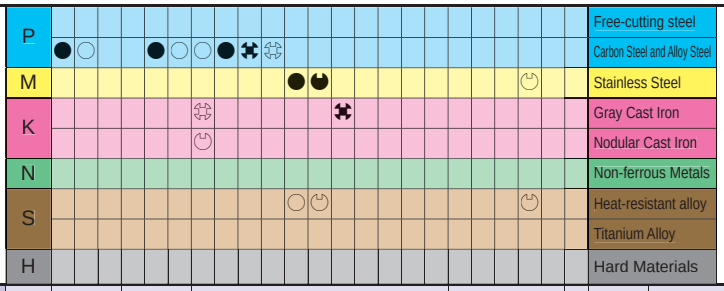
(mm)

Description	A	T	ød
CN_0903_	9.525	3.18	3.81
CN_1204_	12.70	4.76	5.16

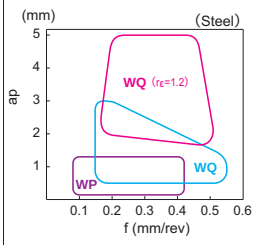
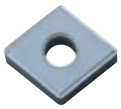
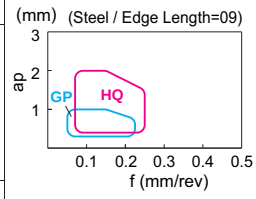
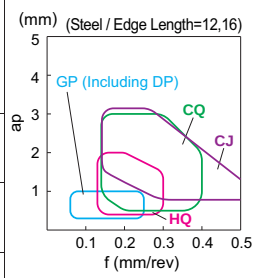
(mm)

Description	A	T	ød
CN_1204_	12.70	4.76	5.16
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94





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 under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	 With Wiper Edge	CNMG	120404WP	0.4		●			●	●	●	●	●														D8 F42 F66	
			120408WP	0.8		●			●	●	●	●	●															
Finishing-Medium	 With Wiper Edge	CNMG	120404WQ	0.4		●	●		●	●	●	●	●															
			120408WQ	0.8		●	●		●	●	●	●	●				●		◯	◯								
			120412WQ	1.2		●	●			●	●	●	●				●		◯	◯								
Finishing		CNGG	120404DP	0.4			●																					
			120408DP	0.8			●																					
Finishing		CNMG	090404GP	0.4			●					●	●														D8 F66	
			090408GP	0.8			●					●	●															
		CNMG	120402GP	0.2		●	●		●	●		●	●														D8 F42 F66	
			120404GP	0.4	●	●	●		●	●	●	●	●															
			120408GP	0.8		●	●		●	●	●	●	●															
Finishing-Medium		CNGG	120408HQ	0.8								●	●														D8 F66	
			120412HQ	1.2								●	●															
		CNMG	090304HQ	0.4			●																				-	
			090308HQ	0.8			●																					
		CNMG	090404HQ	0.4			●					●	●														D8 F66	
			090408HQ	0.8			●					●	●															
		CNMG	120404HQ	0.4	●	●	●		●	●	●	●	●	●	●	●									●		D8 F42 F66	
			120408HQ	0.8	●	●	●		●	●	●	●	●	●	●	●									●			
			120412HQ	1.2			●				●	●	●	●	●	●									●			
Finishing-Medium / Up Facing		CNMG	120404CQ	0.4	●	●			●	●	●	●	●	●													D8 F42 F66	
			120408CQ	0.8	●	●	●		●	●	●	●	●	●														
			120412CQ	1.2			●				●	●	●	●														
		CNMG	160608CQ	0.8								●	●														D8	
			160612CQ	1.2								●	●															
		CNMG	120408CJ	0.8							●	●	●	●													D8 F42 F66	
			120412CJ	1.2							●	●	●	●														
		CNMG	160612CJ	1.2							●	●	●	●													D8	
			160616CJ	1.6							●	●	●	●														
Finishing-Medium		CNMP	120404TK	0.4		●				●		●	●									●					D8 F42 F66	
			120408TK	0.8		●				●		●	●									●						

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page B40

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

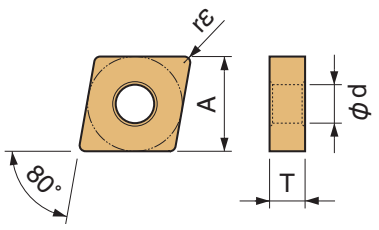
80°Diamond • Negative with Hole

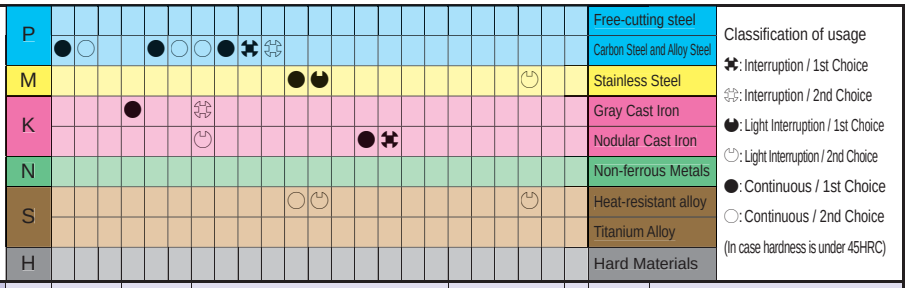
(mm)

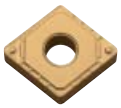
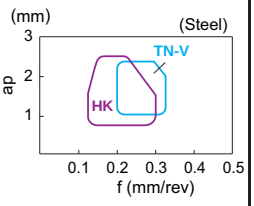
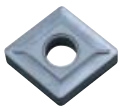
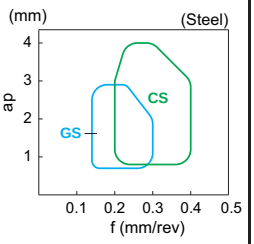
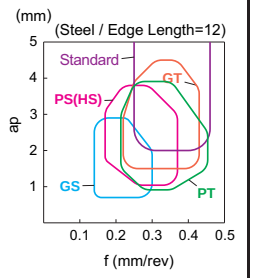
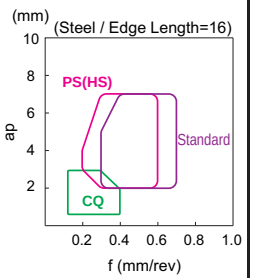
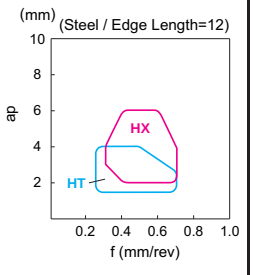
Description	A	T	ød
CN_0903_	9.525	3.18	3.81
CN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	ød
CN_1204_	12.70	4.76	5.16
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94





Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium		CNMG	120404HK	0.4			●																			D8 F42 F66	
			120408HK	0.8			●																				
Medium		CNMG	120404TN-V	0.4			●																				
			120408TN-V	0.8			●																				
Medium-Roughing		CNMG	120404CS	0.4								●	●														
			120408CS	0.8								●	●														
			120412CS	1.2								●	●														
Medium-Roughing		CNMG	090304GS	0.4									●													-	
			090308GS	0.8									●														
		CNMG	090404GS	0.4			●					●	●													D8 F66	
			090408GS	0.8			●					●	●														
		CNMG	120404GS	0.4						●		●	●													D8	
			120408GS	0.8						●		●	●														
			120412GS	1.2						●		●	●														
Medium-Roughing		CNMG	120404PS	0.4	●				●		●	●	●	●	●										●	F42 F66	
			120408PS	0.8	●				●		●	●	●	●	●										●		
			120412PS	1.2							●	●	●	●	●										●		
			120416PS	1.6								●	●	●	●												
		CNMG	160612PS	1.2							●	●	●	●	●											D8	
			160616PS	1.6							●	●	●	●	●												
Medium-Roughing		CNMG	120404HS	0.4		●	●			●		●	●													D8 F42 F66	
			120408HS	0.8		●	●			●		●	●														
			120412HS	1.2		●	●			●		●	●														
			120416HS	1.6			●					●	●														
		CNMG	160612HS	1.2								●	●					●	●							D8	
			160616HS	1.6								●	●					●	●								
		CNMG	190612HS	1.2									●														
Medium-Roughing	 High Feed	CNMG	120408PT	0.8							●	●	●	●	●	●										D8 F42 F66	
			120412PT	1.2							●	●	●	●	●	●											
		CNMG	160608PT	0.8							●	●	●	●	●	●										D8	
			160612PT	1.2							●	●	●	●	●	●											
			160616PT	1.6							●	●	●	●	●	●											
Medium-Roughing	 High Feed	CNMG	120408GT	0.8						●		●	●													D8 F42 F66	
			120412GT	1.2						●		●	●														
		CNMG	190612GT	1.2									●													D8	
Medium-Roughing	 High Feed	CNMG	120408HT	0.8			●					●	●													D8 F42 F66	
			120412HT	1.2			●					●	●														

For grades ⟨TN30 PV30 PV60 PV90 PR905 PR915⟩, See Page ➡ **B40**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

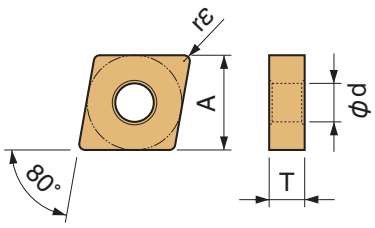
80°Diamond • Negative with Hole

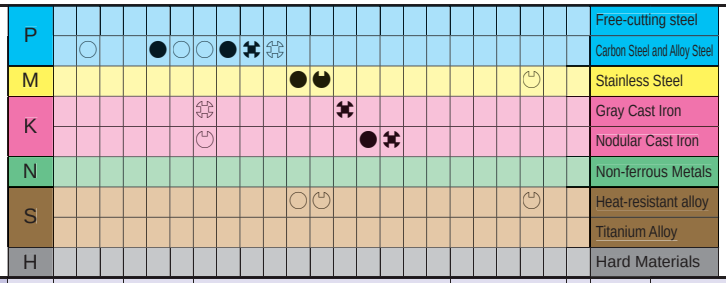
(mm)

Description	A	T	ød
CN_0903_	9.525	3.18	3.81
CN_1204_	12.70	4.76	5.16

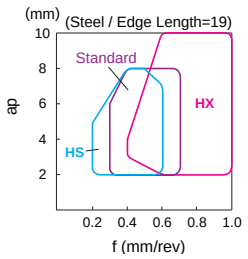
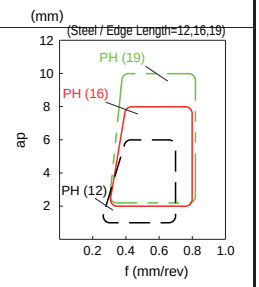
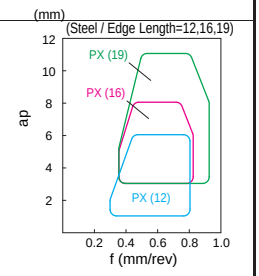
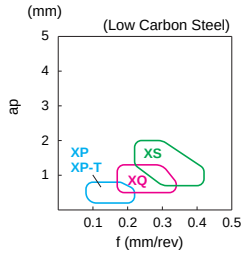
(mm)

Description	A	T	ød
CN_1204_	12.70	4.76	5.16
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94





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 under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Roughing		CNMG	120404	0.4		●	●	●			●	●	●		●	●	●	●	●	○	○			●		D8 F42 F66	
			120408	0.8		●	●	●			●	●	●	●	●	●	●	●	●	○	○			●			
			120412	1.2			●	●			●	●	●	●	●	●	●	●	●	○	○			●			
			120416	1.6							●		●				●	●	●	○	○						
		CNMG	160608	0.8							●	●	●													D8	
			160612	1.2							●	●	●	●			●				○						
			160616	1.6							●	●	●	●			●				○						
		CNMG	190608	0.8							●	●						●	●	○	○					D8	
			190612	1.2							●	●	●	●				●	●	○	○						
			190616	1.6							●	●	●	●				●	●	○	○						
			190624	2.4								●															
Roughing		CNMG	120408PH	0.8								●	●	●												D8 F42 F66	
			120412PH	1.2								●	●	●													
			120416PH	1.6								●	●	●													
		CNMG	160608PH	0.8								●	●													D8	
			160612PH	1.2								●	●	●													
			160616PH	1.6								●	●														
		CNMG	190608PH	0.8								●	●													D8	
			190612PH	1.2								●	●	●													
			190616PH	1.6								●	●	●													
			190624PH	2.4								●	●														
Roughing	 Single Sided / High Feed	CNMM	120408PX	0.8								●	●	●												D8 F42 F66	
			120412PX	1.2								●	●	●													
			120416PX	1.6								●	●	●													
		CNMM	160608PX	0.8								●	●	●												D8	
			160612PX	1.2								●	●	●													
			160616PX	1.6								●	●	●													
		CNMM	190608PX	0.8								●	●	●												D8	
			190612PX	1.2								●	●	●													
			190616PX	1.6								●	●	●													
			190624PX	2.4								●	●	●													
Low Carbon Steel	 Finishing	CNMG	120404XP	0.4		●	●		●	●	●	●	●													D8 F42 F66	
			120408XP	0.8		●	●		●	●	●	●	●														
	 Finishing / Tough Edge	CNMG	120404XP-T	0.4			●																				
			120408XP-T	0.8			●																				
	 Medium	CNMG	120404XQ	0.4		●	●		●	●	●	●	●														
			120408XQ	0.8		●	●		●	●	●	●	●														
	 Roughing	CNMG	120408XS	0.8		●	●			●	●	●	●														

For grades ⟨ TN30 PV60 PR905 / PV30 PV90 PR915 ⟩, See Page ➡ **B40**

Inserts are sold in 10 piece boxes.

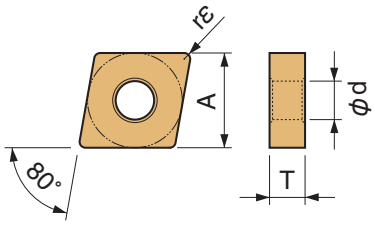
80°Diamond • Negative with Hole

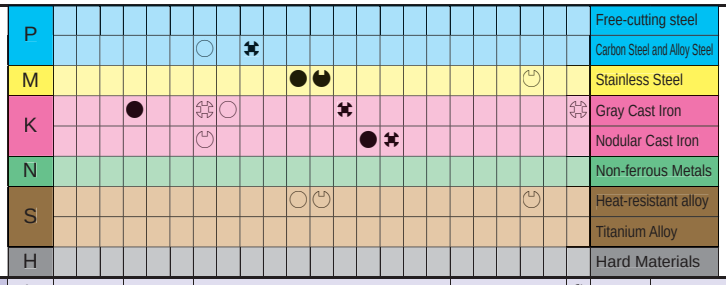
(mm)

Description	A	T	ød
CN_0903_	9.525	3.18	3.81
CN_1204_	12.70	4.76	5.16

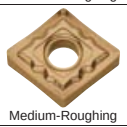
(mm)

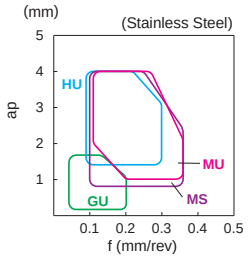
Description	A	T	ød
CN_1204_	12.70	4.76	5.16
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94

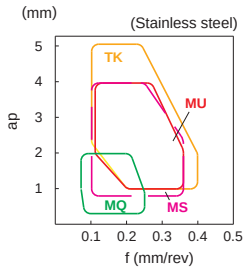


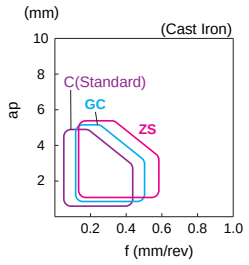


Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	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 CA4010	CVD Coated Carbide CA4115	CVD Coated Carbide CA4120	CVD Coated Carbide CA4505	CVD Coated Carbide CA4515	PVD Coated Carbide PR930	PVD Coated Carbide PR1005	PVD Coated Carbide PR1025	PVD Coated Carbide PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Stainless Steel	 Finishing	CNMG	120404GU	0.4											●	●												
			120408GU	0.8											●	●												
	 Medium-Roughing	CNMG	120408HU	0.8									●		●	●												
			120412HU	1.2											●	●												
	 Finishing-Medium	CNMG	120404MQ	0.4											●	●									●			
			120408MQ	0.8											●	●									●			
	 Medium-Roughing	CNMG	120404MS	0.4											●	●									●	D8 F42 F66		
			120408MS	0.8											●	●									●			
			120412MS	1.2											●	●									●			
			120416MS	1.6											●	●									●			
	 Medium-Roughing	CNMG	120404MU	0.4											●	●									●			
			120408MU	0.8											●	●									●			
			120412MU	1.2											●	●									●			
		CNMG	160608MU	0.8											●	●									●			
			160612MU	1.2											●	●									●			
			160616MU	1.6											●	●									●			
	 Medium-Roughing	CNMG	120404TK	0.4											●	●									●			
			120408TK	0.8											●	●									●			
Cast Iron	 Roughing	CNMG	120404C	0.4							●						●	●	○	○								
			120408C	0.8							●						●	●	○	○								
			120412C	1.2							●						●	●	○	○								
			120416C	1.6							●						●	●	○	○								
		CNMG	160612C	1.2							●						●	●	○	○						D8		
	 Roughing	CNMG	120408ZS	0.8							●						●	●	●	○	○							
			120412ZS	1.2							●						●	●	●	○	○							
	 Roughing	CNMG	120408GC	0.8							●	●					●	●	●	○	○					D8 F42 F66		
			120412GC	1.2							●	●					●	●	●	○	○							
	 Without Chipbreaker	CNGA	120404	0.4				●																	●			
			120408	0.8				●																	●			
		CNMA	120404	0.4							●	●					●	●	●	○	○				●		—	
			120408	0.8							●	●					●	●	●	○	○				●			
			120412	1.2							●	●					●	●	●	○	○							
			120416	1.6							●	●					●	●	●	○	○							
		CNMA	160612	1.2								●					●									D8		







For grades (TN30 PV30 PV60 PV90 PR905 PR915), See Page B40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

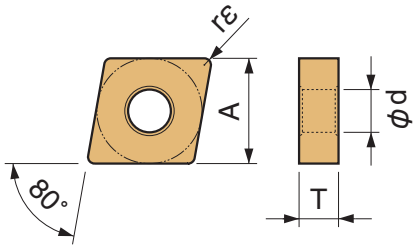
80°Diamond • Negative with Hole

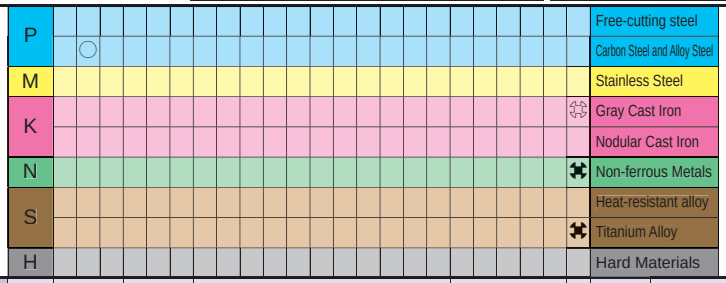
(mm)

Description	A	T	ød
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

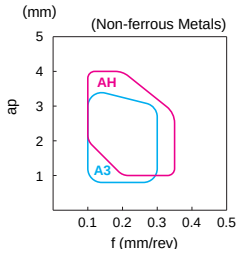
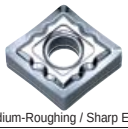
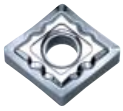
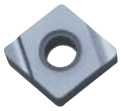
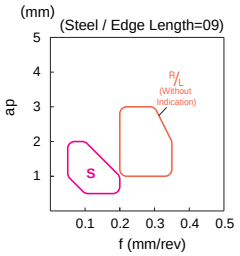
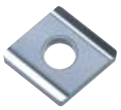
(mm)

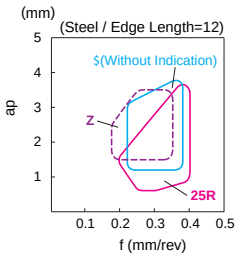
Description	A	T	ød
CN_1606_	15.875	6.35	6.35
CN_1906_	19.05	6.35	7.94





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 under 45HRC)

Insert (Handed Insert shows Right-hand)		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	CNGG 120404R/L-A3	0.4																						●	D8 F42 F66	
		CNGG 120408R/L-A3	0.8																						●		
	 Medium-Roughing / Sharp Edge	CNGG 120404AH	0.4																						●		
		CNGG 120408AH	0.8																						●		
	 Medium-Roughing / With Honing	CNMG 120404AH	0.4																						●		
		CNMG 120408AH	0.8																						●		
Finishing	 Surface Roughness Oriented	CNGG 090402R/L-S	0.2			●																			●	D8 F66	
		CNGG 090404R/L-S	0.4			●																			●		
		CNGG 090408R/L-S	0.8			●																			●		
Medium		CNGG 090404R/L	0.4			●																			●		
		CNGG 090408R/L	0.8			●																			●		
		CNGG 120404R/L	0.4		●	●																				D8 F42 F66	
		CNGG 120408R/L	0.8		●	●																					
Medium-Roughing	 Low Cutting Force	CNGG 120404R/L-25R	0.4			●																			●		
		CNGG 120408R/L-25R	0.8			●																			●		
Medium-Roughing		CNGG 120404Z	0.4			●																			●		
		CNGG 120408Z	0.8			●																			●		



For grades (TN30 PV30 PV60 PV90 PR905 PR915), See Page B40

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

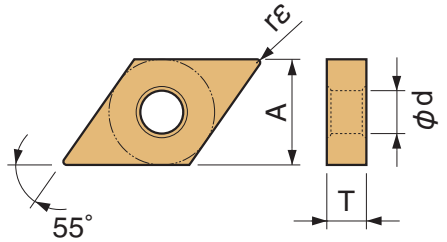
55°Diamond • Negative with Hole

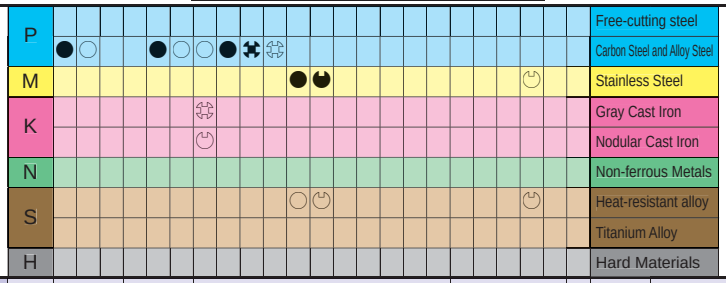
(mm)

Description	A	T	ød
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

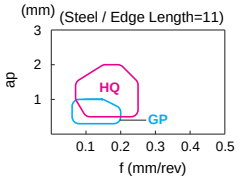
Description	A	T	ød
DN_1506_	12.70	6.35	5.16

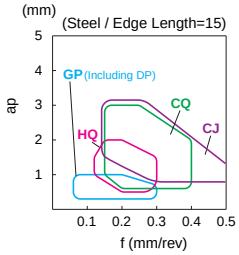


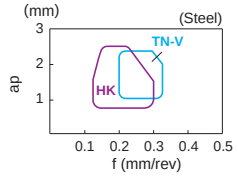


Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	DNGG 150404DP	0.4			●																				D10 D11 F43	
	DNGG 150408DP	0.8			●																					
Finishing	DNMG 110404GP	0.4			●					●	●														D11 F67	
	DNMG 110408GP	0.8			●					●	●															
	DNMG 150402GP	0.2	●	●	●		●	●		●	●														D10 D11 F43	
	DNMG 150404GP	0.4	●	●	●		●	●	●	●	●															
	DNMG 150408GP	0.8		●	●		●	●	●	●	●															
	DNMG 150602GP	0.2	●	●			●	●																		
	DNMG 150604GP	0.4	●	●			●	●																		
	DNMG 150608GP	0.8	●	●			●	●																		
Finishing-Medium	DNMG 110402HQ	0.2			●					●	●														D11 F67	
	DNMG 110404HQ	0.4			●					●	●															
	DNMG 150404HQ	0.4	●	●	●		●	●	●	●	●	●	●	●									●		D10 D11 F43	
	DNMG 150408HQ	0.8	●	●	●		●	●	●	●	●	●	●	●									●			
	DNMG 150412HQ	1.2		●	●			●	●	●	●	●														
	DNMG 150604HQ	0.4	●	●	●		●	●	●	●	●	●	●	●									●			
	DNMG 150608HQ	0.8	●	●	●		●	●	●	●	●	●	●	●									●			
	DNMG 150612HQ	1.2	●				●		●	●	●	●														
Finishing-Medium / Up Facing	DNMG 150404CQ	0.4	●	●	●			●	●	●	●	●														
	DNMG 150408CQ	0.8	●	●	●		●	●	●	●	●	●														
	DNMG 150412CQ	1.2		●	●			●	●	●	●	●														
	DNMG 150604CQ	0.4	●	●			●	●	●	●	●	●														
	DNMG 150608CQ	0.8		●				●	●	●	●	●														
	DNMG 150612CQ	1.2						●	●	●	●	●														
	DNMG 150408CJ	0.8							●	●	●	●														
	DNMG 150412CJ	1.2							●	●	●	●														
	DNMG 150608CJ	0.8							●	●	●	●														
	DNMG 150612CJ	1.2							●	●	●	●														
Finishing-Medium	DNMP 150604TK	0.4		●				●		●	●									●						—
	DNMP 150608TK	0.8		●				●		●	●									●						
Medium cutting	DNMG 150404HK	0.4			●																					
	DNMG 150408HK	0.8			●																					
Medium cutting	DNMG 150404TN-V	0.4			●																					
	DNMG 150408TN-V	0.8			●																					







For grades TN30 PV60 PR905 / PV30 PV90 PR915, See Page B41

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

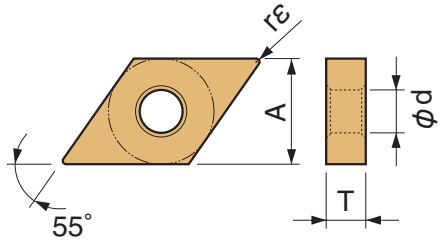
55°Diamond • Negative with Hole

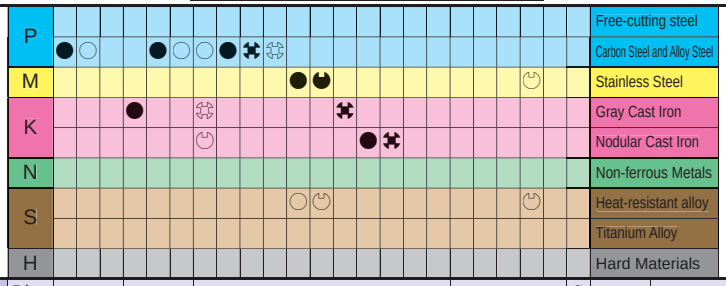
(mm)

Description	A	T	ød
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

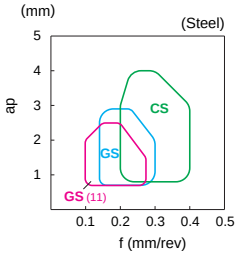
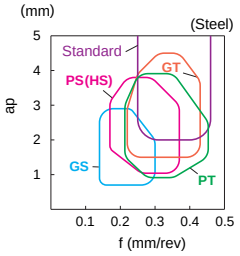
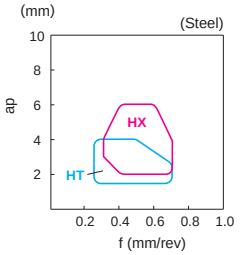
(mm)

Description	A	T	ød
DN_1506_	12.70	6.35	5.16





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 under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium-Roughing		DNMG	150404CS 150408CS	0.4 0.8							●	●															D10 D11 F43	
		DNMG	150604CS 150608CS	0.4 0.8							●	●																
		DNMG	110404GS 110408GS	0.4 0.8			●				●	●															D11 F67	
		DNMG	150404GS 150408GS 150412GS	0.4 0.8 1.2						●	●	●															D10 D11 F43	
		DNMG	150604GS 150608GS 150612GS	0.4 0.8 1.2						●	●	●																
Medium-Roughing		DNMG	150404PS 150408PS 150412PS 150416PS	0.4 0.8 1.2 1.6	●				●		●	●	●	●	●	●									●		D10 D11 F43	
		DNMG	150604PS 150608PS 150612PS 150616PS	0.4 0.8 1.2 1.6	●				●		●	●	●	●	●	●									●			
Medium-Roughing		DNMG	150404HS 150408HS 150412HS	0.4 0.8 1.2		●	●			●	●	●																
		DNMG	150604HS 150608HS 150612HS	0.4 0.8 1.2		●	●			●	●	●																
Medium-Roughing	 High Feed	DNMG	150408PT 150412PT	0.8 1.2							●	●	●	●	●	●												
		DNMG	150608PT 150612PT	0.8 1.2							●	●	●	●	●	●												
Medium-Roughing	 High Feed	DNMG	150408GT 150412GT	0.8 1.2								●	●															
		DNMG	150608GT 150612GT	0.8 1.2								●	●															
Medium-Roughing	 High Feed	DNMG	150408HT 150412HT	0.8 1.2			●					●	●															
		DNMG	150608HT 150612HT	0.8 1.2								●	●															
Roughing		DNMG	150404 150408 150412	0.4 0.8 1.2		●	●	●			●	●	●	●			●	●	●	○	○							
		DNMG	150604 150608 150612	0.4 0.8 1.2		●		●			●	●	●	●			●			○	○							

For grades (TN30 PV30 PV60 PV90 PR905 PR915), See Page B41

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

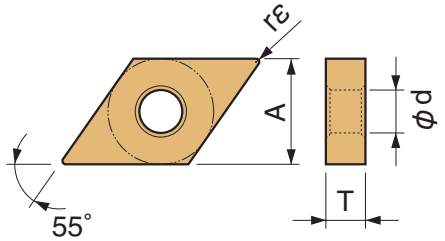
55°Diamond • Negative with Hole

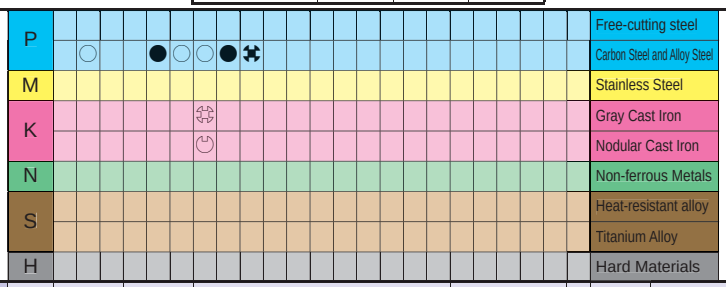
(mm)

Description	A	T	ød
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

(mm)

Description	A	T	ød
DN_1506_	12.70	6.35	5.16

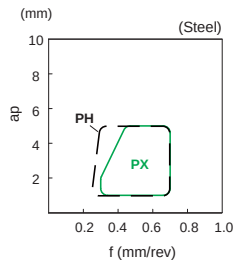


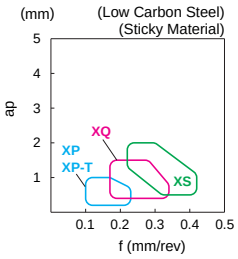


Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Roughing		DNMG	150408PH	0.8								●	●														
			150412PH	1.2								●	●														
			150416PH	1.6								●	●														
		DNMG	150608PH	0.8								●	●	●													
			150612PH	1.2								●	●	●													
			150616PH	1.6								●	●														
Single Sided / Roughing	 High Feed	DNMM	150408PX	0.8								●	●	●													
			150412PX	1.2								●	●	●													
			150416PX	1.6								●	●	●													
		DNMM	150608PX	0.8								●	●	●													
			150612PX	1.2								●	●	●													
			150616PX	1.6								●	●	●													
Low Carbon Steel	 Finishing	DNMG	150404XP	0.4		●	●		●	●	●	●	●														
			150408XP	0.8		●	●		●	●	●	●	●														
		DNMG	150604XP	0.4			●		●	●																	
			150608XP	0.8			●		●	●																	
	 Finishing Tough Edge	DNMG	150404XP-T	0.4			●																				
			150408XP-T	0.8			●																				
	 Medium	DNMG	150404XQ	0.4		●	●		●	●	●	●	●														
			150408XQ	0.8		●	●		●	●	●	●	●														
		DNMG	150604XQ	0.4			●		●	●																	
			150608XQ	0.8			●		●	●			●	●													
	 Roughing	DNMG	150408XS	0.8		●	●			●	●	●	●														
		DNMG	150608XS	0.8								●	●														

D10
D11
F43





For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page B41

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

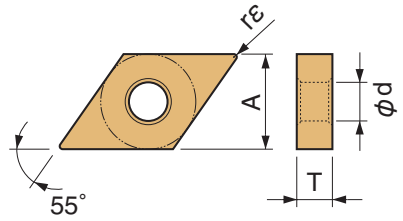
55°Diamond • Negative with Hole

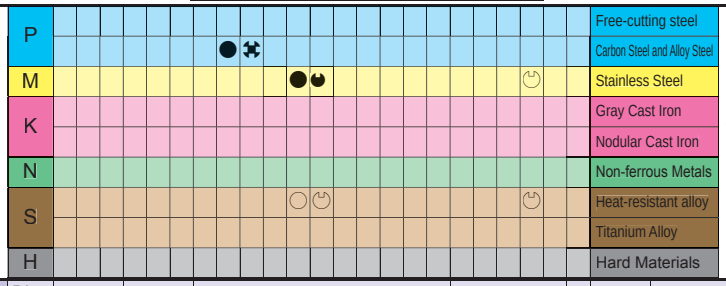
(mm)

Description	A	T	ød
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

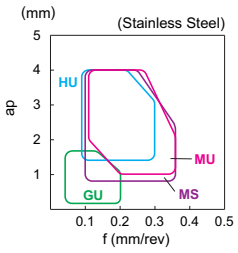
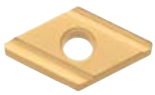
(mm)

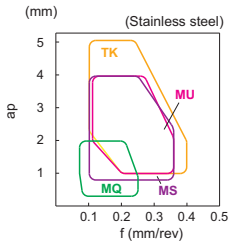
Description	A	T	ød
DN_1506_	12.70	6.35	5.16





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 under 45HRC)

Insert Handed Insert shows Right-hand		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Stainless Steel	 Finishing	DNMG 150404GU 150408GU	0.4 0.8											● ● ● ●	● ● ● ●											D10 D11 F43	
		DNMG 150604GU 150608GU	0.4 0.8											● ● ● ●	● ● ● ●												
	 Medium-Roughing	DNMG 150408HU 150412HU	0.8 1.2									●		● ● ● ●	● ● ● ●												
		DNMG 150608HU 150612HU	0.8 1.2											● ● ● ●	● ● ● ●												
	 Finishing-Medium	DNMG 150404MQ 150408MQ	**0.4** **0.8**											● ● ● ●	● ● ● ●								● ● ● ●				
		DNMG 150604MQ 150608MQ	**0.4** **0.8**											● ● ● ●	● ● ● ●								● ● ● ●				
	 Medium-Roughing	DNMG 150404MS 150408MS 150412MS	**0.4** **0.8** **1.2**											● ● ● ●	● ● ● ●								● ● ● ●				
		DNMG 150604MS 150608MS 150612MS	**0.4** **0.8** **1.2**											● ● ● ●	● ● ● ●								● ● ● ●				
	 Medium-Roughing	DNMG 150404MU 150408MU	**0.4** **0.8**											● ● ● ●	● ● ● ●								● ● ● ●				
		DNMG 150604MU 150608MU	**0.4** **0.8**											● ● ● ●	● ● ● ●								● ● ● ●				
	 Medium-Roughing	DNMG 150404TK 150408TK	**0.4** **0.8**											● ● ● ●	● ● ● ●								● ● ● ●				
		DNMG 150604TK 150608TK	**0.4** **0.8**											● ● ● ●	● ● ● ●								● ● ● ●				
	 Medium-Roughing	DNMG 150604R/L-ST 150608R/L-ST	**0.4** **0.8**								● ● ● ●	● ● ● ●															



For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page ➡ B41

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

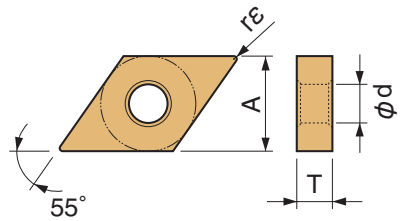
55°Diamond • Negative with Hole

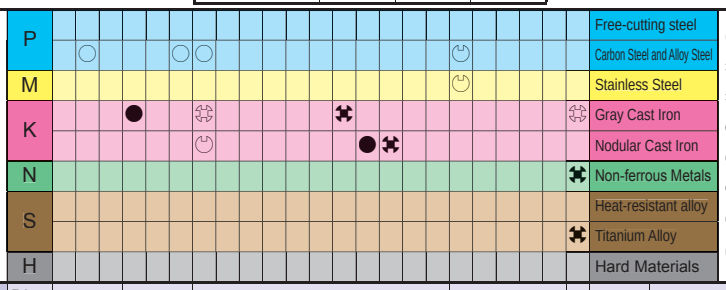
(mm)

Description	A	T	ød
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16

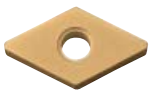
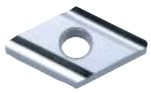
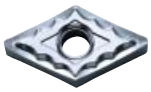
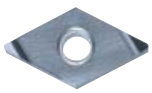
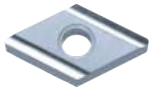
(mm)

Description	A	T	ød
DN_1506_	12.70	6.35	5.16





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 under 45HRC)

Insert (Handed Insert shows Right-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Cast Iron	 Roughing	DNMG	150404C	0.4													●	●	○	○							
			150408C	0.8													●	●	○	○							
			150412C	1.2													●	●	○	○							
		DNMG	150604C	0.4															○	○							
			150608C	0.8							●						●	●	○	○							
			150612C	1.2							●						●	●	○	○							
	 Roughing	DNMG	150408ZS	0.8							●						●	●	○	○							
			150412ZS	1.2							●						●	●	○	○							
		DNMG	150608ZS	0.8							●							●	○	○							
			150612ZS	1.2							●							●	○	○							
	 Roughing	DNMG	150408GC	0.8							●						●	●	●	○	○						
			150412GC	1.2							●						●	●	●								
		DNMG	150608GC	0.8							●	●					●	●	●	○	○						
			150612GC	1.2							●	●					●	●	●								
	 Without Chipbreaker	DNMA	150404	0.4							●							●	●	○	○					D10 D11 F43	—
			150408	0.8							●						●	●	●	○	○						
		DNMA	150604	0.4													●			○	○						
			150608	0.8													●			○	○						
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	DNGG	150404R/L-A3	0.4																						D10 D11 F43	(mm) (Non-ferrous Metals) ap 5 4 3 2 1 AH A3 0.1 0.2 0.3 0.4 0.5 f (mm/rev)
			150408R/L-A3	0.8																							
	 Medium-Roughing / Sharp Edge	DNGG	150404AH	0.4																							
			150408AH	0.8																							
		DNGG	150604AH	0.4																							
			150608AH	0.8																							
	 Medium-Roughing / with Honing	DNMG	150404AH	0.4																							
			150408AH	0.8																							
		DNMG	150604AH	0.4																							
			150608AH	0.8																							
Finishing	 Surface Roughness Oriented	DNGG	110402R/L-S	0.2			●																			D11 F67	(mm) (Steel) ap 5 4 3 2 1 R/L (15) R/L (11) S 0.1 0.2 0.3 0.4 0.5 f (mm/rev)
			110404R/L-S	0.4			●																				
			110408R/L-S	0.8			●																				
Medium cutting		DNGG	110404R/L	0.4			●																				
			110408R/L	0.8			●																				
		DNGG	150404R/L	0.4		●	●	●		●												●				D10 D11 F43	
			150408R/L	0.8		●	●	●		●												●					

For grades (TN30 PV60 PR905 / PV30 PV90 PR915), See Page B41

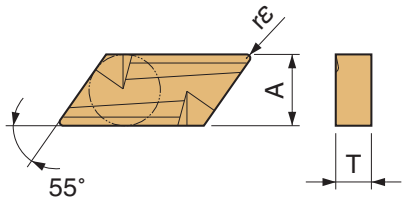
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

55°Parallelogram • Negative without Hole

(mm)

Description	A	T	ød
KNMX1604_	9.525	4.76	-



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

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 under 45HRC)

Insert (Handed Insert shows Right-hand)	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium-Roughing	KNMX 160405R/L-1	0.5								●	●														-	(mm) (Steel) ap 4 3 2 1 0.1 0.2 0.3 0.4 0.5 f (mm/rev)
	KNMX 160410R/L-1	1.0								●	●															

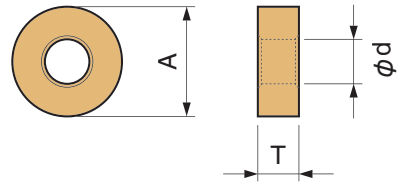
Round • Negative with Hole

(mm)

Description	A	T	ød
RN_0903_	9.525	3.96	3.81
RN_1204_	12.70	4.76	5.16

(mm)

Description	A	T	ød
RN_1506_	15.875	6.35	6.35



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

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 under 45HRC)

Insert	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium-Roughing	RNMG 090300	-			●	●				●	●														D19	(mm) (Steel / Edge Length=09,12,15) ap 4 3 2 1 (12) (15) (09) 0.2 0.4 0.6 0.8 1.0 f (mm/rev)
	RNMG 120400	-			●	●				●	●					●	●		○							
	RNMG 150600	-								●	●					●	●		○						-	

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

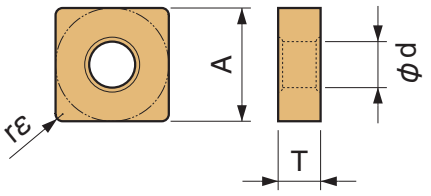
90°Square • Negative with Hole

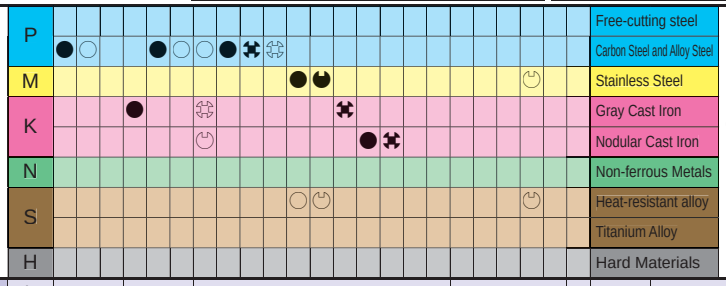
(mm)

Description	A	T	ød
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

(mm)

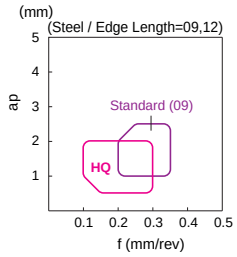
Description	A	T	ød
SN_1506_	15.875	6.35	6.35
SN_1906_	19.05	6.35	7.94

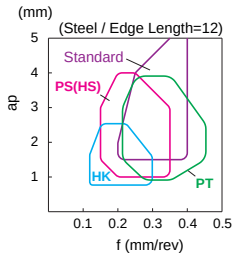


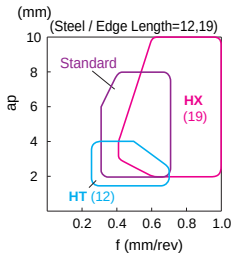


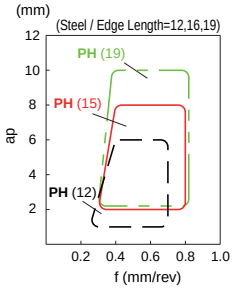
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing-Medium		SNMG	120404HQ	0.4	●	●	●		●	●		●	●															
			120408HQ	0.8	●	●	●		●	●	●	●	●	●	●										●			
			120412HQ	1.2		●	●			●		●	●	●														
Medium cutting		SNMG	120404HK	0.4			●																					
			120408HK	0.8			●																					
			120412HK	1.2			●																					
Medium-Roughing		SNMG	120408PS	0.8	●				●		●	●	●	●	●	●									●			
			120412PS	1.2							●	●	●	●	●	●									●			
			120416PS	1.6								●	●	●	●	●												
Medium-Roughing		SNMG	120408HS	0.8		●	●			●		●	●													D12 D13		
			120412HS	1.2		●	●			●		●	●															
			120416HS	1.6		●	●			●		●	●															
Medium-Roughing	 High Feed	SNMG	120408PT	0.8							●	●	●	●	●	●												
			120412PT	1.2							●	●	●	●	●	●												
Medium-Roughing	 High Feed	SNMG	120408HT	0.8			●					●	●															
			120412HT	1.2			●																					
Roughing		SNMG	090304	0.4			●						●													D13		
			090308	0.8			●						●							○								
		SNMG	120404	0.4		●	●	●			●	●						●	●	○	○								
			120408	0.8		●	●	●			●	●	●	●	●	●	●	●	●	○	○				●			
			120412	1.2		●	●				●	●	●	●			●	●	●	○	○				●			
			120416	1.6		●	●				●	●	●	●			●	●	●		○							
			120420	2.0			●				●						●	●	●		○							
		SNMG	190612	1.2							●	●	●	●														
			190616	1.6							●	●	●	●			●									-		
Roughing		SNMG	120408PH	0.8								●	●	●												D12 D13		
			120412PH	1.2								●	●	●														
			120416PH	1.6								●	●	●														
		SNMG	150612PH	1.2								●	●													-		
			150616PH	1.6								●	●															
		SNMG	190612PH	1.2								●	●	●														
			190616PH	1.6								●	●	●														
			190624PH	2.4								●	●															









For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page B42

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

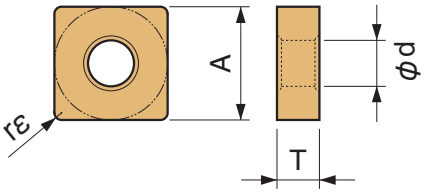
90°Square • Negative with Hole

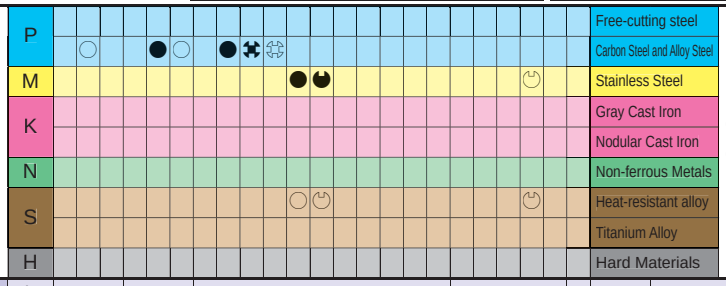
(mm)

Description	A	T	ød
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

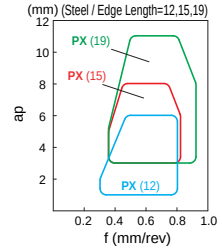
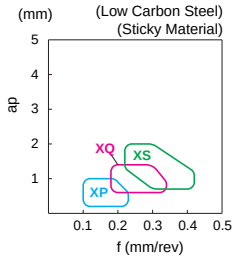
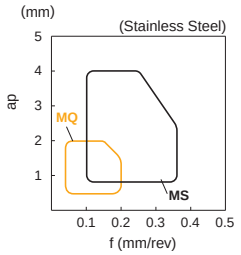
(mm)

Description	A	T	ød
SN_1506_	15.875	6.35	6.35
SN_1906_	19.05	6.35	7.94





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 under 45HRC)

	Insert (Handed Insert shows Right-hand)	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Single Sided / Roughing / High Feed		SNMM 120408PX 120412PX 120416PX	0.8 1.2 1.6								●	●	●												D12 D13	
		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		●	●		●	●		●	●													D12 D13	
	Medium	SNMG 120408XQ	0.8		●	●		●	●		●	●														
	Roughing	SNMG 120408XS	0.8		●	●			●		●	●														
Stainless Steel	Finishing-Medium	SNMG 120404MQ 120408MQ	0.4 0.8											●	●									●		
	Medium-Roughing	SNMG 120404MS 120408MS 120412MS 120416MS	0.4 0.8 1.2 1.6											●	●									●		
Medium-Roughing	Low Cutting Force	SNMG 120408R/L-ST	0.8									●														—

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page B42

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

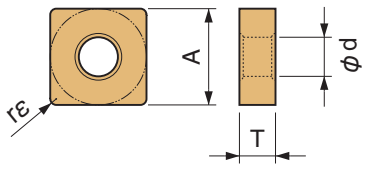
90°Square • Negative with Hole

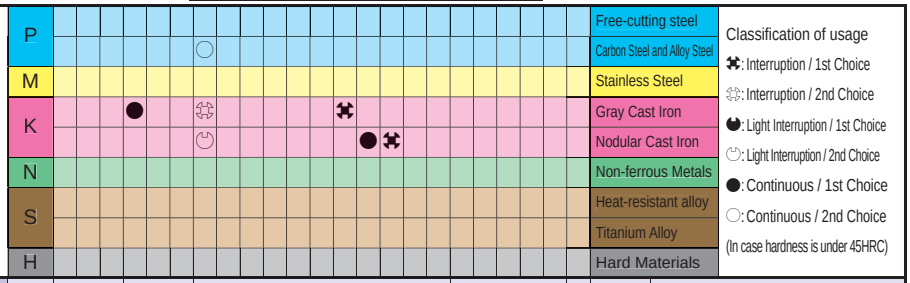
(mm)

Description	A	T	ød
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16

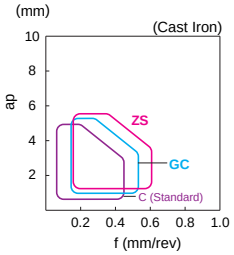
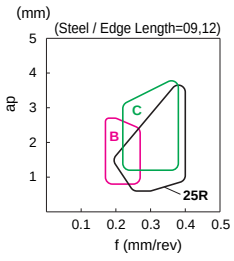
(mm)

Description	A	T	ød
SN_1506_	15.875	6.35	6.35
SN_1906_	19.05	6.35	7.94





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 under 45HRC)

Insert (Handed Insert shows Right-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Cast Iron	 Roughing	SNMG	120408C	0.8							●						●	●		○							D12 D13	
			120412C	1.2							●						●	●		○								
	 Roughing	SNMG	120408ZS	0.8							●						●	●	●	○	○							
			120412ZS	1.2							●						●	●	●	○	○							
	 Roughing	SNMG	120408GC	0.8							●	●					●	●	●	○	○							
			120412GC	1.2							●	●					●	●	●		○							
	 Without Chipbreaker	SNGA	090304	0.4																					●	D13	—
			090308	0.8																					●			
		SNGA	120404	0.4																					●	D12 D13	
			120408	0.8																					●			
			120412	1.2				●																	●			
		SNMA	120404	0.4							●						●	●		○	○							
			120408	0.8							●						●	●		○	○							
			120412	1.2							●						●	●		○	○							
			120416	1.6							●						●	●		○	○							
			120420	2.0							●						●	●			○							
	 Without Chipbreaker	SNMN	120408	0.8							●										○					D34 D35	
			120412	1.2							●										○							
Finishing-Medium-Roughing	 -B: Finishing-Medium -C: Medium-Roughing	SNGG	090304R/L-B	0.4			●	●																		D13	
			090308R/L-B	0.8			●																					
		SNGG	120404R/L-C	0.4			●	●																	●	D12 D13	
			120408R/L-C	0.8			●	●																	●			
		SNMG	120404R/L-C	0.4			●																					
			120408R/L-C	0.8			●																					
Medium-Roughing	 Low Cutting Force	SNGG	120404R/L-25R	0.4			●																			D12 D13	
			120408R/L-25R	0.8			●																					

For grades (TN30 PV30 PV60 PV90 PR905 PR915), See Page B42

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

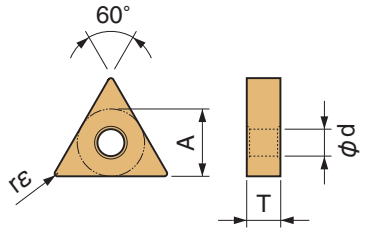
60°Triangle • Negative with Hole

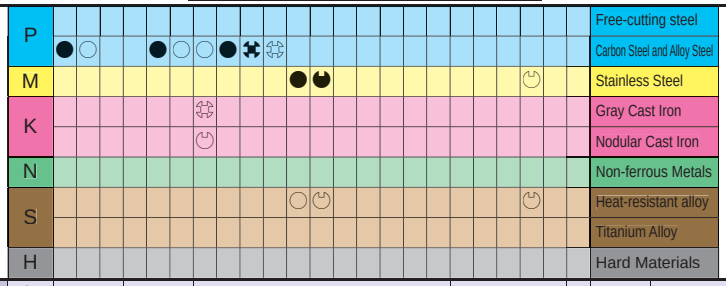
(mm)

Description	A	T	ød
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

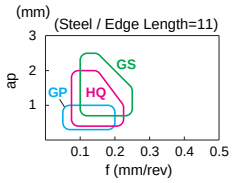
(mm)

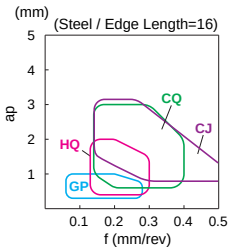
Description	A	T	ød
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

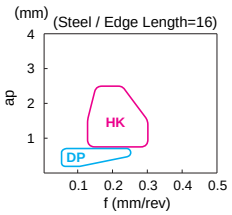


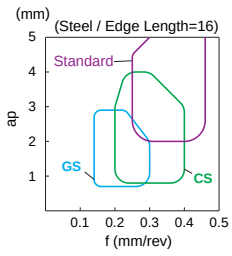


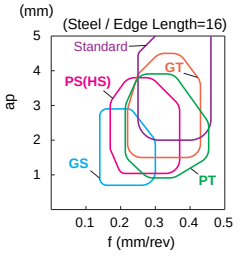
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing		TNGG	160404DP	0.4			●			●																	D14	
			160408DP	0.8			●			●																	D15	
		TNMG	160404DP	0.4		●	●			●																	F43	
			160408DP	0.8		●	●			●																	F68	
Finishing		TNMG	110404GP	0.4			●					●	●														D14	
			110408GP	0.8			●					●	●														F68	
		TNMG	160402GP	0.2	●	●	●	●	●	●	●	●	●														D14	
			160404GP	0.4	●	●	●	●	●	●	●	●	●														D15	
			160408GP	0.8	●	●	●	●	●	●	●	●	●														F43 F68	
Finishing-Medium		TNMG	110404HQ	0.4			●					●	●														D14	
			110408HQ	0.8			●					●	●														F68	
		TNMG	160404HQ	0.4	●	●	●	●	●	●	●	●	●	●	●	●									●			
			160408HQ	0.8	●	●	●	●	●	●	●	●	●	●	●	●									●		D14	
			160412HQ	1.2		●	●			●		●	●														D15	
Finishing-Medium / Up Facing		TNMG	160404CQ	0.4	●	●	●	●	●	●	●	●	●	●													F43	
			160408CQ	0.8	●	●	●	●	●	●	●	●	●	●													F68	
			160412CQ	1.2		●	●			●	●	●	●	●														
		TNMG	220408CQ	0.8								●	●														D14	
			220412CQ	1.2								●	●															
Finishing-Medium		TNMP	160404TK	0.4		●				●		●	●									●					D14	
			160408TK	0.8		●				●		●	●									●					D15	
																											F43	
																											F68	
Medium		TNMG	160404HK	0.4			●																					
			160408HK	0.8			●																					
			160412HK	1.2			●																					
		TNMG	220404HK	0.4			●																				D14	
			220408HK	0.8			●																					
Medium-Roughing		TNMG	160404CS	0.4								●	●														D14	
			160408CS	0.8								●	●														D15	
																											F43	
																											F68	
Medium-Roughing		TNMG	110404GS	0.4			●					●	●														D14	
			110408GS	0.8			●					●	●														F68	
		TNMG	160404GS	0.4						●		●	●														D14	
			160408GS	0.8						●		●	●														D15	
Medium-Roughing		TNMG	160404PS	0.4	●			●			●	●	●	●	●	●									●		F43	
			160408PS	0.8	●			●			●	●	●	●	●	●									●		F68	
			160412PS	1.2								●	●	●	●	●												
		TNMG	220404PS	0.4								●	●	●													D14	
			220408PS	0.8							●	●	●	●	●	●												
			220412PS	1.2							●	●	●	●	●	●												
			220416PS	1.6								●	●															









For grades ⟨TN30 PV60 PR905 / PV30 PV90 PR915⟩, See Page ➡ B42~B43

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

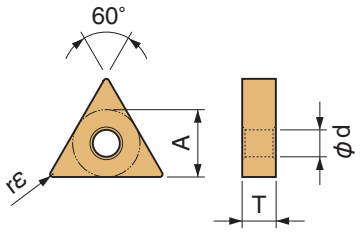
Inserts are sold in 10 piece boxes.

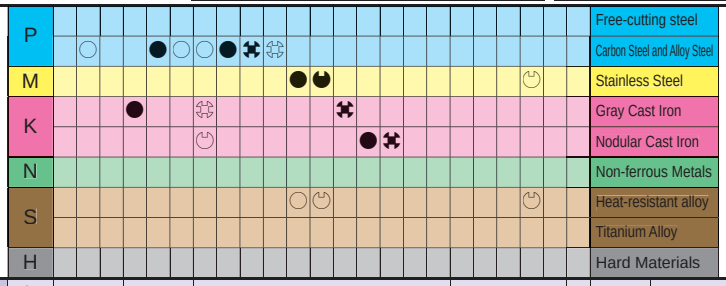
60°Triangle • Negative with Hole

(mm)

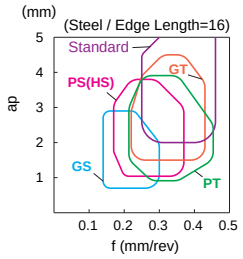
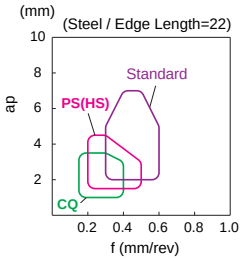
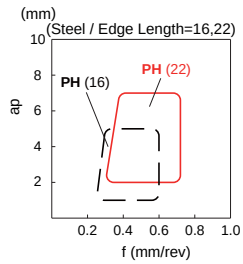
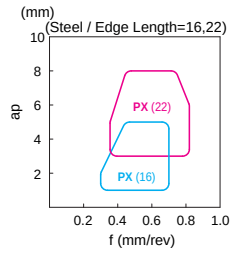
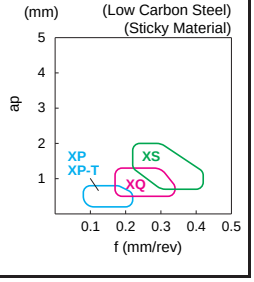
Description	A	T	ød
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

Description	A	T	ød
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16





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 under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium-Roughing		TNMG	160404HS 160408HS 160412HS	0.4 0.8 1.2		●	●			●		●	●													D14 D15 F43 F68	
		TNMG	220404HS 220408HS 220412HS	0.4 0.8 1.2			●					●														D14	
Medium-Roughing / High Feed		TNMG	160408PT 160412PT	0.8 1.2							●	●	●	●	●	●											
Medium-Roughing / High Feed		TNMG	160408GT 160412GT	0.8 1.2						●		●	●													D14 D15 F43 F68	
Medium-Roughing / High Feed		TNMG	160408HT 160412HT	0.8 1.2			●					●	●														
Roughing		TNMG	160404 160408 160412 160416 160420	0.4 0.8 1.2 1.6 2.0		●	●	●	●		●	●	●		●	●	●	●	●	○	○				●			
		TNMG	220404 220408 220412 220416	0.4 0.8 1.2 1.6			●				●	●	●				●	●	●	○	○						D14	
Medium-Roughing		TNMG	160408PH 160412PH	0.8 1.2								●	●													D14 D15 F43 F68	
		TNMG	220408PH 220412PH 220416PH	0.8 1.2 1.6								●	●	●												D14	
Single Sided / Roughing	 High Feed	TNMM	160408PX 160412PX	0.8 1.2								●	●	●												D14 D15 F43 F68	
		TNMM	220408PX 220412PX 220416PX	0.8 1.2 1.6								●	●	●												D14	
Low Carbon Steel	 Finishing	TNMG	160404XP 160408XP	0.4 0.8		●	●		●	●	●	●	●													D14 D15 F43 F68	
	 Finishing / Tough Edge	TNMG	160404XP-T 160408XP-T	0.4 0.8			●																				

For grades (TN30 PV60 PR905 / PV30 PV90 PR915), See Page **B42~B43**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

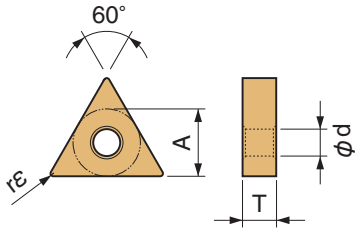
60°Triangle • Negative with Hole

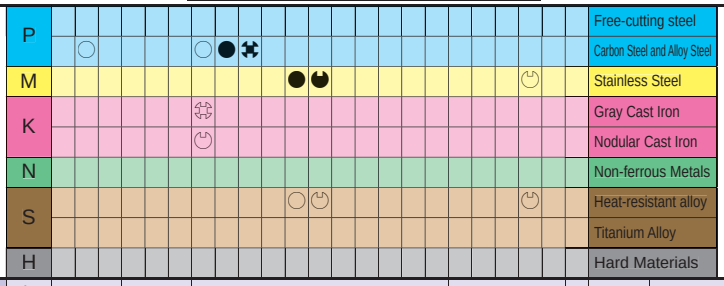
(mm)

Description	A	T	ød
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

(mm)

Description	A	T	ød
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

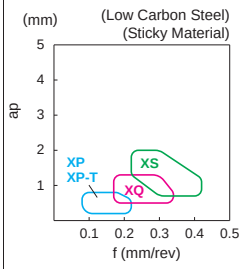


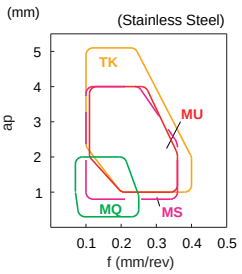


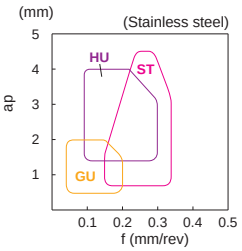
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert Handed Insert shows Right-hand		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Low Carbon Steel	 Medium cutting	TNMG	160404XQ	0.4		●	●		●	●	●	●	●															
			160408XQ	0.8		●	●		●	●	●	●	●															
	 Roughing	TNMG	160408XS	0.8		●	●			●	●	●	●															
Stainless Steel	 Finishing	TNMG	160404GU	0.4											●	●											D14 D15 F43 F68	
			160408GU	0.8											●	●												
	 Medium-Roughing	TNMG	160408HU	0.8									●		●	●												
			160412HU	1.2											●	●												
	 Finishing-Medium	TNMG	160404MQ	0.4											●	●									●			
			160408MQ	0.8											●	●									●			
	 Medium-Roughing	TNMG	160404MS	0.4											●	●									●			
			160408MS	0.8											●	●									●			
			160412MS	1.2											●	●									●			
	 Medium-Roughing	TNMG	160404MU	0.4											●	●												
			160408MU	0.8											●	●												
	 Medium-Roughing	TNMG	160404TK	0.4											●	●									●			
			160408TK	0.8											●	●									●			
	 Medium-Roughing	TNMG	160404R/L-ST	0.4			●					●	●		●	●									●			
			160408R/L-ST	0.8			●					●	●		●	●									●			
		TNMG	220404R/L-ST	0.4									●														D14	
			220408R/L-ST	0.8									●															

Applicable Chipbreaker Range







For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page ➡ B42~B43

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

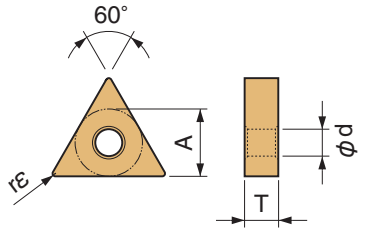
(mm)

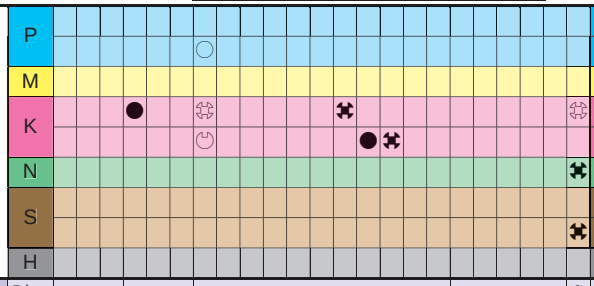
Description	A	T	ød
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

60°Triangle • Negative with Hole

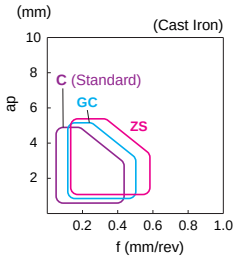
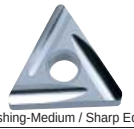
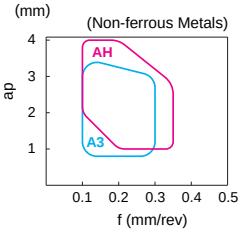
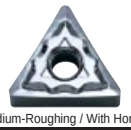
(mm)

Description	A	T	ød
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26





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 under 45HRC)

Insert (Handed Insert shows Right-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Cast Iron	 Roughing	TNMG	160404C	0.4							●						●	●	○	○							D14 D15 F43 F68	
			160408C	0.8							●						●	●	○	○								
			160412C	1.2							●						●	●		○								
	 Roughing	TNMG	160408ZS	0.8							●						●	●	●	○	○							
			160412ZS	1.2							●						●	●	●		○							
	 Roughing	TNMG	160408GC	0.8							●	●					●	●	●	○	○							
			160412GC	1.2							●	●					●	●	●		○							
	 Without Chipbreaker	TNGA	110304	0.4																					●	D14	—
			110308	0.8																					●			
		TNGA	160404	0.4				●																	●	D14		
			160408	0.8				●																	●			
		TNMA	160404	0.4			●				●						●	●	●	○	○					D14 D15 F43 F68		
			160408	0.8			●				●						●	●	●	○	○							
			160412	1.2							●						●	●	●	○	○							
			160416	1.6							●						●	●	●		○							
			160420	2.0							●						●	●	●		○							
		TNMA	220408	0.8								●								○						D14		
Cast Iron	 Without Hole Without Chipbreaker	TNGN	160308	0.8			●													○						-		
			160312	1.2			●																					
		TNMN	220408	0.8			●													○								
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	TNGG	160404R/L-A3	0.4																○					●	D14 D15 F43 F68	
			160408R/L-A3	0.8																					●			
	 Medium-Roughing / Sharp Edge	TNGG	160404AH	0.4																					●			
			160408AH	0.8																					●			
	 Medium-Roughing / With Honing	TNMG	160404AH	0.4																					●			
			160408AH	0.8																					●			

For grades (TN30 PV60 PR905 / PV30 PV90 PR915) , See Page B42~B43

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

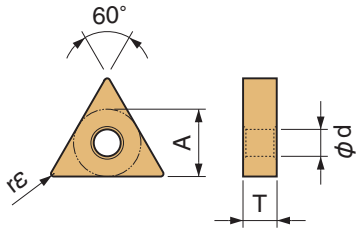
60°Triangle • Negative with Hole

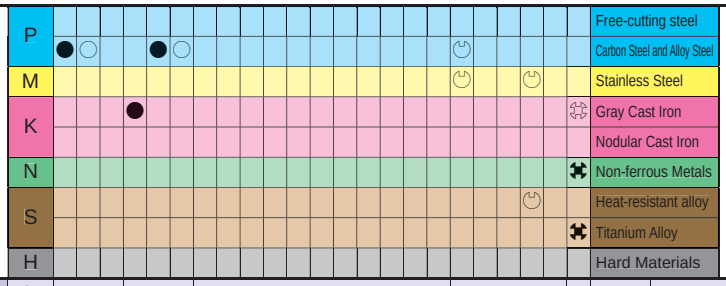
(mm)

Description	A	T	ød
TN_1103_	6.35	3.18	2.26
TN_1104_	6.35	4.76	2.26

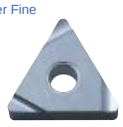
(mm)

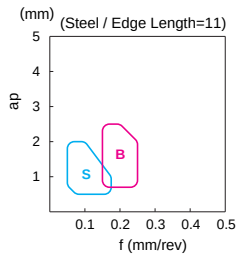
Description	A	T	ød
TN_1603_	9.525	3.18	3.81
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

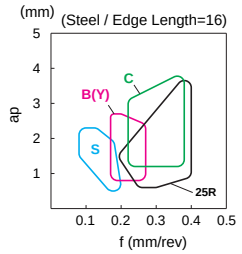


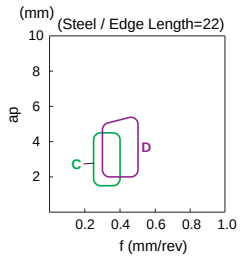


Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert (Handed Insert shows Right-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	 Surface Roughness Oriented	TNGG	110402R/L-S	0.2			●																			●	D14 F68	
			110404R/L-S	0.4			●																			●		
			110408R/L-S	0.8			●																					
		TNGG	160401R/L-S	0.1		●				●																	D14 D15 F43 F68	
			160402R/L-S	0.2	●	●	●			●												●			●		
			160404R/L-S	0.4	●	●	●			●												●			●		
			160408R/L-S	0.8	●	●	●			●												●			●		
Finishing	Super Fine  Sharp Edge / Precision	TNEG	160402R/L-SSF	0.2		●	●			●												●					
			160404R/L-SSF	0.4		●	●			●												●					
Finishing-Medium-Roughing	 -B: Finishing-Medium -C: Medium-Roughing -D: Roughing	TNGG	110302R/L-B	0.2			●																			●	D14	
			110304R/L-B	0.4			●																			●		
			110308R/L-B	0.8			●																			●		
		TNGG	160304R/L-B	0.4			●																				—	
		TNGG	160402R/L-B	0.2	●	●	●		R	●												●				●	D14 D15 F43 F68	
			160404R/L-B	0.4	●	●	●	●	●	●												●					
			160408R/L-B	0.8			●																					
		TNGG	160402R/L-C	0.2		●				●																		
			160404R/L-C	0.4	●	●	●	●	●	●												●				●	
			160408R/L-C	0.8	●	●	●	●	●	●												●				●	
			160412R/L-C	1.2			●	●																				
			160416R/L-C	1.6				R																				
		TNGG	220404R/L-C	0.4		●	●	●																			D14	
			220408R/L-C	0.8		●	●	●																				
		TNGG	220412R/L-D	1.2			●																					
		TNGG	110402R/L	0.2			●																			●	D14 D68	
			110404R/L	0.4			●																			●		
			110408R/L	0.8			●																			●		
		TNMG	160404R/L-C	0.4		●	●			●																	D14 D15 F43 F68	
			160408R/L-C	0.8		●	●			●																		
			160412R/L-C	1.2			●																					
Medium-Roughing	 Low Cutting Resistance	TNGG	160404R/L-25R	0.4		●	●			●												●		●		●	D14 F68	
			160408R/L-25R	0.8		●	●			●												●		●		●		







For grades (TN30 PV30 PV60 PV90 PR905 PR915), See Page B42~B43

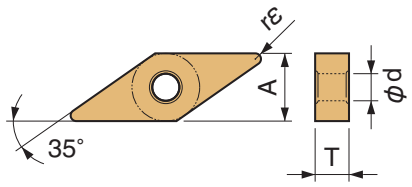
Inserts are sold in 10 piece boxes.

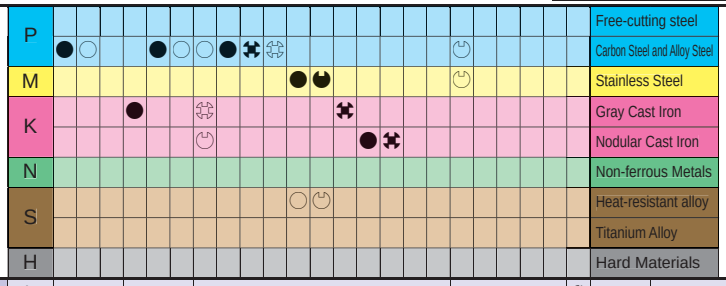
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

35°Diamond • Negative with Hole

(mm)

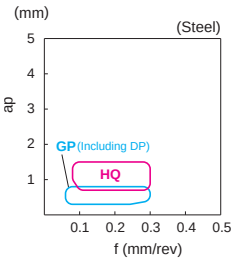
Description	A	T	ød
VN_1604_	9.525	4.76	3.81

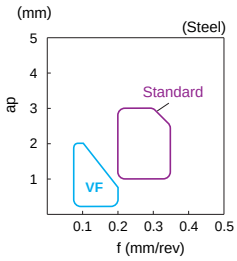




Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing		VNMG	160404DP	0.4			●																				
			160408DP	0.8			●																				
Finishing		VNMG	160402GP	0.2	●	●	●		●	●		●	●														
			160404GP	0.4	●	●	●		●	●		●	●														
			160408GP	0.8	●	●	●		●	●		●	●														
Finishing-Medium		VNMG	160404VF	0.4	●	●			●	●		●	●														
			160408VF	0.8	●	●			●	●		●	●														
			160412VF	1.2		●				●		●	●														
Finishing-Medium		VNMG	160404HQ	0.4	●	●	●		●	●	●	●	●	●												D16	
			160408HQ	0.8	●	●	●		●	●	●	●	●	●												D17	
			160412HQ	1.2		●	●			●	●	●	●	●												D18	
Medium		VNMG	160404TN-V	0.4			●																				
			160408TN-V	0.8			●																				
			160412TN-V	1.2			●																				
Roughing		VNMG	160404	0.4		●	●			●	●	●	●	●	●	●	●	●	○	○							
			160408	0.8		●	●	●		●	●	●	●	●	●	●	●	●	○	○							
Low Carbon Steel	 Finishing	VNMG	160404XP	0.4			●														●						





For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page B43

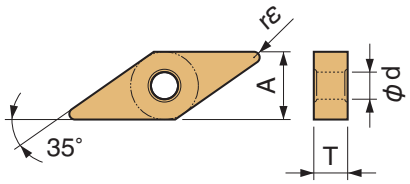
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

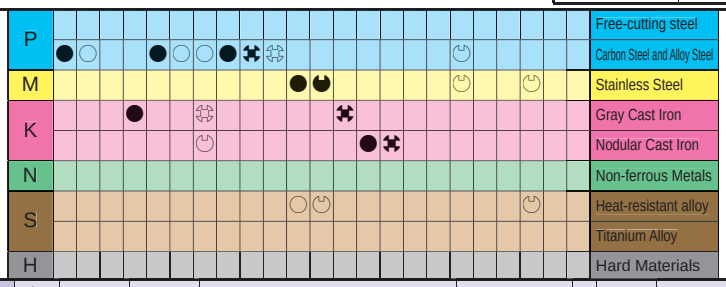
Inserts are sold in 10 piece boxes.

35°Diamond • Negative with Hole

(mm)

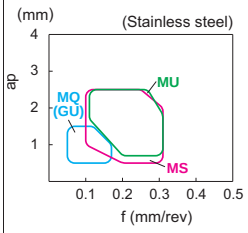
Description	A	T	ød
VN_1604_	9.525	4.76	3.81

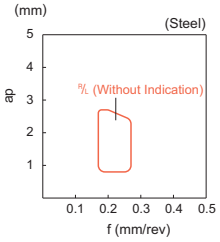




Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
○: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert (Handed Insert shows Right-hand)	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Stainless Steel — Finishing	VNMG 160404GU	0.4											●	●											D16 D17 D18	
	VNMG 160408GU	0.8											●	●												
Stainless Steel — Finishing-Medium	VNMG 160404MQ	0.4											●	●									●			
	VNMG 160408MQ	0.8											●	●									●			
Stainless Steel — Medium-Roughing	VNMG 160404MS	0.4											●	●									●			
	VNMG 160408MS	0.8											●	●									●			
	VNMG 160412MS	1.2											●	●									●			
Stainless Steel — Medium-Roughing	VNMG 160404MU	0.4											●	●									●			
	VNMG 160408MU	0.8											●	●									●			
Cast Iron — Without Chipbreaker	VNGA 160404	0.4				●																		●		
	VNGA 160408	0.8				●																		●		
Medium	VNGG 160402R/L	0.2	R	●	●			●												●						
	VNGG 160404R/L	0.4	R	●	●			●												●				●		
	VNGG 160408R/L	0.8	R		●															●				●		





For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page B43

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

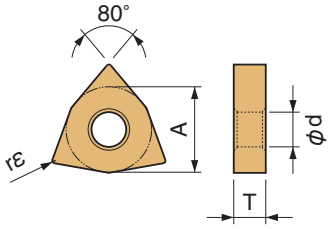
80°Trigon • Negative with Hole

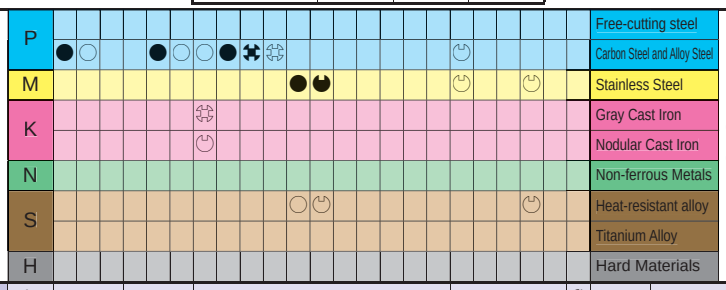
(mm)

Description	A	T	ød
WN_06T3_	9.525	3.96	3.81
WN_0604_	9.525	4.76	3.81

(mm)

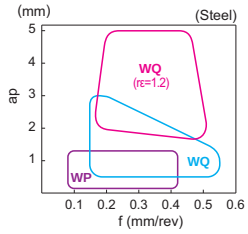
Description	A	T	ød
WN_0804_	12.70	4.76	5.16

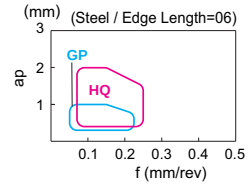


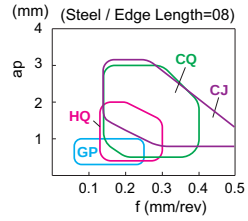


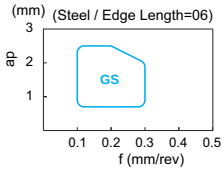
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

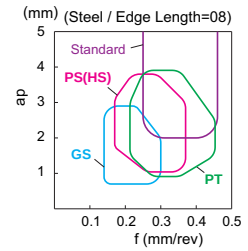
	Insert	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	With Wiper Edge	WNMG 080404WP	0.4	●	●			●	●	●	●	●														D20 F70	
		WNMG 080408WP	0.8		●			●	●	●	●	●															
Finishing-Medium	With Wiper Edge	WNMG 080404WQ	0.4	●	●	●		●	●	●	●	●															
		WNMG 080408WQ	0.8		●	●		●	●	●	●	●															
		WNMG 080412WQ	1.2		●				●	●	●	●															
Finishing		WNMG 060404GP	0.4			●					●	●														D20 F69	
		WNMG 060408GP	0.8			●					●	●															
		WNMG 080404GP	0.4	●	●	●		●	●																	D20 F70	
		WNMG 080408GP	0.8	●	●	●		●	●																		
Finishing-Medium		WNMG 06T304HQ	0.4			●						●														-	
		WNMG 06T308HQ	0.8			●						●															
		WNMG 060404HQ	0.4			●					●	●														D20 F69	
		WNMG 060408HQ	0.8			●					●	●															
		WNMG 080404HQ	0.4	●	●	●		●	●	●	●	●	●	●	●									●		D20 F70	
		WNMG 080408HQ	0.8	●	●	●		●	●	●	●	●	●	●	●									●			
		WNMG 080412HQ	1.2		●	●			●	●	●	●	●														
Finishing-Medium / Up Facing		WNMG 080404CQ	0.4	●	●			●	●	●	●	●															
		WNMG 080408CQ	0.8	●	●	●		●	●	●	●	●	●														
		WNMG 080412CQ	1.2		●	●			●	●	●	●	●														
		WNMG 080408CJ	0.8							●	●	●	●														
		WNMG 080412CJ	1.2							●	●	●	●														
Finishing-Medium		WNMP 080404TK	0.4		●				●		●	●									●						
		WNMP 080408TK	0.8		●				●		●	●									●						
Medium-Roughing		WNMG 080408CS	0.8								●	●															
Medium-Roughing		WNMG 060404GS	0.4			●					●	●														D20 F69	
		WNMG 060408GS	0.8			●					●	●															
		WNMG 080404GS	0.4						●		●	●														D20 F70	
		WNMG 080408GS	0.8						●		●	●															
		WNMG 080412GS	1.2						●		●	●															











For grades ⟨ TN30 PV60 PR905 / PV30 PV90 PR915 ⟩, See Page B44

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

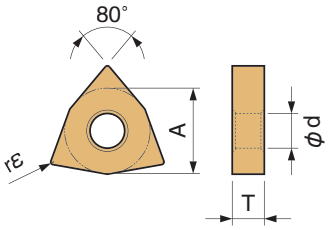
80°Trigon • Negative with Hole

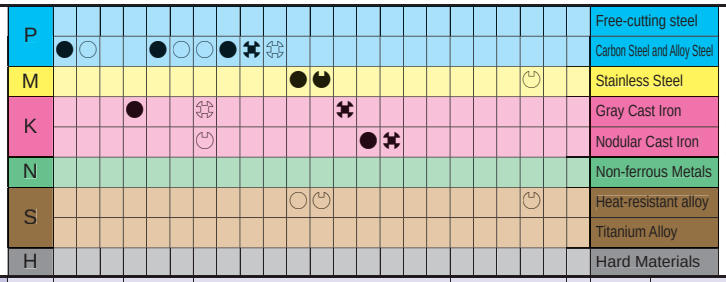
(mm)

Description	A	T	ød
WN_06T3_	9.525	3.96	3.81
WN_0604_	9.525	4.76	3.81

(mm)

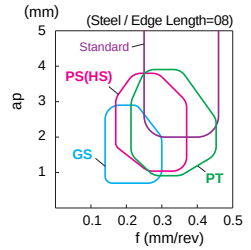
Description	A	T	ød
WN_0804_	12.70	4.76	5.16

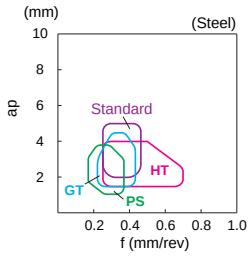


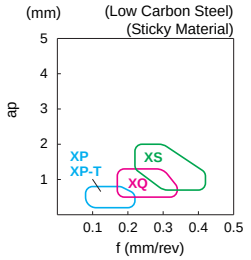


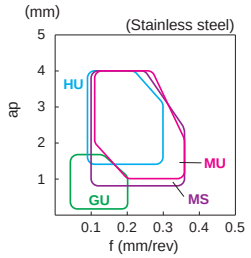
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium-Roughing	WNMG 080404PS	0.4	●				●		●	●	●	●	●	●									●		D20 F70	
	WNMG 080408PS	0.8	●				●		●	●	●	●	●	●									●			
	WNMG 080412PS	1.2							●	●	●	●	●	●												
	WNMG 080416PS	1.6								●	●															
Medium-Roughing	WNMG 080404HS	0.4		●	●			●		●	●															
	WNMG 080408HS	0.8		●	●			●		●	●															
	WNMG 080412HS	1.2		●	●			●		●	●															
Medium-Roughing High Feed	WNMG 080408PT	0.8							●	●	●	●	●	●												
	WNMG 080412PT	1.2							●	●	●	●	●	●												
Medium-Roughing High Feed	WNMG 080408GT	0.8								●	●															
	WNMG 080412GT	1.2								●	●															
Medium-Roughing High Feed	WNMG 080408HT	0.8			●					●	●															
	WNMG 080412HT	1.2			●					●	●															
Roughing	WNMG 080404	0.4			●				●	●	●		●	●	●	●	●	○	○				●			
	WNMG 080408	0.8			●	●			●	●	●	●	●	●	●	●	●	○	○				●			
	WNMG 080412	1.2			●				●	●	●	●	●	●	●	●	●	○	○				●			
Low Carbon Steel Finishing	WNMG 080404XP	0.4		●	●		●	●	●	●	●															
	WNMG 080408XP	0.8		●	●		●	●	●	●	●															
Low Carbon Steel Medium	WNMG 080404XQ	0.4		●	●		●	●	●	●	●															
	WNMG 080408XQ	0.8		●	●		●	●	●	●	●															
Low Carbon Steel Roughing	WNMG 080408XS	0.8		●	●			●	●	●	●															
Stainless Steel Finishing	WNMG 080404GU	0.4											●	●												
	WNMG 080408GU	0.8											●	●												
Stainless Steel Medium-Roughing	WNMG 080408HU	0.8									●		●	●												
	WNMG 080412HU	1.2											●	●												









 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

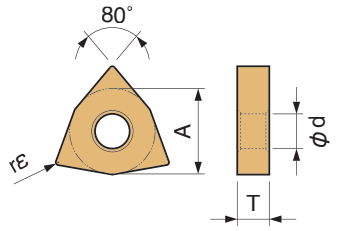
80°Trigon • Negative with Hole

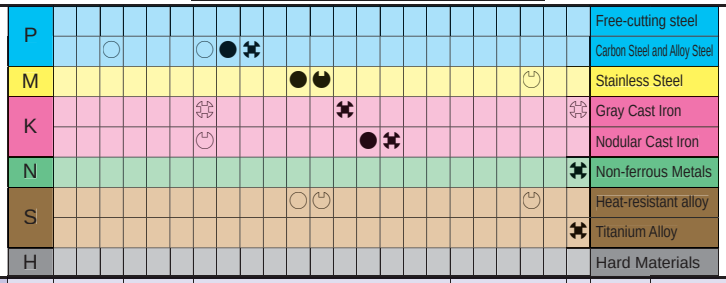
(mm)

Description	A	T	ød
WN_06T3_	9.525	3.96	3.81
WN_0604_	9.525	4.76	3.81

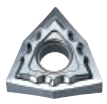
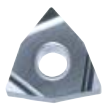
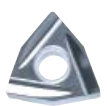
(mm)

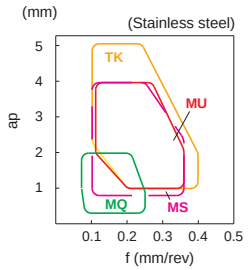
Description	A	T	ød
WN_0804_	12.70	4.76	5.16

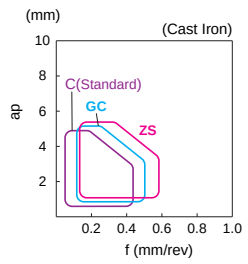


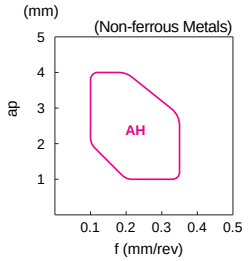


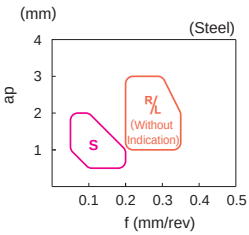
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert Handed Insert shows Right-hand		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Stainless Steel	 Finishing-Medium	WNMG 080404MQ 080408MQ	0.4 0.8											●	●								●				
	 Medium-Roughing	WNMG 080404MS 080408MS 080412MS	0.4 0.8 1.2											●	●								●				
	 Medium-Roughing	WNMG 080404MU 080408MU	0.4 0.8											●	●								●				
	 Medium-Roughing	WNMG 080404TK 080408TK	0.4 0.8											●	●								●				
Cast Iron	 Roughing	WNMG 080404C 080408C 080412C	0.4 0.8 1.2							●						●	●	○	○							D20 F70	
	 Roughing	WNMG 080408ZS 080412ZS	0.8 1.2							●	●	●				●	●	●	○	○							
	 Roughing	WNMG 080408GC 080412GC	0.8 1.2							●	●					●	●	●	○	○							
	 Without Chipbreaker	WNMA 080408 080412	0.8 1.2							●	●					●	●	●	○	○							
Non-ferrous Metals	 Medium-Roughing / Sharp Edge	WNGG 080404AH 080408AH	0.4 0.8																					●			
Finishing	 Surface Roughness Oriented	WNGG 060402R/L-S 060404R/L-S 060408R/L-S	0.2 0.4 0.8			●																			●		
Medium cutting		WNGG 060404R/L 060408R/L	0.4 0.8			●																			●		









For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page B44

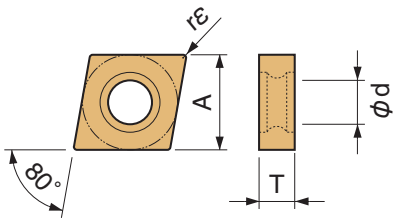
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

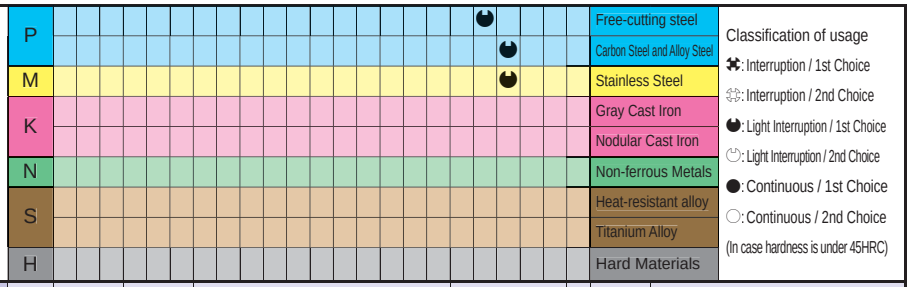
Inserts are sold in 10 piece boxes.

Small Double Sided Tools

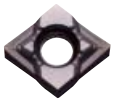
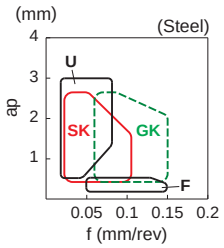
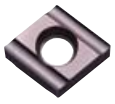
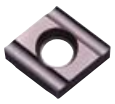
(mm)

Description	A	T	ød
CN_U0703_	7.5	3.18	3.6



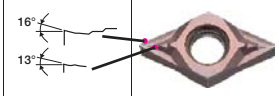
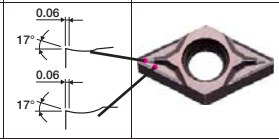
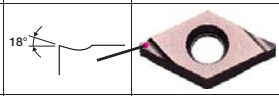
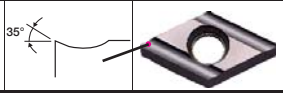


Classification of usage
✖: Interruption / 1st Choice
✱: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert (Handed Insert shows Right-hand)		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing-Medium	 Sharp Edge	CNGU 070301MF-SK	< 0.1																			●				E4	
		CNGU 070302MF-SK	< 0.2																			●					
Medium-Roughing	 With Honing	CNMU 070302E-GK	0.2																			●					
		CNMU 070304E-GK	0.4																		●	●					
Finishing	 Sharp Edge	CNGU 0703005MF$^{R}_{L}$-F	< 0.05																		R	R					
		CNGU 070301MF$^{R}_{L}$-F	< 0.1																		R	R					
		CNGU 070302MF$^{R}_{L}$-F	< 0.2																		R	R					
		CNGU 070304MF$^{R}_{L}$-F	< 0.4																		R	R					
Low Feed	 Sharp Edge	CNGU 0703005MF$^{R}_{L}$-U	< 0.05																		R	R					
		CNGU 070301MF$^{R}_{L}$-U	< 0.1																		R	R					
		CNGU 070302MF$^{R}_{L}$-U	< 0.2																		R	R					
		CNGU 070304MF$^{R}_{L}$-U	< 0.4																		R	R					
Low Feed	 With Honing	CNGU 070301ME$^{R}_{L}$-U	< 0.1																		R	R					
		CNGU 070302ME$^{R}_{L}$-U	< 0.2																		R	R					
		CNGU 070304ME$^{R}_{L}$-U	< 0.4																		R	R					

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance for corner R(rε).

Chipbreaker Selection

Cutting Range	Name	Design	Advantages
Finishing-Medium	SK		A low cutting force chipbreaker designed for chip control in stainless steel. Cutting performance is similar to comparable sized positive inserts.
Medium-Roughing	GK		Chip breaker “dot” and pocket design provide chip control at multiple depths of cut and feed rates.
Finishing	F		Good chip control for finishing to light cutting with low cutting force.
Low Feed	U		Good chip control at low feed rate and varied ap with low cutting force.

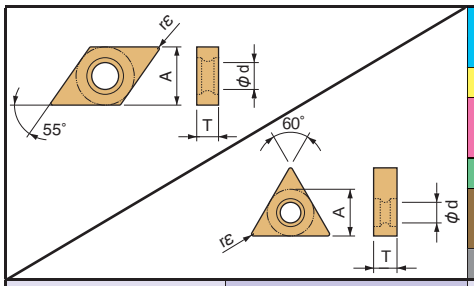
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Small Double Sided Tools

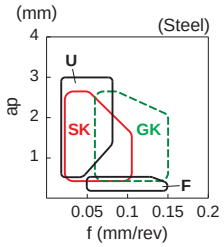
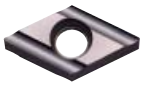
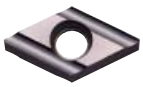
(mm)

Description	A	T	ød
TN_U0903_	5.56	3.18	3.0
DN_U0803_	7.0	3.18	3.6



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

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 under 45HRC)

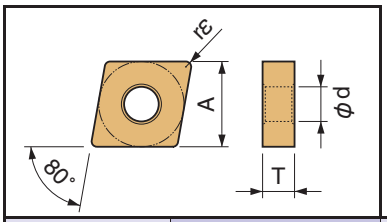
Insert (Handed Insert shows Right-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing-Medium	 Sharp Edge	DNGU	080301MF-SK	< 0.1																			●				E4	
			080302MF-SK	< 0.2																			●					
			080304MF-SK	< 0.4																			●					
Finishing-Medium	 With Honing	DNMU	080302E-GK	0.2																			●					
			080304E-GK	0.4																		●	●					
Finishing	 Sharp Edge	DNGU	0803005MF$^{R}_{L}$-F	< 0.05																		R	R					
			080301MF$^{R}_{L}$-F	< 0.1																		R	R					
			080302MF$^{R}_{L}$-F	< 0.2																		R	R					
			080304MF$^{R}_{L}$-F	< 0.4																		R	R					
Low Feed	 Sharp Edge	DNGU	0803005MF$^{R}_{L}$-U	< 0.05																		R	R					
			080301MF$^{R}_{L}$-U	< 0.1																		R	R					
			080302MF$^{R}_{L}$-U	< 0.2																		R	R					
			080304MF$^{R}_{L}$-U	< 0.4																		R	R					
Low Feed	 With Honing	DNGU	080301ME$^{R}_{L}$-U	< 0.1																		R	R					
			080302ME$^{R}_{L}$-U	< 0.2																		R	R					
			080304ME$^{R}_{L}$-U	< 0.4																		R	R					
Finishing	 Sharp Edge	TNGU	0903005MF$^{R}_{L}$-F	< 0.05																		R	R			E5	
			090301MF$^{R}_{L}$-F	< 0.1																		R	R					
			090302MF$^{R}_{L}$-F	< 0.2																		R	R					
			090304MF$^{R}_{L}$-F	< 0.4																		R	R					
Low Feed	 Sharp Edge	TNGU	0903005MF$^{R}_{L}$-U	< 0.05																		R	R					
			090301MF$^{R}_{L}$-U	< 0.1																		R	R					
			090302MF$^{R}_{L}$-U	< 0.2																		R	R					
			090304MF$^{R}_{L}$-U	< 0.4																		R	R					
Low Feed	 With Honing	TNGU	090301ME$^{R}_{L}$-U	< 0.1																		R	R					
			090302ME$^{R}_{L}$-U	< 0.2																		R	R					
			090304ME$^{R}_{L}$-U	< 0.4																		R	R					

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance for corner R(rε).

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

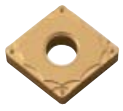
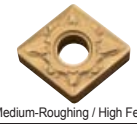
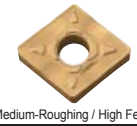
Inserts are sold in 10 piece boxes.

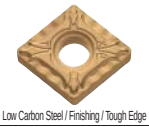
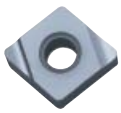
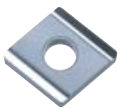
80°Diamond • Negative with Hole



(mm)

Description	A	T	ød
CN_0904_	9.525	4.76	3.81
CN_1204_	12.70	4.76	5.16

Insert	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Finishing-Medium with Wiper Edge	CNMG 120404WQ	0.4				●			D8 F42 F66
	CNMG 120408WQ	0.8				●			
 Finishing	CNMG 090404GP	0.4				●			D8 F66
	CNMG 090408GP	0.8				●			
	CNMG 120402GP	0.2			●	●			D8 F42 F66
	CNMG 120404GP	0.4	●		●	●			
	CNMG 120408GP	0.8			●	●			
 Finishing-Medium	CNMG 090404HQ	0.4				●			D8 F66
	CNMG 090408HQ	0.8				●			
	CNMG 120404HQ	0.4	●	●	●	●			D8 F42 F66
	CNMG 120408HQ	0.8	●	●	●	●			
	CNMG 120412HQ	1.2	●		●	●			
 Finishing-Medium / Up Facing	CNMG 120404CQ	0.4			●	●			
	CNMG 120408CQ	0.8			●	●			
	CNMG 120412CQ	1.2			●	●			
 Finishing-Medium	CNMP 120404TK	0.4					●	●	
	CNMP 120408TK	0.8					●	●	
 Medium-Roughing	CNMG 120404CS	0.4			●				
	CNMG 120408CS	0.8			●				
	CNMG 120412CS	1.2			●				
 Medium-Roughing	CNMG 090404GS	0.4				●			D8 F66
	CNMG 090408GS	0.8				●			
	CNMG 120404GS	0.4			●	●			D8 F42 F66
	CNMG 120408GS	0.8			●	●			
	CNMG 120412GS	1.2			●	●			
 Medium-Roughing	CNMG 120404HS	0.4	●		●	●			
	CNMG 120408HS	0.8	●	●	●	●			
	CNMG 120412HS	1.2			●	●			
 Medium-Roughing / High Feed	CNMG 120408GT	0.8				●			
	CNMG 120412GT	1.2				●			
 Medium-Roughing / High Feed	CNMG 120408HT	0.8				●			
	CNMG 120412HT	1.2				●			

Insert Handed Insert shows Right-hand	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Roughing	CNMG 120404	0.4	●	●	●	●			D8 F42 F66
	CNMG 120408	0.8	●	●	●	●			
	CNMG 120412	1.2			●	●			
 Low Carbon Steel / Finishing	CNMG 120404XP	0.4		●	●	●			
	CNMG 120408XP	0.8			●	●			
 Low Carbon Steel / Finishing / Tough Edge	CNMG 120404XP-T	0.4			●	●			
	CNMG 120408XP-T	0.8			●	●			
 Low Carbon Steel / Medium cutting	CNMG 120404XQ	0.4			●	●			
	CNMG 120408XQ	0.8			●	●			
 Low Carbon Steel / Roughing	CNMG 120408XS	0.8			●	●			
 Without Chipbreaker	CNMA 120404	0.4	●	●					
	CNMA 120408	0.8	●	●					
 Finishing / Surface Roughness Oriented	CNGG 090402R/L-S	0.2				●			D8 F66
	CNGG 090404R/L-S	0.4				●			
	CNGG 090408R/L-S	0.8				●			
 Medium	CNGG 090404R/L	0.4				●			
	CNGG 090408R/L	0.8				●			

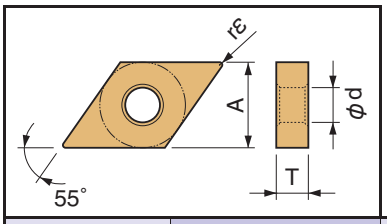
Please refer to pages B14 -B37

For other grade , See Page B14~B18

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

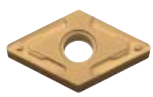
Inserts are sold in 10 piece boxes.

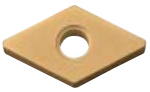
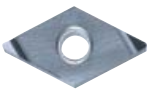
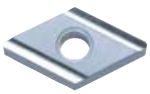
55°Diamond • Negative with Hole



(mm)

Description	A	T	ød
DN_1104_	9.525	4.76	3.81
DN_1504_	12.70	4.76	5.16
DN_1506_	12.70	6.35	5.16

Insert	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Finishing	DNMG 110404GP	0.4				●			D11
	110408GP	0.8				●			F67
	DNMG 150402GP	0.2			●	●			D10
	150404GP	0.4			●	●			D11
	150408GP	0.8			●	●			F43
 Finishing-Medium	DNMG 110402HQ	0.2				●			D11
	110404HQ	0.4				●			F67
	DNMG 150404HQ	0.4		●	●	●			
	150408HQ	0.8		●	●	●			
	150412HQ	1.2			●	●			
	DNMG 150604HQ	0.4		●		●			
	150608HQ	0.8		●		●			
	150612HQ	1.2		●					
 Finishing-Medium / Up Facing	DNMG 150404CQ	0.4			●	●			
	150408CQ	0.8			●	●			
	150412CQ	1.2			●	●			D10 D11 F43
 Finishing-Medium	DNMP 150604TK	0.4					●	●	
	150608TK	0.8					●	●	
 Medium-Roughing	DNMG 150404CS	0.4			●				
	150408CS	0.8			●				
	DNMG 110404GS	0.4				●			D11
	110408GS	0.8				●			F67
	DNMG 150404GS	0.4			●	●			
	150408GS	0.8			●	●			
	150412GS	1.2			●	●			
 Medium-Roughing	DNMG 150604GS	0.4				●			
	150608GS	0.8				●			
	150612GS	1.2				●			
 Medium-Roughing	DNMG 150404HS	0.4			●	●			
	150408HS	0.8		●	●	●			
	150412HS	1.2		●	●	●			
	DNMG 150604HS	0.4				●			D10
	150608HS	0.8				●			D11
	150612HS	1.2				●			F43
 Medium-Roughing / High Feed	DNMG 150408GT	0.8				●			
	150412GT	1.2				●			
	DNMG 150608GT	0.8				●			
	150612GT	1.2				●			
 Medium-Roughing / High Feed	DNMG 150408HT	0.8				●			
	150412HT	1.2				●			
	DNMG 150608HT	0.8				●			
	150612HT	1.2				●			

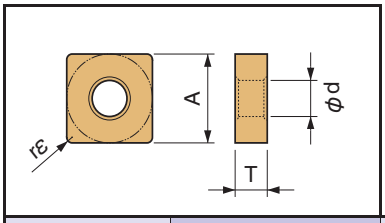
Insert Handed Insert shows Right-hand	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Roughing	DNMG 150404	0.4	●	●	●	●			
	150408	0.8	●	●	●	●			
	150412	1.2				●			
 Low Carbon Steel / Finishing	DNMG 150404XP	0.4			●	●			
	150408XP	0.8			●	●			
	DNMG 150604XP	0.4				●			
	150608XP	0.8				●			
 Low Carbon Steel / Finishing / Tough Edge	DNMG 150404XP-T	0.4			●	●			D10 D11 F43
	150408XP-T	0.8			●	●			
 Low Carbon Steel / Medium	DNMG 150404XQ	0.4			●	●			
	150408XQ	0.8			●	●			
 Low Carbon Steel / Roughing	DNMG 150408XS	0.8			●	●			
 Without Chipbreaker	DNMA 150404	0.4	●						
	150408	0.8	●	●					
 Finishing / Surface Roughness Oriented	DNGG 110402R/L-S	0.2				●			
	110404R/L-S	0.4				●			D11
	110408R/L-S	0.8				●			F67
 Medium	DNGG 110404R/L	0.4				●			
	110408R/L	0.8				●			
	DNGG 150404R/L	0.4	●		●	●			D10
	150408R/L	0.8	●		●	●			D11 F43

Please refer to pages B14 - B37

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

90°Square • Negative with Hole

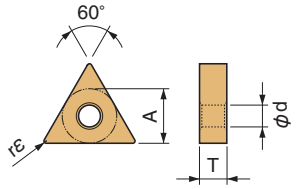


(mm)

Description	A	T	ød
SN_0903_	9.525	3.18	3.81
SN_1204_	12.70	4.76	5.16
SNMN1204_	12.70	4.76	-

Insert (Handed Insert shows Right-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Finishing-Medium	SNMG 120404HQ	0.4			●	●			
	SNMG 120408HQ	0.8	●	●	●	●			
	SNMG 120412HQ	1.2			●	●			
 Medium-Roughing	SNMG 120408HS	0.8			●	●			
	SNMG 120412HS	1.2			●	●			
 Medium-Roughing / High Feed	SNMG 120408HT	0.8				●			
	SNMG 120412HT	1.2				●			
 Roughing	SNMG 120404	0.4	●		●	●			
	SNMG 120408	0.8	●		●	●			
	SNMG 120412	1.2			●	●			
	SNMG 120416	1.6				●			
 Low Carbon Steel / Finishing	SNMG 120408XP	0.8			●	●			D12 D13
 Low Carbon Steel / Medium cutting	SNMG 120408XQ	0.8			●	●			
 Low Carbon Steel / Roughing	SNMG 120408XS	0.8			●	●			
 Without Chipbreaker	SNMA 120404	0.4	●						
	SNMA 120408	0.8	●						
 Without Hole / without Chipbreaker	SNMN 120408	0.8						●	
	SNMN 120412	1.2						●	
 -B: Finishing-Medium -C: Medium-Roughing	SNGG 090308R/L-B	0.8	R						D13
	SNGG 120404R/L-C	0.4	●			●			D12
	SNGG 120408R/L-C	0.8	●			●			D13

60°Triangle • Negative with Hole



(mm)

Description	A	T	ød
TN_1104_	6.35	3.18	2.26
TN_1604_	9.525	4.76	3.81
TN_2204_	12.70	4.76	5.16

Insert	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Finishing	TNMG 110404GP	0.4				●			D14
	TNMG 110408GP	0.8				●			F68
	TNMG 160402GP	0.2			●	●			D14
	TNMG 160404GP	0.4	●		●	●			D15 F43
	TNMG 160408GP	0.8	●		●	●			F68
 Finishing-Medium	TNMG 110404HQ	0.4				●			D14
	TNMG 110408HQ	0.8				●			F68
	TNMG 160404HQ	0.4	●	●	●	●			
	TNMG 160408HQ	0.8	●	●	●	●			
	TNMG 160412HQ	1.2	●		●	●			
 Finishing-Medium / Up Facing	TNMG 160404CQ	0.4			●	●			
	TNMG 160408CQ	0.8			●	●			
	TNMG 160412CQ	1.2			●	●			D14 D15
 Finishing-Medium	TNMP 160404TK	0.4					●	●	F43 F68
	TNMP 160408TK	0.8					●	●	
 Medium-Roughing	TNMG 160404CS	0.4			●				
	TNMG 160408CS	0.8			●				
 Medium-Roughing	TNMG 110404GS	0.4				●			D14
	TNMG 110408GS	0.8				●			F68
	TNMG 160404GS	0.4			●	●			
	TNMG 160408GS	0.8			●	●			D14
	TNMG 160412GS	1.2			●	●			D15
 Medium-Roughing	TNMG 160404HS	0.4	●		●	●			F43
	TNMG 160408HS	0.8	●		●	●			F68
	TNMG 160412HS	1.2			●	●			
	TNMG 220408HS	0.8				●			D14
 Medium-Roughing / High Feed	TNMG 160408GT	0.8				●			
	TNMG 160412GT	1.2				●			
 Medium-Roughing / High Feed	TNMG 160408HT	0.8				●			D14 D15 F43 F68
	TNMG 160412HT	1.2				●			
 Roughing	TNMG 160404	0.4	●	●	●	●			
	TNMG 160408	0.8	●	●	●	●			
	TNMG 160412	1.2	●			●			

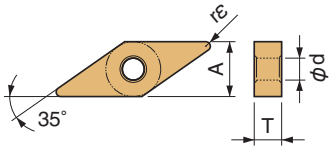
Please refer to pages B14 - B37

For other grade, See Page B25~B27, B28~B32

Inserts are sold in 10 piece boxes.

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

35°Diamond • Negative with Hole



(mm)

Description	A	T	ød
VN_1604_	9.525	4.76	3.81

Insert Handed Insert shows Right-hand	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Low Carbon Steel / Finishing	TNMG 160404XP	0.4			●	●			D14 D15 F43 F68
	TNMG 160408XP	0.8			●	●			
 Low Carbon Steel / Finishing / Tough Edge	TNMG 160404XP-T	0.4			●	●			
	TNMG 160408XP-T	0.8			●	●			
 Low Carbon Steel / Medium cutting	TNMG 160404XQ	0.4			●	●			
	TNMG 160408XQ	0.8			●	●			
 Low Carbon Steel / Roughing	TNMG 160408XS	0.8			●	●			
 Without Chipbreaker	TNMA 160404	0.4	●	●					
	TNMA 160408	0.8	●	●					
 Finishing / Surface Roughness Oriented	TNGG 110402R/L-S	0.2				●			D14
	TNGG 110404R/L-S	0.4				●			
	TNGG 110408R/L-S	0.8				●			
	TNGG 160402R/L-S	0.2	●	●	●	●			D14 D15 F43 F68
	TNGG 160404R/L-S	0.4	●	●	●	●			
	TNGG 160408R/L-S	0.8	●		●				
 Finishing-Medium	TNGG 160404R/L-Y	0.4	●						
	TNGG 160408R/L-Y	0.8	●						
 -B: Finishing-Medium -C: Medium-Roughing	TNGG 110302R/L-B	0.2	●						D14
	TNGG 110304R/L-B	0.4	●						
	TNGG 110402R/L	0.2				●			D14 F68
	TNGG 110404R/L	0.4				●			
	TNGG 110408R/L	0.8				●			
	TNGG 160402R/L-B	0.2	●	●	●				D14 D15
	TNGG 160404R/L-B	0.4	●		●				
	TNGG 160404R/L-C	0.4	●	●	●	●			F43 F68
	TNGG 160408R/L-C	0.8	●	●	●	●			
	TNGG 220404R/L-C	0.4	●						D14
	TNGG 220408R/L-C	0.8	●						
	TNMG 160404R/L-C	0.4	●	●	●				D14 D15 F43 F68
	TNMG 160408R/L-C	0.8	●	●	●				
 Medium-Roughing / Low Cutting Resistance	TNGG 160404R/L-25R	0.4	●		●				
	TNGG 160408R/L-25R	0.8	●		●				

Insert Handed Insert shows Right-hand	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Finishing	VNMG 160402GP	0.2			●	●			D16 D17 D18
	VNMG 160404GP	0.4	●		●	●			
	VNMG 160408GP	0.8			●	●			
 Finishing-Medium	VNMG 160404HQ	0.4			●	●			
	VNMG 160408HQ	0.8			●	●			
	VNMG 160412HQ	1.2			●	●			
 Roughing	VNMG 160404	0.4	●	●	●	●			
	VNMG 160408	0.8	●	●	●	●			
 Low Carbon Steel Finishing	VNMG 160404XP	0.4				●			
 Medium	VNGG 160402R/L	0.2	●	●	●	●			
	VNGG 160404R/L	0.4	●	●	●	●			
	VNGG 160408R/L	0.8				●			

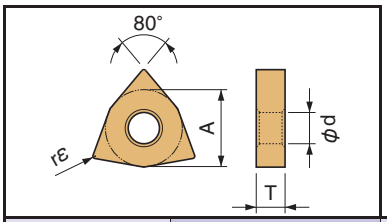
Please refer to pages B14 -B37

For other grade, See Page ➡ B28~B32, B34

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

80°Trigon • Negative with Hole



(mm)

Description	A	T	ød
WN_06T3_	9.525	3.96	3.81
WN_0604_	9.525	4.76	3.81
WN_0804_	12.70	4.76	5.16

Insert	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
Finishing-Medium with Wiper Edge	WNMG 080404WQ	0.4				●			D20 F70
	WNMG 080408WQ	0.8				●			
Finishing	WNMG 060404GP	0.4				●			D20 F69
	WNMG 060408GP	0.8				●			
	WNMG 080404GP	0.4			●	●			D20 F70
	WNMG 080408GP	0.8			●	●			
Finishing-Medium	WNMG 060404HQ	0.4				●			D20 F69
	WNMG 060408HQ	0.8				●			
	WNMG 080404HQ	0.4			●	●			D20 F70
	WNMG 080408HQ	0.8		●	●	●			
	WNMG 080412HQ	1.2		●	●	●			
Finishing-Medium / Up Facing	WNMG 080404CQ	0.4			●	●			
	WNMG 080408CQ	0.8			●	●			
	WNMG 080412CQ	1.2			●	●			
Medium-Roughing	WNMG 080408CS	0.8			●				
Medium-Roughing	WNMG 060404GS	0.4				●			D20 F69
	WNMG 060408GS	0.8				●			
	WNMG 080404GS	0.4			●	●			
	WNMG 080408GS	0.8			●	●			
	WNMG 080412GS	1.2			●	●			
Medium-Roughing	WNMG 080404HS	0.4			●	●			
	WNMG 080408HS	0.8			●	●			
	WNMG 080412HS	1.2			●	●			
Medium-Roughing / High Feed	WNMG 080408GT	0.8				●			D20 F70
	WNMG 080412GT	1.2				●			
Medium-Roughing / High Feed	WNMG 080408HT	0.8				●			
	WNMG 080412HT	1.2				●			

Insert (Handed Insert shows Right-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
Roughing	WNMG 080404	0.4	●	●					
	WNMG 080408	0.8	●	●					
Low Carbon Steel / Finishing	WNMG 080404XP	0.4			●	●			
	WNMG 080408XP	0.8			●	●			
Low Carbon Steel / Medium	WNMG 080404XQ	0.4			●	●			D20 F70
	WNMG 080408XQ	0.8			●	●			
Low Carbon Steel / Roughing	WNMG 080408XS	0.8			●	●			
Without Chipbreaker	WNMA 080404	0.4	●						
	WNMA 080408	0.8	●	●					
Finishing / Surface Roughness Oriented	WNGG 060402R/L-S	0.2				●			D20 F69
	WNGG 060404R/L-S	0.4				●			
	WNGG 060408R/L-S	0.8				●			
Medium	WNGG 060404R/L	0.4				●			
	WNGG 060408R/L	0.8				●			

Please refer to pages B14 -B37

For other grade, See Page B35~B37

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

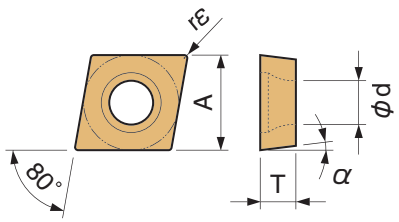
80°Diamond • Positive with Hole

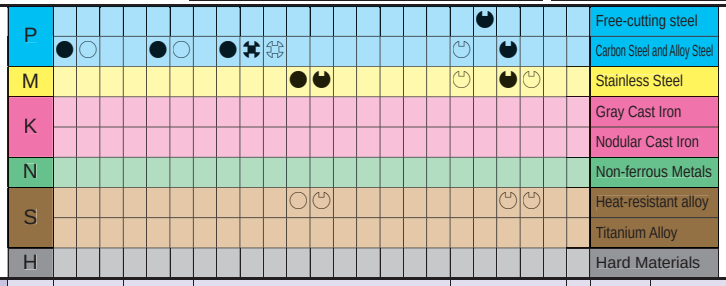
(mm)

Description	A	T	ød	α
CC_0301_	3.5	1.4	1.9	7°
CC_0401_	4.3	1.8	2.3	7°

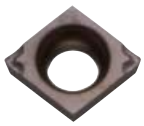
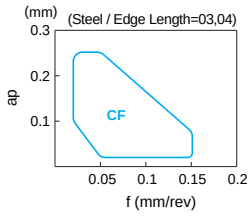
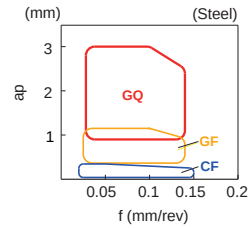
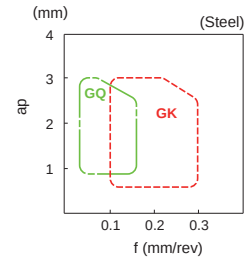
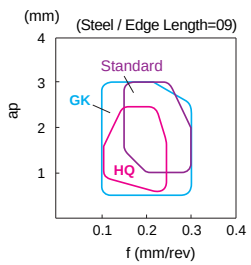
(mm)

Description	A	T	ød	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°





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 under 45HRC)

	Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Minute ap		Sharp Edge	CCGT	030101M-CF	< 0.1																		●	●			F24 F49	
				030102M-CF	< 0.2																		●	●				
			CCGT	040101M-CF	< 0.1																		●	●				
				040102M-CF	< 0.2																		●	●				
Minute ap		Sharp Edge / Polished Surface	CCGT	030101MP-CF	< 0.1																			●				
				030102MP-CF	< 0.2																			●				
			CCGT	040101MP-CF	< 0.1																			●				
				040102MP-CF	< 0.2																			●				
Finishing		Sharp Edge	CCGT	060201MF-GF	< 0.1																			●			E11~13 F49~50	
				060202MF-GF	< 0.2																			●				
			CCGT	09T301MF-GF	< 0.1																			●			E11~13 F24 F44	
				09T302MF-GF	< 0.2																			●				
				09T304MF-GF	< 0.4																			●				
Finishing		Sharp Edge / Polished Surface	CCGT	060201MFP-GF	< 0.1																			●			E11~13 F49~50	
				060202MFP-GF	< 0.2																			●				
			CCGT	09T301MFP-GF	< 0.1																			●			E11~13 F24 F44	
				09T302MFP-GF	< 0.2																			●				
				09T304MFP-GF	< 0.4																			●				
Finishing-Medium		Sharp Edge	CCGT	060201MF-GQ	< 0.1																			●			E11~13 F49~50	
				060202MF-GQ	< 0.2																			●				
				060204MF-GQ	< 0.4																			●				
			CCGT	09T301MF-GQ	< 0.1																			●			E11~13 F24 F44	
				09T302MF-GQ	< 0.2																			●				
				09T304MF-GQ	< 0.4																			●				
Finishing-Medium		Sharp Edge / Polished Surface	CCGT	060201MFP-GQ	< 0.1																			●			E11~13 F49~50	
				060202MFP-GQ	< 0.2																			●				
				060204MFP-GQ	< 0.4																			●				
			CCGT	09T301MFP-GQ	< 0.1																			●			E11~13 F24 F44	
				09T302MFP-GQ	< 0.2																			●				
				09T304MFP-GQ	< 0.4																			●				
Finishing-Medium			CCMT	060202GK	0.2	●	●		●	●		●	●	●	●	●	●				○		●		●	●	E11~13 F49~50	
				060204GK	0.4	●	●		●	●		●	●	●	●	●	●				○		●		●	●		
			CCMT	09T302GK	0.2	●	●		●	●		●	●	●	●	●	●				○		●		●	●	E11~13 F24 F44	
				09T304GK	0.4	●	●		●	●		●	●	●	●	●	●				○		●		●	●		
			CCMT	120404GK	0.4	●	●		●	●		●	●	●	●	●	●				○		●		●	●	E12	
				120408GK	0.8	●	●		●	●		●	●	●	●	●	●				○		●		●	●		
				120412GK	1.2		●			●		●	●	●	●	●	●						●		●	●		
Finishing-Medium			CCMT	060202HQ	0.2	●	●	●	●	●		●	●	●	●	●							●		●	●	E11~13 F49~50	
				060204HQ	0.4	●	●	●	●	●		●	●	●	●	●							●		●	●		
			CCMT	09T302HQ	0.2	●	●	●	●	●		●	●	●	●	●							●		●	●	E11~13 F24 F44	
				09T304HQ	0.4	●	●	●	●	●		●	●	●	●	●							●		●	●		
				09T308HQ	0.8	●	●	●	●	●		●	●	●	●	●							●		●	●		

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05, <0.1, <0.2** etc.) indicate models with minus tolerance for corner R(rε).

For other grade , See Page ➡ **B74**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

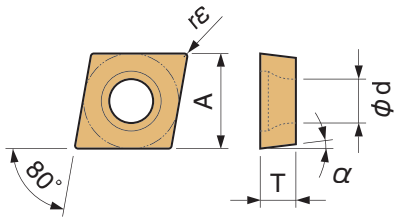
80°Diamond • Positive with Hole

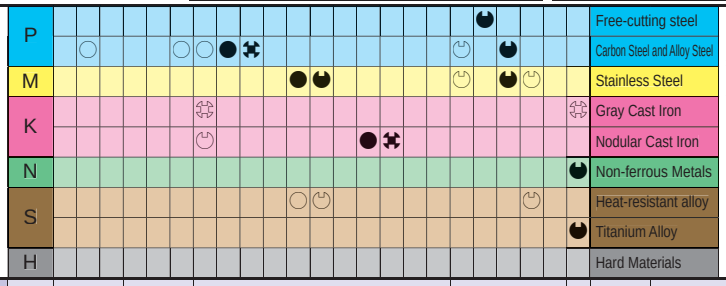
(mm)

Description	A	T	ød	α
CC_0301_	3.5	1.4	1.9	7°
CC_0401_	4.3	1.8	2.3	7°

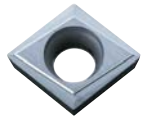
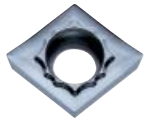
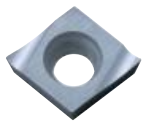
(mm)

Description	A	T	ød	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium		CCGT 060201 060202 060204	0.1 0.2 0.4		● ● ●	● ● ●			● ● ●												● ● ●					E11~13 F24 F49~50	
		CCGT 09T301 09T302 09T304	0.1 0.2 0.4		● ● ●	● ● ●			● ● ●												● ● ●					E11~13 F24 F44	
		CCMT 09T308	0.8		●	●			●	●	●	●		●	●		●	●	◯	◯	●		●	●			
		CCGT 0602005M 060201M 060202M 060204M	< 0.05 < 0.1 < 0.2 < 0.4																			● ● ● ●				E11~13 F24 F49~50	(mm) (Steel / Edge Length=09) ap f (mm/rev) Standard GK HQ
		CCGT 09T3005M 09T301M 09T302M 09T304M	< 0.05 < 0.1 < 0.2 < 0.4																			● ● ● ●				E11~13 F24 F44	
Medium cutting	 Sharp Edge	CCGT 0602005MF 060201MF 060202MF 060204MF	< 0.05 < 0.1 < 0.2 < 0.4																			● ● ●				E11~13 F24 F49~50	
		CCGT 09T3005MF 09T301MF 09T302MF 09T304MF	< 0.05 < 0.1 < 0.2 < 0.4																			● ● ●				E11~13 F24 F44	
Medium Cutting		CCGT 060202FN-Z 060204FN-Z	0.2 0.4		● ●	● ●			● ●												● ●					E11~13 F24 F49~50	
		CCGT 09T302FN-Z 09T304FN-Z 09T308FN-Z	0.2 0.4 0.8		● ●	● ●															● ● ●						
Stainless Steel	 Finishing-Medium	CCMT 09T304MQ 09T308MQ	0.4 0.8											● ●	● ●								● ●			E11~13 F24 F44	(mm) (Stainless Steel) ap f (mm/rev) MQ
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	CCGT 09T304AH 09T308AH	0.4 0.8																						● ●		(mm) (Non-ferrous Metals) ap f (mm/rev) AH A3
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	CCGT 09T302R/L-A3 09T304R/L-A3 09T308R/L-A3	0.2 0.4 0.8																						● ● ●		
		CCGT 120402R/L-A3 120404R/L-A3 120408R/L-A3	0.2 0.4 0.8																						● ● ●	E12	

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page **B74**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

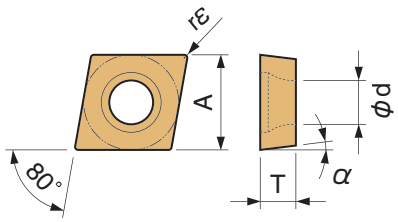
80°Diamond • Positive with Hole

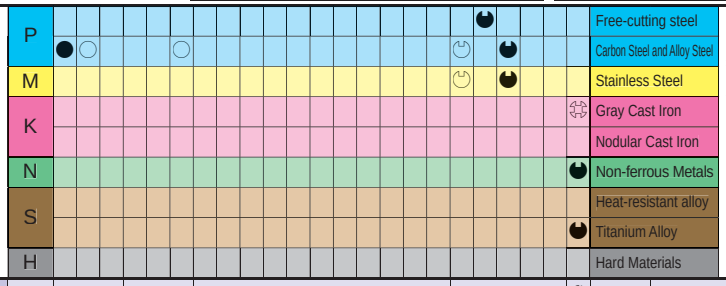
(mm)

Description	A	T	ød	α
CC_0301_	3.5	1.4	1.9	7°
CC_0401_	4.3	1.8	2.3	7°

(mm)

Description	A	T	ød	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Cast Iron — Without Chipbreaker	CCGW 060200	0.0																			●			●	E11~13	—
	CCGW 060201	0.1																			●			●	F24	
	CCGW 060202	0.2																			●			●	F49~50	
	CCGW 09T300	0.0																			●			●	E11~13	
	CCGW 09T301	0.1																			●			●	F24	
	CCGW 09T302	0.2																			●			●	F44	
	CCGW 09T304	0.4																			●			●		
Finishing — Super Fine / Sharp Edge / Precision	CCET 0301003R/L-FSF	0.03																		●					F24 F49	(mm) 0.5 ap 0 (Steel / Edge Length=03) F / FSF 0.05 0.1 0.15 0.2 f (mm/rev)
	CCET 030101R/L-FSF	0.1			●															●						
	CCET 030102R/L-FSF	0.2			●															●						
	CCET 030104R/L-FSF	0.4			●															●						
	CCET 0401003R/L-FSF	0.03																		●						
	CCET 040101R/L-FSF	0.1			●															●						
	CCET 040102R/L-FSF	0.2			●															●						
	CCET 040104R/L-FSF	0.4			●															●						
	CCET 0301005MR/L-FSF	< 0.05																				●				
	CCET 030101MR/L-FSF	< 0.1																				●				
	CCET 030102MR/L-FSF	< 0.2																				●				
	CCET 030104MR/L-FSF	< 0.4																				●				
	CCET 0401005MR/L-FSF	< 0.05																				●				
	CCET 040101MR/L-FSF	< 0.1																				●				
	CCET 040102MR/L-FSF	< 0.2																				●				
	CCET 040104MR/L-FSF	< 0.4																				●				
Finishing — Sharp Edge	CCGT 0301003R/L-F	0.03			●															●						(mm) 0.5 ap 0 (Steel / Edge Length=04) F / FSF 0.05 0.1 0.15 0.2 f (mm/rev)
	CCGT 030101R/L-F	0.1			●															●				●		
	CCGT 030102R/L-F	0.2	L	L	●			L												●				●		
	CCGT 030104R/L-F	0.4	L	L	●			L												●				●		
	CCGT 0401003R/L-F	0.03																		●						
	CCGT 040101R/L-F	0.1			●															●				●		
	CCGT 040102R/L-F	0.2	L	L	●			L												●				●		
	CCGT 040104R/L-F	0.4	L	L	●			L												●				●		
	CCGT 0301005MR/L-F	< 0.05																			●	●				
	CCGT 030101MR/L-F	< 0.1																			●	●				
	CCGT 030102MR/L-F	< 0.2																			●	●				
	CCGT 030104MR/L-F	< 0.4																			●	●				
	CCGT 0401005MR/L-F	< 0.05																			●	●				
	CCGT 040101MR/L-F	< 0.1																			●	●				
	CCGT 040102MR/L-F	< 0.2																			●	●				
	CCGT 040104MR/L-F	< 0.4																			●	●				
Finishing-Medium	CCGT 060202R/L-FS	0.2			●																●				E11~13 F24 F49~50	
	CCGT 060204R/L-FS	0.4			●																●					
	CCGT 09T302R/L-FS	0.2			●																			●	E11~13	
	CCGT 09T304R/L-FS	0.4			●																			●	F24	
	CCGT 09T308R/L-FS	0.8			●																				F44	

・ Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV30 PV60 PV90 PR905 PR915 } , See Page ➡ **B74**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

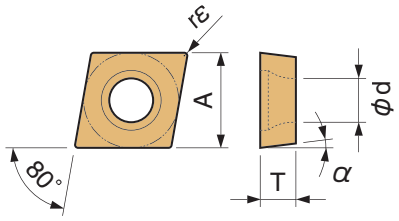
80°Diamond • Positive with Hole

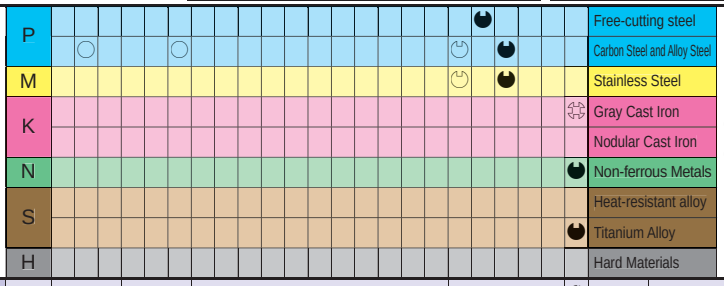
(mm)

Description	A	T	ød	α
CC_0301_	3.5	1.4	1.9	7°
CC_0401_	4.3	1.8	2.3	7°

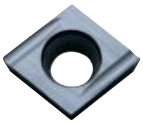
(mm)

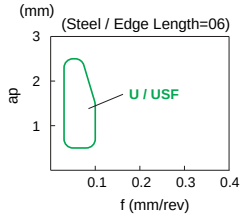
Description	A	T	ød	α
CC_0602_	6.35	2.38	2.8	7°
CC_09T3_	9.525	3.97	4.4	7°
CC_1204_	12.7	4.76	5.5	7°

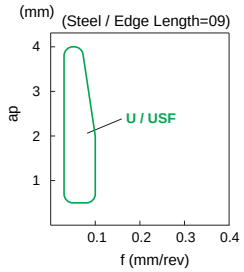




Classification of usage
✖: Interruption / 1st Choice
✱: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Low Feed	 Sharp Edge	CCGT	060200F$^{R}_{L}$-U	0.0																						●	E11~13 F24 F49~50	
			0602003F$^{R}_{L}$-U	0.03			●															●				●		
			060201F$^{R}_{L}$-U	0.1		●	●															●				●		
			060202F$^{R}_{L}$-U	0.2		●	●			L												●				●		
		CCGT	09T300F$^{R}_{L}$-U	0.0																						●	E11~13 F24 F44	
			09T3003F$^{R}_{L}$-U	0.03			●															●				●		
			09T301F$^{R}_{L}$-U	0.1		R	●															●				●		
			09T302F$^{R}_{L}$-U	0.2		R	●															●				●		
		CCGT	0602005MF$^{R}_{L}$-U	< 0.05																			●	●			E11~13 F24 F49~50	
			060201MF$^{R}_{L}$-U	< 0.1																			●	●				
			060202MF$^{R}_{L}$-U	< 0.2																			●	●				
			060204MF$^{R}_{L}$-U	< 0.4																			●	●				
		CCGT	09T3005MF$^{R}_{L}$-U	< 0.05																			●	●			E11~13 F24 F44	
			09T301MF$^{R}_{L}$-U	< 0.1																			●	●				
			09T302MF$^{R}_{L}$-U	< 0.2																			●	●				
			09T304MF$^{R}_{L}$-U	< 0.4																			●	●				
Low Feed	 Super Fine Sharp Edge / Precision	CCET	0602003F$^{R}_{L}$-USF	0.03			R															●				●	E11~13 F24 F49~50	
			060201F$^{R}_{L}$-USF	0.1			●															●				●		
			060202F$^{R}_{L}$-USF	0.2			●															●				●		
		CCET	09T3003F$^{R}_{L}$-USF	0.03			R															●				●	E11~13 F24 F44	
			09T301F$^{R}_{L}$-USF	0.1			●															●				●		
			09T302F$^{R}_{L}$-USF	0.2			●															●				●		
		CCET	0602005MF$^{R}_{L}$-USF	< 0.05																				●			E11~13 F24 F49~50	
			060201MF$^{R}_{L}$-USF	< 0.1																				●				
			060202MF$^{R}_{L}$-USF	< 0.2																				●				
		CCET	09T3005MF$^{R}_{L}$-USF	< 0.05																				●			E11~13 F24 F44	
			09T301MF$^{R}_{L}$-USF	< 0.1																				●				
			09T302MF$^{R}_{L}$-USF	< 0.2																				●				
Low Feed	 With Honing	CCGT	060201E$^{R}_{L}$-U	0.1			●															●				●	E11~13 F24 F49~50	
			060202E$^{R}_{L}$-U	0.2		●	●			L												●				●		
			060204E$^{R}_{L}$-U	0.4		●	●			L												●				●		
		CCGT	09T301E$^{R}_{L}$-U	0.1			●															●				●	E11~13 F24 F44	
			09T302E$^{R}_{L}$-U	0.2		R	●															●				●		
			09T304E$^{R}_{L}$-U	0.4		R	●															●				●		
		CCGT	060201ME$^{R}_{L}$-U	< 0.1																				●			E11~13 F24 F49~50	
			060202ME$^{R}_{L}$-U	< 0.2																				●				
			060204ME$^{R}_{L}$-U	< 0.4																				●				
		CCGT	09T301ME$^{R}_{L}$-U	< 0.1																				●			E11~13 F24 F44	
			09T302ME$^{R}_{L}$-U	< 0.2																				●				
			09T304ME$^{R}_{L}$-U	< 0.4																				●				





・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page **B74**

Inserts are sold in 10 piece boxes.

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

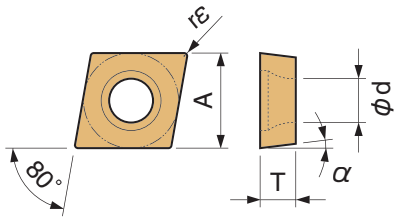
80°Diamond • Positive with Hole

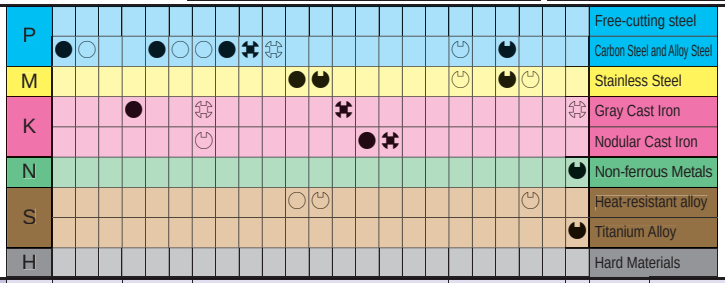
(mm)

Description	A	T	ød	α
CPMT0802_	7.94	2.38	3.3	11°
CPMT0903_	9.525	3.18	4.4	11°

(mm)

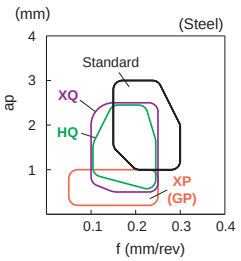
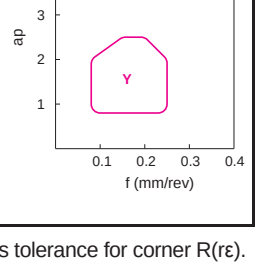
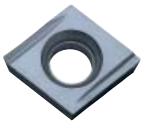
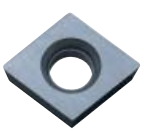
Description	A	T	ød	α
CP_0802_	7.94	2.38	3.5	11°
CP_0903_	9.525	3.18	4.5	11°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing		CPMT	080204GP	0.4	●	●	●		●	●		●	●									●		●			F27 F49 F50	
		CPMT	090304GP 090308GP	0.4 0.8	● ●	● ●	● ●		● ●	● ●		● ●	● ●									● ●		● ●				
Finishing-Medium		CPMH	080204HQ 080208HQ	0.4 0.8	● ●	● ●	● ●		● ●	● ●		● ●	● ●	● ●	● ●	● ●						● ●		● ●	● ●			
		CPMH	090304HQ 090308HQ	0.4 0.8	● ●	● ●	● ●		● ●	● ●		● ●	● ●	● ●	● ●	● ●						● ●		● ●	● ●			
Medium cutting		CPMH	080204 080208	0.4 0.8	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●		● ●	● ●	● ●	● ●	● ●	○ ○	○ ○	● ●		● ●	● ●			
		CPMH	090304 090308	0.4 0.8	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●		● ●	● ●	● ●	● ●	● ●	○ ○	○ ○	● ●		● ●	● ●			
Low Carbon Steel	 Finishing	CPMT	080204XP	0.4		●			●	●		●	●									●		●				
		CPMT	090304XP 090308XP	0.4 0.8		● ●			● ●	● ●		● ●	● ●									● ●		● ●				
Low Carbon Steel	 Finishing-Medium	CPMT	090304XQ 090308XQ	0.4 0.8		● ●			● ●	● ●		● ●	● ●															
Finishing-Medium		CPMH	080204R/L-Y 080208R/L-Y	0.4 0.8		L	● ●			L												● ●		● ●		● ●		
		CPMH	090304R/L-Y 090308R/L-Y	0.4 0.8		L	● ●			L												● ●		● ●		● ●		
Cast Iron	 Without Chipbreaker	CPMB	080202 080204 080208	0.2 0.4 0.8																						● ● ●		
		CPMB	090302 090304 090308	0.2 0.4 0.8																						● ● ●		

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B74**

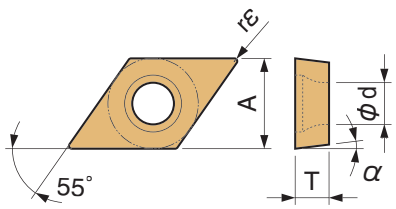
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

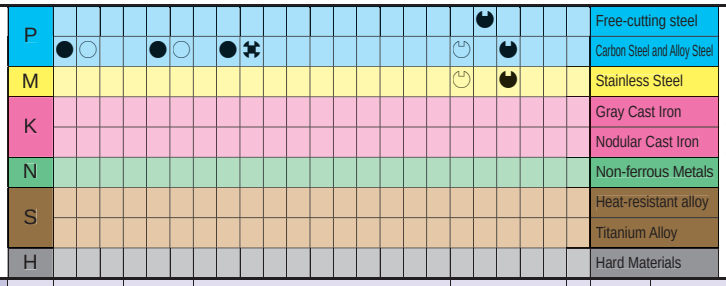
Inserts are sold in 10 piece boxes.

55°Diamond • Positive with Hole

(mm)

Description	A	T	ød	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°

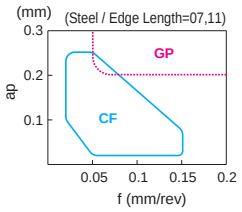


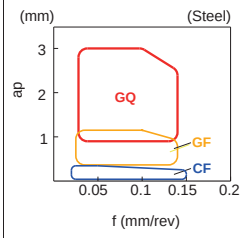


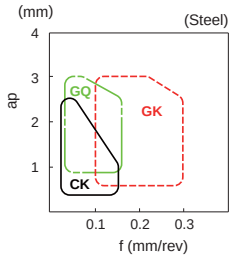
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Minute ap	 Sharp Edge	DCGT	070202CF	0.2																		●						
		DCGT	11T302CF	0.2																		●						
		DCGT	070201M-CF 070202M-CF	< 0.1 < 0.2																			● ● ● ●	● ● ● ●				
		DCGT	11T301M-CF 11T302M-CF	< 0.1 < 0.2																			● ● ● ●	● ● ● ●				
Minute ap	 Sharp Edge / Polished Surface	DCGT	070201MP-CF 070202MP-CF	< 0.1 < 0.2																				● ● ● ●				
		DCGT	11T301MP-CF 11T302MP-CF	< 0.1 < 0.2																				● ● ● ●				
Finishing	 Sharp Edge	DCGT	070201MF-GF 070202MF-GF	< 0.1 < 0.2																				● ● ● ●				
		DCGT	11T301MF-GF 11T302MF-GF 11T304MF-GF	< 0.1 < 0.2 < 0.4																				● ● ● ● ● ●				
Finishing	 Sharp Edge / Polished Surface	DCGT	070201MFP-GF 070202MFP-GF	< 0.1 < 0.2																				● ● ● ●				
		DCGT	11T301MFP-GF 11T302MFP-GF 11T304MFP-GF	< 0.1 < 0.2 < 0.4																				● ● ● ● ● ●				
Finishing		DCGT	070201CK 070202CK	0.1 0.2																		● ● ● ●						
		DCGT	11T301CK 11T302CK	0.1 0.2																		● ● ● ●						
		DCGT	070201M-CK 070202M-CK	< 0.1 < 0.2																			● ● ● ●	● ● ● ●				
		DCGT	11T301M-CK 11T302M-CK	< 0.1 < 0.2																			● ● ● ●	● ● ● ●				
Finishing	 Sharp Edge / Polished Surface	DCGT	070201MP-CK 070202MP-CK	< 0.1 < 0.2																				● ● ● ●				
		DCGT	11T301MP-CK 11T302MP-CK	< 0.1 < 0.2																				● ● ● ●				
Finishing		DCMT	070202GP 070204GP	0.2 0.4	● ● ● ● ● ●				● ● ● ●			● ● ● ●										● ● ● ●		● ● ● ●				
		DCMT	11T304GP 11T308GP	0.4 0.8	● ● ● ● ● ●				● ● ● ●			● ● ● ●										● ● ● ●		● ● ● ●				

Refer to the table below







・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

Description	Ref. Page for Toolholder
DC..07 type	**E14~17,E19~21,F29,F51~52**
DC..11 type	**E14~17,E19~21,F29,F44,F51~52**

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page **B75**

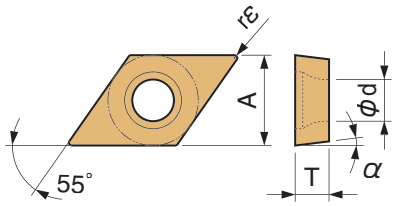
Inserts are sold in 10 piece boxes.

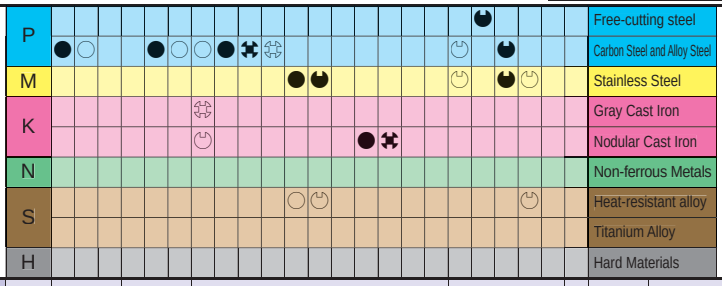
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

55°Diamond • Positive with Hole

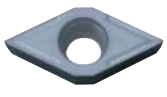
(mm)

Description	A	T	ød	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°



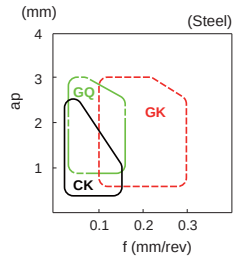


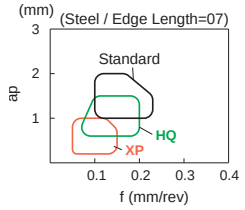
Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

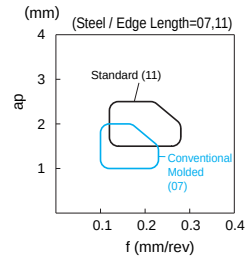
Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing-Medium	 Sharp Edge	DCGT	070201MF-GQ	< 0.1																			●				
			070202MF-GQ	< 0.2																			●				
			070204MF-GQ	< 0.4																			●				
		DCGT	11T301MF-GQ	< 0.1																			●				
			11T302MF-GQ	< 0.2																			●				
			11T304MF-GQ	< 0.4																			●				
Finishing-Medium	 Sharp Edge / Polished Surface	DCGT	070201MFP-GQ	< 0.1																			●				
			070202MFP-GQ	< 0.2																			●				
			070204MFP-GQ	< 0.4																			●				
		DCGT	11T301MFP-GQ	< 0.1																			●				
			11T302MFP-GQ	< 0.2																			●				
			11T304MFP-GQ	< 0.4																			●				
Finishing-Medium		DCMT	070202GK	0.2	●	●		●	●		●	●	●	●	●	●	●	●	○	○	●		●	●				
			070204GK	0.4	●	●		●	●		●	●	●	●	●	●	●	●	○	○	●		●	●				
			070208GK	0.8	●	●		●	●		●	●	●	●	●	●	●	●	○	○	●		●	●				
		DCMT	11T302GK	0.2	●	●		●	●		●	●	●	●	●	●	●			○	●		●	●				
			11T304GK	0.4	●	●		●	●		●	●	●	●	●	●	●			○	●		●	●				
			11T308GK	0.8	●	●		●	●		●	●	●	●	●	●	●			○	●		●	●				
Finishing-Medium		DCMT	070202HQ	0.2	●	●	●	●	●		●	●	●								●		●					
			070204HQ	0.4	●	●	●	●	●		●	●	●	●	●	●					●		●	●				
			070208HQ	0.8	●	●	●	●	●		●	●	●	●	●	●					●		●	●				
		DCMT	11T302HQ	0.2	●	●	●	●	●		●	●	●	●	●	●					●		●	●				
			11T304HQ	0.4	●	●	●	●	●		●	●	●	●	●	●					●		●	●				
			11T308HQ	0.8	●	●	●	●	●		●	●	●	●	●	●					●		●	●				
Medium		DCGT	070201	0.1		●	●														●							
			070202	0.2		●	●			●											●							
			070204	0.4		●	●			●											●							
		DCGT	11T301	0.1			●														●							
			11T302	0.2		●	●			●											●							
			11T304	0.4		●	●			●											●							
		DCMT	11T308	0.8		●	●			●	●						●	●	○	○	●		●					
		DCGT	0702005M	< 0.05																			●				
			070201M	< 0.1																			●				
			070202M	< 0.2																			●				
			070204M	< 0.4																			●				
		DCGT	11T3005M	< 0.05																			●				
			11T301M	< 0.1																			●				
			11T302M	< 0.2																			●				
			11T304M	< 0.4																			●				
Medium	 Sharp Edge	DCGT	0702005MF	< 0.05																			●				
			070201MF	< 0.1																		●	●				
			070202MF	< 0.2																		●	●				
			070204MF	< 0.4																		●	●				
		DCGT	11T3005MF	< 0.05																			●				
			11T301MF	< 0.1																		●	●				
			11T302MF	< 0.2																		●	●				
			11T304MF	< 0.4																		●	●				

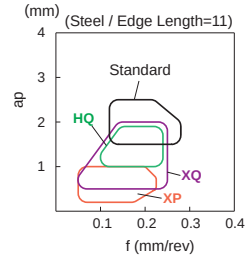
Refer to the table below

Applicable Chipbreaker Range









・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

Description	Ref. Page for Toolholder
DC..07 type	**E14~17,E19~21,F29,F51~52**
DC..11 type	**E14~17,E19~21,F29,F44,F51~52**

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B75**

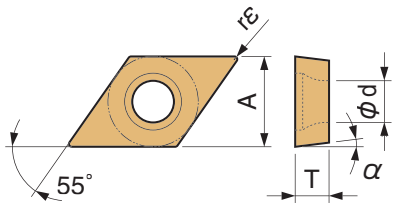
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

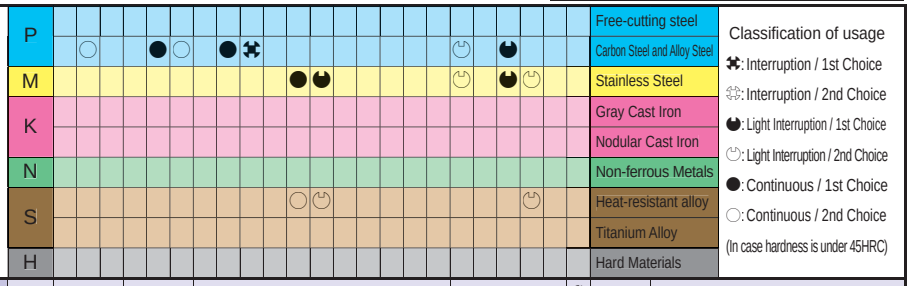
Inserts are sold in 10 piece boxes.

55°Diamond • Positive with Hole

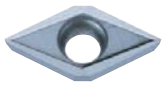
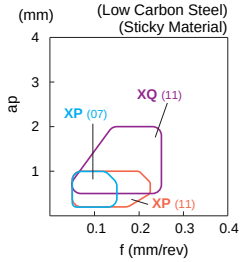
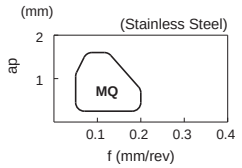
(mm)

Description	A	T	ød	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°





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 under 45HRC)

	Insert	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium	 Sharp Edge	DCGT 070202FN-Z 070204FN-Z	0.2 0.4		● ●	● ●			● ●												● ●					Refer to the table below	—
		DCGT 11T302FN-Z 11T304FN-Z 11T308FN-Z	0.2 0.4 0.8		● ● ●	● ● ●			● ● ●												● ● ●						
Low Carbon Steel	 Finishing	DCMT 070204XP	0.4		●			●	●		●	●									●		●				
		DCMT 11T302XP 11T304XP 11T308XP	0.2 0.4 0.8		● ● ●			● ● ●	● ● ●		● ● ●	● ● ●									● ● ●		● ● ●				
Low Carbon Steel	 Finishing-Medium	DCMT 11T304XQ 11T308XQ	0.4 0.8		● ●			● ●	● ●		● ●	● ●															
Stainless Steel	 Finishing-Medium	DCMT 070202MQ 070204MQ	0.2 0.4											● ●	● ●									● ●			
		DCMT 11T302MQ 11T304MQ	0.2 0.4											● ●	● ●									● ●			

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

Description	Ref. Page for Toolholder
DC..07 type	**E14~17,E19~21,F29,F51~52**
DC..11 type	**E14~17,E19~21,F29,F44,F51~52**

For grades { TN30 PV30 PV60 PV90 PR905 PR915 } , See Page **B75**

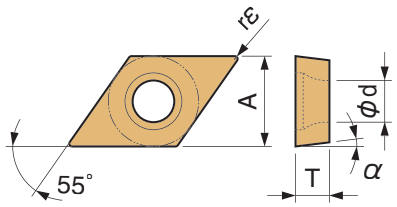
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

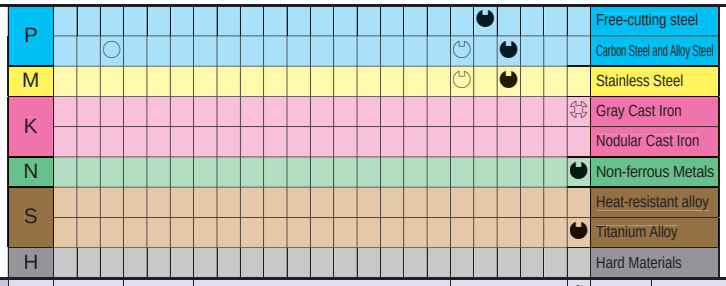
Inserts are sold in 10 piece boxes.

(mm)

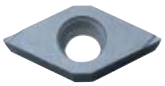
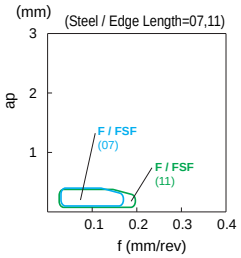
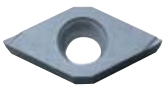
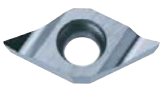
55°Diamond • Positive with Hole

Description	A	T	ød	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing		DCGT	0702003R/L-F	0.03																●					●	Refer to the table below	
			070201R/L-F	0.1			●													●					●		
			070202R/L-F	0.2			●													●					●		
			070204R/L-F	0.4			●													●					●		
		DCGT	11T3003R/L-F	0.03																●					R		
			11T301R/L-F	0.1			●													●					●		
			11T302R/L-F	0.2			●													●					●		
			11T304R/L-F	0.4			●													●					●		
		DCGT	0702005MR/L-F	< 0.05																	●	●					
			070201MR/L-F	< 0.1																	●	●					
			070202MR/L-F	< 0.2																	●	●					
			070204MR/L-F	< 0.4																	●	●					
		DCGT	11T3005MR/L-F	< 0.05																	●	●					
			11T301MR/L-F	< 0.1																	●	●					
			11T302MR/L-F	< 0.2																	●	●					
			11T304MR/L-F	< 0.4																	●	●					
Finishing	Super Fine  Sharp Edge / Precision	DCET	0702003R/L-FSF	0.03																●							
			070201R/L-FSF	0.1			●													●							
			070202R/L-FSF	0.2			●													●							
			070204R/L-FSF	0.4			●													●							
		DCET	11T3003R/L-FSF	0.03																●							
			11T301R/L-FSF	0.1			●													●							
			11T302R/L-FSF	0.2			●													●							
			11T304R/L-FSF	0.4			●													●							
		DCET	0702005MR/L-FSF	< 0.05																		●					
			070201MR/L-FSF	< 0.1																		●					
			070202MR/L-FSF	< 0.2																		●					
			070204MR/L-FSF	< 0.4																		●					
		DCET	11T3005MR/L-FSF	< 0.05																		●					
			11T301MR/L-FSF	< 0.1																		●					
			11T302MR/L-FSF	< 0.2																		●					
			11T304MR/L-FSF	< 0.4																		●					
	 Finishing / Medium	DCGT	070202R/L-FS	0.2			●													●							
			070204R/L-FS	0.4			●													●							
		DCGT	11T302R/L-FS	0.2			●													●							
			11T304R/L-FS	0.4			●													●							
			11T308R/L-FS	0.8			●													●							

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

Description	Ref. Page for Toolholder
DC..07 type	**E14~17,E19~21,F29,F51~52**
DC..11 type	**E14~17,E19~21,F29,F44,F51~52**

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B75**

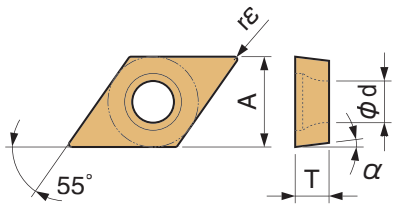
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

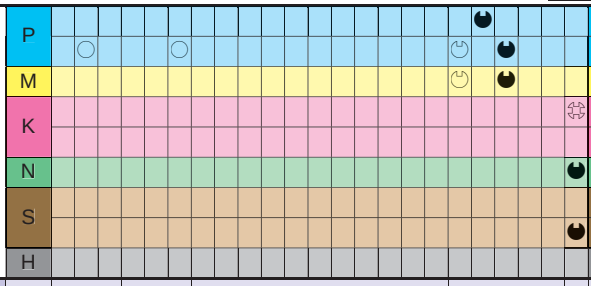
Inserts are sold in 10 piece boxes.

(mm)

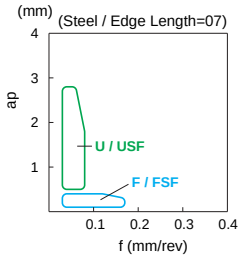
55°Diamond • Positive with Hole

Description	A	T	ød	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	7°





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 under 45HRC)

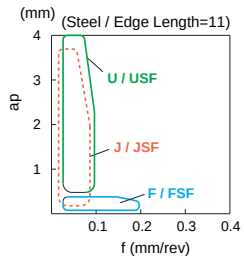
Insert Handed Insert shows Left-hand	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Low Feed	DCGT 0702003F$^{R}_{L}$-U	0.03			●															●				●	Refer to the table below	
	DCGT 070201F$^{R}_{L}$-U	0.1		●	●			●												●				●		
	DCGT 070202F$^{R}_{L}$-U	0.2		●	●			●												●				●		
	DCGT 11T3003F$^{R}_{L}$-U	0.03			●															●				R		
	DCGT 11T301F$^{R}_{L}$-U	0.1			●															●				●		
	DCGT 11T302F$^{R}_{L}$-U	0.2		●	●			●												●				●		
	DCGT 0702003MF$^{R}_{L}$-U	< 0.03																			●	●				
	DCGT 0702005MF$^{R}_{L}$-U	< 0.05																			●	●				
	DCGT 070201MF$^{R}_{L}$-U	< 0.1																			●	●				
	DCGT 070202MF$^{R}_{L}$-U	< 0.2																			●	●				
	DCGT 070204MF$^{R}_{L}$-U	< 0.4																			●	●				
	DCGT 11T3005MF$^{R}_{L}$-U	< 0.05																			●	●				
	DCGT 11T301MF$^{R}_{L}$-U	< 0.1																			●	●				
	DCGT 11T302MF$^{R}_{L}$-U	< 0.2																			●	●				
	DCGT 11T304MF$^{R}_{L}$-U	< 0.4																			●	●				
Low Feed	DCET 0702003F$^{R}_{L}$-USF	0.03																		●						
	DCET 070201F$^{R}_{L}$-USF	0.1			●															●						
	DCET 070202F$^{R}_{L}$-USF	0.2			●															●						
	DCET 11T3003F$^{R}_{L}$-USF	0.03			R															●						
	DCET 11T301F$^{R}_{L}$-USF	0.1			●															●						
	DCET 11T302F$^{R}_{L}$-USF	0.2			●															●						
	DCET 0702005MF$^{R}_{L}$-USF	< 0.05																				●				
	DCET 070201MF$^{R}_{L}$-USF	< 0.1																				●				
	DCET 070202MF$^{R}_{L}$-USF	< 0.2																				●				
	DCET 11T3005MF$^{R}_{L}$-USF	< 0.05																				●				
	DCET 11T301MF$^{R}_{L}$-USF	< 0.1																				●				
	DCET 11T302MF$^{R}_{L}$-USF	< 0.2																				●				
Low Feed	DCGT 070201E$^{R}_{L}$-U	0.1																		●						
	DCGT 070202E$^{R}_{L}$-U	0.2		●	●			●												●						
	DCGT 070204E$^{R}_{L}$-U	0.4		●	●			●												●						
	DCGT 11T301E$^{R}_{L}$-U	0.1																		●						
	DCGT 11T302E$^{R}_{L}$-U	0.2		●	●			●												●						
	DCGT 11T304E$^{R}_{L}$-U	0.4		●	●			●												●						
	DCGT 070201ME$^{R}_{L}$-U	< 0.1																				●				
	DCGT 070202ME$^{R}_{L}$-U	< 0.2																				●				
	DCGT 070204ME$^{R}_{L}$-U	< 0.4																				●				
	DCGT 11T301ME$^{R}_{L}$-U	< 0.1																				●				
	DCGT 11T302ME$^{R}_{L}$-U	< 0.2																				●				
	DCGT 11T304ME$^{R}_{L}$-U	< 0.4																				●				

Sharp Edge

Super Fine

Sharp Edge / Precision

With Honing



・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

Description	Ref. Page for Toolholder
DC..07 type	**E14~17,E19~21,F29,F51~52**
DC..11 type	**E14~17,E19~21,F29,F44,F51~52**

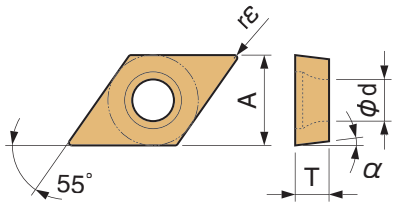
For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B75**

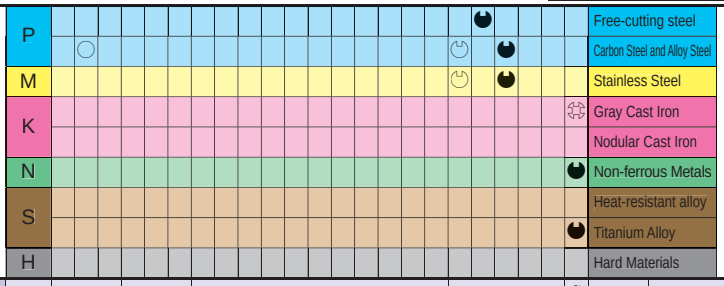
Inserts are sold in 10 piece boxes.

(mm)

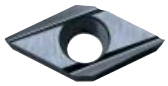
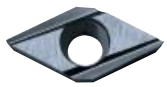
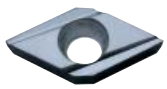
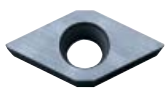
Description	A	T	ød	α
DC_0702_	6.35	2.38	2.8	11°
DC_11T3_	9.525	3.97	4.4	11°

55°Diamond • Positive with Hole



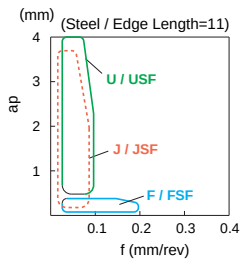


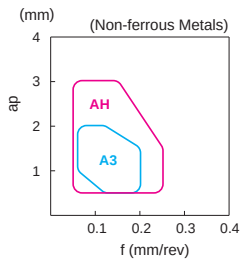
Classification of usage
✖: Interruption / 1st Choice
✱: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
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(In case hardness is under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Low Feed	 Sharp Edge	DCGT	11T3003F$^{R}_{L}$-J	0.03			●															●						
			11T301F$^{R}_{L}$-J	0.1			●															●				●		
			11T302F$^{R}_{L}$-J	0.2			●															●				●		
		DCGT	11T3005MF$^{R}_{L}$-J	< 0.05																			●	●				
			11T301MF$^{R}_{L}$-J	< 0.1																			●	●				
			11T302MF$^{R}_{L}$-J	< 0.2																			●	●				
			11T304MF$^{R}_{L}$-J	< 0.4																			●	●				
Low Feed	Super Fine  Sharp Edge / Precision	DCET	11T3003F$^{R}_{L}$-JSF	0.03			●															●						
			11T301F$^{R}_{L}$-JSF	0.1			●															●						
			11T302F$^{R}_{L}$-JSF	0.2			●															●						
		DCET	11T3005MF$^{R}_{L}$-JSF	< 0.05																				●				
			11T301MF$^{R}_{L}$-JSF	< 0.1																				●				
			11T302MF$^{R}_{L}$-JSF	< 0.2																				●				
Low Feed	 With Honing	DCGT	11T3003E$^{R}_{L}$-J	0.03																		●				●		
			11T301E$^{R}_{L}$-J	0.1			●															●				●		
			11T302E$^{R}_{L}$-J	0.2			●															●				●		
			11T304E$^{R}_{L}$-J	0.4		●	●															●				●		
		DCGT	11T3005ME$^{R}_{L}$-J	< 0.05																				●				
			11T301ME$^{R}_{L}$-J	< 0.1																				●				
			11T302ME$^{R}_{L}$-J	< 0.2																				●				
			11T304ME$^{R}_{L}$-J	< 0.4																				●				
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	DCGT	11T304AH	0.4																						●		
			11T308AH	0.8																						●		
		DCGT	070202$^{R}_{L}$-A3	0.2																						R		
Non-ferrous	 Finishing-Medium / Sharp Edge	DCGT	11T302$^{R}_{L}$-A3	0.2																						●		
			11T304$^{R}_{L}$-A3	0.4																						●		
Cast Iron	 Without Chipbreaker	DCGW	070201	0.1																						●		
			070202	0.2																						●		
		DCGW	11T301	0.1																						●		
			11T302	0.2																						●		
			11T304	0.4																						●		

Refer to the table below

Applicable Chipbreaker Range





—

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

Description	Ref. Page for Toolholder
DC..07 type	**E14~17,E19~21,F29,F51~52**
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For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page **B75**

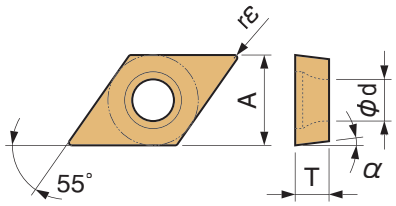
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

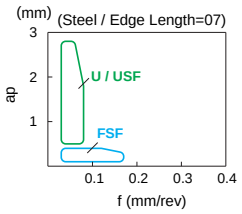
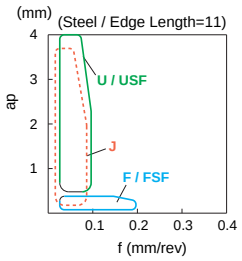
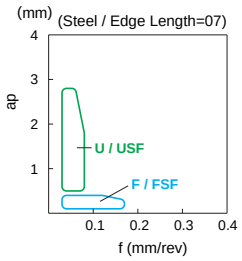
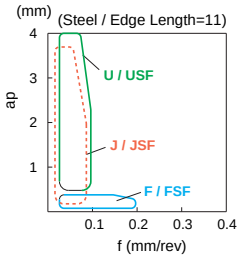
55°Diamond • Positive with Hole

(mm)

Description	A	T	ød	α
DP_0702_	6.35	2.38	2.8	11°
DP_11T3_	9.525	3.97	4.4	11°



P	Free-cutting steel	Classification of usage
	Carbon Steel and Alloy Steel	✖: Interruption / 1st Choice
M	Stainless Steel	✖: Interruption / 2nd Choice
K	Gray Cast Iron	●: Light Interruption / 1st Choice
	Nodular Cast Iron	◔: Light Interruption / 2nd Choice
N	Non-ferrous Metals	●: Continuous / 1st Choice
S	Heat-resistant alloy	○: Continuous / 2nd Choice
	Titanium Alloy	(In case hardness is under 45HRC)
H	Hard Materials	

Insert (Handed Insert shows Left-hand)		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	Super Fine	DPET 0702003R/L-FSF	0.03																		●					E16	
		DPET 070201R/L-FSF	0.1			●															●						
		DPET 070202R/L-FSF	0.2			●															●						
		DPET 11T3003R/L-FSF	0.03																		●						
		DPET 11T301R/L-FSF	0.1			●															●						
		DPET 11T302R/L-FSF	0.2			●															●						
		DPET 0702005MR/L-FSF	< 0.05																				●				
		DPET 070201MR/L-FSF	< 0.1																				●				
		DPET 070202MR/L-FSF	< 0.2																				●				
		DPET 11T3005MR/L-FSF	< 0.05																				●				
		DPET 11T301MR/L-FSF	< 0.1																				●				
	Sharp Edge / Precision	DPET 11T302MR/L-FSF	< 0.2																				●				
Low Feed	Super Fine	DPET 0702003FR/L-USF	0.03																		●						
		DPET 070201FR/L-USF	0.1			●															●						
		DPET 070202FR/L-USF	0.2			●															●						
		DPET 11T3003FR/L-USF	0.03																		●						
		DPET 11T301FR/L-USF	0.1			●															●						
		DPET 11T302FR/L-USF	0.2			●															●						
		DPET 0702005MFR/L-USF	< 0.05																				●				
		DPET 070201MFR/L-USF	< 0.1																				●				
		DPET 070202MFR/L-USF	< 0.2																				●				
		DPET 11T3005MFR/L-USF	< 0.05																				●				
		DPET 11T301MFR/L-USF	< 0.1																				●				
	Sharp Edge / Precision	DPET 11T302MFR/L-USF	< 0.2																				●				

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page B75

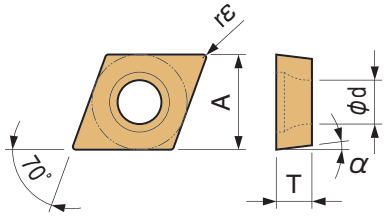
Inserts are sold in 10 piece boxes.

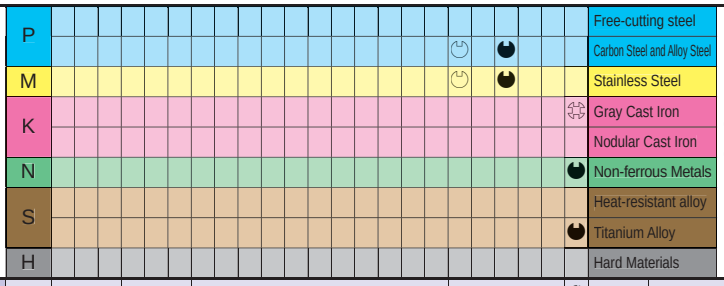
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

70°Diamond • Positive with Hole

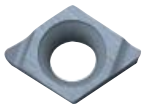
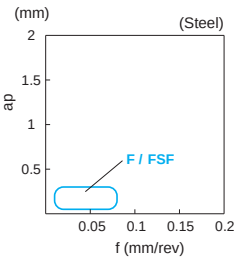
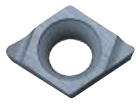
(mm)

Description	A	T	ød	α
JC_0301_	3.5	1.4	1.9	7°





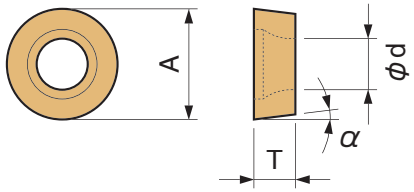
Classification of usage
✖: Interruption / 1st Choice
✱: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

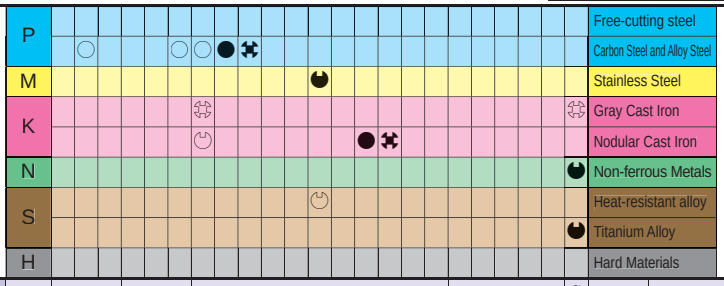
Insert (Handed Insert shows Left-hand)		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing		JCGT 030101R/L-F	0.1			●															●				●	F53	
		JCGT 030102R/L-F	0.2			●															●				●		
		JCGT 030104R/L-F	0.4			●															●				●		
		JCGT 030101MR/L-F	< 0.1																				●				
		JCGT 030102MR/L-F	< 0.2																				●				
		JCGT 030104MR/L-F	< 0.4																				●				
Finishing	Super Fine  Sharp Edge / Precision	JCET 030101R/L-FSF	0.1			●															●						
		JCET 030102R/L-FSF	0.2			●															●						
		JCET 030104R/L-FSF	0.4			●															●						
		JCET 030101MR/L-FSF	< 0.1																				●				
		JCET 030102MR/L-FSF	< 0.2																				●				
		JCET 030104MR/L-FSF	< 0.4																				●				

(mm)

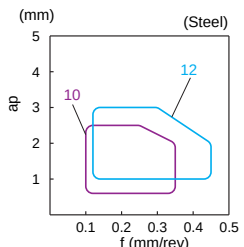
Round • Positive with Hole

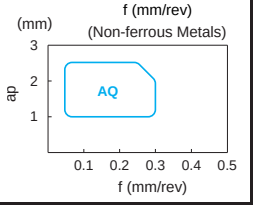
Description	A	T	ød	α
RC_1003_	10.0	3.18	3.6	7°
RC_1204_	12.0	4.76	4.2	7°





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 under 45HRC)

Insert		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Medium		RCMX 1003M0	-		●	●			●	●	●	●			●											D19	
		RCMX 1204M0	-		●	●			●	●	●	●			●		●	●	○	○							
Non-ferrous Metals	 Finishing-Medium	RCGX 1003M0-AQ	-																						●		



For grades { TN30 PV30 PV60 PV90 PR905 PR915 }, See Page B75

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

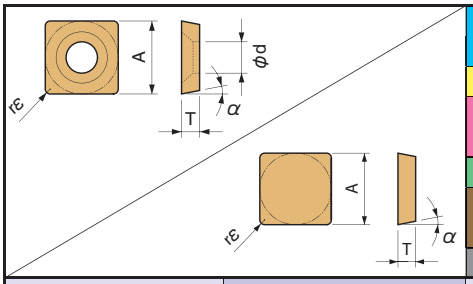
90°Square • Positive with Hole / without Hole

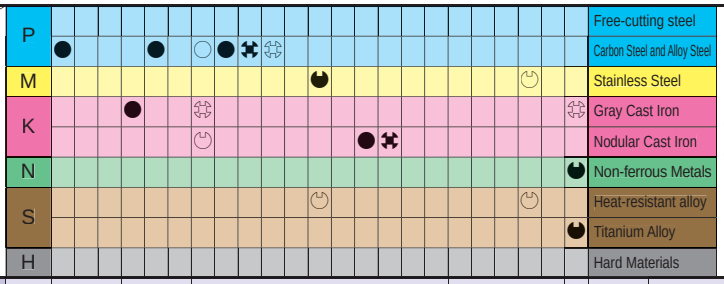
(mm)

Description	A	T	ød	α
SC_09T3_	9.525	3.97	4.4	7°
SP_0903_	9.525	3.18	4.5	11°
SP_1203_	12.7	3.18	5.5	11°

(mm)

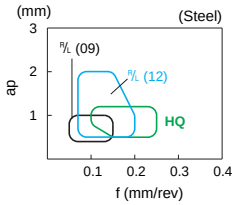
Description	A	T	ød	α
SP_0903_	9.525	3.18	-	11°
SP_1203_	12.7	3.18	-	11°
SP_1204_	12.7	4.76	-	11°

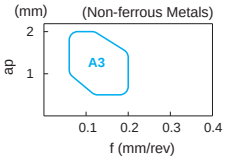


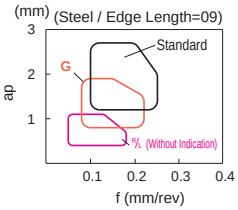


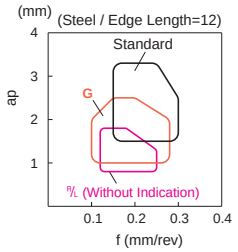
Classification of usage
- ✖: Interruption / 1st Choice
- ✖: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

(In case hardness is under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing-Medium		SCMT	09T304HQ	0.4	●		●		●			●●	●●	●													-	
			09T308HQ	0.8	●		●		●			●●	●●	●														
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	SCGT	09T304R/L-A3	0.4																						●	-	
			09T308R/L-A3	0.8																						●		
Finishing		SPGH	090304R/L	0.4			L																				F60	
			090308R/L	0.8			L																					
		SPGH	120304R/L	0.4			L																					
			120308R/L	0.8			L																					
Medium		SPMR	090304G	0.4			●																				E28 F60	
			090308G	0.8			●																					
		SPMR	120304G	0.4			●																					
			120308G	0.8			●																					
Medium		SPMR	090304	0.4								●●	●●		●										●			
			090308	0.8								●●	●●		●										●			
		SPMR	120304	0.4								●●	●●		●										●			
			120308	0.8								●●	●●		●										●			
Finishing		SPGR	090304R/L	0.4			●	●																				
			090308R/L	0.8			●																					
		SPGR	120304R/L	0.4			●																					
			120308R/L	0.8			●	●																				
Cast Iron	 Without Chipbreaker	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														●●		○							-	
			120412	1.2														●●		○								
		SPUN	090308	0.8								●					●		●								E28 F60	







For grades { TN30 PV30 PV60 PV90 PR905 PR915 }, See Page B75

Inserts are sold in 10 piece boxes.

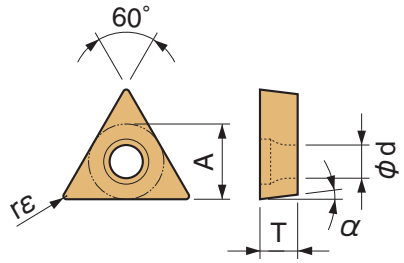
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

(mm)

60°Triangle • Positive with Hole

Description	A	T	ød	α
TB_0601_	3.97	1.59	2.3	5°
TC_0902_	5.56	2.38	2.5	7°

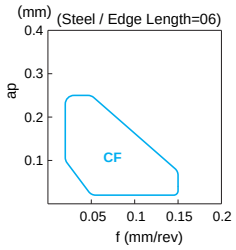
Description	A	T	ød	α
TC_1102_	6.35	2.38	2.8	7°
TC_1103_	6.35	3.18	2.8	7°
TC_16T3_	9.525	3.97	4.4	7°

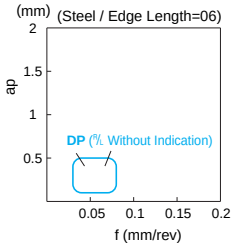


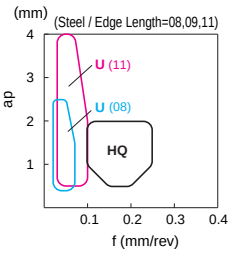
P	● ○	Free-cutting steel
		Carbon Steel and Alloy Steel
M		Stainless Steel
K		Gray Cast Iron
		Nodular Cast Iron
N		Non-ferrous Metals
S		Heat-resistant alloy
		Titanium Alloy
H		Hard Materials

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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Minute ap	 Sharp Edge	TBGT	060102CF	0.2																		●						
		TBGT	060101M-CF	< 0.1																			●	●				
			060102M-CF	< 0.2																			●	●				
Minute ap	 Sharp Edge / Polished Surface	TBGT	060101MP-CF	< 0.1																				●				
			060102MP-CF	< 0.2																				●				
Finishing		TBMT	060102DP	0.2		●	●			●		●	●															
			060104DP	0.4		●	●			●		●	●									●					F33 F55 F58	
Finishing		TBGT	0601003R/L	0.03																		●						
			060101R/L	0.1			●															●					●	
			060102R/L	0.2		L	●			L												●					●	
			060104R/L	0.4		L	●			L												●					●	
		TBGT	0601005MR/L	< 0.05																			●	●				
			060101MR/L	< 0.1																			●	●				
			060102MR/L	< 0.2																			●	●				
			060104MR/L	< 0.4																			●	●				
Cast Iron	 Without Chipbreaker	TBGW	060102	0.2			●																			●		
			060104	0.4			●																			●		
Finishing-Medium		TCMT	090202HQ	0.2	●		●	●					●															
			090204HQ	0.4	●		●	●					●															
		TCMT	110202HQ	0.2	●		●	●					●									●						
			110204HQ	0.4	●	●	●	●				●	●	●			●	●	○			●					F34	
			110208HQ	0.8	●	●	●	●				●	●	●			●	●	○									
		TCMT	16T304HQ	0.4			●					●	●									●						
			16T308HQ	0.8			●					●	●				●	●	○			●					-	
			16T312HQ	1.2								●	●				●	●	○									
Finishing		TCGT	110201R/L	0.1			●																					
			110202R/L	0.2			●																				F34	—
			110204R/L	0.4			●																					







・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page ➡ **B76**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

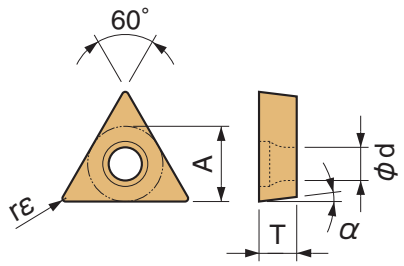
60°Triangle • Positive with Hole / without Hole

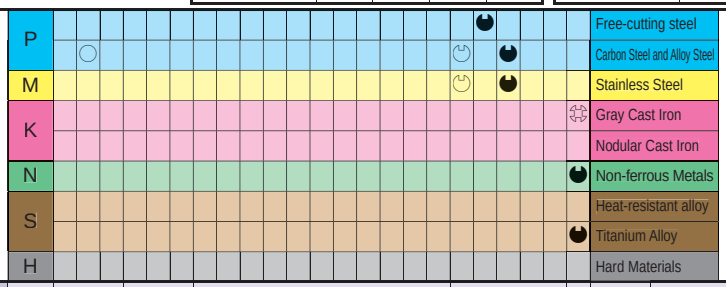
(mm)

Description	A	T	ød	α
TB_0601_	3.97	1.59	2.3	5°
TC_0802_	4.76	2.38	2.3	7°

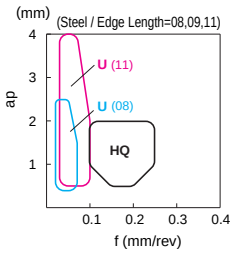
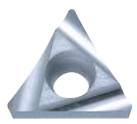
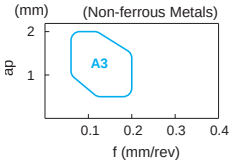
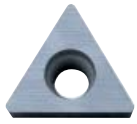
(mm)

Description	A	T	ød	α
TC_0902_	5.56	2.38	2.5	7°
TC_1102_	6.35	2.38	2.8	7°
TC_1103_	6.35	3.18	2.8	7°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Low Feed	 Sharp Edge	TCGT	0802003F$^{R}_{L}$-U	0.03																		●					E22	
			080201F$^{R}_{L}$-U	0.1			●															●				●		
			080202F$^{R}_{L}$-U	0.2		R	●															●				●		
		TCGT	1103003F$^{R}_{L}$-U	0.03																		●				R	E22	
			110301F$^{R}_{L}$-U	0.1			●															●				●	F34	
			110302F$^{R}_{L}$-U	0.2		R	●															●				●		
		TCGT	0802005MF$^{R}_{L}$-U	< 0.05																			●	●			E22	
			080201MF$^{R}_{L}$-U	< 0.1																			●	●				
			080202MF$^{R}_{L}$-U	< 0.2																			●	●				
		TCGT	1103005MF$^{R}_{L}$-U	< 0.05																			●	●			E22	
			110301MF$^{R}_{L}$-U	< 0.1																			●	●			F34	
			110302MF$^{R}_{L}$-U	< 0.2																			●	●				
			110304MF$^{R}_{L}$-U	< 0.4																			●	●				
Low Feed	Super Fine  Sharp Edge / Precision	TCET	0802003F$^{R}_{L}$-USF	0.03																		●					E22	
			080201F$^{R}_{L}$-USF	0.1			●															●						
			080202F$^{R}_{L}$-USF	0.2			●															●						
		TCET	1103003F$^{R}_{L}$-USF	0.03																		●					E22	
			110301F$^{R}_{L}$-USF	0.1			●															●					F34	
			110302F$^{R}_{L}$-USF	0.2			●															●						
		TCET	0802005MF$^{R}_{L}$-USF	< 0.05																				●			E22	
			080201MF$^{R}_{L}$-USF	< 0.1																				●				
			080202MF$^{R}_{L}$-USF	< 0.2																				●				
		TCET	1103005MF$^{R}_{L}$-USF	< 0.05																				●			E22	
			110301MF$^{R}_{L}$-USF	< 0.1																				●			F34	
			110302MF$^{R}_{L}$-USF	< 0.2																				●				
Low Feed	 With Honing	TCGT	080201E$^{R}_{L}$-U	0.1			●															●					E22	
			080202E$^{R}_{L}$-U	0.2			●															●						
		TCGT	110301E$^{R}_{L}$-U	0.1		●	●															●					E22	
			110302E$^{R}_{L}$-U	0.2		●	●															●					F34	
			110304E$^{R}_{L}$-U	0.4		●	●															●						
		TCGT	080201ME$^{R}_{L}$-U	< 0.1																				●			E22	
			080202ME$^{R}_{L}$-U	< 0.2																				●				
		TCGT	110301ME$^{R}_{L}$-U	< 0.1																				●			E22	
			110302ME$^{R}_{L}$-U	< 0.2																				●			F34	
			110304ME$^{R}_{L}$-U	< 0.4																				●				
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	TCGT	110302$^{R}_{L}$-A3	0.2																						●	E22	
			110304$^{R}_{L}$-A3	0.4																						●	F34	
Cast Iron	 Without Chipbreaker	TCGW	080201	0.1																						●	E22	—
			080202	0.2																						●		
		TCGW	110301	0.1																						●	E22	
			110302	0.2																						●	F34	
			110304	0.4																						●		

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page ➡ **B76**

Inserts are sold in 10 piece boxes.

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

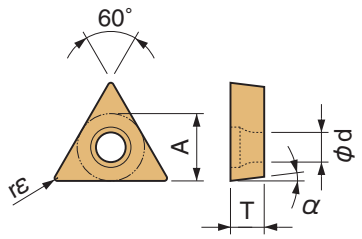
60°Triangle • Positive with Hole

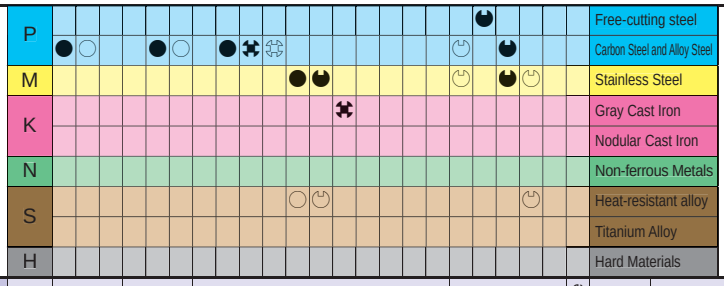
(mm)

Description	A	T	ød	α
TP_0802_	4.76	2.38	2.3	11°
TPMT0902_	5.56	2.38	2.8	11°
TP_0902	5.56	2.38	3.0	11°
TP_1102	6.35	2.38	3.5	11°

(mm)

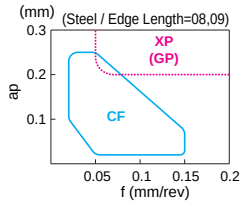
Description	A	T	ød	α
TP_1103_	6.35	3.18	3.3	11°
TPMT1603_	9.525	3.18	4.4	11°
TP_1603_	9.525	3.18	4.5	11°
TP_1604_	9.525	4.76	4.4	11°

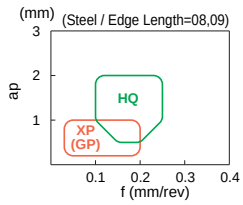


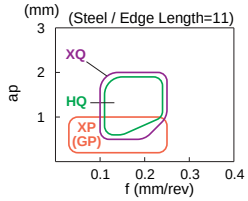


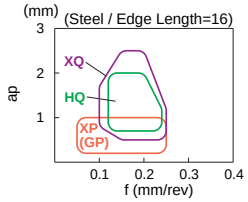
Classification of usage
: Interruption / 1st Choice
: Interruption / 2nd Choice
: Light Interruption / 1st Choice
: Light Interruption / 2nd Choice
: Continuous / 1st Choice
: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Minute ap	Sharp Edge	TPGT	080202CF	0.2																	●					E22 F55 F58	
		TPGT	090202CF	0.2																	●					F33 F55 F58	
		TPGT	080201M-CF 080202M-CF	< 0.1 < 0.2																		● ●	● ●			E22 F55 F58	
		TPGT	090201M-CF 090202M-CF	< 0.1 < 0.2																		● ●	● ●			F33 F55 F58	
Minute ap	Sharp Edge / Polished Surface	TPGT	080201MP-CF 080202MP-CF	< 0.1 < 0.2																			● ●			E22 F55 F58	
		TPGT	090201MP-CF 090202MP-CF	< 0.1 < 0.2																			● ●			F33 F55 F58	
Finishing		TPMT	090202GP 090204GP	0.2 0.4	● ●	● ●	● ●		● ●	● ●		● ●	● ●									● ●		● ●			F33 F55 F58	
		TPMT	110304GP 110308GP	0.4 0.8	● ●	● ●	● ●		● ●	● ●		● ●	● ●									● ●		● ●			E22 F33 F55 F57	
		TPMT	160304GP	0.4	●	●	●		●	●		●	●									●		●			F33 F55 F57	
Finishing-Medium		TPMT	090202HQ 090204HQ	0.2 0.4	● ●	● ●	● ●		● ●	● ●		● ●	● ●	● ●	● ●	● ●						● ●		● ●	● ●		F33 F55 F58	
		TPMT	110302HQ 110304HQ 110308HQ	0.2 0.4 0.8	● ● ●	● ● ●	● ● ●		● ● ●	● ● ●		● ● ●	● ● ●	● ● ●	● ● ●	● ● ●			○ ○	○ ○		● ● ●		● ● ●	● ● ●		E22 F33 F55 F57	
		TPMT	160302HQ 160304HQ 160308HQ	0.2 0.4 0.8	 ● ●	 ● ●	● ● ●		 ● ●	 ● ●		● ● ●	● ● ●	● ● ●	● ● ●	● ● ●			 ○ ○	 ○ ○		● ● ●		● ● ●	● ● ●		F33 F55 F57	
Low Carbon Steel	Finishing	TPMT	090204XP	0.4		●			●	●		●	●									●		●			F33 F55 F58	
		TPMT	110304XP 110308XP	0.4 0.8	 ●	● ●	 		● ●	● ●		● ●	● ●									● ●		● ●			E22 F33 F55 F57	
		TPMT	160304XP 160308XP	0.4 0.8		● ●			● ●	● ●		● ●	● ●									● ●					F33 F55 F57	
Low Carbon Steel	Finishing-Medium	TPMT	110304XQ 110308XQ	0.4 0.8	 ●	● ●	 		● ●	● ●		● ●	● ●														E22 F33 F55 F57	
		TPMT	160304XQ 160308XQ	0.4 0.8		● ●			● ●	● ●		● ●	● ●														F33 F55 F57	









・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B76**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

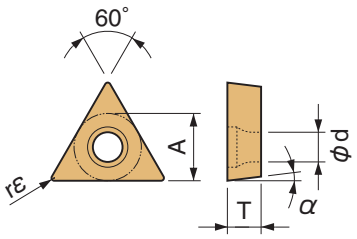
60°Triangle • Positive with Hole

(mm)

Description	A	T	ød	α
TP_0802_	4.76	2.38	2.3	11°
TP_0902	5.56	2.38	3.0	11°
TP_1102	6.35	2.38	3.5	11°

(mm)

Description	A	T	ød	α
TP_1103_	6.35	3.18	3.3	11°
TP_1603_	9.525	3.18	4.5	11°
TP_1604_	9.525	4.76	4.4	11°

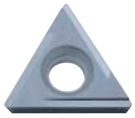


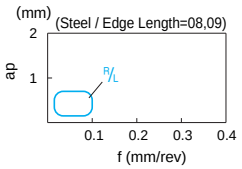
P Free-cutting steel; Carbon Steel and Alloy Steel
M Stainless Steel
K Gray Cast Iron; Nodular Cast Iron
N Non-ferrous Metals
S Heat-resistant alloy; Titanium Alloy
H Hard Materials

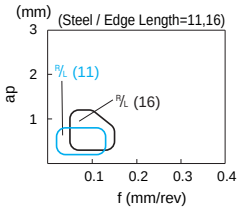
Classification of usage
✖: Interruption / 1st Choice
✱: Interruption / 2nd Choice
◓: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

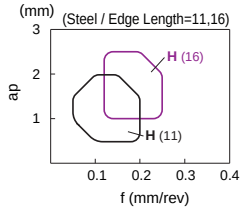
Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	TPGH 080201R/L	0.1			●															●				●	E22	
	TPGH 080202R/L	0.2	L	●	●	●		●												●				●	F55	
	TPGH 080204R/L	0.4	L	●	●	●		●												●				●	F58	
	TPGH 090201R/L	0.1			●															●				●	F33	
	TPGH 090202R/L	0.2	L	●	●	●		●												●				●	F55	
	TPGH 090204R/L	0.4	L	●	●	●		●												●				●	F58	
	TPGH 110202R/L	0.2	L		●															●				●	F57	
	TPGH 110204R/L	0.4	L		●	●														●				●		
	TPGH 110302R/L	0.2	L	●	●	●		●												●				●	E22	
	TPGH 110304R/L	0.4	L	●	●	●		●												●				●	F33	
	TPGH 110308R/L	0.8	L		●															●				●	F55	
																									F57	
	TPGH 160302R/L	0.2	L		●															●				●	F33	
	TPGH 160304R/L	0.4	L	●	●	●		L												●				●	F55	
	TPGH 160308R/L	0.8			●	●														●				●	F57	
	TPGH 080201MR/L	< 0.1																			●	●			E22	
	TPGH 080202MR/L	< 0.2																			●	●			F55	
	TPGH 080204MR/L	< 0.4																			●	●			F58	
	TPGH 090201MR/L	< 0.1																			●	●			F33	
	TPGH 090202MR/L	< 0.2																			●	●			F55	
	TPGH 090204MR/L	< 0.4																			●	●			F58	
	TPGH 110202MR/L	< 0.2																			●	●			F57	
	TPGH 110204MR/L	< 0.4																			●	●				
	TPGH 110302MR/L	< 0.2																			●	●			E22	
	TPGH 110304MR/L	< 0.4																			●	●			F33	
	TPGH 110308MR/L	< 0.8																			●	●			F55	
																									F57	
	TPGH 160302MR/L	< 0.2																			●	●			F33	
	TPGH 160304MR/L	< 0.4																			●	●			F55	
	TPGH 160308MR/L	< 0.8																			●	●			F57	
Medium	TPGH 110302R/L-H	0.2	L	L	●			L												●				●	E22	
	TPGH 110304R/L-H	0.4	L	●	●			●												●				●	F33	
	TPGH 110308R/L-H	0.8	L	L	●			L												●				●	F55	
																									F57	
	TPGH 160304R/L-H	0.4	L	L	●			L												●				●	F33	
	TPGH 160308R/L-H	0.8			●															●				●	F55	
																									F57	
	TPGT 160402R/L-H	0.2			L																				-	
	TPGT 160404R/L-H	0.4			L																					
	TPGT 160408R/L-H	0.8			L																					
	TPGH 110302MR/L-H	< 0.2																				●			E22	
	TPGH 110304MR/L-H	< 0.4																				●			F33	
	TPGH 110308MR/L-H	< 0.8																				●			F55	
																									F57	
	TPGH 160304MR/L-H	< 0.4																				●			F33	
	TPGH 160308MR/L-H	< 0.8																				●			F55	
																									F57	











・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B76**

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

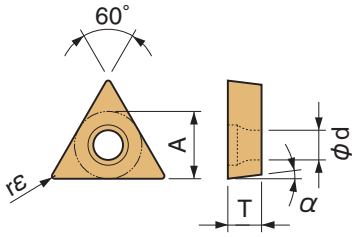
60°Triangle • Positive with Hole

(mm)

Description	A	T	ød	α
TP_0802_	4.76	2.38	2.3	11°
TP_1103_	6.35	3.18	3.3	11°

(mm)

Description	A	T	ød	α
TPGN0902_	5.56	2.38	-	11°
TP_N1103_	6.35	3.18	-	11°
TP_N1603_	9.525	3.18	-	11°



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

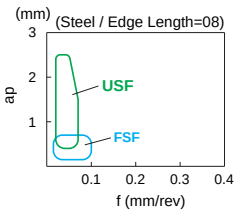
Classification of usage
✲: Interruption / 1st Choice
✲: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

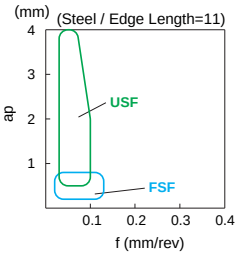
	Insert (Handed Insert shows Left-hand)	Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	Super Fine	TPET	0802003R/L-FSF	0.03			●															●					E22
			080201R/L-FSF	0.1			●															●					F55
			080202R/L-FSF	0.2			●															●					F58
		TPET	1103003R/L-FSF	0.03			●															●					E22 F33
			110301R/L-FSF	0.1			●															●					F55
			110302R/L-FSF	0.2			●															●					F57
		TPET	0802005MR/L-FSF	< 0.05																			●				E22
			080201MR/L-FSF	< 0.1																			●				F55
			080202MR/L-FSF	< 0.2																			●				F58
		TPET	1103005MR/L-FSF	< 0.05																			●				E22
			110301MR/L-FSF	< 0.1																			●				F33 F55
			110302MR/L-FSF	< 0.2																			●				F57
	Super Fine	TPET	0802003FR/L-USF	0.03			●															●					E22
			080201FR/L-USF	0.1			●															●					F55
			080202FR/L-USF	0.2			●															●					F58
		TPET	1103003FR/L-USF	0.03			●															●					E22 F33
			110301FR/L-USF	0.1			●															●					F55
			110302FR/L-USF	0.2			●															●					F57
		TPET	0802005MFR/L-USF	< 0.05																			●				E22
			080201MFR/L-USF	< 0.1																			●				F55
			080202MFR/L-USF	< 0.2																			●				F58
		TPET	1103005MFR/L-USF	< 0.05																			●				E22
			110301MFR/L-USF	< 0.1																			●				F33 F55
			110302MFR/L-USF	< 0.2																			●				F57
Cast Iron	Without Chipbreaker	TPGB	080202	0.2		●	●			●																●	E22
			080204	0.4		●	●			●																●	F55
			080208	0.8			●																				F58
		TPGB	090202	0.2			●																			●	F33 F55
			090204	0.4		●	●	●		●																●	F58
		TPGB	1102005	0.05			●																			●	F57
			110201	0.1			●																			●	
			110202	0.2			●																			●	
			110204	0.4			●																			●	
		TPGB	1103005	0.05			●																			●	E22
			110301	0.1			●																			●	F33
			110302	0.2		●	●			●																●	F55
			110304	0.4		●	●	●		●																●	F57
			110308	0.8		●	●	●		●																●	
		TPGB	160304	0.4			●	●																		●	F33 F55
			160308	0.8			●																			●	F57











—

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B76**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

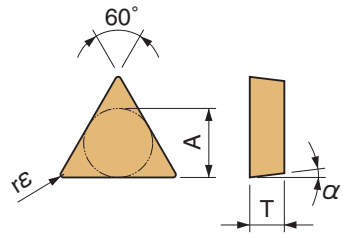
60°Triangle • Positive without Hole

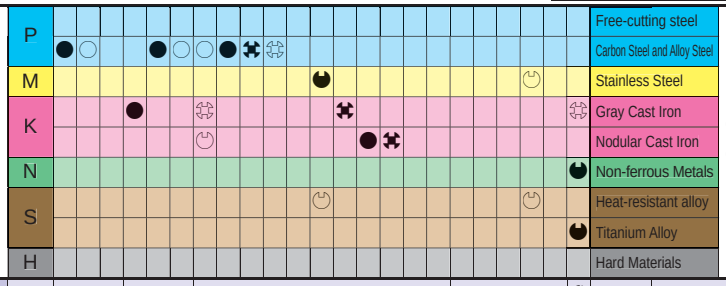
(mm)

Description	A	T	ød	α
TC_0601_	3.97	1.59	-	7°

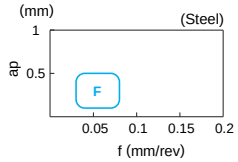
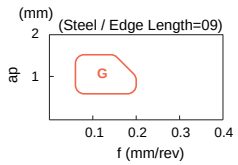
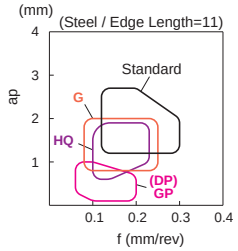
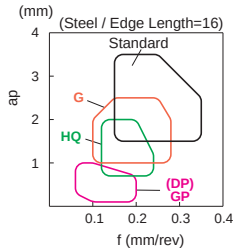
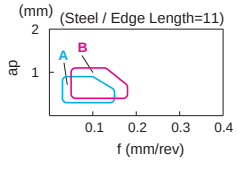
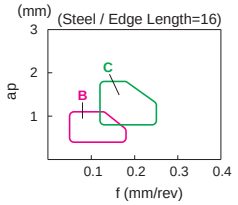
(mm)

Description	A	T	ød	α
TPGN0902_	5.56	2.38	-	11°
TP_N1103_	6.35	3.18	-	11°
TP_N1603_	9.525	3.18	-	11°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	TCGR 060102R/L-F	0.2			●																				-	
	TCGR 060104R/L-F	0.4			●																					
Cast Iron	TCGN 060102	0.2			●																			●	-	
Without Chipbreaker	TCGN 060104	0.4			●																			●		
Finishing	TPMR 110304DP	0.4			●																				E29 F61	
	TPMR 110308DP	0.8			●																					
	TPMR 160304DP	0.4			●																					
	TPMR 160308DP	0.8			●																					
Finishing	TPMR 110304GP	0.4		●	●			●																		
	TPMR 160304GP	0.4		●	●			●		●	●															
Finishing-Medium	TPMR 110304HQ	0.4			●					●	●	●		●									●			
	TPMR 110308HQ	0.8			●					●	●	●		●									●			
	TPMR 160304HQ	0.4	●		●	●				●	●	●		●									●			
	TPMR 160308HQ	0.8	●		●	●				●	●	●		●									●			
Medium	TPMR 090202G	0.2			●																				F61	
	TPMR 090204G	0.4			●					●	●															
	TPMR 110304G	0.4			●																				E29 F61	
	TPMR 110308G	0.8			●																					
	TPMR 160304G	0.4			●																					
	TPMR 160308G	0.8			●																					
Medium	TPMR 110304	0.4			●				●	●	●			●	●	●	●		○				●			
	TPMR 110308	0.8			●				●	●	●			●	●	●	●	○	○				●			
	TPMR 160304	0.4			●	●			●	●	●			●	●	●	●	○	○				●			
	TPMR 160308	0.8	●		●	●	●		●	●	●			●	●	●	●	○	○				●			
Finishing	TPGR 090202R/L-F	0.2			●																				F61	
	TPGR 090204R/L-F	0.4			●																					
	TPGR 090208R/L-F	0.8			●																					
Finishing-Medium	TPGR 110302R/L-A	0.2		L	●	L		L																	E29 F61	
	TPGR 110304R/L-A	0.4		L	●	L		L																●		
	TPGR 110304R/L-B	0.4		L	●			L																		
	TPGR 110308R/L-B	0.8			●																					
	TPGR 160302R/L-B	0.2	L	L	●	L	L	L																		
	TPGR 160304R/L-B	0.4	L	L	●	L	L	L																●		
	TPGR 160308R/L-B	0.8		L	●	L		L																●		
	TPGR 160304R/L-C	0.4	L	L	●		L	L																		
	TPGR 160308R/L-C	0.8		L	●			L																		

-A: Finishing
-B: Finishing-Medium
-C: Medium cutting

For grades (TN30 PV60 PR905 / PV30 PV90 PR915), See Page B77

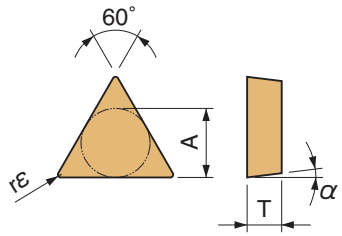
Inserts are sold in 10 piece boxes.

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

(mm)

Description	A	T	ød	α
TP_0902_	5.56	2.38	-	11°
TP_1103_	6.35	3.18	-	11°
TP_1603_	9.525	3.18	-	11°

60°Triangle • Positive without Hole



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

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 under 45HRC)

Insert	Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Cast Iron	 Without Chipbreaker	TPGN	090202	0.2			●																		●	F61	—
			090204	0.4			●																		●		
			090208	0.8			●																				
		TPGN	110302	0.2																					●		
			110304	0.4			●	●																	●		
			110308	0.8			●	●																	●		
		TPGN	160304	0.4			●	●																	●	E29 F61	
			160308	0.8			●	●																	●		
			160312	1.2																					●		
		TPMN	110304	0.4						●						●	●	○	○						●		
			110308	0.8						●						●	●	○	○						●		
		TPMN	160304	0.4						●						●	●	○	○						●		
			160308	0.8						●						●	●	○	○						●		
			160312	1.2												●	●		○								

For grades ⟨ TN30 PV60 PR905 / PV30 PV90 PR915 ⟩, See Page ➡ **B77**

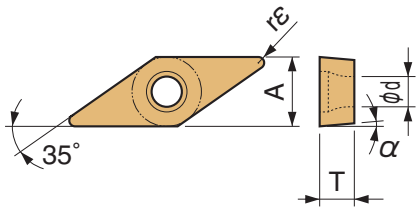
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

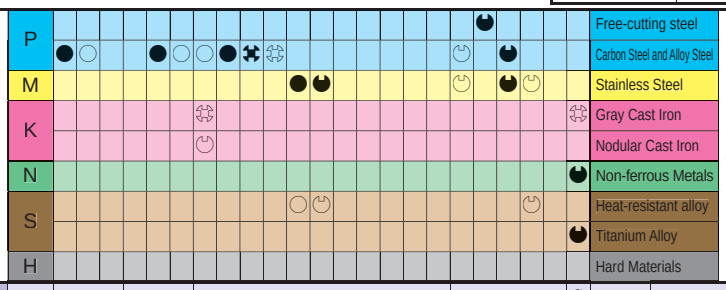
Inserts are sold in 10 piece boxes.

35°Diamond • Positive with Hole

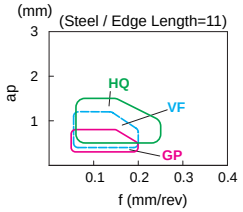
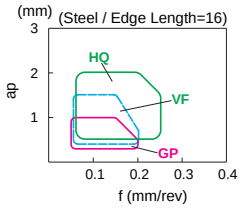
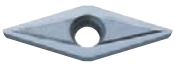
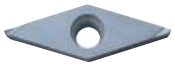
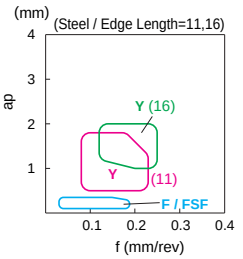
(mm)

Description	A	T	ød	α
VB_1103_	6.35	3.18	2.8	5°
VB_1604_	9.525	4.76	4.4	5°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing		VBMT	110304GP	0.4	●	●	●		●	●			●	●										●				E23 ~E27 F37 F39 F63	
		VBMT	160404GP 160408GP	0.4 0.8	● ●	● ●	● ●		● ●	● ●			● ●	● ●								● ●		● ●				E23 E37 E39 F63	
		VBMT	110302VF 110304VF 110308VF	0.2 0.4 0.8	● ● ●	● ● ●			● ● ●	● ● ●	● ● ●		● ● ●	● ● ●	● ●							● ● ●		● ● ●				E23 ~E27 F37 F39 F63	
		VBMT	160402VF 160404VF 160408VF 160412VF	0.2 0.4 0.8 1.2	● ● ● ●	● ● ● ●			● ● ● ●	● ● ● ●	● ● ● ●		● ● ● ●	● ● ● ●	● ●							● ● ● ●		● ● ● ●				E23 E37 E39 F63	
Finishing-Medium		VBMT	110304HQ 110308HQ	0.4 0.8	● ●	● ●	● ●		● ●	● ●			● ●	● ●	● ●	● ●						● ●		● ●	● ●			E23 ~E27 F37 F39 F63	
		VBMT	160404HQ 160408HQ 160412HQ	0.4 0.8 1.2	● ● ●	● ● ●	● ● ●		● ● ●	● ● ●			● ● ●	● ● ●	● ● ●	● ● ●						● ● ●		● ● ●	● ● ●			E23 E37 E39 F63	
Medium	 Sharp Edge	VBGT	110301FN-Z 110302FN-Z 110304FN-Z 110308FN-Z	0.1 0.2 0.4 0.8			● ● ● ●															● ● ● ●							—
Finishing		VBGT	1103003R/L-F 110301R/L-F 110302R/L-F	0.03 0.1 0.2	 ●	 ●	 ● ●	 	 ●	 	 	 	 	 	 	 	 	 	 	 	● ● ●	 	 	 	R ● ●	E23 E25 E27 F37 F39 F63	
		VBGT	1103005MR/L-F 110301MR/L-F 110302MR/L-F	< 0.05 < 0.1 < 0.2																			● ●	● ●				
	Super Fine 	VBET	1103003R/L-FSF 110301R/L-FSF 110302R/L-FSF	0.03 0.1 0.2			● ● ●															● ● ●						
	Sharp Edge / Precision	VBET	1103005MR/L-FSF 110301MR/L-FSF 110302MR/L-FSF	< 0.05 < 0.1 < 0.2																				● ● ●			

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page **B77**

Inserts are sold in 10 piece boxes.

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

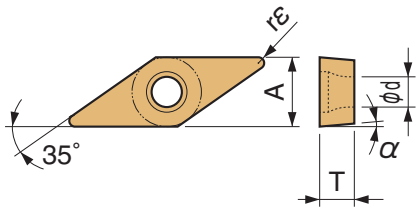
35°Diamond • Positive with Hole

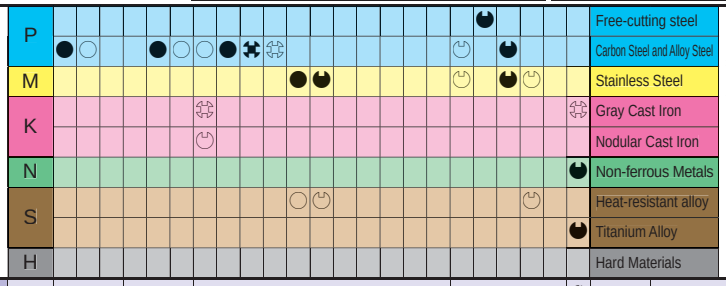
(mm)

Description	A	T	ød	α
VC_0802_	4.76	2.38	2.3	7°
VC_1103_	6.35	3.18	2.8	7°

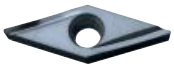
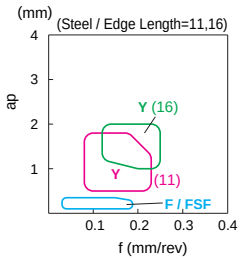
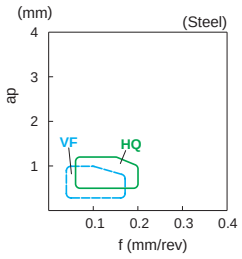
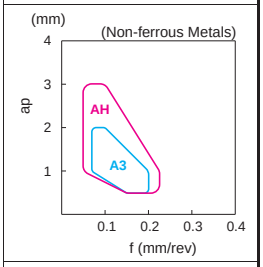
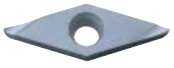
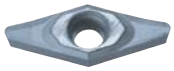
(mm)

Description	A	T	ød	α
VC_1604_	9.525	4.76	4.4	7°
VC_2205_	12.70	5.56	5.5	7°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing-Medium		VBGT	1103003R/L-Y	0.03																	●				R	E23 E25 E27 F37 F39 F63	
		VBGT	110301R/L-Y	0.1			●														●				●		
		VBGT	110302R/L-Y	0.2	●	●	●			●											●				●		
		VBGT	110304R/L-Y	0.4	●	●	●			●											●				●		
		VBGT	110308R/L-Y	0.8			●														●				●		
		VBGT	160402R/L-Y	0.2	●		●														●				●		
		VBGT	160404R/L-Y	0.4	●	●	●			●											●				●		
		VBGT	160408R/L-Y	0.8			●														●				●		
		VBGT	1103005MR/L-Y	< 0.05																		●	●				
		VBGT	110301MR/L-Y	< 0.1																		●	●				
		VBGT	110302MR/L-Y	< 0.2																		●	●				
		VBGT	110304MR/L-Y	< 0.4																		●	●				
		VBGT	110308MR/L-Y	< 0.8																		●	●				
		VBGT	160402MR/L-Y	< 0.2																		●	●				
		VBGT	160404MR/L-Y	< 0.4																		●	●				
		VBGT	160408MR/L-Y	< 0.8																		●	●				
Finishing		VCMT	080202VF	0.2	●	●		●	●	●	●	●	●								●		●			E27 F37 F39 F63	
		VCMT	080204VF	0.4	●	●		●	●	●	●	●	●	●							●		●				
Finishing-Medium		VCMT	080202HQ	0.2	●	●	●	●	●		●	●									●		●				
		VCMT	080204HQ	0.4	●	●	●	●	●		●	●	●	●	●						●		●	●			
		VCMT	110304HQ	0.4			●					●	●								●					Refer to the table below	
		VCMT	160404HQ	0.4			●					●	●														
		VCMT	160408HQ	0.8			●						●														
	 Medium / Sharp Edge	VCGT	110301FN-Z	0.1			●																				—
		VCGT	110302FN-Z	0.2			●																				
		VCGT	110304FN-Z	0.4			●																				
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	VCGT	160404AH	0.4																					●		
Non-ferrous Metals	 Finishing-Medium / Sharp Edge	VCGT	160404R/L-A3	0.4																					●		
		VCGT	160408R/L-A3	0.8																					●		
	 Non-ferrous Material Medium-Roughing	VCGT	160412	1.2																					●		—
		VCGT	220530	3.0																					●	-	

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

Description	Ref. Page for Toolholder
VC..11 type	**E23,E25,E27,F37,F39,F63**
VC..16 type	**E23,E25,F37,F39,F63**

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page **B77**

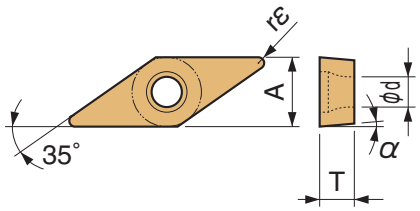
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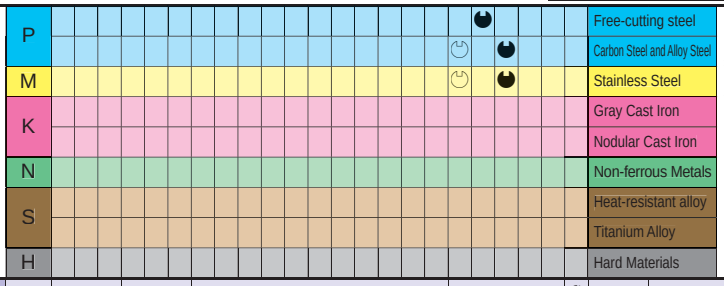
Inserts are sold in 10 piece boxes.

35°Diamond • Positive with Hole

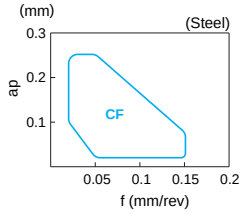
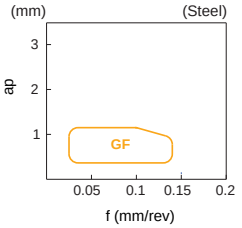
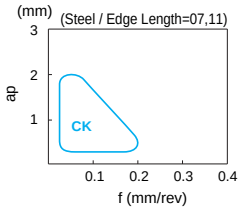
(mm)

Description	A	T	ød	α
VB_0802_	4.76	2.38	2.3	11°
VB_1103_	6.35	3.18	2.8	11°





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 under 45HRC)

Insert		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Minute ap	Sharp Edge	VPGT	110302CF	0.2																	●					E25 E26	
		VPGT	110301M-CF	< 0.1																		●	●				
			110302M-CF	< 0.2																		●	●				
	Sharp Edge / Polished Surface	VPGT	110301MP-CF	< 0.1																			●				
			110302MP-CF	< 0.2																			●				
Finishing	Sharp Edge	VPGT	110301MF-GF	< 0.1																			●				
			110302MF-GF	< 0.2																			●				
	Sharp Edge / Polished Surface	VPGT	110301MFP-GF	< 0.1																			●				
			110302MFP-GF	< 0.2																			●				
Finishing	With Honing	VPGT	080201CK	0.1																	●					E25 E26 F37 F63	
			080202CK	0.2																	●						
		VPGT	110301CK	0.1																	●					E25 E26	
			110302CK	0.2																	●						
		VPGT	080201M-CK	< 0.1																		●	●			E25 E26 F37 F63	
			080202M-CK	< 0.2																		●	●				
		VPGT	110301M-CK	< 0.1																		●	●			E25 E26	
			110302M-CK	< 0.2																		●	●				
Finishing	Sharp Edge / Polished Surface	VPGT	080201MP-CK	< 0.1																			●			E25 E26 F37 F63	
			080202MP-CK	< 0.2																			●				
		VPGT	110301MP-CK	< 0.1																			●			E26	
			110302MP-CK	< 0.2																			●				

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 } , See Page **B77**

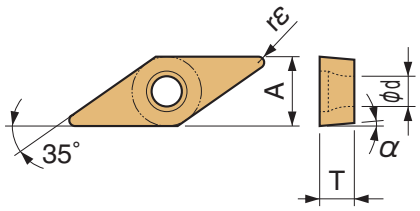
Inserts are sold in 10 piece boxes.

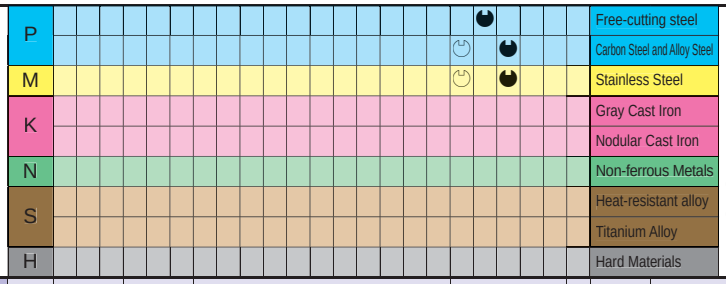
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

(mm)

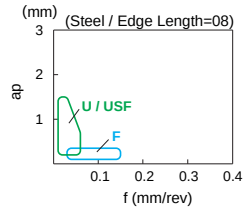
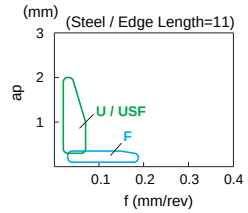
35°Diamond • Positive with Hole

Description	A	T	ød	α
VP_0802_	4.76	2.38	2.3	11°
VP_1103_	6.35	3.18	2.8	11°





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 under 45HRC)

Insert (Handed Insert shows Left-hand)		Description		Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing	Super Fine	VPET	080201R/L-FSF	0.1			●															●					E25 E26 F37 F63	
		VPET	080202R/L-FSF	0.2			●															●						
		VPET	1103003R/L-FSF	0.03																		●					E25 E26	
		VPET	110301R/L-FSF	0.1			●															●						
		VPET	110302R/L-FSF	0.2			●															●						
		VPET	080201MR/L-FSF	< 0.1																			●				E25 E26 F37 F63	
		VPET	080202MR/L-FSF	< 0.2																			●					
		VPET	1103005MR/L-FSF	< 0.05																			●				E25 E26	
		VPET	110301MR/L-FSF	< 0.1																			●					
		VPET	110302MR/L-FSF	< 0.2																			●					
	Sharp Edge / Precision																											
Low Feed	Super Fine	VPET	080201FR/L-USF	0.1			●															●					E25 E26 F37 F63	
		VPET	080202FR/L-USF	0.2			●															●						
		VPET	1103003FR/L-USF	0.03																		●					E25 E26	
		VPET	110301FR/L-USF	0.1			●															●						
		VPET	110302FR/L-USF	0.2			●															●						
		VPET	080201MFR/L-USF	< 0.1																			●				E25 E26 F37 F63	
		VPET	080202MFR/L-USF	< 0.2																			●					
		VPET	1103005MFR/L-USF	< 0.05																			●				E25 E26	
		VPET	110301MFR/L-USF	< 0.1																			●					
		VPET	110302MFR/L-USF	< 0.2																			●					
	Sharp Edge / Precision																											

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page B77

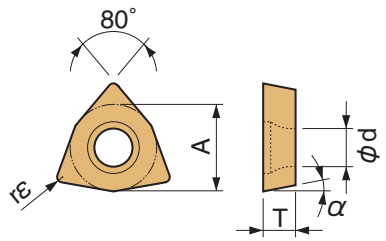
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

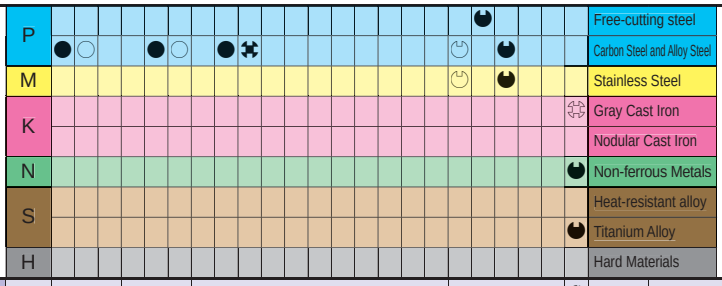
Inserts are sold in 10 piece boxes.

80°Trigon • Positive with Hole

(mm)

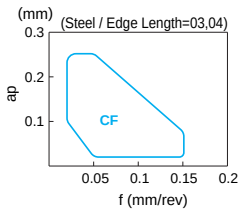
Description	A	T	ød	α
WB_0601_	3.97	1.59	2.3	5°
WB_0802_	4.76	2.38	2.3	5°
WC_0201_	3.97	1.59	2.3	7°

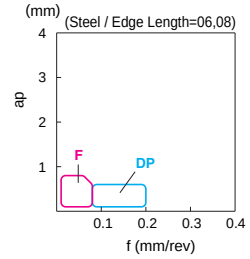




Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
○: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice
(In case hardness is under 45HRC)

Insert (Handed Insert shows Left-hand)		Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Minute ap	 Sharp Edge	WBGT 060101M$^{R/L}$-CF	< 0.1																			●	●				
		WBGT 060102M$^{R/L}$-CF	< 0.2																			●	●				
Minute ap	 Sharp Edge / Polished Surface	WBGT 060101MP$^{R/L}$-CF	< 0.1																				●				
		WBGT 060102MP$^{R/L}$-CF	< 0.2																				●				
Finishing		WBMT 060102$^{R/L}$-DP	0.2	L	L	●		L	L		L	L									●		●				
		WBMT 060104$^{R/L}$-DP	0.4	L	L	●		L	L		L	L									●		●				
		WBMT 080202$^{R/L}$-DP	0.2	L	L	●		L	L		●	●									●		●				
		WBMT 080204$^{R/L}$-DP	0.4	L	L	●		L	L		●	●									●		●			F41 F65	
Finishing		WBGT 0601003$^{R/L}$-F	0.03			L															●				L		
		WBGT 060101$^{R/L}$-F	0.1			●															●				●		
		WBGT 060102$^{R/L}$-F	0.2		L	●			L												●				●		
		WBGT 060104$^{R/L}$-F	0.4		●	●			●												●				●		
		WBGT 0802003$^{R/L}$-F	0.03																		●						
		WBGT 080201$^{R/L}$-F	0.1			●															●				●		
		WBGT 080202$^{R/L}$-F	0.2		L	●			L												●				●		
		WBGT 080204$^{R/L}$-F	0.4		●	●			●												●				●		
		WBGT 0601005M$^{R/L}$-F	< 0.05																			●	●				
		WBGT 060101M$^{R/L}$-F	< 0.1																			●	●				
		WBGT 060102M$^{R/L}$-F	< 0.2																			●	●				
		WBGT 060104M$^{R/L}$-F	< 0.4																			●	●				
		WBGT 0802005M$^{R/L}$-F	< 0.05																			●	●				
		WBGT 080201M$^{R/L}$-F	< 0.1																			●	●				
		WBGT 080202M$^{R/L}$-F	< 0.2																			●	●				
		WBGT 080204M$^{R/L}$-F	< 0.4																			●	●				
		WCGT 020101$^{R/L}$-F	0.1			L															L					-	
		WCGT 020102$^{R/L}$-F	0.2			●															L						
		WCGT 020104$^{R/L}$-F	0.4			●															L						
Cast Iron	 Without Chipbreaker	WBGW 060102$^{R/L}$	0.2			L																			L	F41 F65	—
		WBGW 060104$^{R/L}$	0.4			L																			L		
		WBGW 080202$^{R/L}$	0.2			L																			L		
		WBGW 080204$^{R/L}$	0.4			L																			L		





・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page ➡ **B78**

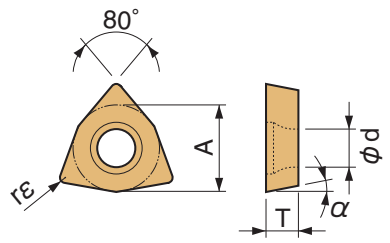
Inserts are sold in 10 piece boxes.

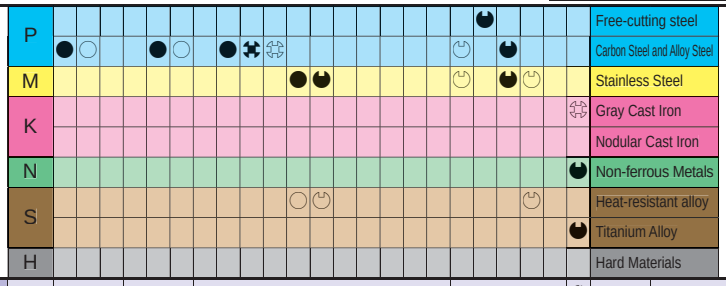
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

(mm)

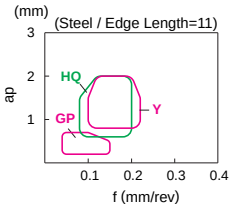
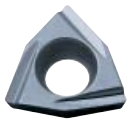
80°Trigon • Positive with Hole

Description	A	T	ød	α
WP_1102_	6.35	2.38	2.8	11°
WP_1603_	9.525	3.18	4.4	11°





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 under 45HRC)

	Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN6010	Cermet TN6020	Cermet TN60	PVD Cermet PV7005	PVD Cermet PV7010	PVD Cermet PV7020	CVD Coated Carbide CA5505	CA5515	CA5525	CA5535	CA6515	CA6525	CA4010	CA4115	CA4120	CA4505	CA4515	PVD Coated Carbide PR930	PR1005	PR1025	PR1125	Carbide KW10	Ref. Page for Toolholder	Applicable Chipbreaker Range
Finishing		WPMT 110204GP	0.4			●					●	●									●		●			F41 F65	
		WPMT 160304GP	0.4			●					●	●									●		●				
Finishing-Medium		WPMT 110202HQ 110204HQ	0.2 0.4	 ●	 ●	● ●	 ●	 ●		 ●	● ●	● ●	 ●	 ●							● ●		● ●	●			
		WPMT 160304HQ 160308HQ	0.4 0.8	● ●	● ●	● ●	● ●	● ●		● ●	● ●	● ●	● ●	● ●							● ●		● ●	●			
Finishing-Medium		WPGT 110202R/L-Y 110204R/L-Y	0.2 0.4		 L	● ●															● ●				● ●		
		WPGT 160304R/L-Y 160308R/L-Y	0.4 0.8		L	● ●															● ●				● ●		
		WPGT 110202MR/L-Y 110204MR/L-Y	< 0.2 < 0.4																			● ●	● ●				
		WPGT 160304MR/L-Y 160308MR/L-Y	< 0.4 < 0.8																			● ●	● ●				
Cast Iron	 Without Chipbreaker	WPGW 110202 110204	0.2 0.4																						● ●		—
		WPGW 160304 160308	0.4 0.8																						● ●		

・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For grades { TN30 PV60 PR905 / PV30 PV90 PR915 }, See Page **B78**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

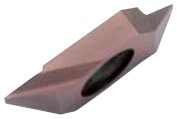
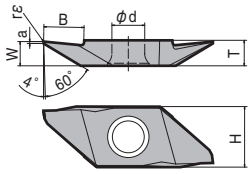
Inserts for Back Turning (Small Tools)

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 under 45HRC)

		PR1025	KW10
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 alloy		
	Titanium Alloy		◕
H	Hard Materials		

For KTKF type toolholder

Insert (Handed insert shows Right-hand)	Description	W	a	B	R(rε)	T	H	ød	PVD Coated Carbide PR1025	Carbide KW10	Ref. Page for Toolholder
 	**TKFB 12R15005M**	1.5	0.25	2.6	<0.05	3.0	8.7	5.2	●	●	E6
	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				●	●	

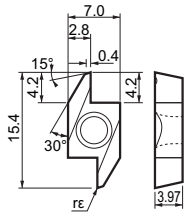
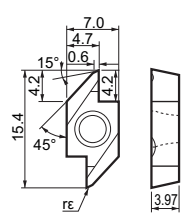
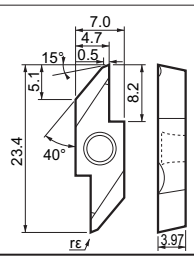
・Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

For AABS / SABS / AABW / SABW toolholder

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 under 45HRC)

		Cermet TC60	PVD Coated Carbide PR930	PR1005	PR1025	Carbide KW10
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 Alloy				◔	
	Titanium Alloy					◕
H	Hard Materials					

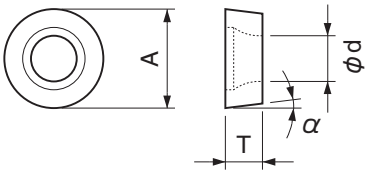
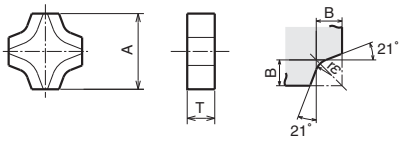
Insert (Handed insert shows Right-hand)	Description	Dim. (mm) rε	Cermet TC60	PVD Coated Carbide PR930	PR1005	PR1025	Carbide KW10	Ref. Page for Toolholder
 	**ABS 15°L4005**	0.05	R	R			R	E8
	15°L4015	0.15	R	R			R	
	ABS 15°L4005M	<0.05			R	R		
	15°L4015M	<0.15			R	R		
 	**ABW 15°L4005**	0.05	R	R			R	E9
	15°L4015	0.15	R	R			R	
	ABW 15°L4005M	<0.05			R	R		
	15°L4015M	<0.15			R	R		
 	**ABW 23°L5005**	0.05	R	R			R	E10
	23°L5015	0.15	R	R			R	
	ABW 23°L5005M	<0.05			R	R		
	23°L5015M	<0.15			R	R		

• Insert whose corner R(rε) dimension expressed with less than sign (e.g. **<0.05**, **<0.1**, **<0.2** etc.) indicate models with minus tolerance for corner R(rε).

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

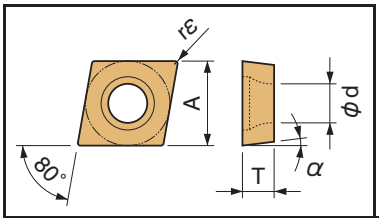
Bearing Machining

Insert		Description	Dimension (mm) A	T	ø d	rε	Angle (°) α	Cermet TN90	Ref. Page for Toolholder
 External / Internal / 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°	●	**F71**
		1604M0-BB	16.0	4.76	5.5			●	
 Round Chamfering					B	rε			
		SNMF 120406-21	12.70	4.76	1.5	0.6	-	●	**D38 F71**
		120410-21			3.0	1.0		●	
		120416-21			3.1	1.6		●	
		120421-21			3.2	2.1		●	
		120426-21			3.3	2.6		●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

80°Diamond • Positive with Hole

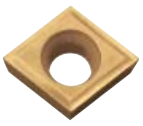
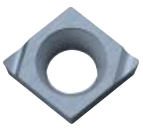
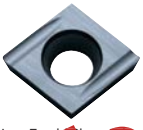


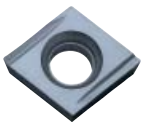
(mm)

Description	A	T	ød	α
CC_0301_	3.5	1.4	1.9	7°
CC_0401_	4.3	1.8	2.3	
CC_0602_	6.35	2.38	2.8	
CC_09T3_	9.525	3.97	4.4	
CC_1204_	12.7	4.76	5.5	

(mm)

Description	A	T	ød	α
CPMT0802_	7.94	2.38	3.3	11°
CP_0802_	7.94	2.38	3.5	
CP_0903_	9.525	3.18	4.5	

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Finishing-Medium	CCMT 060202HQ	0.2			●	●			E11~13
	CCMT 060204HQ	0.4	●	●	●	●			F49~50
	CCMT 09T302HQ	0.2	●		●	●			E11~13
	CCMT 09T304HQ	0.4	●	●	●	●			F24
	CCMT 09T308HQ	0.8	●	●	●	●			F44
 Finishing-Medium	CCMT 060202GK	0.2					●		E11~13
	CCMT 060204GK	0.4					●		F49~50
	CCMT 09T302GK	0.2					●		E11~13
	CCMT 09T304GK	0.4					●		F24 F44
	CCMT 120404GK	0.4					●		E12
	CCMT 120408GK	0.8					●		
	CCMT 120412GK	1.2					●		
 Medium	CCGT 060201	0.1	●		●	●			E11~13
	CCGT 060202	0.2	●		●	●			F49
	CCGT 060204	0.4	●		●	●			F50
	CCGT 09T301	0.1			●	●			E11~13
	CCGT 09T302	0.2	●		●	●			F24
	CCGT 09T304	0.4	●		●	●			F44
	CCMT 09T308	0.8			●	●			
 Finishing	CCGT 030102R/L-F	0.2			L	L			F24
	CCGT 030104R/L-F	0.4			L	L			F49
	CCGT 040102R/L-F	0.2			L	L			
	CCGT 040104R/L-F	0.4			L	L			
 Low Feed / Sharp Edge	CCGT 060201F R/L-U	0.1	R	R	●	●			E11~13
	CCGT 060202F R/L-U	0.2	R	R	●	L			F49~50
	CCGT 09T301F R/L-U	0.1	R	R					E11~13
	CCGT 09T302F R/L-U	0.2	R	R					F24 F44
 Low Feed / With Honing	CCGT 060202E R/L-U	0.2	●	●	●	L			E11~13
	CCGT 060204E R/L-U	0.4			●	L			F49~50
	CCGT 09T301E R/L-U	0.1	R	●					E11-13
	CCGT 09T302E R/L-U	0.2	R	●					F24
	CCGT 09T304E R/L-U	0.4	●	●					F44

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PV60	PV90	PVD Coated Carbide PR915	PR905	Ref. Page for Toolholder
 Finishing	CPMT 080204GP	0.4			●	●			F26 F49 F50
	CPMT 090304GP	0.4			●	●			F24 F26 F49 F50
	CPMT 090308GP	0.8			●	●			
 Finishing-Medium	CPMH 080204HQ	0.4			●	●			F26 F49 F50
	CPMH 080208HQ	0.8			●	●			
	CPMH 090304HQ	0.4	●	●	●	●			F24 F26 F49 F50
	CPMH 090308HQ	0.8		●	●	●			
 Medium cutting	CPMH 080204	0.4			●	●			F26 F49 F50
	CPMH 080208	0.8			●	●			
	CPMH 090304	0.4	●	●	●	●			F24 F26 F49 F50
	CPMH 090308	0.8	●	●	●	●			
 Low Carbon Steel Finishing	CPMT 080204XP	0.4			●	●			F26 F49 F50
	CPMT 090304XP	0.4			●	●			F24 F26 F49 F50
	CPMT 090308XP	0.8			●	●			
 Low Carbon Steel Finishing-Medium	CPMT 090304XQ	0.4			●	●			F24 F26 F49 F50
	CPMT 090308XQ	0.8			●	●			
 Finishing-Medium	CPMH 080204R/L-Y	0.4				●			F26 F49 F50
	CPMH 080208R/L-Y	0.8				●			
	CPMH 090304R/L-Y	0.4				●			F24 F26 F49 F50
	CPMH 090308R/L-Y	0.8				●			

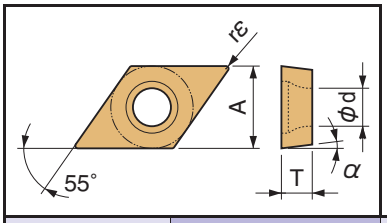
Please refer to pages B45 - B71

For other grade, See Page B45~B71

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

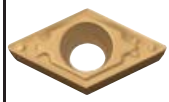
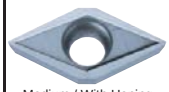
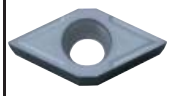
Inserts are sold in 10 piece boxes.

55°Diamond • Positive with Hole



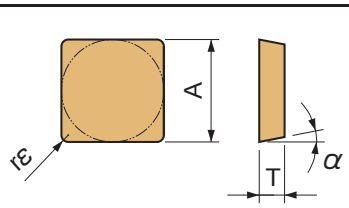
(mm)

Description	A	T	ød	α
DC_0702_	6.35	2.38	2.8	7°
DC_11T3_	9.525	3.97	4.4	

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Minute ap	DCGT 070202CF	0.2					●		Refer to the table below
	DCGT 11T302CF	0.2					●		
 Finishing	DCMT 070202GP 070204GP	0.2 0.4			● ●	● ●			
	DCMT 11T304GP 11T308GP	0.4 0.8			● ●	● ●			
 Finishing-Medium	DCMT 070202HQ 070204HQ 070208HQ	0.2 0.4 0.8	 ● 		● ● ●	● ● ●			
	DCMT 11T302HQ 11T304HQ 11T308HQ	0.2 0.4 0.8	● ● ●	 ● ●	● ● ●	● ● ●			
 Medium / With Honing	DCGT 11T302EN-Z 11T304EN-Z	0.2 0.4				● ●			
 Medium cutting	DCGT 070201 070202 070204	0.1 0.2 0.4	● ● ●	● ● ●	● ● ●	● ● ●			
	DCGT 11T301 11T302 11T304	0.1 0.2 0.4	● ● ●	● ● ●	● ● ●	● ● ●			
	DCMT 11T308	0.8	●	●	●	●			
 Low Carbon Steel / Finishing	DCMT 070204XP	0.4			●	●			
	DCMT 11T302XP 11T304XP 11T308XP	0.2 0.4 0.8			● ● ●	● ● ●			
 Low Carbon Steel / Finishing-Medium	DCMT 11T304XQ 11T308XQ	0.4 0.8			● ●	● ●			
 Low Feed / Sharp Edge	DCGT 070202F$^{R}_{L}$-U	0.2	●	R		●	●	●	
	DCGT 11T301F$^{R}_{L}$-U 11T302F$^{R}_{L}$-U	0.1 0.2	 R	R R		 ●	 ●	 ●	
 Low Feed / With Honing	DCGT 070202E$^{R}_{L}$-U 070204E$^{R}_{L}$-U	0.2 0.4	R R	R		● ●			
	DCGT 11T302E$^{R}_{L}$-U 11T304E$^{R}_{L}$-U	0.2 0.4	R ●	 ●		● ●			

Description	Ref. Page for Toolholder
DC..07 type	E14~17,E19~21,F29,F51~52
DC..11 type	E14~17,E19~21,F29,F44,F51~52

90°Square • Positive without Hole



(mm)

Description	A	T	ød
SP_0903_	9.525	3.18	11°
SP_1203_	12.7	3.18	11°
SP_1204_	12.7	4.76	11°

Insert	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Medium cutting	SPMR 090304G 090308G	0.4 0.8				● ●			E28 F60
	SPMR 120304G 120308G	0.4 0.8				● ●			
 Without Chipbreaker	SPMN 090308	0.8		●					E28 F60
	SPMN 120308	0.8		●					
	SPMN 120408 120412	0.8 1.2						● ●	-

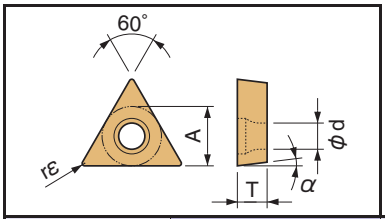
Please refer to pages B45 - B71

For other grade, See Page B45~B71

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

60°Triangle • Positive with Hole



(mm)

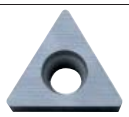
Description	A	T	ød	α
TB_0601_	3.97	1.59	2.3	5°
TC_0902_	5.56	2.38	2.5	7°
TC_1102_	6.35	2.38	2.8	
TC_16T3_	9.525	3.97	4.4	

(mm)

Description	A	T	ød	α
TPMT0902_	5.56	2.38	2.8	11°
TPMT1603_	9.525	3.18	4.4	

(mm)

Description	A	T	ød	α
TP_0802_	4.76	2.38	2.3	11°
TP_0902_	5.56	2.38	3.0	
TP_1102_	6.35	2.38	3.5	
TP_1103_	6.35	3.18	3.3	
TP_1603_	9.525	3.18	4.5	

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Minute ap	TBGT 060102CF	0.2					●		
 Finishing	TBGT 060102R/L	0.2	●		●	L	●	●	F33 F48 F55
	060104R/L	0.4	L		●	L			
 Without Chipbreaker	TBGW 060102	0.2			●				
 Finishing-Medium	TCMT 16T304HQ	0.4				●			
	16T308HQ	0.8				●			
 Low Feed / Sharp Edge	TCGT 080202FR/L-U	0.2	R	R					E22
	TCGT 110301FR/L-U	0.1	R	R					E22
	110302FR/L-U	0.2	R	R					F34
 Low Feed / Wiper	TCGT 080202ER/L-U	0.2	R						E22
	TCGT 110304ER/L-U	0.4	R						E22 F34
 Minute ap	TPGT 080202CF	0.2					●		E22 F55 F58
	TPGT 090202CF	0.2					●		F33 F55 F58
 Finishing	TPMT 090202GP	0.2				●			F33 F55 F58
	090204GP	0.4			●	●			
	TPMT 110304GP	0.4			●	●			E22 F33 F55 F58
	110308GP	0.8			●	●			
	TPMT 160304GP	0.4			●	●			F33
 Finishing-Medium	TPMT 090202HQ	0.2			●	●			F55
	090204HQ	0.4	●		●	●			F58
	TPMT 110302HQ	0.2	●		●				E22
	110304HQ	0.4	●		●	●			F33 F55
	110308HQ	0.8	●		●	●			F58
	TPMT 160304HQ	0.4			●	●			F33 F55
	160308HQ	0.8			●	●			F58

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Low Carbon Steel / Finishing	TPMT 090204XP	0.4			●	●			E22 F55 F58
	TPMT 110304XP	0.4			●	●			E22 F33 F55 F58
	110308XP	0.8			●	●			
	TPMT 160304XP	0.4			●	●			F33 F55 F58
	160308XP	0.8			●	●			
 Low Carbon Steel / Finishing-Medium	TPMT 110304XQ	0.4			●	●			E22 F33 F55 F58
	110308XQ	0.8			●	●			
	TPMT 160304XQ	0.4			●	●			F33 F55 F58
	160308XQ	0.8			●	●			
Finishing	TPGH 080202R/L	0.2	●	●	L	L	●	●	E22 F55 F58
	080204R/L	0.4	L	L	●	L			
	TPGH 090202R/L	0.2	●	●	L	L	●	●	F33 F55 F58
	090204R/L	0.4	L	L	●	L			
	TPGH 110202R/L	0.2			L	L			F57
	110204R/L	0.4			L	L			
	TPGH 110302R/L	0.2	R	●	L	L			E22 F33 F55 F58
	110304R/L	0.4	●	●	●	L			
	110308R/L	0.8			L	L			
	TPGH 160302R/L	0.2			L	L			F33 F55 F58
	160304R/L	0.4	●	L	●	L			
	160308R/L	0.8	●		L	L			
 Medium	TPGH 110302R/L-H	0.2	L		L	L			E22 F33 F55 F58
	110304R/L-H	0.4	●		●	L			
	110308R/L-H	0.8			L	L			
	TPGH 160304R/L-H	0.4			L	L			F33 F55 F58
	160308R/L-H	0.8			L	L			
 Without Chipbreaker	TPGB 080202	0.2	●						E22 F55 F58
	080204	0.4	●		●				
	TPGB 090202	0.2	●						F33 F55 F58
	090204	0.4	●		●				
	TPGB 110202	0.2	●						F57
	TPGB 110301	0.1			●				E22 F33 F55 F58
	110302	0.2	●		●				
	110304	0.4	●		●				
	110308	0.8	●						
	TPGB 160304	0.4	●						F33 F55 F58

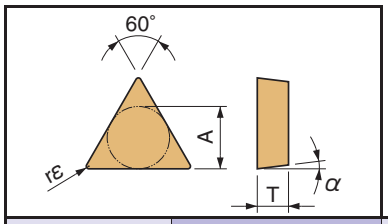
Please refer to pages B45 - B71

For other grade, See Page B45~B71

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

60°Triangle • Positive without Hole

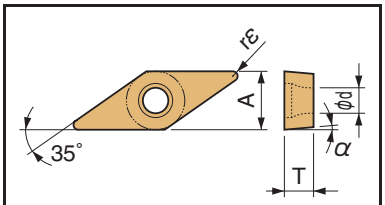


(mm)

Description	A	T	α
TP_0902_	5.56	2.38	11°
TP_1103_	6.35	3.18	
TP_1603_	9.525	3.18	

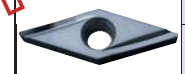
Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Finishing	TPMR 110304DP	0.4	●						E69 F61
	TPMR 160304DP	0.4	●						
 Finishing	TPMR 110304GP	0.4				●			
	TPMR 160304GP	0.4				●			
 Finishing-Medium	TPMR 110304HQ 110308HQ	0.4 0.8	● ●			● ●			
	TPMR 160304HQ 160308HQ	0.4 0.8				● ●			
 Medium cutting	TPMR 110304G 110308G	0.4 0.8				● ●			
	TPMR 160304G 160308G	0.4 0.8				● ●			
 Medium cutting	TPMR 110304	0.4	●						
	TPMR 160304 160308	0.4 0.8	● ●	● ●					E69 F61
 -A: Finishing -B: Finishing-Medium -C: Medium cutting	TPGR 110302R/L-A 110304R/L-A	0.2 0.4	L ●		L ●	L L			
	TPGR 110304R/L-B 110308R/L-B	0.4 0.8	● R		● L	L L			
	TPGR 160302R/L-B 160304R/L-B 160308R/L-B	0.2 0.4 0.8	L ● L		L ● L	L L L			
	TPGR 160304R/L-C 160308R/L-C	0.4 0.8	L L		● L	L L			
 Without Chipbreaker	TPGN 090204	0.4	●						F61
	TPGN 160308	0.8	●						E69 F61
	TPMN 160308	0.8		●					

35°Diamond • Positive with Hole



(mm)

Description	A	T	ød	α
VB_1103_	6.35	3.18	2.8	5°
VB_1604_	9.525	4.76	4.4	
VC_0802_	4.76	2.38	2.3	7°
VP_1103_	6.35	3.18	2.8	11°

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Finishing	VBMT 110304GP	0.4			●	●			E23 ~E27 F37 F39 F63
	VBMT 160404GP 160408GP	0.4 0.8	●	●	● ●	● ●			E23 F37 F39 F63
 Finishing	VBMT 110302VF 110304VF 110308VF	0.2 0.4 0.8				● ● ●			E23 ~E27 F37 F39 F63
	VBMT 160402VF 160404VF 160408VF 160412VF	0.2 0.4 0.8 1.2				● ● ● ●			E23 F37 F39 F63
 Finishing-Medium	VBMT 110304HQ 110308HQ	0.4 0.8	● ●	● ●	● ●	● ●			E23 ~E27 F37 F39 F63
	VBMT 160404HQ 160408HQ 160412HQ	0.4 0.8 1.2	● ●	● ●	● ●	● ● ●			E23 F37 F39 F63
 Finishing	VBGT 110302R/L-F	0.2			●				E23 E25 E27 F37 F39 F63
 Finishing-Medium	VBGT 110302R/L-Y 110304R/L-Y	0.2 0.4			● ●				
	VBGT 160402R/L-Y 160404R/L-Y	0.2 0.4			● ●				E23 E25 E27 F37 F39 F63
 Finishing	VCMT 080202VF 080204VF	0.2 0.4				● ●			
 Finishing-Medium	VCMT 080202HQ 080204HQ	0.2 0.4			● ●	● ●			E27 E37 F39 F63
	VCMT 160404HQ 160408HQ	0.2 0.4				● ●			
 Minute ap	VPGT 110302CF	0.2					●		E25 E26
 Low Feed / Sharp Edge	VPGT 110302FR/L-U	0.2					●	●	

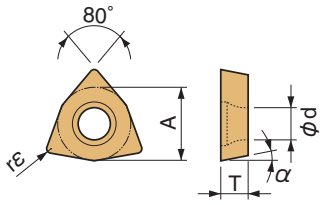
Please refer to pages B45-B71

For other grade, See Page B45~B71

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

80°Trigon • Positive with Hole

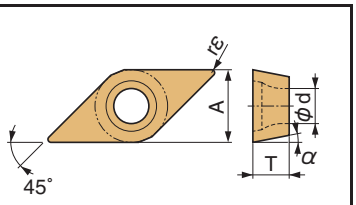


(mm)

Description	A	T	ød	α
WB__0601_	3.97	1.59	2.3	5°
WB__0802_	4.76	2.38	2.3	
WP__1102_	6.35	2.38	2.8	11°
WP__1603_	9.525	3.18	4.4	

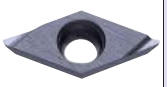
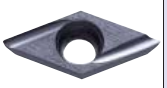
Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Finishing	WBMT 060102R/L-DP	0.2			L				F41 F65
	WBMT 060104R/L-DP	0.4			L				
	WBMT 080202R/L-DP	0.2			L				
	WBMT 080204R/L-DP	0.4			L				
 Finishing	WBGT 060102R/L-F	0.2	●	●	L	L			
	WBGT 060104R/L-F	0.4	●	●	L	L			
	WBGT 080202R/L-F	0.2	●	●	L	L			
	WBGT 080204R/L-F	0.4	●	●	L	L			
 Finishing	WPMT 110204GP	0.4			●	●			
	WPMT 160304GP	0.4			●	●			
 Finishing-Medium	WPMT 110202HQ	0.2			●	●			
	WPMT 110204HQ	0.4			●	●			
	WPMT 160304HQ	0.4			●	●			
	WPMT 160308HQ	0.8			●	●			
 Finishing-Medium	WPGT 110202R/L-Y	0.2			L	L			
	WPGT 110204R/L-Y	0.4			L	L			
	WPGT 160304R/L-Y	0.4			L	L			
	WPGT 160308R/L-Y	0.8			L	L			

45°Diamond • Positive with Hole



(mm)

Description	A	T	ød	α
YP_0602_	4.76	2.38	2.3	11°

Insert (Handed Insert shows Left-hand)	Description	Dim. (mm) rε	Cermet TN30	PVD Cermet PV30	PVD Cermet PV60	PVD Cermet PV90	PVD Coated Carbide PR915	PVD Coated Carbide PR905	Ref. Page for Toolholder
 Finishing	YPGT 060202R/L-F	0.2					●	●	F27 F59
 Low Feed / Sharp Edge	YPGT 060202FR/L-U	0.2					●	●	

Please refer to pages B45 - B71

For other grade, See Page B45~B71

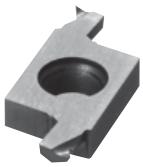
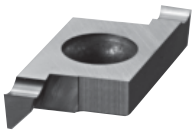
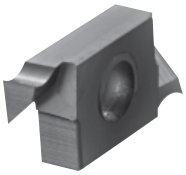
 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Solid Tip-bars

Micro Boring

● Twin Bar

Micro Boring	Micro Face Grooving
TWB Twin Bar ➡ **F8**	TWFG Twin Bar ➡ **G54**
	
TWBT Twin Bar ➡ **F8**	TWFGT Twin Bar ➡ **G54**
	

● System Tip-Bar, Tip-Bar & 2 Edges Tip-Bar

Micro Boring		Micro Back Boring
VNB-S / VNB System Tip-Bar ➡ **F10**	VNBX-S System Tip-Bar ➡ **F16**	VNBT System Tip-Bar ➡ **F10**
		
HPB 2 Edges Tip-Bar ➡ **F18**	-	HPBT 2 Edges Tip-Bar ➡ **F18**
	-	
PSB-S Tip-Bar ➡ **F20**	-	PSBT-S tip bar ➡ **F20**
	-	

Solid Tip-Bar [Grooving / Threading]

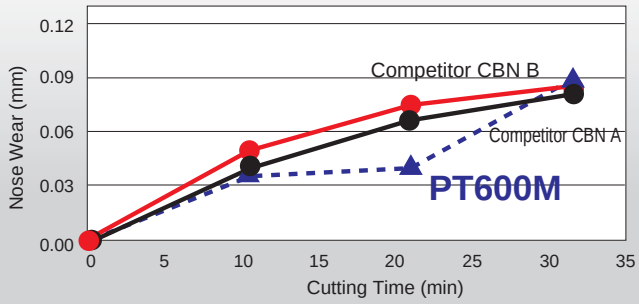
Micro Internal Grooving	Micro Face Grooving	Micro Internal Threading
VNG System Tip-Bar ➡ **G33**	VNFG System Tip-Bar ➡ **G56**	VNT System Tip-Bar ➡ **J27**
		
HPG 2 Edges Tip-Bar ➡ **G30**	HPFG 2 Edges Tip-Bar ➡ **G53**	HPT 2 Edges Tip-Bar ➡ **J24**
		
PSG Tip-Bar ➡ **G32**	PSFG Tip-Bar ➡ **G57**	PST Tip-Bar ➡ **J26**
		

"PT600M" for Hard Materials / Gray Cast Iron

MEGACOAT

With the use of MEGACOAT, it achieves a significantly longer tool life approaching that of CBN.

Wear comparison (for machining of hard materials)



Cutting Condition:
Vc=100m/min, ap=0.2mm, f=0.1mm/rev, Wet
Workpiece Material: SCM415H (Hardened)
58~62HRC

The wear resistance of PT600M is similar to that of competitor's CBN A and B for low speed machining of hard materials (Vc=100m/min)

Cell Fiber Ceramic "CF1" for Heat-resistant Alloy

What is Cell Fiber?

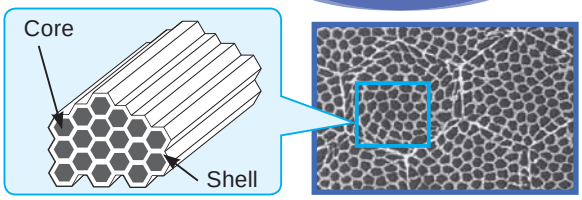
Composite material consisting of high structure control composite core (gray part) and fibriform organization of shell (white part)

Features

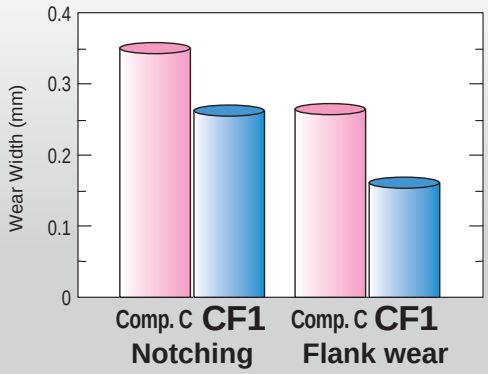
Consisting of polycrystaline ceramics material

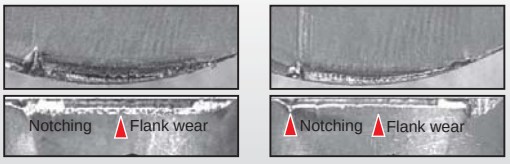
- Superior heat and oxidation resistance
- Hardened / Superior wear resistance
- Superior fracture resistance by crack progress supression

Prolonged tool life and acceleration of cutting of heat resistant alloy such as inconel



Comparison of Wear Resistance





Competitor C **CF1**

<Cutting Condition>
Workpiece: Inconel 718,
Tool geometry; RNGN120400
Vc =150m/min, ap =1mm
f =0.15mm/rev Wet Cutting

Ceramic Inserts Identification System

● Identification System

C	N	G	A	12	04	04	S01525

Turning Indexable Inserts Identification System See page **B2**

Edge Preparation (See Table.1)

● How to identify edge preparation Table-1

Edge Preparation				
Symbol	Cutting Edge Spec.	Example		Shape
S	Chamfered + Honed Cutting Edge	S01525	0.15mm X 25° Chamfered + Honed Cutting Edge	
T	Chamfered Cutting Edge	T02025	0.20mm X 25° Chamfered Cutting Edge	

● See Page **B3** for insert color.

80°Diamond • Negative

(mm)

Description	A	T	ød
CN_A1204_	12.70	4.76	5.16
CNGA1606_	15.875	6.35	6.35
CN_N1204_	12.70	4.76	-

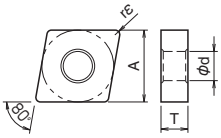
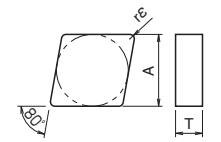
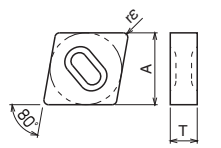
(mm)

Description	A	T	ød
CN_N 1207_	12.70	7.94	-
CNGN 1607_	15.875	7.94	-
CNGX 1207_	12.70	7.94	-

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✖: Interruption / 1st Choice
- ✖: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ○: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

		Alumina Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		Cell Fiber		
		KA30	A65		A66N	PT600M	KS6000		CF1		
K	Gray Cast Iron (With Scale)					●	✖				
K	Gray Cast Iron (Without Scale)	●		○		●					
S	Heat-resistant alloy								●		
H	Hard Materials			○		●			○		

Insert	Description	(Previous Description)	Edge Preparation	Dim. (mm) rε	Ref. Page for Toolholder
 	CNGA 120412S01025	CNGA 120412	S01025	1.2	
	CNGA 120404S01525	CNGA 120404	S01525	0.4	
	120408S01525	120408		0.8	
	120412S01525	120412		1.2	
	CNGA 120404S02025	-	S02025	0.4	
	120408S02025	-		0.8	
	120412S02025	-		1.2	
	CNGA 120404S03030	CNGA 120404-T30	S03030	0.4	D8
	120408S03030	120408-T30		0.8	F42
	120412S03030	120412-T30		1.2	F66
	CNGA 120412T00520	CNGA 120412-T05	T00520	1.2	
	CNGA 120404T01525	CNGA 120404T01525	T01525	0.4	
	120408T01525	120408T01525		0.8	
	120412T01525	120412T01525		1.2	
	CNGA 120404T02025	-	T02025	0.4	
	120408T02025	CNGA 120408		0.8	
	120412T02025	120412		1.2	
	CNGA 160612T02025	CNGA 160612	T02025	1.2	D8
	CNMA 120408S01525	CNMA 120408	S01525	0.8	D8
	CNMA 120408S03030	CNMA 120408-T30	S03030	0.8	F42
	120412S03030	120412-T30		1.2	F66
 	CNGN 120408S01025	CNGN 120408	S01025	0.8	
	120412S01025	120412		1.2	
	120416S01025	120416		1.6	
	CNGN 120404T00520	-	T00520	0.4	
	120408T00520	-		0.8	
	CNGN 120408T01020	CNGN 120408	T01020	0.8	
	120412T01020	120412		1.2	
	CNGN 120404T02025	-	T02025	0.4	
	120408T02025	CNGN 120408		0.8	
	120412T02025	120412		1.2	
	120416T02025	120416		1.6	
	CNGN 120708S01525	CNGN 120708	S01525	0.8	
	CNGN 120708T01020	CNGN 120708	T01020	0.8	D22
	120712T01020	120712		1.2	
	CNGN 120712T01525	CNGN 120712T01525	T01525	1.2	
	120716T01525	120716T01525		1.6	
	CNGN 120704T02025	CNGN 120704	T02025	0.4	
	120708T02025	120708		0.8	
	120712T02025	120712		1.2	
	120716T02025	120716		1.6	
	CNGN 160708T02025	CNGN 160708	T02025	0.8	
	160712T02025	160712		1.2	
	160716T02025	160716		1.6	
	CNMN 120708T02025	CNMN 120708	T02025	0.8	
	120712T02025	120712		1.2	
 	CNGX 120708T02025	-	T02025	0.8	D28 F73
	120712T02025	-		1.2	
	120716T02025	-		1.6	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

55°Diamond • Negative

(mm)

Description	A	T	ød
DNGA1504_	12.70	4.76	5.16
1506_		6.35	
DNGN1504_	12.70	4.76	-
1507_		7.94	

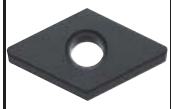
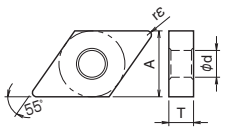
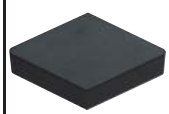
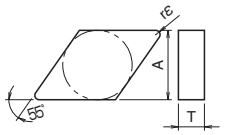
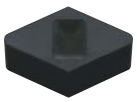
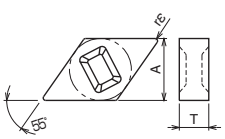
(mm)

Description	A	T	ød
DNGX 1207_	10.00	7.94	-
DNGX 1507_	12.70	7.94	-

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✖: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

		Alumina Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		Cell Fiber		Ref. Page for Toolholder
		KA30	A65		A66N	PT600M	KS6000		CF1		
K	Gray Cast Iron (With Scale)					◕	✱				
	Gray Cast Iron (Without Scale)	●		◔		◕					
S	Heat-resistant alloy										
H	Hard Materials				○	●					

Insert		Description		(Previous Description)		Edge Preparation	Dim. (mm) rε	KA30	A65		A66N	PT600M	KS6000		CF1		Ref. Page for Toolholder
		DNGA	150408S01025	DNGA	150408	S01025	0.8	●									D10 D11 F43
			150412S01025		150412		1.2	●									
		DNGA	150404S01525	DNGA	150404	S01525	0.4				●						
			150408S01525		150408		0.8				●						
		DNGA	150404S02025		-	S02025	0.4					●					
			150408S02025		-		0.8					●					
		DNGA	150408S03030	DNGA	150408-T30	S03030	0.8				●						
		DNGA	150404T02025	DNGA	150404	T02025	0.4		●			●					
			150408T02025		150408		0.8		●			●	●				
			150412T02025		-		1.2					●	●				
			150416T02025		150416		1.6		●								
		DNGA	150604S01525	DNGA	150604	S01525	0.4				●						
			150608S01525		150608		0.8				●						
			150612S01525		150612		1.2				●						
			150616S01525		150616		1.6				●						
		DNGA	150604T01525	DNGA	150604T01525	T01525	0.4		●								
			150608T01525		150608T01525		0.8		●								
			150612T01525		150612T01525		1.2		●								
		DNGA	150604T02025		-	T02025	0.4					●					
			150608T02025		-		0.8					●					
			150612T02025		-		1.2					●					
		DNGN	150404S01025	DNGN	150404	S01025	0.4	●									D23
			150408S01025		150408		0.8	●									
			150412S01025		150412		1.2	●									
			150416S01025		150416		1.6	●									
		DNGN	150408T02025		-	T02025	0.8					●					
		DNGN	150704S01525	DNGN	150704	S01525	0.4				●						
			150708S01525		150708		0.8				●						
			150712S01525		150712		1.2				●						
		DNGN	150704S02025		-	S02025	0.4					●					
			150708S02025		-		0.8					●					
			150712S02025		-		1.2					●					
		DNGN	150704T02025	DNGN	150704	T02025	0.4		●								
			150708T02025		150708		0.8		●								
			150712T02025		150712		1.2		●								
			150716T02025		150716		1.6		●								
		DNGX	120708T02025		-	T02025	0.8						●				D29 F73
			120712T02025		-		1.2						●				
			120716T02025		-		1.6						●				
		DNGX	150708T02025		-	T02025	0.8						●				D29
			150712T02025		-		1.2						●				
			150716T02025		-		1.6						●				

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

75°Diamond • Negative
Round • Negative

(mm)

Description	A	T	ød
ENGN 1307_	12.70	7.94	-
RNGN 0603_	6.35	3.18	
RNGN 0903_	9.525	3.18	
0904_		4.76	
0907_		7.94	

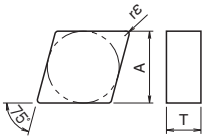
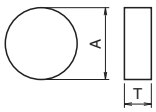
(mm)

Description	A	T	ød
RNGN 1204_	12.70	4.76	-
1207_		7.94	
RNGN 1507_	15.875	7.94	
RNGN 2507_	25.40	7.94	

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
✖: Interruption / 1st Choice
✖: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		Alumina Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		Cell Fiber		Ref. Page for Toolholder
		KA30	A65		A66N	PT600M	KS6000		CF1		
K	Gray Cast Iron (With Scale)				●	✖					
	Gray Cast Iron (Without Scale)			◔	●						
S	Heat-resistant alloy								●		
H	Hard Materials			○	●				◔		

Insert	Description	(Previous Description)	* Edge Preparation	Dim. (mm) rε	KA30	A65		A66N	PT600M	KS6000		CF1		Ref. Page for Toolholder
 	ENGN 130708S01525	ENGN 130708	S01525	0.8				●						D23 F72
	130712S01525	130712		1.2				●						
	ENGN 130708S02025	-	S02025	0.8					●					
	130712S02025	-		1.2					●					
	ENGN 130704T02025	ENGN 130704	T02025	0.4		●			●					
	130708T02025	130708		0.8		●			●					
	130712T02025	130712		1.2		●			●					
	130716T02025	130716		1.6		●			●					
	130720T02025	130720		2.0		●			●					
	130730T02025	130730		3.0		●			●					
 	RNGN 060300T01525	RNGN 060300T01525	T01525	-				●						-
	RNGN 090300T01525	RNGN 090300T01525	T01525	-				●						D33
	RNGN 090400S01525	RNGN 090400	S01525	-				●						D27 D33
	090400S02025	-	S02025	-					●					
	090400T01020	-	T01020	-								●		
	090400T02025	RNGN 090400	T02025	-		●			●					
	RNGN 090700T01020	-	T01020	-								●		
	RNGN 120400S01525	RNGN 120400	S01525	-				●						
	120400S02025	-	S02025	-					●					
	120400T01020	-	T01020	-								●		
	120400T01525	RNGN 120400T01525	T01525	-				●						
	120400T02025	RNGN 120400	T02025	-		●	●		●	●				
	RNGN 120700K15015	RNGN 120700K	K15015	-			●	●	●					
	120700S01525	RNGN 120700	S01525	-				●						
	120700S02025	-	S02025	-					●					
	120700S03030	RNGN 120700-T30	S03030	-				●						
	120700T01020	-	T01020	-								●		
	120700T01525	RNGN 120700T01525	T01525	-				●						
	120700T02025	RNGN 120700	T02025	-		●	●		●	●				
	RNGN 150700S01525	RNGN 150700	S01525	-				●						
	150700S02025	-	S02025	-					●					
	150700T02025	RNGN 150700	T02025	-		●			●					
	RNGN 250700P20015	RNGN 250700K	P20015	-				●						

* For edge preparation **K**, refer to the table below.

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
K	Double Chamfered Cutting Edge	K15015	1.5mm X 15° Chamfered Cutting Edge

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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

90°Square • Negative

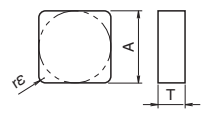
(mm)

Description	A	T	ød
SN_A1204_	12.70	4.76	5.16
SNGN1204_			-
SNGN1207_		7.94	

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✖: Interruption / 1st Choice
- ✖: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

		KA30	A65		A66N	PT600M	KS6000		CF1		Ref. Page for Toolholder
		Alumina Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		Cell Fiber		
K	Gray Cast Iron (With Scale)				◕	✖					
	Gray Cast Iron (Without Scale)	●		◔		◕					
S	Heat-resistant alloy										
H	Hard Materials			○	●						

Insert		Description		(Previous Description)		Edge Preparation	Dim. (mm) rε	KA30	A65		A66N	PT600M	KS6000		CF1		Ref. Page for Toolholder
		SNGA	120408S01525	SNGA	120408	S01525	0.8				●						D12 D13
			120412S01525		120412		1.2				●						
		SNGA	120408S02025		-	S02025	0.8					●					
			120412S02025		-		1.2					●					
		SNGA	120408T01525	SNGA	120408T01525	T01525	0.8				●						
			120412T01525		120412T01525		1.2				●						
		SNGA	120408T02025	SNGA	120408	T02025	0.8		●			●	●				
			120412T02025		120412		1.2		●			●	●				
			120416T02025		120416		1.6					●	●				
		SNMA	120408S03030	SNMA	120408-T30	S03030	0.8				●						
		SNGN	120404S01025	SNGN	120404	S01025	0.4	●									D24 D25 D34 D35 F72
			120408S01025		120408		0.8	●									
			120412S01025		120412		1.2	●									
			120416S01025		120416		1.6	●									
			120420S01025		120420		2.0	●									
		SNGN	120408S01525	SNGN	120408	S01525	0.8				●						
			120412S01525		120412		1.2				●						
			120416S01525		120416		1.6				●						
		SNGN	120408S02025		-	S02025	0.8					●					
			120412S02025		-		1.2					●					
			120416S02025		-		1.6					●					
		SNGN	120408T00520	SNGN	120408-T05	T00520	0.8	●	●								
			120412T00520		120412-T05		1.2	●									
			120416T00520		120416-T05		1.6		●								
		SNGN	120408T01020		-	T01020	1.2				●				●		
			120412T01020		-										●		
			120416T01020		-										●		
			120420T01020		-										●		
		SNGN	120404T02025	SNGN	120404	T02025	0.4		●			●					
			120408T02025		120408		0.8		●			●	●				
			120412T02025		120412		1.2		●			●	●				
			120416T02025		120416		1.6		●			●	●				
			120420T02025		120420		2.0		●			●	●				
		SNGN	120704S01025	SNGN	120704	S01025	0.4	●									
			120708S01025		120708		0.8	●									
			120712S01025		120712		1.2	●									
			120716S01025		120716		1.6	●									
		SNGN	120704S01525	SNGN	120704	S01525	0.4				●						
			120708S01525		120708		0.8				●						
			120712S01525		120712		1.2				●						
			120716S01525		120716		1.6				●						
			120720S01525		120720		2.0				●						

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

90°Square • Negative

(mm)

Description	A	T	ød
SN_N 1207_	12.70	7.94	-
SNGN 1507_	15.875		
1907_	19.05		
2507_	25.40		

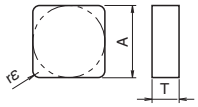
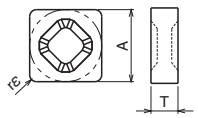
(mm)

Description	A	T	ød
SNGX1207_	12.70	7.94	-
SNGX1507_	15.875		

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✖: Interruption / 1st Choice
- ✖: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

K	Gray Cast Iron (With Scale)	◕ ✖
	Gray Cast Iron (Without Scale)	◕
S	Heat-resistant alloy	◕
H	Hard Materials	● ◔

Insert		Description		(Previous Description)		Edge Preparation	Dim. (mm) rε	Alumina Ceramic KA30	Alumina Ceramic A65		PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6000		Cell Fiber CF1		Ref. Page for Toolholder
		SNGN	120704S02025		-	S02025	0.4					●					D24 D25 D34 D35
			120708S02025		-		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								●		
		SNGN	120704T02025	SNGN	120704	T02025	0.4		●			●					
			120708T02025		120708		0.8		●			●	●				
			120712T02025		120712		1.2		●			●	●				
			120716T02025		120716		1.6		●			●	●				
			120720T02025		120720		2.0		●			●					
		SNGN	150712T02025	SNGN	150712	T02025	1.2		●			●	●				
			150716T02025		150716		1.6		●			●	●				
		SNMN	120716T02025	SNMN	120716	T02025	1.6		●								
		SNGX	120708T02025		-	T02025	0.8						●				D30 D31 F73
			120712T02025		-		1.2						●				
			120716T02025		-		1.6						●				
			120720T02025		-		2.0						●				
		SNGX	150708T02025		-	T02025	0.8						●				D30 D31
			150712T02025		-		1.2						●				
			150716T02025		-		1.6						●				
			150720T02025		-		2.0						●				
		SNGX	150712T03030		-	T03030	1.2						●				
			150716T03030		-		1.6						●				
			150720T03030		-		2.0						●				

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

60°Triangle • Negative

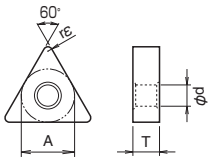
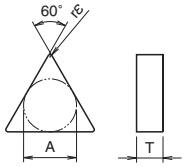
(mm)

Description	A	T	ød
TNGA 1604_	9.525	4.76	3.81
TNGN 1103_	6.35	3.18	-
TNGN 1604_	9.525	4.76	
1607_		7.94	

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✖: Interruption / 1st Choice
- ✖: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

		Alumina Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		Cell Fiber	
		KA30	A65	KT66	A66N	PT600M	KS6000		CF1	
K	Gray Cast Iron (With Scale)					◕	✖			
	Gray Cast Iron (Without Scale)	●		◔		◕				
S	Heat-resistant alloy									
H	Hard Materials			○		●				

Insert	Description	(Previous Description)	Edge Preparation	Dim. (mm) rε	KA30	A65	KT66	A66N	PT600M	KS6000		CF1		Ref. Page for Toolholder
 	TNGA 160408S01025	TNGA 160408	S01025	0.8	●									D14 D15 F43 F68
	TNGA 160404S01525	TNGA 160404	S01525	0.4				●						
	160408S01525	160408		0.8				●						
	160412S01525	160412		1.2				●						
	TNGA 160404S02025	-	S02025	0.4					●					
	160408S02025	-		0.8					●					
	160412S02025	-		1.2					●					
	TNGA 160408S03030	TNGA 160408-T30	S03030	0.8				●						
	160412S03030	160412-T30		1.2				●						
	TNGA 160408T00520	TNGA 160408-T05	T00520	0.8	●									
	TNGA 160404T01525	TNGA 160404T01525	T01525	0.4				●						
	160408T01525	160408T01525		0.8				●						
	160412T01525	160412T01525		1.2				●						
	TNGA 160404T02025	TNGA 160404	T02025	0.4		●			●					
	160408T02025	160408		0.8		●			●	●				
	160412T02025	160412		1.2					●	●				
 	TNGN 110308S00520	TNGN 110308	S00520	0.8				●						D36 F74
	TNGN 110304T00520	TNGN 110304	T00520	0.4		●			●					
	110308T00520	110308		0.8		●			●					
	110312T00520	110312		1.2		●			●					
	TNGN 110304T01525	TNGN 110304T01525	T01525	0.4				●						
	110308T01525	110308T01525		0.8				●						
	110312T01525	110312T01525		1.2				●						
	TNGN 160404S01025	TNGN 160404	S01025	0.4	●									D26
	160408S01025	160408		0.8	●									
	160412S01025	160412		1.2	●									
	160416S01025	160416		1.6	●									
	160420S01025	160420		2.0	●									
	TNGN 160404S01525	TNGN 160404	S01525	0.4				●						
	160408S01525	160408		0.8				●						
	160412S01525	160412		1.2				●						
	TNGN 160404S02025	-	S02025	0.4					●					
	160408S02025	-		0.8					●					
	160412S02025	-		1.2					●					
	TNGN 160404T00520	TNGN 160404-T05	T00520	0.4	●	●								
	160408T00520	160408-T05		0.8	●	●								
	160412T00520	160412-T05		1.2	●									
	160416T00520	160416-T05		1.6	●									
	160420T00520	160420-T05		2.0	●									
	TNGN 160404T02025	TNGN 160404	T02025	0.4		●			●					
	160408T02025	160408		0.8		●			●	●				
	160412T02025	160412		1.2		●			●					

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

60°Triangle • Negative
35°Diamond • Negative
80°Trigon • Negative

(mm)

Description	A	T	ød
TNGN1607_	9.525	7.94	-
TNGN2204_	12.70	4.76	

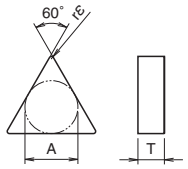
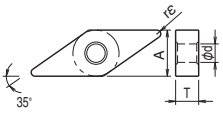
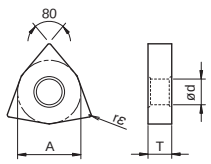
(mm)

Description	A	T	ød
VN_A1604_	9.525	4.76	3.81
WNGA0804_	12.70	4.76	5.16

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✖: Interruption / 1st Choice
- ✖: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description		(Previous Description)		Edge Preparation	Dim. (mm) rε	Alumina Ceramic KA30	Alumina Ceramic A65	Alumina Ceramic KT66	PVD Coated Ceramic A66N	MEGACOAT Ceramic PT600M	Silicon Nitride Ceramic KS6000		Cell Fiber CF1		Ref. Page for Toolholder
		TNGN	160708S01525	TNGN	160708	S01525	0.8				●						
		TNGN	160708S02025		-	S02025	0.8					●					
		TNGN	160704T02025	TNGN	160704	T02025	0.4		●			●					D26
			160708T02025		160708		0.8		●			●					
			160712T02025		160712		1.2		●			●					
			160716T02025		160716		1.6		●								
			160720T02025		160720		2.0		●								
		TNGN	220408T02025	TNGN	220408T02025	T02025	0.8		●								-
			220412T02025		220412T02025		1.2		●								
			220416T02025		220416T02025		1.6		●								
		VNGA	160404S01525	VNGA	160404	S01525	0.4				●						D16 D17 D18
			160408S01525		160408		0.8				●						
		VNGA	160404S02025		-	S02025	0.4					●					
			160408S02025		-		0.8					●					
		VNGA	160404T01525	VNGA	160404T01525	T01525	0.4										
			160408T01525		160408T01525		0.8										
		VNGA	160404T02025	VNGA	160404	T02025	0.4		●			●					
			160408T02025		160408		0.8		●			●					
			160412T02025		-		1.2					●					
		VNMA	160408S01525	VNMA	160408	S01525	0.8				●						
		WNGA	080408S01525	WNGA	080408	S01525	0.8				●						D20 F70
		WNGA	080404T01525	WNGA	080404T01525	T01525	0.4				●						
			080408T01525		080408T01525		0.8				●						
			080412T01525		080412T01525		1.2				●						
		WNGA	080412T02025	WNGA	080412T02025	T02025	1.2						●				

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

90°Square / 90°Triangle • Positive

(mm)

Description	A	T	øα
SPGN 0903_	9.525	3.18	11°
SPGN 1203_	12.70	3.18	

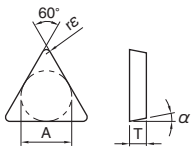
(mm)

Description	A	T	øα
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 Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✖: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description	(Previous Description)	Edge Preparation	Dim. (mm)	Alumina Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		Cell Fiber		Ref. Page for Toolholder
					rε	KA30	A65		A66N	PT600M	KS6000		CF1		
		SPGN 090308S00820	SPGN 090308	S00820	0.8				●						E28 F60
		SPGN 120308S00820	SPGN 120308	S00820	0.8				●	●					
		SPGN 090308T00820	SPGN 090308	T00820	0.8		●			●					
		SPGN 120308T00820	SPGN 120308		0.8		●			●					
		120312T00820	120312	T00820	1.2		●			●					
		120316T00820	-		1.6					●					
		TBGN 060102S00820	TBGN 060102		0.2				●						-
		060104S00820	060104	S00820	0.4				●	●					
		060108S00820	060108		0.8				●	●					
		TBGN 060102T00820	-		0.2				●						
		060104T00820	-	T00820	0.4					●					
		060108T00820	-		0.8					●					
		TCGN 160404T00820	TCGN 160404	T00820	0.4		●								F72
		160408T00820	160408		0.8		●								
		TPGN 090204T00820	-	T00820	0.4					●					F61
		090208T00820	-		0.8					●					
		TPGN 110302S00820	TPGN 110302		0.2				●						E29 F61
		110304S00820	110304	S00820	0.4				●	●					
		110308S00820	110308		0.8				●	●					
		TPGN 110304T00820	TPGN 110304	T00820	0.4		●		●	●					
		110308T00820	110308		0.8		●		●	●					
		TPGN 160304S00820	TPGN 160304		0.4				●	●					
		160308S00820	160308	S00820	0.8				●	●					
		160312S00820	160312		1.2				●	●					
		TPGN 160302T00820	TPGN 160302		0.2		●								
		160304T00820	160304	T00820	0.4		●			●					
		160308T00820	160308		0.8		●			●					
		160312T00820	160312		1.2		●			●					

Inserts are sold in 10 piece boxes.

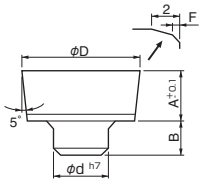
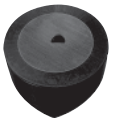
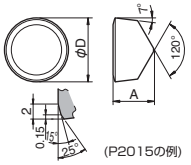
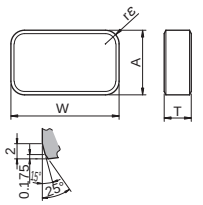
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts for Hardened Rolls

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
✱: Interruption / 1st Choice
✱: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
○: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		Alumina Ceramic			PVD Coated Ceramic	MEGACOAT Ceramic	Silicon Nitride Ceramic		Cell Fiber		Ref. Page for Toolholder
		KA30	A65		A66N	PT600M	KS6000		CF1		
K	Gray Cast Iron (With Scale)					✱					
	Gray Cast Iron (Without Scale)										
S	Heat-resistant alloy								●		
H	Hard Materials			○		●					

Insert		Description	(Previous Description)	*Edge Preparation	Dimension (mm) øD	ød	A	B	F	Ref. Page for Toolholder
		RBG 12K20003	-	K20003	12	6	6	3	0.2	
		16K20003	RBG 16W	K20003	16	8	8	5	0.2	-
		20K20003	RBG 20W	K20003	20	10	10	5	0.3	
	 (P2015の例)	RCGX 090700P20015	-	P20015	9.525	-	8	-	-	
		090700S01020		S01020						
		090700T01525	RCGX090700T01525	T01525						
		RCGX 120700P20015	-	P20015	12.7	-	8	-	-	-
		120700S01020		S01020						
		120700T01525	RCGX120700T01525	T01525						
		RCGX160700K20015	RCGX160700	K20015	15.875	-	8	-	-	
		RCGX191000P20015	RCGX191000	P20015	19.05	-	10			
		RCGX251200P20015	RCGX251200	P20015	25.40	-	12			
		LNUN 381232P20015	LNUN 381232	P20015	W= 38.1	T= 12.70	A= 19.05	rε= 3.18	-	-

* For edge specification **K** and **P**, refer to the table below.

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
K	Double Chamfered Cutting Edge	K20003	0.08in X 3° Chamfered Cutting Edge
P	Double Chamfered + Honed Cutting Edge	P20015	2.00mm X 15° Chamfered + Honed Cutting Edge

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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

RBG Inserts are sold in 1 piece boxes.

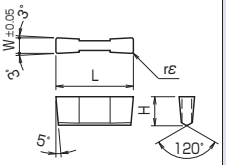
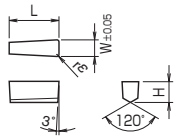
Turning Indexable Inserts

Grooving Inserts

Edge Specification			
Symbol	Cutting Edge Spec.	Example	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

		KA30	A65		A66N	PT600M	KS6000		CF1	
K	Gray Cast Iron (With Scale)									
K	Gray Cast Iron (Without Scale)		○			●				
S	Heat-resistant alloy									
H	Hard Materials				○	●				

Insert		Description		(Previous Description)	Edge Preparation	Dimension (mm) W	rε	L	H	KA30	A65		A66N	PT600M	KS6000		CF1		Ref. Page for Toolholder
		GH	4020-05	-	S01020	4.0	0.5	20	7.5				●						G16 G45
			4020-05		T01020						●			●					
			5020-05		S01020	5.0							●						
			5020-05		T01020						●			●					
			6020-05		T01020	6.0					●			●					
			7020-05		T01020	7.0					●			●					
		GS	91-5	-	T01020	5.0	0.5	15	7.5		●								G15
			91-6		T01020	6.0	0.8												
			91-7		T01020	7.0													
			91-8		T01020	8.0					●								

 ● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

CBN & PCD Tools

C

C1~C28

MEGACOAT CBN (MEGACOAT)	**C2~C3**
Application Map	C2
Recommended Cutting Conditions	C3
CBN & PCD Tools Identification System	**C4**
CBN Tools	**C5~C16**
Turning negative Inserts	C5~C8
Negative Inserts (Solid)	C9
Turning Positive Inserts	C10~C15
Grooving Inserts	C16
Tip-Bars	C16
PCD Tools	**C17~C28**
Turning Negative Inserts	C17
Turning Positive Inserts	C18~C23
Grooving Inserts	C24~C25
For Aluminum Wheel	C25
System Tip-Bars	C26
Tip-Bars	C26
Milling Inserts	C27
PCD Grades and Features	C28
Recommended Cutting Conditions	C28

MEGACOAT CBN



Extended Tool Life **Stability** **High Speed availability**

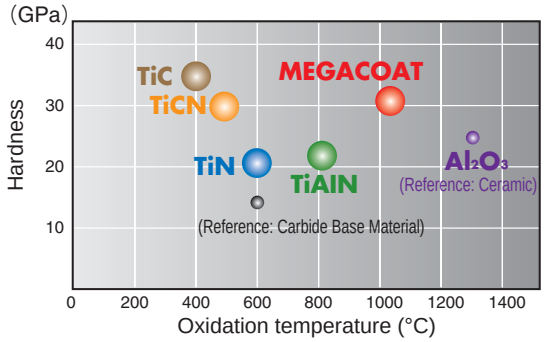
Kyocera's new innovative CBN tools.

CBN Variation and Features ➔ See page A9.

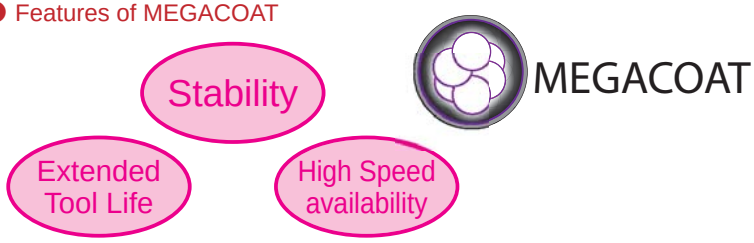
Eight grades in the lineup to accommodate a wide range of workpiece materials

MEGACOAT CBN

Features of PVD coated layer



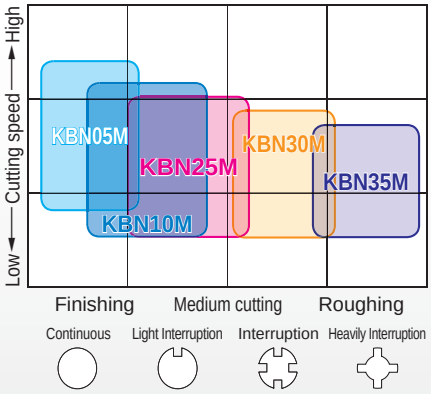
Features of MEGACOAT



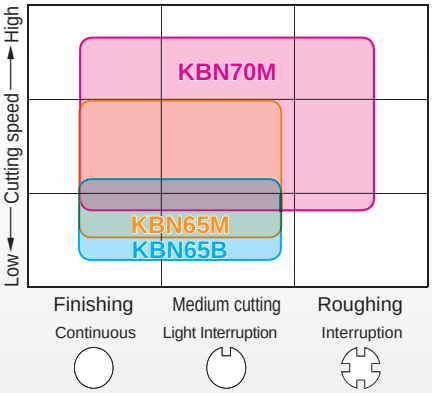
- Long lasting stable machining by its high hardness and superior heat resistance.
- Improved stability by preventing crater wear.
- Excellent finishing surface is brought by its high-temp stability and surface smoothness.

Application Map

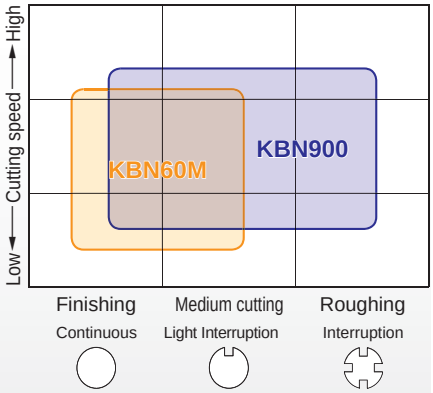
Hard Materials Machining



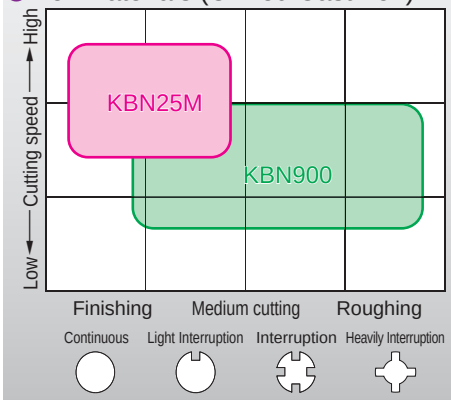
Sintered steel Machining



Cast Iron Machining



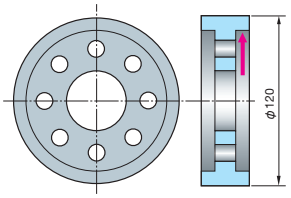
Roll Materials (Chilled Cast Iron)



Case Studies

25CrMo4 (SCM420) (60HRC)

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



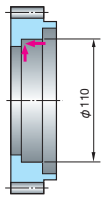
KBN25M	70pcs/edge
Compe.B (CBN tool)	30pcs/edge (Unstable)

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

Evaluation by the user

25CrMo4 (SCM420) (58HRC)

- Gear Parts
- Vc=170m/min
- ap=0.3mm
- f=0.2mm/rev
- Wet ⇒ Dry
- CNGA120412S01215MEW (KBN25M)



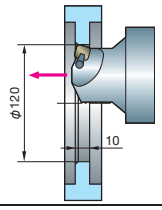
KBN25M	250pcs/edge (Stable)
Compe.C (CBN tool)	250pcs/edge (Unstable) Many times for correction

Competitor C (CBN tool) required many dimensional corrections in order to accomplish 250 pieces/edge, and its tool life was not stable. KBN25M (with wiper edge) exhibited good wear resistance and the edge condition is capable of further extension of tool life.

Evaluation by the user

25CrMo4 (SCM420) (61~65HRC)

- Ring Gear
- Vc=170m/min
- ap=0.15mm
- f=0.21mm/rev
- Wet
- SNGA120412 (KBN25M)



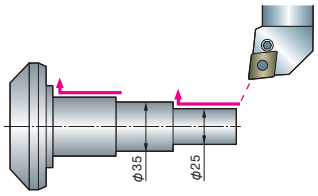
KBN25M	Over 400pcs/edge
Conve. D	200pcs/edge

KBN25M has a better wear resistance, and it could extend its tool life two times more than conventional D. (Tool life is determined by the surface roughness.)

Evaluation by the user

25CrMo4 (SCM420) (over 60HRC)

- Gear Shaft
- Vc=140m/min
- ap=0.3mm
- f=0.14mm/rev
- Dry
- CNGA120408S01215MEW (KBN10M)



KBN10M	Over 300pcs/edge
Conve. G	100pcs/edge

KBN10M (with wiper edge) has good relief wear and exhibits stable surface roughness; in addition, tool life improved three times more than before.

Evaluation by the user

Recommended Cutting Conditions

Workpiece Materials	Hardness	Application		Recommended Insert Grade	Cutting Conditions		
					Cutting Speed Vc (m/min)	ap (mm)	f (mm/rev)
Hard Materials	Over 55HRC	Finishing	Continuous - Light Interruption	KBN10M	200	0.3	0.08
		High Efficient Stable Cutting	Continuous - Interruption	KBN25M	150	0.3	0.08
		Heavy Cutting	Continuous - Interruption	KBN900	80	Under 2.0	0.2
	Under 55HRC	Finishing	Continuous	PT600M	80	0.5	0.2
Gray Cast Iron	Under 250HB	Finishing	Continuous - Light Interruption	KBN60M	700	0.2	0.1
		High Efficient Stable Cutting	Continuous - Light Interruption	KBN900	1200	0.5	0.3
		Heavy Cutting	Continuous - Interruption	KBN900	700	2.0	0.4
Roll Materials (Chilled Cast Iron)	Over 55HRC	Finishing	Continuous - Interruption	KBN25M	120	0.3	0.1
		Heavy Cutting	Continuous - Interruption	KBN900	80	Under 2.0	0.3
Sintered steel	Under 35HRC	Finishing	Continuous - Light Interruption	KBN65M	200	0.3	0.1
	Over 35HRC	Finishing	Continuous - Interruption	KBN70M	250	0.3	0.15

Turning Insert

● Identification System

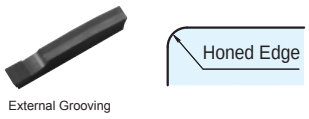
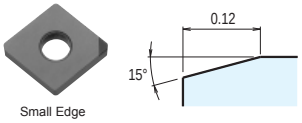
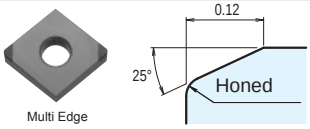
C	N	G	A	12	04	04	S01225	ME

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

Insert Type	Example of type	*Edge Preparation	Manufacture's Option	Feature of insert		No. of Edge	Re-grinding
				Cutting Edge Length	Strengthening of edge		
Negative	CNGA120404S01225	S01225	Without Indication	Long	Standard specification (Specification is different from materials)	1	Possible
	CNGA120404T01215	T01215				1	
	CNMN120404S02020	S02020	Without Indication (Only KBN900)		Standard specification	4 (Plural Edge)	
	CNGA120404S01225SE	S01225	SE	Short (Small Edge)		1	Not recommended
	CNGA120404S01225ME	S01225	ME			2 (Plural Edge)	
	CNGA120404S01730SET	S01730	SET (SE-T)		Tough Edge	1	
	CNGA120404S01730MET	S01730	MET (ME-T)		Tough Edge	2 (Plural Edge)	
	CNGM120404S00825BB1 CNGM120404S01225BB2 CNGM120404S01625BB3	S00825 S01225 S01625	BB1 BB2 BB3		With chipbeaker (Specification is different from chipbreaker)	1	
Positive	CPGB090304T00815	T00815	Without Indication	Long	Standard specification	1	Possible
	CPGB090304T00815SE	T00815	SE	Short (Small Edge)		1	Not recommended
	CPGB090304T00815ME	T00815	ME			2 (Plural Edge)	
	CPGB090304S01035SET	S01035	SET (SE-T)		Tough Edge	1	
	CPGB090304S01035MET	S01035	MET (ME-T)		Tough Edge	2 (Plural Edge)	

*No edge spec. identification because all PCD insert is sharp edge.
・See Page **B3** for insert color

● How to identify edge specification

Edge Preparation				
Symbol	Cutting Edge Spec.	Example		Shape
E	Honed Cutting Edge	E008	R0.08mm Honed	
T	Chamfered Cutting Edge	T01215	0.12mm X 15° Chamfered Cutting Edge	
S	Chamfered + Honed Cutting Edge	S01225	0.12mm X 25° Chamfered + Honed Cutting Edge	

80°Diamond / Negative

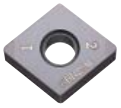
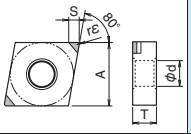
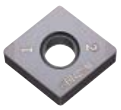
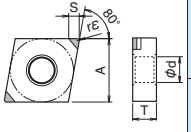
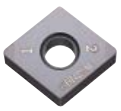
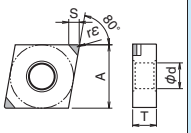
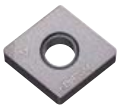
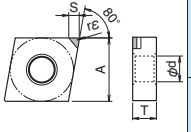
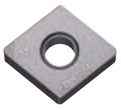
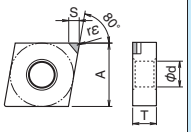
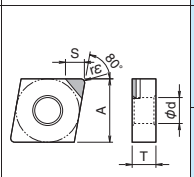
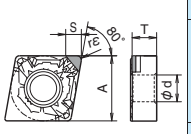
(mm)

Description	A	T	ød
CNGA 1204_	12.70	4.76	5.16
CNGM 1204_			

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
✱: Interruption / 1st Choice
✱: Interruption / 2nd Choice
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

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

Insert	Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD Coated CBN KBN10C	PVD Coated CBN KBN25C	Ref. Page for Toolholder
 With Multi-Edge Wiper Edge		CNGA 120404S01215MEW	CNGA 120404MEW	S01215	0.4	2.6				●	●		●	●	●	●				●	●	D8 F42 F66
		120408S01215MEW	120408MEW		0.8	2.5	2				●	●		●	●	●	●				●	●	
		120412S01215MEW	120412MEW		1.2	2.5					●	●		●	●	●	●				●	●	
 Multi Edge		CNGA 120402S01225ME	CNGA 120402ME	S01225	0.2	2.6	2	●			●	●	○	●	●		●	●			●	●	
		120404S01225ME	120404ME		0.4	2.5		●	●		●	●	○	●	●	●	●	●			●	●	
		120408S01225ME	120408ME		0.8	2.6		●	●		●	●	○	●	●	●	●	●			●	●	
		120412S01225ME	120412ME		1.2	2.5			●		●	●	○	●	●	●	●	●			●	●	
		CNGA 120404T01215ME	CNGA 120404ME	T01215	0.4	2.5	2												●	●			
		120408T01215ME	120408ME		0.8	2.6													●	●			
		120412T01215ME	120412ME		1.2	2.5													●	●			
 Multi Edge / Tough		CNGA 120404S01730MET	CNGA 120404ME-T	S01730	0.4	2.5	2		●			●		●	●	●	●				●	●	
		120408S01730MET	120408ME-T		0.8	2.6			●			●		●	●	●	●				●	●	
		120412S01730MET	120412ME-T		1.2	2.5			●			●		●	●	●	●				●	●	
 Small Edge		CNGA 120402S01225SE	CNGA 120402SE	S01225	0.2	2.6	1	●	●		●	●		●	●						●	●	
		120404S01225SE	120404SE		0.4	2.5		●	●		●	●		●	●						●	●	
		120408S01225SE	120408SE		0.8	2.6		●	●		●	●		●	●						●	●	
		120412S01225SE	120412SE		1.2	2.5			●			●		●	●						●	●	
		CNGA 120404T01215SE	CNGA 120404SE	T01215	0.4	2.5	1			●													
		120408T01215SE	120408SE		0.8	2.6				●													
		120412T01215SE	120412SE		1.2	2.5				●													
 Small Edge / Tough		CNGA 120404S01730SET	CNGA 120404SE-T	S01730	0.4	2.6	1					●			●							●	
		120408S01730SET	120408SE-T		0.8	2.6						●			●							●	
		120412S01730SET	120412SE-T		1.2	2.5						●			●							●	
		CNGA 120404S01225	CNGA 120404	S01225	0.4	3.7	1	●	●		●	●		●	●						●	●	
		120408S01225	120408		0.8	3.6		●	●		●	●		●	●						●	●	
		120412S01225	120412		1.2	3.6		●	●		●	●		●	●						●	●	
		CNGA 120404T01215	CNGA 120404	T01215	0.4	3.7	1			●													
		120408T01215	120408		0.8	3.6				●													
		120412T01215	120412		1.2	3.6				●													
 With Chipbreaker		CNGM 120404S00825BB1	CNGM 120404BB1	S00825	0.4	1.8	1						●	●								
		120408S00825BB1	120408BB1		0.8	2.0							●	●								
		120412S00825BB1	120412BB1		1.2	2.2							●	●								
		CNGM 120404S01225BB2	CNGM 120404BB2	S01225	0.4	2.2	1						●	●								
		120408S01225BB2	120408BB2		0.8	2.4							●	●								
		120412S01225BB2	120412BB2		1.2	2.6							●	●								
		CNGM 120404S01625BB3	CNGM 120404BB3	S01625	0.4	2.6	1						●	●								
		120408S01625BB3	120408BB3		0.8	2.8							●	●								
		120412S01625BB3	120412BB3		1.2	3.0							●	●								

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

55°Diamond / Negative

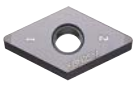
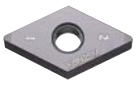
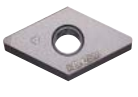
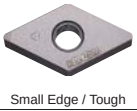
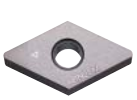
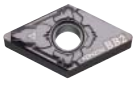
(mm)

Description	A	T	ød
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	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 15° Chamfer + Honing

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

		CBN				MEGACOAT CBN								PVD Coated CBN	
		KBN10B	KBN25B	KBN65B	KBN510	KBN525	KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	KBN10C	KBN25C
K	Gray Cast Iron (With Scale)															
	Gray Cast Iron (Without Scale)											●				
	Nodular Cast Iron (Without Scale)			◔												
	Sintered Steel												◔	✱		
H	Hard Materials (Roughing)									✱	✱					
	Hard Materials (Finishing)				◔	◔		●	●						○	◔
	Hard Materials (Chip Control)				◔	◔		●	●						○	◔

Insert	Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	Ref. Page for Toolholder
 Multi Edge	DNGA 150401S01225ME	DNGA 150401ME		0.1	2.2		D10 D11 F43
	150402S01225ME	150402ME		0.2	2.5		
	150404S01225ME	150404ME	S01225	0.4	2.3	2	
	150408S01225ME	150408ME		0.8	1.9		
	150412S01225ME	150412ME		1.2	1.9		
	DNGA 150404T01215ME	DNGA 150404ME		0.4	2.3		
	150408T01215ME	150408ME	T01215	0.8	1.9	2	
	150412T01215ME	150412ME		1.2	1.9		
	DNGA 150604S01225ME	DNGA 150604ME		0.4	2.3		
	150608S01225ME	150608ME	S01225	0.8	1.9	2	
	150612S01225ME	150612ME		1.2	1.9		
	DNGA 150604T01215ME	DNGA 150604ME		0.4	2.3		
	150608T01215ME	150608ME	T01215	0.8	1.9	2	
	150612T01215ME	150612ME		1.2	1.9		
 Multi Edge / Tough	DNGA 150404S01730MET	DNGA 150404ME-T		0.4	2.3		
	150408S01730MET	150408ME-T	S01730	0.8	1.9	2	
	150412S01730MET	150412ME-T		1.2	1.9		
	DNGA 150604S01730MET	DNGA 150604ME-T		0.4	2.3		
	150608S01730MET	150608ME-T	S01730	0.8	1.9	2	
	150612S01730MET	150612ME-T		1.2	1.9		
 Small Edge	DNGA 150401S01225SE	DNGA 150401SE		0.1	2.2		
	150402S01225SE	150402SE		0.2	2.5		
	150404S01225SE	150404SE	S01225	0.4	2.3	1	
	150408S01225SE	150408SE		0.8	1.9		
	150412S01225SE	150412SE		1.2	1.9		
	DNGA 150404T01215SE	DNGA 150404SE	T01215	0.4	2.3	1	
	150408T01215SE	150408SE		0.8	1.9		
	DNGA 150604S01225SE	DNGA 150604SE		0.4	2.3		
	150608S01225SE	150608SE	S01225	0.8	1.9	1	
	150612S01225SE	150612SE		1.2	1.9		
 Small Edge / Tough	DNGA 150404S01730SET	DNGA 150404SE-T		0.4	2.3		
	150408S01730SET	150408SE-T	S01730	0.8	1.9	1	
	150412S01730SET	150412SE-T		1.2	1.9		
	DNGA 150404S01225	DNGA 150404	S01225	0.4	5.8	1	
	150408S01225	150408		0.8	5.5		
	DNGA 150404T01215	DNGA 150404	T01215	0.4	5.8	1	
	150408T01215	150408		0.8	5.5		
 With Chipbreaker	DNGM 150404S00825BB1	DNGM 150404BB1		0.4	1.6		
	150408S00825BB1	150408BB1	S00825	0.8	1.6	1	
	150412S00825BB1	150412BB1		1.2	1.8		
	DNGM 150404S01225BB2	DNGM 150404BB2		0.4	1.8		
	150408S01225BB2	150408BB2	S01225	0.8	2.0	1	
	150412S01225BB2	150412BB2		1.2	2.1		
	DNGM 150404S01625BB3	DNGM 150404BB3		0.4	2.2		
	150408S01625BB3	150408BB3	S01625	0.8	2.5	1	
	150412S01625BB3	150412BB3		1.2	2.5		

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

90°Square / 60°Triangle / Negative

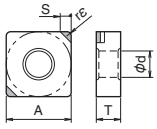
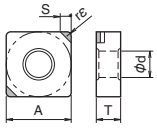
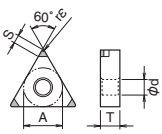
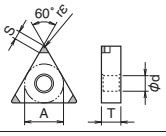
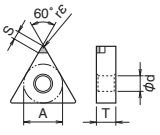
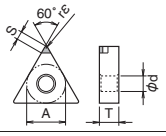
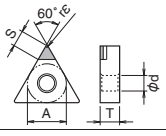
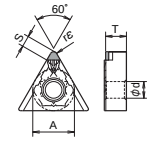
(mm)

Description	A	T	ød
SNGA 1204_	12.70	4.76	5.16
TNGA 1604_ TNGM 1604_	9.525	4.76	3.81

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD Coated CBN KBN10C	PVD Coated CBN KBN25C	Ref. Page for Toolholder
 Multi Edge		SNGA 120404S01225ME	SNGA 120404ME	S01225	0.4	1.8	2				●	●	○	●	●			●			●	●	D12 D13
		120408S01225ME	120408ME		0.8	1.8					●	●	○	●	●	●	●	●			●	●	
		SNGA 120404T01215ME	SNGA 120404ME		0.4	1.8													●	●			
		120408T01215ME	120408ME	T01215	0.8	1.8	2												●	●			
		120412T01215ME	120412ME		1.2	2.2													●	●			
 Multi Edge / Tough		SNGA 120404S01730MET	SNGA 120404ME-T	S01730	0.4	1.8	2		●			●		●	●							●	●	
		120408S01730MET	120408ME-T		0.8	1.8			●			●		●	●	●	●					●	●	
		120412S01730MET	120412ME-T		1.2	2.2			●			●		●	●	●	●					●	●	
 Multi Edge		TNGA 160401S01225ME	TNGA 160401ME	S01225	0.1	2.6	3						○	●	●			●			●	●	D14 D15 F43 F68
		160402S01225ME	160402ME		0.2	2.5					●	●	○	●	●		●	●			●	●	
		160404S01225ME	160404ME		0.4	2.4			●		●	●	○	●	●	●	●	●			●	●	
		160408S01225ME	160408ME		0.8	2.4			●		●	●	○	●	●	●	●	●			●	●	
		160412S01225ME	160412ME		1.2	2.1			●		●	●	○	●	●	●	●	●			●	●	
		TNGA 160404T01215ME	TNGA 160404ME	T01215	0.4	2.4	3												●	●			
		160408T01215ME	160408ME		0.8	2.4													●	●			
		160412T01215ME	160412ME		1.2	2.1													●	●			
 Multi Edge / Tough		TNGA 160404S01730MET	TNGA 160404ME-T	S01730	0.4	2.4	3		●			●		●	●	●	●					●	●	
		160408S01730MET	160408ME-T		0.8	2.4			●			●		●	●	●	●					●	●	
		160412S01730MET	160412ME-T		1.2	2.1			●			●		●	●	●	●					●	●	
 Small Edge		TNGA 160401S01225SE	TNGA 160401SE	S01225	0.1	2.6	1					●			●								●	
		160402S01225SE	160402SE		0.2	2.9					●	●		●	●							●	●	
		160404S01225SE	160404SE		0.4	2.7					●	●		●	●							●	●	
		160408S01225SE	160408SE		0.8	2.4					●	●		●	●							●	●	
		160412S01225SE	160412SE		1.2	2.1						●			●								●	
		TNGA 160404T01215SE	TNGA 160404SE	T01215	0.4	2.4	1			●														
		160408T01215SE	160408SE		0.8	2.4				●														
		160412T01215SE	160412SE		1.2	2.2				●														
 Small Edge / Tough		TNGA 160404S01730SET	TNGA 160404SE-T	S01730	0.4	2.7	1					●			●								●	
		160408S01730SET	160408SE-T		0.8	2.4						●			●								●	
		160412S01730SET	160412SE-T		1.2	2.1						●			●								●	
		TNGA 160404S01225	TNGA 160404	S01225	0.4	3.8	1				●	●		●	●						●	●	
		160408S01225	160408		0.8	3.5					●	●		●	●						●	●	
		TNGA 160404T01215	TNGA 160404	T01215	0.4	3.8	1			●														
		160408T01215	160408		0.8	3.5				●														
 With Chipbreaker		TNGM 160404S00825BB1	TNGM 160404BB1	S00825	0.4	1.5	1							●	●								
		160408S00825BB1	160408BB1		0.8	1.7								●	●								
		160412S00825BB1	160412BB1		1.2	1.9								●	●								
		TNGM 160404S01225BB2	TNGM 160404BB2	S01225	0.4	1.9	1							●	●								
		160408S01225BB2	160408BB2		0.8	2.1								●	●								
		160412S01225BB2	160412BB2		1.2	2.2								●	●								
		TNGM 160404S01625BB3	TNGM 160404BB3	S01625	0.4	2.2	1							●	●								
		160408S01625BB3	160408BB3		0.8	2.4								●	●								
		160412S01625BB3	160412BB3		1.2	2.6								●	●								

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

35°Diamond / 80°Trigon / Negative

(mm)

Description	A	T	ød
VNGA 1604_	9.525	4.76	3.81
WNGA 0804_	12.70	4.76	5.16

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 15° Chamfer + Honing

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert	Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	S	No. of Edge	CBN KBN10B	KBN25B	KBN65B	KBN510	KBN525	MEGACOAT CBN KBN05M	KBN10M	KBN25M	KBN30M	KBN35M	KBN60M	KBN65M	KBN70M	PVD Coated CBN KBN10C	KBN25C	Ref. Page for Toolholder
Multi Edge	VNGA 160401S01225ME	VNGA 160401ME	S01225	0.1	2.6	2							●	●						●	●	D16 D17 D18
	VNGA 160402S01225ME	VNGA 160402ME		0.2	2.3		●			●	●	○	●	●		●	●			●	●	
	VNGA 160404S01225ME	VNGA 160404ME		0.4	2.0		●	●		●	●	○	●	●	●	●	●			●	●	
	VNGA 160408S01225ME	VNGA 160408ME		0.8	1.8		●	●				○	●	●	●	●	●					
	VNGA 160404T01215ME	VNGA 160404ME	T01215	0.4	2.0	2												●	●			
	VNGA 160408T01215ME	VNGA 160408ME		0.8	1.8													●	●			
Multi Edge / Tough	VNGA 160404S01730MET	VNGA 160404ME-T	S01730	0.4	2.0	2		●			●		●	●	●	●				●	●	
	VNGA 160408S01730MET	VNGA 160408ME-T		0.8	1.8			●			●		●	●	●	●				●	●	
Small Edge	VNGA 160401S01225SE	VNGA 160401SE	S01225	0.1	2.6	1					●			●							●	
	VNGA 160402S01225SE	VNGA 160402SE		0.2	2.3					●	●		●	●						●	●	
	VNGA 160404S01225SE	VNGA 160404SE		0.4	2.7					●	●		●	●						●	●	
	VNGA 160408S01225SE	VNGA 160408SE		0.8	1.9					●	●		●	●						●	●	
	VNGA 160404T01215SE	VNGA 160404SE	T01215	0.4	1.9	1			●													
	VNGA 160408T01215SE	VNGA 160408SE		0.8	1.6				●													
Small Edge / Tough	VNGA 160404S01730SET	VNGA 160404SE-T	S01730	0.4	1.9	1					●			●							●	
	VNGA 160408S01730SET	VNGA 160408SE-T		0.8	2.7						●			●							●	
	VNGA 160404S01225	VNGA 160404	S01225	0.4	4.9	1				●	●		●	●						●	●	
	VNGA 160408S01225	VNGA 160408		0.8	4.0					●	●		●	●						●	●	
	VNGA 160404T01215	VNGA 160404	T01215	0.4	4.9	1			●													
	VNGA 160408T01215	VNGA 160408		0.8	4.0				●													
Multi Edge	WNGA 080404S01225ME	WNGA 080404ME	S01225	0.4	2.0	3				●	●	○	●	●	●	●	●			●	●	D20 F70
	WNGA 080408S01225ME	WNGA 080408ME		0.8	2.6					●	●	○	●	●	●	●	●			●	●	
	WNGA 080412S01225ME	WNGA 080412ME		1.2	2.5							○	●	●	●	●	●			●	●	
	WNGA 080404T01215ME	WNGA 080404ME	T01215	0.4	2.0	3												●	●			
	WNGA 080408T01215ME	WNGA 080408ME		0.8	2.6													●	●			
	WNGA 080412T01215ME	WNGA 080412ME		1.2	2.5													●	●			
Multi Edge / Tough	WNGA 080404S01730MET	WNGA 080404ME-T	S01730	0.4	2.0	3							●	●	●	●				●	●	
	WNGA 080408S01730MET	WNGA 080408ME-T		0.8	2.6								●	●	●	●				●	●	
	WNGA 080412S01730MET	WNGA 080412ME-T		1.2	2.5								●	●	●	●				●	●	
Small Edge	WNGA 080404S01225SE	WNGA 080404SE	S01225	0.4	2.0	1					●		●	●							●	
	WNGA 080408S01225SE	WNGA 080408SE		0.8	1.9						●		●	●							●	
Small Edge / Tough	WNGA 080404S01730SET	WNGA 080404SE-T	S01730	0.4	2.0	1					●			●							●	
	WNGA 080408S01730SET	WNGA 080408SE-T		0.8	1.9						●			●							●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

Negative (Solid)

(mm)

Description	A	T
CNMN 0903_	9.525	3.18
1204_	12.70	4.76
DNMN 1103_	9.525	3.18

(mm)

Description	A	T
RNMN 0603_	6.35	3.18
0903_	9.525	
1203_	12.70	
1204_		4.76

(mm)

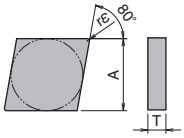
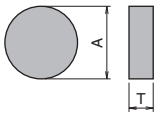
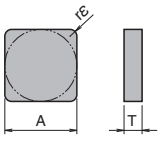
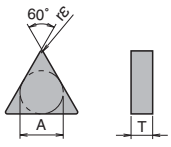
Description	A	T
SNMN 0903_	9.525	3.18
1203_	12.70	3.18
1204_		4.76
TNMN 1103_	6.35	3.18
1604_	9.525	4.76

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage

- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	No. of Edge	PVD Coated CBN KBN900	Ref. Page for Toolholder
 Solid		CNMN 090308S02020	CNMN 090308	S02020	0.8	4	●	D32 F74
		090312S02020	090312		1.2		●	
		CNMN 120408S02020	CNMN 120408	S02020	0.8		●	D22
		120412S02020	120412		1.2		●	
		120416S02020	120416		1.6		●	
		CNMN 120412S04015	CNMN 120412S04015	S04015	1.2		●	
		120416S04015	120416S04015		1.6		●	
 Solid		RNMN 060300S02020	RNMN 060300	S02020	Depends on ap		●	-
		RNMN 090300S02020	RNMN 090300				●	D33
		RNMN 120300S02020	RNMN 120300				●	
		RNMN 120400S02020	RNMN 120400				●	D27 D33
		RNMN 120400S04015	RNMN 120400S04015	S04015			●	
 Solid		SNMN 090308S02020	SNMN 090308	S02020	0.8	8	●	D32 D34 D35 F74
		090312S02020	090312		1.2		●	
		SNMN 120308S02020	SNMN 120308	S02020	0.8		●	D34 D35
		120312S02020	120312		1.2		●	
		SNMN 120408S02020	SNMN 120408	S02020	0.8		●	D25 D34 D35 F72
		120412S02020	120412		1.2		●	
		120416S02020	120416		1.6		●	
		120420S02020	120420		2.0		●	
		SNMN 120412S04015	SNMN 120412S04015	S04015	1.2		●	
		120416S04015	120416S04015		1.6		●	
		120432S04015	120432S04015		3.2		●	
 Solid		TNMN 110308S02020	TNMN 110308	S02020	0.8	6	●	D36 F74
		110312S02020	110312		1.2		●	
		TNMN 160408S02020	TNMN 160408	S02020	0.8		●	D26
		160412S02020	160412		1.2		●	
		160416S02020	160416		1.6		●	
		160420S02020	160420		2.0		●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

80°Diamond / Positive

(mm)

Description		A	T	ød	α
CCMW	0301_	3.5	1.4	1.9	7°
	0401_	4.3	1.8	2.3	
	0602_	6.35	2.38	2.8	
	09T3_	9.525	3.97	4.4	

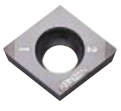
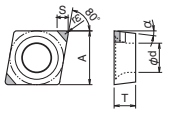
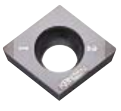
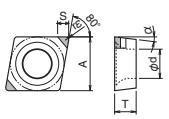
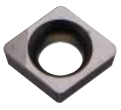
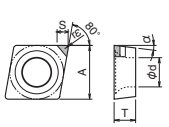
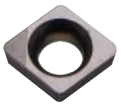
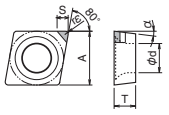
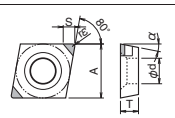
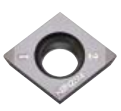
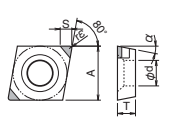
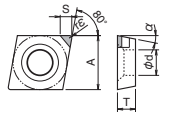
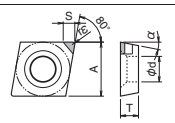
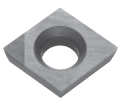
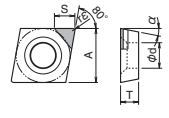
(mm)

Description		A	T	ød	α
CPGB	0802_	7.94	2.38	3.5	11°
	0903_	9.525	3.18	4.5	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
- ✖: Interruption / 1st Choice
- ✲: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD coated CBN KBN10C	PVD coated CBN KBN25C	Ref. Page for Toolholder
 Multi Edge		CCMW 030102T00815ME	CCMW 030102S2E	T00815	0.2	1.4	2	●	●					●									F24 F49
		030104T00815ME	030104S2E		0.4	1.4		●						●									
		CCMW 060202T00815ME	CCMW 060202ME	T00815	0.2	2.0		●	●		●	●	○	●	●		●	●					E11~13 F24 F49 F50
		060204T00815ME	060204ME		0.4	1.9		●	●		●	●	○	●	●		●	●					
		060208T00815ME	060208ME		0.8	1.8			●		●	●	○	●	●		●	●					
		CCMW 09T302T00815ME	CCMW 09T302ME	T00815	0.2	2.0	2	●	●		●	●	○	●	●		●	●					E11~13 F24 F44
		09T304T00815ME	09T304ME		0.4	1.9		●	●		●	●	○	●	●	●	●	●	●				
		09T308T00815ME	09T308ME		0.8	1.8		●	●		●	●	○	●	●	●	●	●	●				
 Multi Edge / Tough		CCMW 060208T00815MET	CCMW 060208ME-T	T00815	0.8	1.8	2		●														E11~13 F24 F49 F50
		CCMW 09T304S01035MET	CCMW 09T304ME-T	S01035	0.4	1.9			●			●		●	●		●						E11~13 F24 F44
		09T308S01035MET	09T308ME-T		0.8	1.8			●					●	●		●						
 Small Edge		CCMW 030102T00815SE	CCMW 030102SE	T00815	0.2	1.4	1	●	●		●	●		●	●								F24 F49
		030104T00815SE	030104SE		0.4	1.4		●	●		●	●		●	●								
		CCMW 040102T00815SE	CCMW 040102SE	T00815	0.2	1.4	1	●	●		●	●		●	●								
		040104T00815SE	040104SE		0.4	1.4		●	●		●	●		●	●								
		CCMW 060202T00815SE	CCMW 060202SE	T00815	0.2	2.0	1	●	●		●	●											E11~13 F24 F49 F50
		060204T00815SE	060204SE		0.4	1.9		●	●		●	●			●								
		CCMW 09T302T00815SE	CCMW 09T302SE	T00815	0.2	2.0	1	●	●		●	●		●									E11~13 F24 F44
		09T304T00815SE	09T304SE		0.4	1.9		●	●		●	●		●									
 Small Edge / Tough		CCMW 030102S01035SET	CCMW 030102SE-T	S01035	0.2	1.4	1							●	●								F24 F49
		030104S01035SET	030104SE-T		0.4	1.4			●			●		●	●								
		CCMW 040102S01035SET	CCMW 040102SE-T	S01035	0.2	1.4	1							●	●								
		040104S01035SET	040104SE-T		0.4	1.4			●			●		●	●								
		CCMW 060204S01035SET	CCMW 060204SE-T	S01035	0.4	1.9	1		●			●											E11~13 F24 F49 F50
		CCMW 09T304S01035SET	CCMW 09T304SE-T	S01035	0.4	1.9	1		●			●											E11~13 F24 F44
 Multi Edge		CPGB 080204T00815ME	CPGB 080204ME	T00815	0.4	1.9	2				●	●	○	●	●		●	●					F26 F27 F49 F50
		CPGB 090302T00815ME	CPGB 090302ME	T00815	0.2	1.9	2				●	●	○	●	●		●	●					
		090304T00815ME	090304ME		0.4	1.9					●	●	○	●	●		●	●					
 Multi Edge / Tough		CPGB 080204S01035MET	CPGB 080204ME-T	S01035	0.4	1.9	2		●			●		●	●		●						
		080208S01035MET	080208ME-T		0.8	2.2								●	●		●						
		CPGB 090304S01035MET	CPGB 090304ME-T	S01035	0.4	1.9	2		●			●		●	●		●						
		090308S01035MET	090308ME-T		0.8	2.5								●	●		●						
 Small Edge		CPGB 080202T00815SE	CPGB 080202SE	T00815	0.2	1.9	1					●											
		080204T00815SE	080204SE		0.4	1.9						●											
		CPGB 090302T00815SE	CPGB 090302SE	T00815	0.2	1.9	1					●											
		090304T00815SE	090304SE		0.4	1.9						●		●									
 Small Edge / Tough		CPGB 080204S01035SET	CPGB 080204SE-T	S01035	0.4	1.9	1					●			●								
		CPGB 090304S01035SET	CPGB 090304SE-T	S01035	0.4	1.9	1					●											
		CPGB 090304T00815	CPGB 090304	T00815	0.4	3.7	1					●											
		090308T00815	090308		0.8	3.6						●											

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

55°Diamond / Positive

(mm)

Description	A	T	ød	α
DCMW 0702_	6.35	2.38	2.8	7°
11T3_	9.525	3.97	4.4	

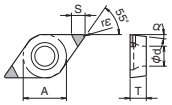
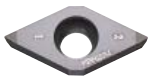
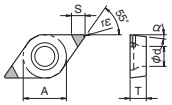
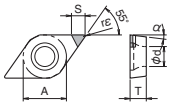
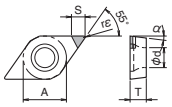
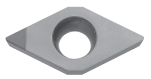
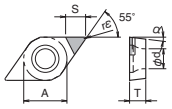
(mm)

Description	A	T	ød	α
TCMW 1102_	6.35	2.38	2.8	7°

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD coated CBN KBN10C	PVD coated CBN KBN25C	Ref. Page for Toolholder
 Multi Edge		DCMW 070202T00815ME	DCMW 070202ME	T00815	0.2	1.9	2	●	●		●	●	○	●	●		●	●					Refer to the table below.
		070204T00815ME	070204ME		0.4	1.7		●	●		●	●	○	●	●		●	●					
		070208T00815ME	070208ME		0.8	1.9			●		●	●	○	●	●		●	●					
		DCMW 11T302T00815ME	DCMW 11T302ME	T00815	0.2	1.9	2	●	●		●	●	○	●	●		●	●					
		11T304T00815ME	11T304ME		0.4	1.7		●	●		●	●	○	●	●	●	●	●	●	●			
		11T308T00815ME	11T308ME		0.8	1.9		●	●		●	●	○	●	●	●	●	●	●	●			
		11T312T00815ME	11T312ME		1.2	1.9					●	●	○	●	●	●	●	●					
 Multi Edge / Tough		DCMW 070202S01035MET	DCMW 070202ME-T	S01035	0.2	1.9	2							●	●		●						
		070204S01035MET	070204ME-T		0.4	1.7								●	●		●						
		070208S01035MET	070208ME-T		0.8	1.9								●	●		●						
		DCMW 11T302S01035MET	DCMW 11T302ME-T	S01035	0.2	1.9	2		●			●		●	●		●						
		11T304S01035MET	11T304ME-T		0.4	1.7			●			●		●	●		●						
		11T308S01035MET	11T308ME-T		0.8	1.9			●			●		●	●		●						
		11T312S01035MET	11T312ME-T		1.2	1.9								●	●		●						
 Small Edge		DCMW 070202T00815SE	DCMW 070202SE	T00815	0.2	1.9	1	●	●		●	●		●	●								
		070204T00815SE	070204SE		0.4	1.7		●	●		●	●		●	●								
		DCMW 11T302T00815SE	DCMW 11T302SE	T00815	0.2	1.9	1				●	●											
		11T304T00815SE	11T304SE		0.4	1.7		●	●		●	●											
		11T308T00815SE	11T308SE		0.8	1.9		●	●			●			●								
 Small Edge / Tough		DCMW 070204S01035SET	DCMW 070204SE-T	S01035	0.4	1.7	1					●											
		DCMW 11T302S01035SET	DCMW 11T302SE-T	S01035	0.2	1.9	1					●											
		11T304S01035SET	11T304SE-T		0.4	1.7						●											
		11T308S01035SET	11T308SE-T		0.8	1.9						●											
		DCMW 11T302T00815	DCMW 11T302	T00815	0.2	3.7	1				●	●											
		11T304T00815	11T304		0.4	3.5				●	●	●											
		11T308T00815	11T308		0.8	3.1				●													

Description	Ref. Page for Toolholder
DC..07 type	**E14~17,E19~21,F29,F51~52**
DC..11 type	**E14~17,E19~21,F29,F44,F51~52**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

60°Triangle / Positive

(mm)

Description	A	T	ød	α
TPGB 0802_	4.76	2.38	2.5	11°
0902_	5.56		3.0	

(mm)

Description	A	T	ød	α
TPGB 1103_	6.35	3.18	3.5	11°
1603_	9.525		4.5	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ●: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert	Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD coated CBN KBN10C	PVD coated CBN KBN25C	Ref. Page for Toolholder
 Small Edge	TCMW 110202T00815SE	TCMW 110202SE	T00815	0.2	1.9	1		●														F34
	110204T00815SE	110204SE		0.4	1.8			●														
	110208T00815SE	110208SE		0.8	1.5			●														
 Multi Edge	TPGB 110302T00815ME	TPGB 110302ME	T00815	0.2	2.3	3				●	●	○	●	●		●	●					E22 F32 F33 F55 F57
	110304T00815ME	110304ME		0.4	2.1					●	●	○	●	●		●	●					
	110308T00815ME	110308ME		0.8	1.8					●	●	○	●	●		●	●					
	TPGB 160304T00815ME	TPGB 160304ME	T00815	0.4	1.8	3						○	●	●		●	●					F32 F33 F55 F57
	160308T00815ME	160308ME		0.8	1.5							○	●	●		●	●					
 Multi Edge / Tough	TPGB 110302S01035MET	TPGB 110302ME-T	S01035	0.2	2.3	3							●	●		●						E22 F32 F33 F55 F57
	110304S01035MET	110304ME-T		0.4	2.1								●	●		●						
	110308S01035MET	110308ME-T		0.8	1.8								●	●		●						
	TPGB 160304S01035MET	TPGB 160304ME-T	S01035	0.4	1.8	3					●		●	●		●						F32 F33 F55 F57
	160308S01035MET	160308ME-T		0.8	1.5						●		●	●		●						
 Small Edge	TPGB 080202T00815SE	TPGB 080202SE	T00815	0.2	1.8	1	●	●		●	●		●	●								E22 F55 F58
	080204T00815SE	080204SE		0.4	1.6		●	●		●	●		●	●								
	TPGB 090202T00815SE	TPGB 090202SE	T00815	0.2	1.8	1	●	●		●	●		●	●								F32 F33 F55 F58
	090204T00815SE	090204SE		0.4	1.6		●	●		●	●		●	●								
	TPGB 110302T00815SE	TPGB 110302SE	T00815	0.2	1.9	1	●	●		●	●		●									E22 F32 F33 F55 F57
	110304T00815SE	110304SE		0.4	1.8		●	●		●	●		●									
	110308T00815SE	110308SE		0.8	1.5			●			●											
	TPGB 160302T00815SE	TPGB 160302SE	T00815	0.2	1.9	1	●	●		●	●		●									F32 F33 F55 F57
	160304T00815SE	160304SE		0.4	1.8		●	●		●	●		●									
 Small Edge / Tough	TPGB 080202S01035SET	TPGB 080202SE-T	S01035	0.2	1.8	1							●	●								E22 F55 F58
	080204S01035SET	080204SE-T		0.4	1.6						●		●	●								
	TPGB 090202S01035SET	TPGB 090202SE-T	S01035	0.2	1.8	1							●	●								F32 F33 F55 F58
	090204S01035SET	090204SE-T		0.4	1.6						●		●	●								
	TPGB 110304S01035SET	TPGB 110304SE-T	S01035	0.4	1.8	1					●											E22 F32 F33 F55 F57
	110308S01035SET	110308SE-T		0.8	1.5						●											
	TPGB 160304S01035SET	TPGB 160304SE-T	S01035	0.4	1.8	1					●											F32 F33 F55 F57
	160308S01035SET	160308SE-T		0.8	1.5						●											

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

60°Triangle / Positive
35°Diamond / Positive

(mm)

Description	A	T	ød	α
TPGW 1604_	9.525	4.76	4.4	11°

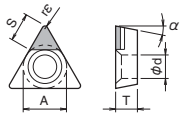
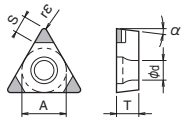
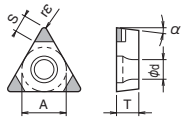
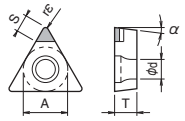
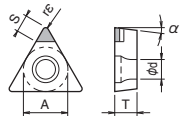
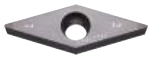
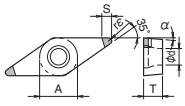
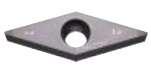
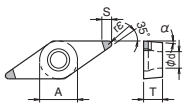
(mm)

Description	A	T	ød	α
VBGW 1103_	6.35	3.18	2.8	5°
1604_	9.525	4.76	4.4	

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD coated CBN KBN10C	PVD coated CBN KBN25C	Ref. Page for Toolholder
		TPGB 080202T00815	TPGB 080202	T00815	0.2	2.4	1				●	●											E22 F55 F58
		TPGB 080204T00815	TPGB 080204		0.4	2.3					●	●											
		TPGB 090202T00815	TPGB 090202	T00815	0.2	2.9	1				●	●											F32 F33 F55 F58
		TPGB 090204T00815	TPGB 090204		0.4	2.8					●	●											
		TPGB 110302T00815	TPGB 110302	T00815	0.2	3.9	1				●	●											E22 F32 F33 F55 F57
		TPGB 110304T00815	TPGB 110304		0.4	3.8					●	●											
		TPGB 110308T00815	TPGB 110308		0.8	3.5					●	●											
		TPGB 160302T00815	TPGB 160302	T00815	0.2	4.0	1					●											F32 F33 F55 F57
		TPGB 160304T00815	TPGB 160304		0.4	3.8					●	●											
		TPGB 160308T00815	TPGB 160308		0.8	3.5					●	●											
 Multi Edge		TPGW 160404T00815ME	TPGW 160404ME	T00815	0.4	1.8	3							●	●								-
		TPGW 160408T00815ME	TPGW 160408ME		0.8	1.5								●	●								
 Multi Edge / Tough		TPGW 160404S01035MET	TPGW 160404ME-T	S01035	0.4	1.8	3					●		●	●								
		TPGW 160408S01035MET	TPGW 160408ME-T		0.8	1.5						●		●	●								
 Small Edge		TPGW 160404T00815SE	TPGW 160404SE	T00815	0.4	1.8	1					●											
		TPGW 160408T00815SE	TPGW 160408SE		0.8	1.5						●			●								
 Small Edge / Tough		TPGW 160404S01035SET	TPGW 160404SE-T	S01035	0.4	1.9	1					●											
		TPGW 160408S01035SET	TPGW 160408SE-T		0.8	1.8						●											
		VBGW 110302T00815ME	VBGW 110302ME	T00815	0.2	2.4	2				●	●	○	●	●		●	●					E23 E25 E27 F36~39 F63
		VBGW 110304T00815ME	VBGW 110304ME		0.4	2.0			●		●	●	○	●	●	●	●	●	●	●			
		VBGW 110308T00815ME	VBGW 110308ME		0.8	1.7					●	●	○	●	●	●	●	●	●				
		VBGW 160402T00815ME	VBGW 160402ME	T00815	0.2	2.4	2				●	●	○	●	●		●	●					E23 E25 F36~39 F63
		VBGW 160404T00815ME	VBGW 160404ME		0.4	2.0			●		●	●	○	●	●	●	●	●	●	●			
Multi Edge		VBGW 160408T00815ME	VBGW 160408ME		0.8	1.7			●		●	●	○	●	●	●	●	●	●	●			
		VBGW 110302S01035MET	VBGW 110302ME-T	S01035	0.2	2.4	2							●	●		●						E23 E25 E27 F36~39 F63
		VBGW 110304S01035MET	VBGW 110304ME-T		0.4	2.0			●			●		●	●		●						
		VBGW 110308S01035MET	VBGW 110308ME-T		0.8	1.7								●	●		●						
		VBGW 160402S01035MET	VBGW 160402ME-T	S01035	0.2	2.4	2							●	●		●						E23 E25 F36~39 F63
		VBGW 160404S01035MET	VBGW 160404ME-T		0.4	2.0			●			●		●	●		●						
Multi Edge / Tough		VBGW 160408S01035MET	VBGW 160408ME-T		0.8	1.7								●	●		●						

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

35°Diamond / Positive

80°Trigon / Positive

(mm)

Description	A	T	ød	α
VCGW 0802_	4.76	2.38	2.3	7°
1604_	9.525	4.76	4.4	

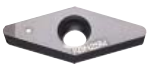
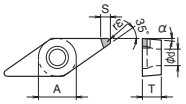
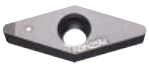
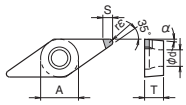
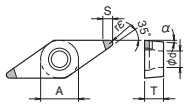
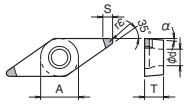
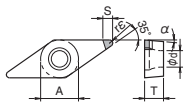
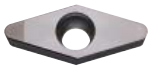
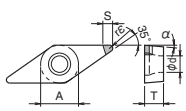
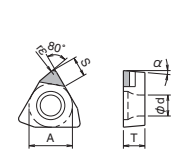
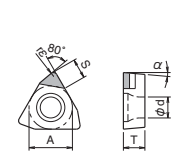
(mm)

Description	A	T	ød	α
WBGW 0601_	3.97	1.59	2.3	5°
0802_	4.76	2.38		

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
- ✖: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert (Handed Insert shows Left-hand)		Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD coated CBN KBN10C	PVD coated CBN KBN25C	Ref. Page for Toolholder
 Small Edge		VBGW 110302T00815SE	VBGW 110302SE	T00815	0.2	2.8	1	●	●		●	●		●	●								E23 E25 E27 F36~39 F63
		110304T00815SE	110304SE		0.4	2.4		●	●		●	●		●	●								
		110308T00815SE	110308SE		0.8	1.7					●	●		●	●								
		VBGW 160402T00815SE	VBGW 160402SE	T00815	0.2	2.4	1		●		●	●											E23 E25 F36~39 F63
		160404T00815SE	160404SE		0.4	2.0		●	●		●	●		●									
		160408T00815SE	160408SE		0.8	1.7		●	●		●	●											
 Small Edge / Tough		VBGW 110304S01035SET	VBGW 110304SE-T	S01035	0.4	2.0	1					●											E23 E25 E27 F36~39 F63
		110308S01035SET	110308SE-T		0.8	1.7						●			●								
		VBGW 160404S01035SET	VBGW 160404SE-T	S01035	0.4	2.0	1					●											E23 E25 F36~39 F63
		160408S01035SET	160408SE-T		0.8	1.7						●											
 Multi Edge		VCGW 080202T00815ME	VCGW 080202ME	T00815	0.2	2.0	2	●			●	●	○	●	●		●	●					E27 F36~39 F63
		080204T00815ME	080204ME		0.4	2.0		●			●	●	○	●	●		●	●					
		080208T00815ME	080208ME		0.8	1.7		●			●	●	○	●	●		●	●					
		VCGW 160408T00815ME	VCGW 160408S2E	T00815	0.8	2.7				●													E23 E25 F36~39 F63
		160412T00815ME	160412S2E		1.2	1.9				●													
 Multi Edge / Tough		VCGW 080202S01035MET	VCGW 080202ME-T	S01035	0.2	2.0	2							●	●		●						
		080204S01035MET	080204ME-T		0.4	2.0								●	●		●						
		080208S01035MET	080208ME-T		0.8	1.7								●	●		●						
 Small Edge		VCGW 080202T00815SE	VCGW 080202SE	T00815	0.2	2.4	1	●	●		●	●		●	●								E27 F36 F37 F38 F39 F63
		080204T00815SE	080204SE		0.4	2.0					●	●		●									
		080208T00815SE	080208SE		0.8	1.8					●	●											
 Small Edge / Tough		VCGW 080204S01035SET	VCGW 080204SE-T	S01035	0.4	2.0	1		●			●											
		080208S01035SET	080208SE-T		0.8	1.8						●			●								
 Small Edge		WBGW 060102T00815R/L-SE	WBGW 060102R/L-SE	T00815	0.2	1.9	1	●			L	L		L	L								F40 F41 F65
		060104T00815R/L-SE	060104R/L-SE		0.4	1.9		●	L		L	L		L	L								
		WBGW 080202T00815R/L-SE	WBGW 080202R/L-SE	T00815	0.2	2.3	1	L			L	L		L	L								
		080204T00815R/L-SE	080204R/L-SE		0.4	2.3		●	L		L	L		L	L								
 Small Edge / Tough		WBGW 060102S01035R/LSET	WBGW 060102R/L-SE-T	S01035	0.2	1.9	1							L	L								
		060104S01035R/LSET	060104R/L-SE-T		0.4	1.9						L		L	L								
		WBGW 080202S01035R/LSET	WBGW 080202R/L-SE-T	S01035	0.2	2.3	1							L	L								
		080204S01035R/LSET	080204R/L-SE-T		0.4	2.3						L		L	L								

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

90°Square / Positive (without hole)

(mm)

Description	A	T	ød	α
SPGN 0903_	9.525	3.18	-	11°
1203_	12.70			

60°Triangle / Positive (without hole)

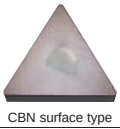
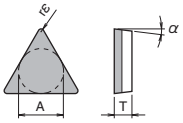
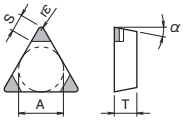
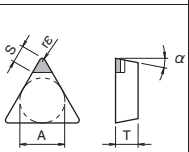
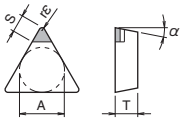
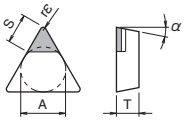
(mm)

Description	A	T	ød	α
TBGN 0601_	3.97	1.59	-	5°
TPGN 1103_	6.35	3.18		11°
1603_	9.525			

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
- ✱: Interruption / 1st Choice
- ✱: Interruption / 2nd Choice
- ◕: Light Interruption / 1st Choice
- ◔: Light Interruption / 2nd Choice
- ●: Continuous / 1st Choice
- ○: Continuous / 2nd Choice

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

Insert		Description	(Previous Description)	Edge Prep.	Dimension (mm) rε	Dimension (mm) S	No. of Edge	CBN KBN10B	CBN KBN25B	CBN KBN65B	CBN KBN510	CBN KBN525	MEGACOAT CBN KBN05M	MEGACOAT CBN KBN10M	MEGACOAT CBN KBN25M	MEGACOAT CBN KBN30M	MEGACOAT CBN KBN35M	MEGACOAT CBN KBN60M	MEGACOAT CBN KBN65M	MEGACOAT CBN KBN70M	PVD coated CBN KBN10C	PVD coated CBN KBN25C	Ref. Page for Toolholder
 CBN surface type		TBGN 060102T00815	TBGN 060102	T00815	0.2	-	3				●	●		●									-
		060104T00815	060104		0.4	-					●	●		●									
		060108T00815	060108		0.8	-					●	●		●									
 Multi Edge		TPGN 110302T00815ME	TPGN 110302ME	T00815	0.2	2.6	3				●	●											E29 F61
		110304T00815ME	110304ME		0.4	2.5					●	●											
		110308T00815ME	110308ME		0.8	2.4					●	●											
 Small Edge		TPGN 110302T00815SE	TPGN 110302SE	T00815	0.2	2.6	1				●	●											
		110304T00815SE	110304SE		0.4	2.5					●	●											
		110308T00815SE	110308SE		0.8	2.4						●											
		TPGN 160302T00815SE	TPGN 160302SE	T00815	0.2	2.6	1				●	●											
		160304T00815SE	160304SE		0.4	2.4					●	●											
		160308T00815SE	160308SE		0.8	2.1						●											
 Small Edge / Tough		TPGN 110304S01035SET	TPGN 110304SE-T	S01035	0.4	2.5	1					●											
		110308S01035SET	110308SE-T		0.8	2.4						●											
		TPGN 160304S01035SET	TPGN 160304SE-T	S01035	0.4	2.4	1					●											
		160308S01035SET	160308SE-T		0.8	2.1						●											
		TPGN 110304T00815	TPGN 110304	T00815	0.4	3.8	1				●	●											
		110308T00815	110308		0.8	3.5					●	●											
		TPGN 160304T00815	TPGN 160304	T00815	0.4	3.9	1					●											
		160308T00815	160308		0.8	3.6					●	●											
		160312T00815	160312		1.2	3.3						●											

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

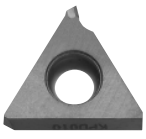
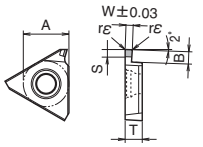
CBN & PCD Tools are sold in 1 piece boxes.

Grooving Inserts (1-Edge)

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
✱: Interruption / 1st Choice
✱: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

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

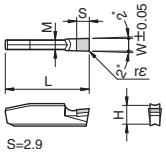
Insert (Handed Insert shows Right-hand)		Description	(Previous Description)	Edge Prep.	Dimension (mm) W	B	rε	A	T	ød	S			No. of Edge	CBN KBN10B	KBN510	KBN525	Ref. Page for Toolholder
 External / Internal Grooving		GBA43R/L 125-020	GBA43R/L 125	E008	1.25	2.0	0.2	12.70	4.76	5.5	1.9			1	●	●	●	G9 G11 G43
		150-020	150	E008	1.50	3.5									●	●	●	
		200-020	200	E008	2.00	3.5									●	●	●	
		250-020	250	E008	2.50	4.0									●	●	●	
		300-020	300	E008	3.00	4.0									●	●	●	

Deep Grooving Inserts (1-Edge)

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
✱: Interruption / 1st Choice
✱: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

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

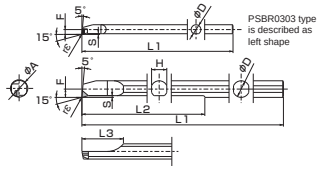
Insert		Description	(Previous Description)	Edge Prep.	Dimension (mm) W	rε	L	H	M	S				No. of Edge	CBN KBN10B	KBN510	KBN525	Ref. Page for Toolholder
 External Grooving	 S=2.9	GMN 2	-	E008	2.0	0.2	20	4.3	1.8	2.9				1	●	●	●	G22 G23 G24
		3	-	E008	3.0	0.4			2.3						●	●	●	
		4	-	E008	4.0				3.3						●	●	●	
		5	-	E008	5.0				4.2						●	●	●	
		6	-	E008	6.0				5.2						●	●	●	

Tip-Bars

Edge Prep.			
Symbol	Cutting Edge Spec.	Example	
E	R Honing	E008	R0.08mm Honing
T	Chamfer	T01215	0.12mm X 15° Chamfer
S	Chamfer +Honing	S01225	0.12mm X 25° Chamfer + Honing

Classification of usage
✱: Interruption / 1st Choice
✱: Interruption / 2nd Choice
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

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

Insert (Handed Insert shows Right-hand)		Description	(Previous Description)	Edge Prep.	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	F	S	rε	No. of Edge	CBN KBN10B	KBN510	KBN525	Ref. Page for Toolholder
	PSBR 0303-50NBS	-	T00815	3	2.8	-	50	25	7	1.4	0.15		1	●	●	●	F21
PSBR0303 type is described as left shape	0404-60NBS	-	T00815	4	3.8	3.6	60	30	10	1.9	0.3			●	●	●	
	0505-70NBS	-	T00815	5	4.8	4.4	70	40		2.4		0.05		●	●	●	
	0606-70NBS	-	T00815	6	5.8	5.2	70	45	12	2.9	0.5			●	●	●	
	0707-80NBS	-	T00815	7	6.8	6.2	80	50		3.4				●	●	●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

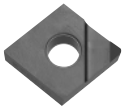
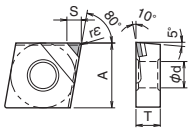
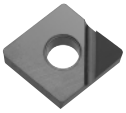
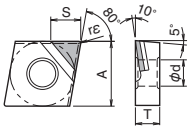
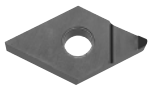
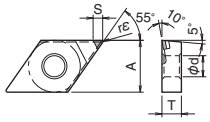
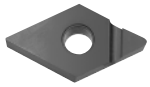
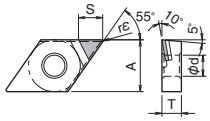
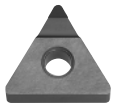
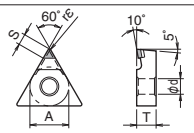
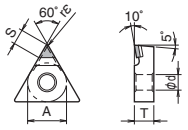
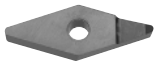
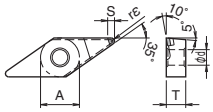
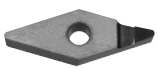
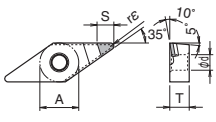
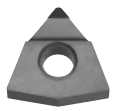
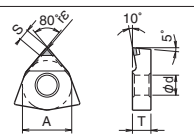
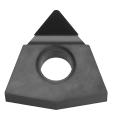
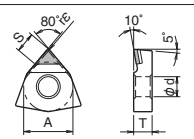
CBN & PCD Tools are sold in 1 piece boxes.

Negative

Classification of usage
◕: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		KPD001	KPD010
N	Non-ferrous Metals (with interruption)	◕	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◕	
	Titanium Alloy (without interruption)	●	

Edge Prep.: All Items / Sharp Edge

Insert	Description	A	T	ød	rε	S	α	No. of Edge	KPD001	KPD010	Ref. Page for Toolholder
 Small Edge 	CNMM 120402M-SE	12.70	4.76	5.16	0.2	2.8	-	1	●	●	D8 F42 F66
	CNMM 120404M-SE				0.4	2.8			●	●	
	CNMM 120408M-SE				0.8	2.7			●	●	
 	CNMM 120402M-NE				0.2	5.1			●		
	CNMM 120404M-NE				0.4	5.0			●		
	CNMM 120408M-NE				0.8	4.9			●		
	CNMM 120402M				0.2	5.8			●	●	
	CNMM 120404M				0.4	5.8			●	●	
	CNMM 120408M				0.8	5.7			●	●	
	CNMM 120412M				1.2	5.6			●	●	
 Small Edge 	DNMM 150402M-SE	12.70	4.76	5.16	0.2	2.8	-	1	●	●	D10 D11 F43
	DNMM 150404M-SE				0.4	2.6			●	●	
	DNMM 150408M-SE				0.8	2.2			●	●	
 	DNMM 150402M-NE				0.2	5.2			●		
	DNMM 150404M-NE				0.4	5.0			●		
	DNMM 150408M-NE				0.8	4.6			●		
	DNMM 150402M				0.2	5.9			●	●	
	DNMM 150404M				0.4	5.8			●	●	
	DNMM 150408M				0.8	5.4			●	●	
	DNMM 150412M				1.2	5.0				●	
 Small Edge 	TNMM 160402M-SE	9.525	4.76	3.81	0.2	2.7	-	1	●	●	D14 D15 F43 F68
	TNMM 160404M-SE				0.4	2.6			●	●	
	TNMM 160408M-SE				0.8	2.3			●	●	
 	TNMM 160402M-NE				0.2	3.2			●		
	TNMM 160404M-NE				0.4	3.1			●		
	TNMM 160408M-NE				0.8	2.8			●		
	TNMM 160402M				0.2	3.8			●	●	
	TNMM 160404M				0.4	3.6			●	●	
	TNMM 160408M				0.8	3.3			●	●	
	TNMM 160412M				1.2	3.0				●	
 Small Edge 	VNMM 160402M-SE	9.525	4.76	3.81	0.2	2.9	-	1	●	●	D16 D17 D18
	VNMM 160404M-SE				0.4	2.5			●	●	
	VNMM 160408M-SE				0.8	1.6			●	●	
 	VNMM 160402M-NE				0.2	4.7			●		
	VNMM 160404M-NE				0.4	4.2			●		
	VNMM 160408M-NE				0.8	3.4			●		
	VNMM 160402M				0.2	5.3			●	●	
	VNMM 160404M				0.4	4.8			●	●	
	VNMM 160408M				0.8	4.0			●	●	
	VNMM 160412M				1.2	3.1				●	
 Small Edge 	WNMM 080402M-SE	12.70	4.76	5.16	0.2	2.8	-	1		●	D20 F70
	WNMM 080404M-SE				0.4	2.8				●	
	WNMM 080408M-SE				0.8	2.7				●	
 	WNMM 080402M-NE				0.2	5.0			●		
	WNMM 080404M-NE				0.4	5.0			●		
	WNMM 080402M				0.2	5.8				●	
	WNMM 080404M				0.4	5.8				●	

・ Suffix "SE" attached to a description means Small Edge and "NE" means New Value Edge.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

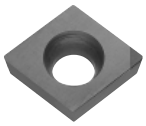
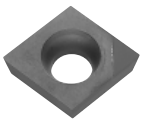
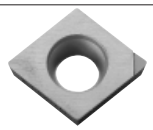
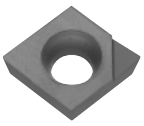
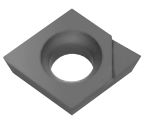
CBN & PCD Tools are sold in 1 piece boxes.

Positive

Classification of usage
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

N	Non-ferrous Metals (with interruption)	◔
	Non-ferrous Metals (without interruption)	●
S	Titanium Alloy (with interruption)	◔
	Titanium Alloy (without interruption)	●

Edge Prep. — All Items / Sharp Edge

Insert	Description	Dimension (mm) A	T	ød	rε	S	Angle (°) α	No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
 Small Edge	CCGW 060202SE	6.35	2.38	2.8	0.2	1.9	7°	1		●	E11~13
	CCGW 060204SE				0.4	1.9				●	F24
	CCGW 060208SE				0.8	1.8				●	F49~50
	CCGW 09T304SE	9.525	3.97	4.4	0.4	1.9				●	E11~13
	CCGW 09T308SE				0.8	1.8				●	F24 F44
	CCGW 040101NE	4.3	1.8	2.3	0.1	1.7	7°	1	●		
	CCGW 040102NE				0.2	1.6			●		
	CCGW 040104NE				0.4	1.6			●		F24
	CCGW 040101				0.1	1.9			●	●	F29
	CCGW 040102				0.2	1.9			●	●	
	CCGW 040104				0.4	1.9			●	●	
	CCGW 060201NE	6.35	2.38	2.8	0.1	3.1			●		E11
	CCGW 060202NE				0.2	3.0			●		E12
	CCGW 060204NE				0.4	3.0			●		E13
	CCGW 060201				0.1	3.5				●	F24
	CCGW 060202				0.2	3.5				●	F49
	CCGW 060204				0.4	3.5				●	F50
	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			●		E11
	CCGW 09T301				0.1	3.8			●	●	E12
	CCGW 09T302				0.2	3.8			●	●	E13
	CCGW 09T304				0.4	3.7			●	●	F24
	CCGW 09T308				0.8	3.6				●	F44
 Small Edge	CCMT 09T304SE	9.525	3.97	4.4	0.4	1.9	7°	1		●	
	CCMT 09T308SE				0.8	1.8				●	
	CCMT 120404SE	12.70	4.76	5.16	0.4	2.8				●	E12
	CCMT 120408SE				0.8	2.7				●	
	CCMT 060201NE	6.35	2.38	2.8	0.1	2.8	7°	1	●		E11
	CCMT 060202NE				0.2	2.8			●		E12
	CCMT 060204NE				0.4	2.8			●		E13
	CCMT 060201				0.1	3.3			●	●	F24
	CCMT 060202				0.2	3.3			●	●	F49
	CCMT 060204				0.4	3.2			●	●	F50
	CCMT 09T301NE	9.525	3.97	4.4	0.1	3.4			●		
	CCMT 09T302NE				0.2	3.4			●		E11
	CCMT 09T304NE				0.4	3.4			●		E12
	CCMT 09T308NE				0.8	3.3			●		E13
	CCMT 09T301				0.1	3.9			●	●	F24
	CCMT 09T302				0.2	3.9			●	●	F44
	CCMT 09T304				0.4	3.9			●	●	
	CCMT 09T308				0.8	3.8				●	
	CPMH 080201NE	7.94	2.38	3.5	0.1	3.2	11°	1	●		
	CPMH 080202NE				0.2	3.2			●		
	CPMH 080204NE				0.4	3.2			●		
	CPMH 080208NE				0.8	3.2			●		
	CPMH 080201				0.1	3.7			●	●	
	CPMH 080202				0.2	3.7			●	●	
	CPMH 080204				0.4	3.7			●	●	F26
	CPMH 080208				0.8	3.5				●	F49
	CPMH 090301NE	9.525	3.18	4.5	0.1	3.4			●		F50
	CPMH 090302NE				0.2	3.4			●		
	CPMH 090304NE				0.4	3.4			●		
	CPMH 090308NE				0.8	3.3			●		
	CPMH 090301				0.1	4.0			●	●	
	CPMH 090302				0.2	3.9			●	●	
	CPMH 090304				0.4	3.9			●	●	
	CPMH 090308				0.8	3.8				●	

・Suffix SE attached to a description means Small Edge and NE means New Value Edge.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

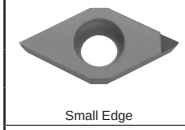
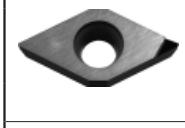
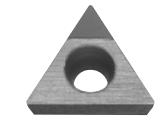
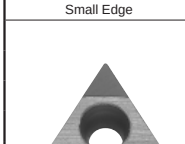
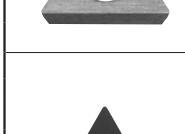
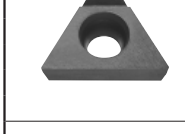
CBN & PCD Tools are sold in 1 piece boxes.

Positive

Edge Prep.: All Items / Sharp Edge

Classification of usage
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		KPD001	KPD010
N	Non-ferrous Metals (with interruption)	◔	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◔	
	Titanium Alloy (without interruption)	●	

Insert (Handed insert indicates Left-hand)	Description	A	T	ød	rε	S	Angle (°) α	No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
 Small Edge	DCMT 070202SE	6.35	2.38	2.8	0.2	2.5	7°	1		●	Refer to the table below.
	DCMT 070204SE				0.4	2.4				●	
	DCMT 11T304SE	9.525	3.97	4.4	0.4	2.2				●	
	DCMT 11T308SE				0.8	2.0				●	
	DCMT 070201NE	6.35	2.38	2.8	0.1	3.4	7°	1	●		
	DCMT 070202NE				0.2	3.4			●		
	DCMT 070204NE				0.4	3.2			●		
	DCMT 070201				0.1	4.0			●	●	
	DCMT 070202				0.2	3.9			●	●	
	DCMT 070204				0.4	3.7			●	●	
	DCMT 11T301NE	9.525	3.97	4.4	0.1	3.4			●		
	DCMT 11T302NE				0.2	3.3			●		
	DCMT 11T304NE				0.4	3.2			●		
	DCMT 11T308NE				0.8	2.8			●		
	DCMT 11T301				0.1	4.0			●	●	
	DCMT 11T302				0.2	3.9			●	●	
	DCMT 11T304				0.4	3.7			●	●	
	DCMT 11T308				0.8	3.3			●	●	
	DCMT 070202R/L-NE	6.35	2.38	2.8	0.2	3.3			●		
	DCMT 070204R/L-NE				0.4	3.2			●		
	DCMT 11T302R/L-NE	9.525	3.97	4.4	0.2	3.3			●		
	DCMT 11T304R/L-NE				0.4	3.2			●		
	TBGW 060102NE	3.97	1.59	2.3	0.2	2.1	5°	1	●		F33 F55
	TBGW 060104NE				0.4	1.9			●		
	TBGW 060102				0.2	2.4			●	●	
	TBGW 060104				0.4	2.2			●	●	
 Small Edge	TCGW 110302SE	6.35	3.18	2.8	0.2	2.5	7°	1		●	E22 F34
	TCGW 110304SE				0.4	2.4				●	
	TCGW 110302NE				0.2	3.3			●		
	TCGW 110304NE				0.4	3.2			●		
	TCGW 110308NE				0.8	2.9			●		
	TCGW 110302				0.2	3.9				●	
	TCGW 110304				0.4	3.7				●	
	TCGW 110308				0.8	3.4				●	
	TBMT 060101NE	3.97	1.59	2.3	0.1	2.2	5°	1	●		F33 F55 F58
	TBMT 060102NE				0.2	2.1			●		
	TBMT 060104NE				0.4	2.0			●		
	TBMT 060108NE				0.8	1.7			●		
	TBMT 060101				0.1	2.6				●	
	TBMT 060102				0.2	2.5			●	●	
	TBMT 060104				0.4	2.3			●	●	
	TBMT 060108				0.8	2.0			●	●	
	TCMT 080202NE	4.76	2.38	2.3	0.2	2.1	7°	1	●		E22
	TCMT 080204NE				0.4	2.0			●		
	TCMT 080208NE				0.8	1.7			●		
	TCMT 080202				0.2	2.4				●	
	TCMT 080204				0.4	2.2				●	
	TCMT 080208				0.8	1.9				●	

・Suffix SE attached to a description means Small Edge and NE means New Value Edge.

Description	Ref. Page for Toolholder
DC..07 type	E14~17,E19~21,F29,F51~52
DC..11 type	E14~17,E19~21,F29,F44,F51~52

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

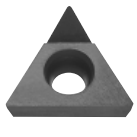
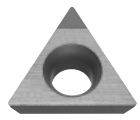
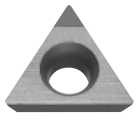
CBN & PCD Tools are sold in 1 piece boxes.

Positive

Classification of usage
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		PCD	
N	Non-ferrous Metals (with interruption)	◔	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◔	
	Titanium Alloy (without interruption)	●	

Edge Prep.: All Items / Sharp Edge

Insert	Description	A	T	ød	rε	S	α	No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
 Small Edge	TCMT 110301SE	6.35	3.18	2.8	0.1	2.6	7°	1		●	E22
	TCMT 110302SE				0.2	2.5				●	
	TCMT 110304SE				0.4	2.4				●	
	TCMT 110302NE				0.2	3.4			●		F34
	TCMT 110304NE				0.4	3.3			●		
	TCMT 110308NE				0.8	3.0			●		
	TCMT 110302				0.2	3.9				●	
	TCMT 110304				0.4	3.7				●	
	TCMT 110308				0.8	3.4				●	
	TPGB 080202NE	4.76	2.38	2.3	0.2	2.2	11°	1	●		E22
	TPGB 080204NE				0.4	2.1			●		
	TPGB 080208NE				0.8	1.8			●		
	TPGB 080202				0.2	2.6			●	●	F55
	TPGB 080204				0.4	2.4			●	●	
	TPGB 080208				0.8	2.2				●	
	TPGB 090202NE	5.56	2.38	3.0	0.2	2.7			●		
	TPGB 090204NE				0.4	2.6			●		
	TPGB 090208NE				0.8	2.3			●		F33
	TPGB 090202				0.2	3.2			●	●	F55
	TPGB 090204				0.4	3.0			●	●	
	TPGB 090208				0.8	2.7				●	
 Small Edge	TPGB 110301SE	6.35	3.18	3.3	0.1	2.7			●	●	E22 F33
	TPGB 110302SE				0.2	2.6			●	●	
	TPGB 110304SE				0.4	2.5			●	●	
	TPGB 110302NE				0.2	3.4			●		F55
	TPGB 110304NE				0.4	3.3			●		F57
	TPGB 110308NE				0.8	3.0			●		
	TPGB 110302				0.2	3.9			●	●	
	TPGB 110304				0.4	3.7			●	●	
	TPGB 110308				0.8	3.4			●	●	
 Small Edge	TPGB 160301SE	9.525	3.18	4.5	0.1	2.6				●	F33 F55 F57
	TPGB 160302SE				0.2	2.6			●	●	
	TPGB 160304SE				0.4	2.4			●	●	
	TPGB 160302NE				0.2	3.3			●		
	TPGB 160304NE				0.4	3.2			●		
	TPGB 160308NE				0.8	2.9			●		
	TPGB 160302				0.2	3.9			●	●	
	TPGB 160304				0.4	3.7			●	●	
	TPGB 160308				0.8	3.4			●	●	

・Suffix SE attached to a description means Small Edge and NE means New Value Edge.

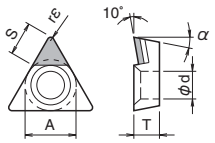
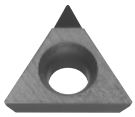
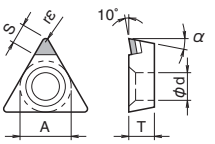
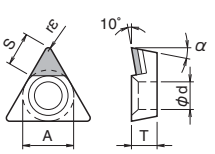
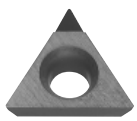
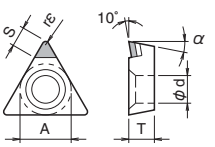
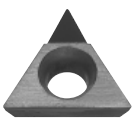
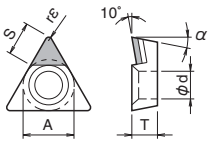
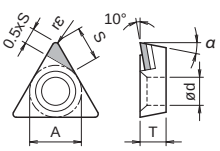
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

Positive

Classification of usage			
●: Light Interruption / 1st Choice	N	Non-ferrous Metals (with interruption)	◕
◔: Light Interruption / 2nd Choice		Non-ferrous Metals (without interruption)	●
●: Continuous / 1st Choice	S	Titanium Alloy (with interruption)	◕
○: Continuous / 2nd Choice		Titanium Alloy (without interruption)	●

Edge Prep.	
All Items	Sharp Edge

Insert (Handed Insert shows Left-hand)	Description	Dimension (mm) A	T	ød	rε	S	Angle (°) α	No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
 	TPMH 080201NE	4.76	2.38	2.3	0.1	2.3	11°	1	●		E22 F55 F58
	TPMH 080202NE				0.2	2.2			●		
	TPMH 080204NE				0.4	2.1			●		
	TPMH 080208NE				0.8	1.8			●		
	TPMH 080201				0.1	2.6				●	
	TPMH 080202				0.2	2.5			●	●	
	TPMH 080204				0.4	2.3			●	●	
	TPMH 080208				0.8	2.0			●	●	
	TPMH 090201NE	5.56	2.38	3.0	0.1	2.7			●		F55 F58
	TPMH 090202NE				0.2	2.6			●		
	TPMH 090204NE				0.4	2.5			●		
	TPMH 090208NE				0.8	2.2			●		
	TPMH 090201				0.1	3.0			●	●	
	TPMH 090202				0.2	2.9			●	●	
	TPMH 090204				0.4	2.8			●	●	
	TPMH 090208				0.8	2.5			●	●	
 Small Edge 	TPMH 110301SE	6.35	3.18	3.3	0.1	2.7			●	●	E22 F55 F57
	TPMH 110302SE				0.2	2.6			●	●	
	TPMH 110304SE				0.4	2.5			●	●	
 	TPMH 110301NE				0.1	3.4			●		
	TPMH 110302NE				0.2	3.3			●		
	TPMH 110304NE				0.4	3.2			●		
	TPMH 110308NE				0.8	2.9			●		
	TPMH 110301				0.1	3.9			●	●	
	TPMH 110302				0.2	3.9			●	●	
	TPMH 110304				0.4	3.7			●	●	
	TPMH 110308				0.8	3.4			●	●	
 Small Edge 	TPMH 160301SE	9.525	3.18	4.5	0.1	2.6				●	
	TPMH 160302SE				0.2	2.6			●	●	
	TPMH 160304SE				0.4	2.4			●	●	
 	TPMH 160301NE				0.1	3.5			●		F55 F57
	TPMH 160302NE				0.2	3.4			●		
	TPMH 160304NE				0.4	3.3			●		
	TPMH 160308NE				0.8	3.0			●		
	TPMH 160301				0.1	4.1				●	
	TPMH 160302				0.2	4.0			●	●	
	TPMH 160304				0.4	3.8			●	●	
	TPMH 160308				0.8	3.6				●	
 	TPMH 110302R/L-NE	6.35	3.18	3.3	0.2	3.8			●		E22 F55 F57
	TPMH 110304R/L-NE				0.4	3.6			●		

・Suffix SE attached to a description means Small Edge and NE means New Value Edge.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

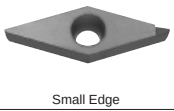
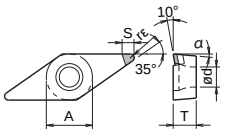
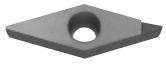
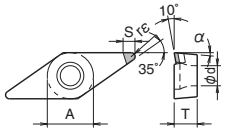
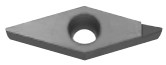
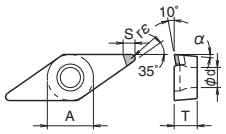
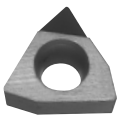
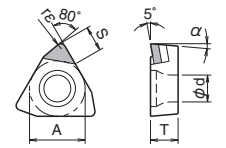
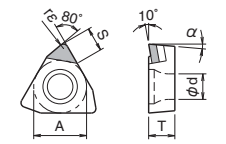
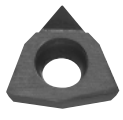
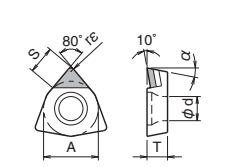
CBN & PCD Tools are sold in 1 piece boxes.

Positive

Classification of usage
●: Light Interruption / 1st Choice
◌: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		KPD001	KPD010
N	Non-ferrous Metals (with interruption)	◌	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◌	
	Titanium Alloy (without interruption)	●	

Edge Prep.: All Items / Sharp Edge

Insert (Handed insert indicates Left-hand)	Description	A	T	ød	rε	S	Angle (°) α	No. of Edge	KPD001	KPD010	Ref. Page for Toolholder
 Small Edge	 VBMT 160404SE	9.525	4.76	4.4	0.4	2.0	5°	1		●	E23~25 F37 F39 F63
	 VBMT 110301NE	6.35	3.18	2.8	0.1	2.6	5°	1	●		E23 E24 E25 E27 F37 F39 F63
	VBMT 110302NE				0.2	2.4			●		
	VBMT 110304NE				0.4	2.0			●		
	VBMT 110308NE				0.8	3.1			●		
	VBMT 110301				0.1	3.0			●	●	
	VBMT 110302				0.2	2.8			●	●	
	VBMT 110304				0.4	2.4			●	●	
	VBMT 110308				0.8	3.5			●	●	
	VBMT 160401NE	9.525	4.76	4.4	0.1	2.8			●		E23 E24 E25 F37 F39 F63
	VBMT 160402NE				0.2	2.6			●		
	VBMT 160404NE				0.4	2.2			●		
	VBMT 160408NE				0.8	3.0			●		
	VBMT 160401				0.1	3.2			●	●	
	VBMT 160402				0.2	3.0			●	●	
	VBMT 160404				0.4	2.6			●	●	
	VBMT 160408				0.8	3.5			●	●	
	 VCMT 080201NE	4.76	2.38	2.3	0.1	1.7	7°	1	●		E27 F37 F39 F63
	VCMT 080202NE				0.2	1.7			●		
	VCMT 080204NE				0.4	1.8			●		
	VCMT 080208NE				0.8	1.9			●		
	VCMT 080201				0.1	2.0			●	●	
	VCMT 080202				0.2	2.0			●	●	
	VCMT 080204				0.4	2.1			●	●	
	VCMT 080208				0.8	2.2			●	●	
	 WBMT 060101L-NE	3.97	1.59	2.3	0.1	1.7	5°	1	●		F41 F65
	WBMT 060102L-NE				0.2	1.6			●		
	WBMT 060104L-NE				0.4	1.6			●		
	WBMT 060101L				0.1	1.9			●	●	
	WBMT 060102L				0.2	1.9			●	●	
	WBMT 060104L				0.4	1.9			●	●	
	 WBMT 080202L-NE	4.76	2.38	2.3	0.2	2.1			●		
	WBMT 080204L-NE				0.4	2.1			●		
	WBMT 080202L				0.2	2.4			●	●	
	WBMT 080204L				0.4	2.3			●	●	
	 WPMT 110201NE	6.35	2.38	2.8	0.1	2.7	11°	1	●		
	WPMT 110202NE				0.2	2.7			●		
	WPMT 110204NE				0.4	2.7			●		
	WPMT 110201				0.1	3.0				●	
	WPMT 110202				0.2	3.1				●	
	WPMT 110204				0.4	3.1				●	

・Suffix SE attached to a description means Small Edge and NE means New Value Edge.

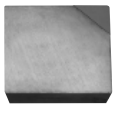
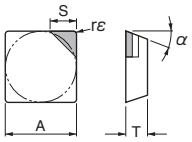
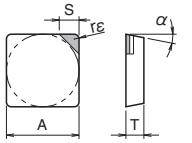
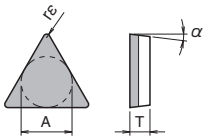
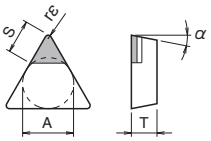
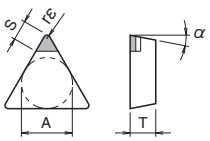
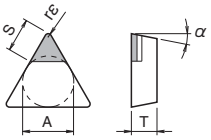
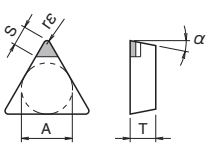
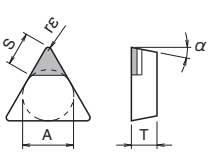
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

Positive

Classification of usage				
●: Light Interruption / 1st Choice	N	Non-ferrous Metals (with interruption)	◕	
◔: Light Interruption / 2nd Choice		Non-ferrous Metals (without interruption)	●	
●: Continuous / 1st Choice	S	Titanium Alloy (with interruption)	◕	
○: Continuous / 2nd Choice		Titanium Alloy (without interruption)	●	

Edge Prep.	
All Items	Sharp Edge

Insert		Description		Dimension (mm)					Angle (°)	No. of Edge	PCD		Ref. Page for Toolholder
				A	T	ød	rε	S	α		KPD001	KPD010	
		SEGN	120304NE	12.70	3.18	-	0.4	3.6	20°	1	●		-
			120304					4.2				●	
		SPGN	120304NE	12.70	3.18	-	0.4	3.6	11°	1	●		E28 F60
			120304					4.2				●	
 PCD surface type		TBGN	060102	3.97	1.59	-	0.2	-	5°	3		●	-
			060104				0.4					●	
		TPGN	090202NE	5.56	2.38	-	0.2	3.3	11°	1	●		F61
			090204NE				0.4	3.2			●		
			090208NE				0.8	2.9			●		
		TPGN	090202				0.2	3.9				●	
			090204				0.4	3.7				●	
			090208				0.8	3.4				●	
 Small Edge		TPGN	110301SE	6.35	3.18	-	0.1	2.6	11°	1	●	●	E29 F61
			110302SE				0.2	2.5			●	●	
			110304SE				0.4	2.4			●	●	
		TPGN	110302NE				0.2	3.4			●		
			110304NE				0.4	3.2			●		
			110308NE				0.8	2.9			●		
		TPGN	110302				0.2	3.9			●	●	
			110304				0.4	3.7			●	●	
			110308				0.8	3.4				●	
 Small Edge		TPGN	160301SE	9.525	3.18	-	0.1	2.6	11°	1		●	
			160302SE				0.2	2.6			●	●	
			160304SE				0.4	2.4			●	●	
		TPGN	160302NE				0.2	3.3			●		
			160304NE				0.4	3.2			●		
			160308NE				0.8	2.9			●		
		TPGN	160302				0.2	3.9			●	●	
			160304				0.4	3.7			●	●	
			160308				0.8	3.4				●	

・Suffix SE attached to a description means Small Edge and NE means New Value Edge.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

Grooving Inserts (1-Edge)

Edge Prep.: All Items / Sharp Edge

Classification of usage
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		KPD001	KPD010
N	Non-ferrous Metals (with interruption)	◔	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◔	
	Titanium Alloy (without interruption)	●	

Insert (Handed Insert shows Right-hand)	Description	(Previous Description)	W	B	rε	A	T	ød	S	No. of Edge	PCD KPD001 R	PCD KPD001 L	PCD KPD010 R	PCD KPD010 L	Ref. Page for Toolholder
External / Internal Grooving	GBA32R/L 125-010	GBA32R/L 125	1.25	2.0	0.1	9.525	3.18	4.4	1.7	1			●		G9 G11 G43
	150-010	150	1.50								●		●		
	GBA43R/L 125-010	GBA43R/L 125	1.25	2.0									●	●	
	150-010	150	1.50	3.5							●	●	●	●	
	200-010	200	2.00			12.70	4.76	5.5	1.9		●	●	●	●	
	250-010	250	2.50	4.0							●	●	●	●	
	300-010	300	3.00								●	●	●	●	
External Grooving	TGF32R/L 125	-	1.25	2.0	C0.1	9.525	3.18	4.5	1.7	1	●		●		G12 G13
	150	-	1.50								●		●		
	200	-	2.00	2.5							●		●		
	TGF32R/L 125-010	-	1.25	2.0	0.1	9.525	3.18	4.5	1.7	1	●				
	150-010	-	1.50								●				
	200-010	-	2.00	2.5							●				

Insert (Handed Insert shows Right-hand)	Description	(Previous Description)	W	B	rε	A	L	H	No. of Edge	PCD KPD001 R	PCD KPD001 L	PCD KPD010 R	PCD KPD010 L	Ref. Page for Toolholder
Internal Grooving	GVR/L 145-020A	GVR/L 145A	1.45	2.3	0.2	4.0	12	5.0	1			●	●	G40 G41
	200-020A	200A	2.00									●	●	
	300-020A	300A	3.00									●	●	
	GVR/L 200-020B	GVR/L 200B	2.00	3.2	0.2	4.5	15	5.5				●	●	
	250-020B	250B	2.50									●	●	
	300-020B	300B	3.00	4.2								●	●	
	GVR/L 300-020C	GVR/L 300C	3.00	4.5	0.2	5.8	21	6.5				●	●	
	400-020C	400C	4.00	5.5								●	●	
Face Grooving	GVFR/L 250-020B	GVFR/L 250B	2.50	4.8	0.2	5.8	20	5.0	1			●	●	G60 ≀ G64
	300-020B	300B	3.00	4.8								●	●	
	400-020B	400B	4.00	5.3								●	●	
	GVFR/L 350-020C	-	3.50	6.8	0.2	7.0	27	7.0				●	●	
	400-020C	-	4.00	6.8								●	●	
	GVFR/L 350-040C	GVFR/L 350C	3.50	6.8	0.4	7.0	27	7.0				●	●	
	400-040C	400C	4.00	6.8								●	●	

Insert	Description	(Previous Description)	W	rε	L	H	M	S	No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
External Grooving	GMN 2	-	2.0	0.2	20	4.3	1.8	2.9	1	●	●	G22 G23
	3	-	3.0				2.3			●	●	G22 G23 G24
	4	-	4.0				3.3			●	●	
	5	-	5.0				4.2			●	●	
	6	-	6.0				5.2				●	G22 G23

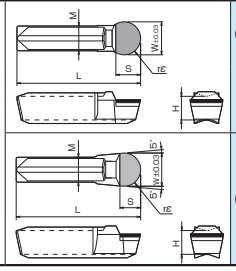
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

For Aluminum Wheel (1-Edge)

Classification of usage
●: Light Interruption / 1st Choice
◡: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

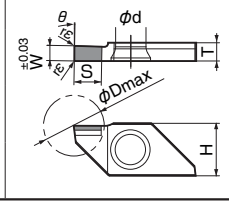
N	Non-ferrous Metals (with interruption)	●
	Non-ferrous Metals (without interruption)	●
S	Titanium Alloy (with interruption)	◡
	Titanium Alloy (without interruption)	●

Edge Prep.		Dimension (mm)							No. of Edge	PCD		Ref. Page for Toolholder
All Items	Sharp Edge	W	rε	L	H	M	S			KPD001	KPD010	
Insert	Description											
		**GMGW 6030-30R**	6	3	30	5.5	5	4.5		1	●		G27
		8030-40R	8	4			6	6			●		
		GMGW 8030-40R-HR	8	4	30	5.5	6	5			●		

Grooving Inserts (1-Edge)

Classification of usage
●: Light Interruption / 1st Choice
◡: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

N	Non-ferrous Metals (with interruption)	◡
	Non-ferrous Metals (without interruption)	●
S	Titanium Alloy (with interruption)	◡
	Titanium Alloy (without interruption)	●

Edge Prep.		Dimension (mm)							Angle (°)	No. of Edge	PCD				Ref. Page for Toolholder
All Items	Sharp Edge	W	øD max	rε	T	H	ød	S	θ*		KPD001		KPD010		
Insert Handed Insert shows Right-hand	Description										R	L	R	L	
 External Grooving (Traversing available)		**TKF12R/L 150-NB**	1.5	7	0.1 +0 -0.05	3	8.7	5	2.0	0°	1	●	●			H6
		200-NB	2.0	8					3.0			●	●			
		250-NB	2.5	8					3.0			●	●			
		250-NB4.5	2.5	10					4.5			●	●			

* Lead angle (Front cutting edge angle: θ) shows the angle when installed in toolholder.

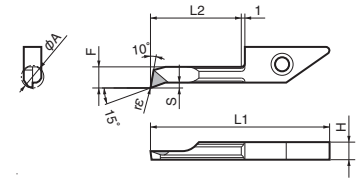
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

System Tip-Bars

Classification of usage
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

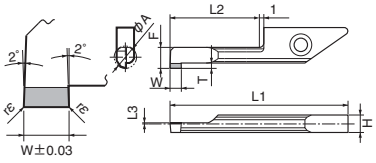
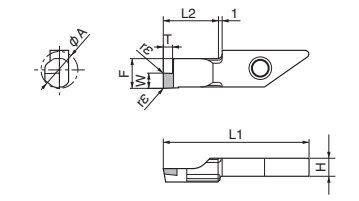
		KPD001	KPD010
N	Non-ferrous Metals (with interruption)	◔	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◔	
	Titanium Alloy (without interruption)	●	

Edge Prep.		Insert (Handed Insert shows Right-hand)	Description		Min.Bore Dia. ø A	Dimension (mm) H	L1	L2	F	S	rε		No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
All Items	Sharp Edge															
●	●	 Micro Boring	VNBR	0411-02NB	4	3.9	30.8	11	3.5	0.5	0.2		1	●	●	F12 F13 F14
				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

Classification of usage
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

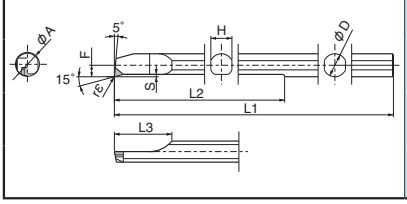
		KPD001	KPD010
N	Non-ferrous Metals (with interruption)	◔	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◔	
	Titanium Alloy (without interruption)	●	

Edge Prep.		Insert (Handed Insert shows Right-hand)	Description		Min.Bore Dia. ø A	Dimension (mm) W	rε	H	L1	L2	L3	F	T	No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
All Items	Sharp Edge																
●	●	 Micro Internal Grooving	VNGR	0410-11NB	4	1.0	0.05	3.9	30.8	11	0.1	3.5	0.8	1	●	●	F12 F13 F14
				0420-11NB		2.0	0.10								●	●	
			VNGR	0510-11NB	5	1.0	0.05	3.9	30.8	11	0.1	4.4	1.0		●	●	
				0520-11NB		2.0	0.10								●	●	
			VNGR	0610-20NB	6	1.0	0.05	3.9	39.8	20	0.3	5.2	1.8		●	●	
				0620-20NB		2.0	0.10								●	●	
			VNGR	0710-20NB	7	1.0	0.05	3.9	39.8	20	0.3	6.2	2.0		●	●	
				0720-20NB		2.0	0.10								●	●	
		 Micro Face Grooving	VNFGR	0820-10NB	8	2.0	0.05	3.9	39.8	10	-	7.3	2.0	1	●	●	
				0830-10NB	8	3.0							3.0		●	●	

Tip-Bars

Classification of usage
●: Light Interruption / 1st Choice
◔: Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

		KPD001	KPD010
N	Non-ferrous Metals (with interruption)	◔	
	Non-ferrous Metals (without interruption)	●	
S	Titanium Alloy (with interruption)	◔	
	Titanium Alloy (without interruption)	●	

Edge Prep.		Insert (Handed Insert shows Right-hand)	Description		Min.Bore Dia. ø A	Dimension (mm) øD	H	L1	L2	L3	F	S	rε	No. of Edge	PCD KPD001	PCD KPD010	Ref. Page for Toolholder
All Items	Sharp Edge																
●	●		PSBR	0404-60NBS	4	3.8	3.6	60	30	10	1.9	0.3	0.05	1	●	●	F21
				0505-70NBS	5	4.8	4.4	70	40	12	2.4	0.5			●	●	
				0606-70NBS	6	5.8	5.2		45		2.9				●	●	
				0707-80NBS	7	6.8	6.2	80	50		3.4				●	●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

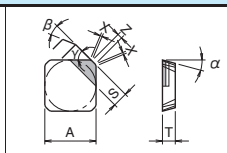
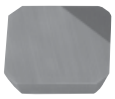
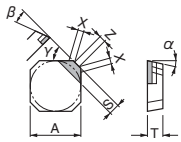
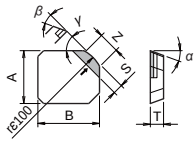
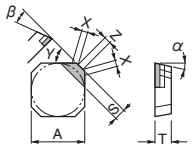
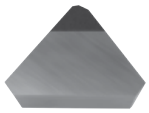
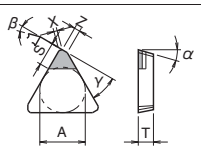
CBN & PCD Tools are sold in 1 piece boxes.

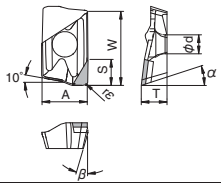
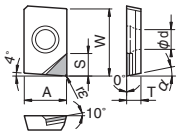
Milling Inserts

Edge Prep. — All Items / Sharp Edge

Classification of usage
■ : Light Interruption / 1st Choice
□ : Light Interruption / 2nd Choice

N	Non-ferrous Metals (with interruption)	□	■
S	Titanium Alloy (with interruption)	□	■

Insert	Description	A	T	X	Z	S		α	β	γ	No. of Edge	KPD001	KPD010	KPD230	Ref. Page for Toolholder
		Dimension (mm)						Angle (°)				PCD			
 	SDKN 1203AUFN-NE	12.70	3.18	0.5	1.2	3.1		15°	23°	45°	1	●			M31
	SDKN 1203AUFN					3.6						●	●		
 	SEEN 1203AFFN-NE	12.70	3.18	0.5	1.4	3.0		20°	25°	45°	1	●			M27 M28
	SEEN 1203AFFN					3.5						●	●		
 Wiper 	SEEN 1203AFFR-W	12.50	3.18	-	3.5	1.7	B= 14.56	20°	25°	45°	1	●			M28
 	SOKN 13T3AXFN-NE	13.494	3.97	0.4	1.1	3.0		27°	32°	45°	1			●	M33
 	TEEN 1603PTFR-NE	9.525	3.18	0.6	1.4	4.1		20°	22°	30°	1	●		●	M85
	TEEN 1603PTFR					4.7						●	●		
	TEKN 2204PTFR-NE	12.70	4.76	0.7	1.8	4.2		20°	22°	30°	1	●		●	M41
	TEKN 2204PTFR					4.8						●	●		

Insert	Description	A	T	ød	W	rε	S	α	β		No. of Edge	KPD001	KPD010	KPD230	Ref. Page for Toolholder
		Dimension (mm)						Angle (°)				PCD			
 	BDMT 11T302FR	6.7	3.8	2.8	11.0	0.2	3.6	18°	13°		1	●		●	M47
	BDMT 11T304FR					0.4						●		●	
	BDMT 170402FR	9.6	4.9	4.4	17.0	0.2	4.4	18°	13°		1	●		●	
	BDMT 170404FR					0.4						●		●	
 	NDCW 150302FRX-NE	9.525	3.18	4.4	15.0	0.2	5.1	15°	-		1	●		●	M83
	NDCW 150302FRX						5.7					●	●		

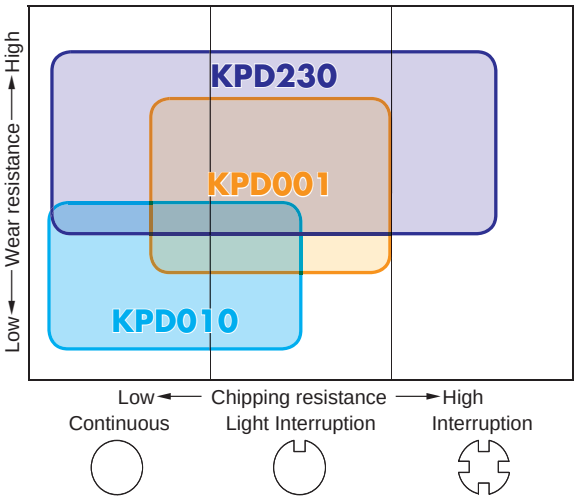
・Suffix SE attached to a description means Small Edge and NE means New Value Edge.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Tools are sold in 1 piece boxes.

Recommended Cutting Conditions

Application Map



Insert Grade	Applications	Features
KPD001 (Ave. Grain Size under 1μm)	●High speed machining for non-ferrous metals and brass ●High speed machining of glass fiber and plastics ●Machining for carbide and ceramics	●The world highest level micro-grain diamond ●High edge strength, and superior to wear resistance, chipping resistance and edge sharpening performance
KPD230 (Mixture of fine grain with the ave. grain size 2-30μm and rough grain)	●High speed milling of aluminum alloy and non ferrous metals such as brass ●High speed milling of glass fiber and plastics	●High-density carbide with mixture of rough and fine grains features excellent abrasive wear resistance and chipping resistance.

Insert Grade	Applications	Features
KPD010 (Ave. Grain Size 10μm)	●High speed machining for non-ferrous metals and brass ●High speed machining of glass fiber and plastics ●Machining for carbide and ceramics	●Good balance of wear resistance and flexural strength ●General Purpose

Recommended Cutting Conditions (Turning)

Workpiece Material	Insert Grade		Cutting Conditions				Remarks
	KPD001	KPD010	Vc (m/min)	*ap* (mm) Small edge and Positive (Insert)	*ap* (mm) Negative (Inserts)	f (mm/rev)	
Aluminum Alloy Zinc Alloy	★	☆	300~1500	~1.0	~2.0	0.03~0.5	Both Dry and Coolant Available
Copper, Brass, Bronze	★	☆	300~1000	~1.0	~2.0	0.03~0.5	
Magnesium Alloy	★	☆	400~1200	~1.0	~2.0	0.03~0.5	
Carbide	★	☆	10~30	~0.3	~0.3	0.03~0.1	
Titanium Alloy	★	☆	100~200	~1.0	~2.0	0.05~0.2	Coolant
Glass Fiber Reinforced Plastic 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

External

D1~D40

Turning Toolholders Identification System		**D3**
Product Lineup		**D4~D5**
Clamping system		**D6~D7**
Toolholders for General Purpose		**D8~D21**
CN □□ Insert	DCLN / PCLN	D8
DN □□ Insert	DDJN / DDHN	D10
	PDJN / PDHN	D11
SN □□ Insert	DSBN / PSBN / PSKN	D12
	PSSN / PSDN	D13
TN □□ Insert	DTGN / PTGN / PTFN	D14
	WTJN-N / WTKN-N / WTEN-N	D15
VN □□ Insert	DVLN / DVPN / DVVN	D16
	MVLN / MVVN	D17
	PVLN / PVPN / PVVN	D18
RC □□ Insert	PRGC / PRXC	D19
RN □□ Insert	PRGN	D19
WN □□ Insert	DWLN / PWLN / WWLN	D20
Toolholders for Ceramic Tools		**D22~D31**
CN □□ Insert	CCLN	D22
DN □□ Insert	CDJN	D23
EN □□ Insert	CELN	D23
SN □□ Insert	CSRN / CS-N / CSKN / CSYN	D24
	CSSN / CSDN	D25
TN □□ Insert	CTJN / CTUN	D26
RN □□ Insert	CRSN / CRDN	D27
CN □□ GX Insert	CCLN-GX	D28
DN □□ GX Insert	CDHN-GX / CDJN-GX	D29
SN □□ CX Insert	CSRN-GX / CSDN-GX / CSSN-GX	D30
	CS-N-GX / CSKN-GX / CSYN-GX	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 / CSYN-A	D34
	CSSN-A / CSDN-A	D35
TNMN Insert	CTJN-A / CTUN-A	D36
Toolholders for Bearing Machining		**D37~D38**
RCMT Insert	PRGC-BE / PRGC-BF	D37
SNMF Insert	CBSN	D38
Technical Information		**D39~D40**
Recommended Cutting Conditions		D39



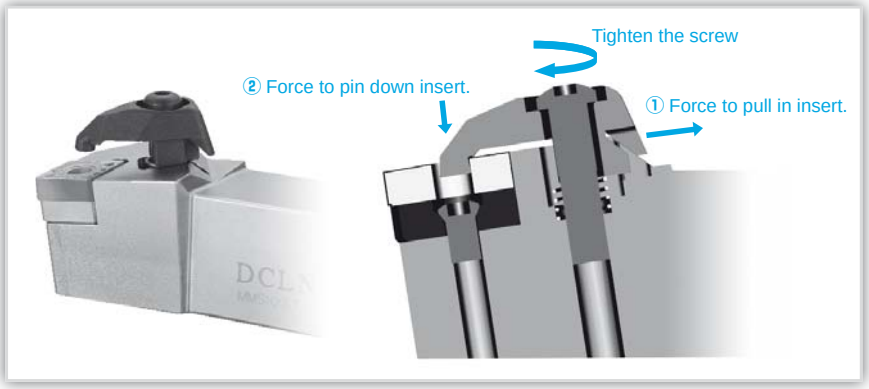
High rigidity holder

Double Clamp Series

Securely clamps the insert with a single action

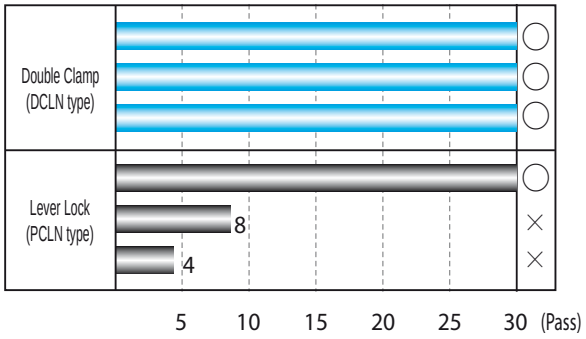
Improved Clamping Rigidity

Firmly clamp the insert in two directions with one action.



Achieving long Insert Life

By strongly clamping the insert in two directions, good contact between the shim and insert can be maintained, even with high feed rates.
Along with improving the accuracy of the insert position, long insert life can be achieved.



<Cutting Conditions>
34CrMo4(SCM435), Vc=150m/min, ap=1mm, f=0.4mm/rev
CNMG120408PS, 30 Pass Interrupted Cutting

● Comparison of shim and insert contact

Coating material is applied to the shim side of the insert, which is installed on the tool holder. Compare the shim contact surface after tightening.

PS Chipbreaker	Shim contact surface of double clamp	Shim contact surface of lever lock
	Cutting edge side 	Cutting edge side 
	The shape of insert chipbreaker is transferred. There is a high level of contact.	Only a part of the shape of insert chip-breaker is transferred. There is a low level of contact.

Convenient marking design



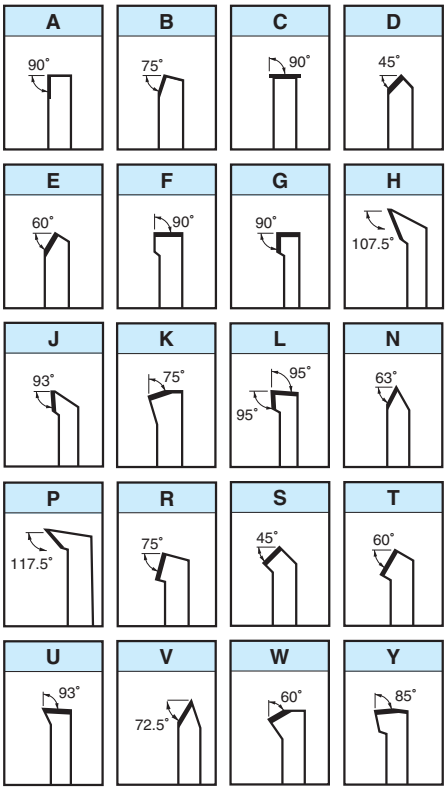
Screw	Tightening Torque (N•m)
CS-2D	1.7
CS-3D	3.9
CS-5D	3.0

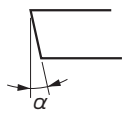
The part description can be confirmed for convenient ordering. The screw tightening torque is also indicated.

Turning Toolholders Identification System (Square Shank)

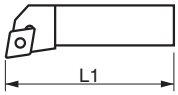
Clamping System	Insert Shape	Hand of Tool	Shank Height	Shank Width	Others					
A: Anchor Pin Style **C**: Clamp Only **D**: Double Clamp **M**: Clamp and Lock Pin **P**: Lock Pin Only or Lever Lock **S**: Screw Only **W**: Wedge Lock	**R** : Round **S** : 90° Square **T** : 60° Triangle **C** : 80° Diamond **D** : 55° Diamond **V** : 35° Diamond **W** : 80° Trigon	**R**: Right-hand **L**: Left-hand **N**: Neutral	Shank Height (mm)	Shank Width (mm)	Manufacture's Option Manufacture's Option or Number					
D	**C**	**L**	**N**	**R**	**20**	**20**	**K**	—	**12**	

Cutting Edge Angle	Insert Relief Angle	Toolholder Length	Insert Size



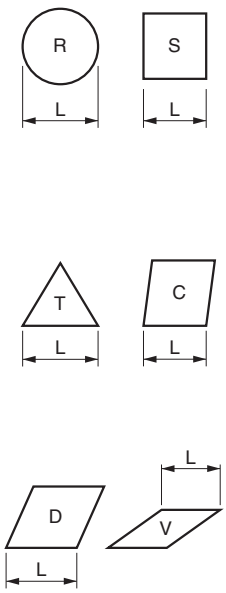


B: 5° Positive
C: 7° Positive
D: 15° Positive
E: 20° Positive
N: 0° Negative
P: 11° Positive



(mm)

A : 32	**J** : 110	**S** : 250
B : 40	**K** : 125	**T** : 300
C : 50	**L** : 140	**U** : 350
D : 60	**M** : 150	**V** : 400
E : 70	**N** : 160	**W** : 450
F : 80	**P** : 170	**Y** : 500
G : 90	**Q** : 180	**X** Special
H : 100	**R** : 200	



- Specification may change without any prior notice.
- Due to the installation size constrains on the machine, the toolholder length of some products may not match with the symbol.

Toolholders for General Purpose

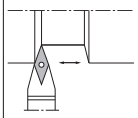
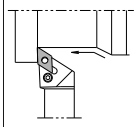
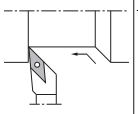
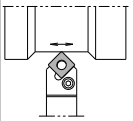
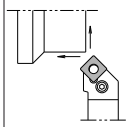
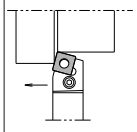
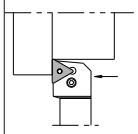
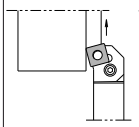
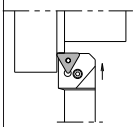
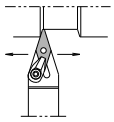
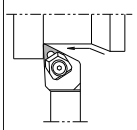
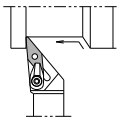
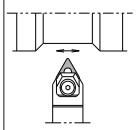
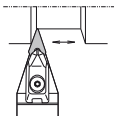
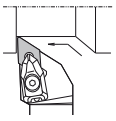
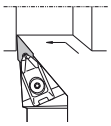
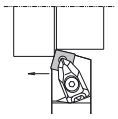
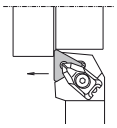
Applicable Insert Shape	CN..	WN..	TN..	DN..	RC..		RN..	VN..
Application	External / Facing		External / Facing / Copying					External / Facing / Copying / Undercutting
Cutting Edge Angle	95°		105°	107.5°	Special			117.5°
Lever Lock (Pin Lock)	PCLN	PWLN		PDHN	PRGC	PRXC	PRGN	PVPN (Pin Lock)
Ref. Page	**D8**	**D20**		**D11**	**D19**	**D19**	**D19**	**D18**
Wedge Lock Multi Lock		WWLN	WTKN-N					
Ref. Page		**D20**	**D15**					
Double Clamp	DCLN	DWLN		DDHN				DVPN
Ref. Page	**D8**	**D20**		**D10**				**D16**

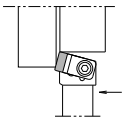
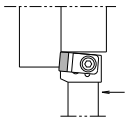
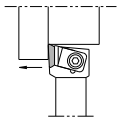
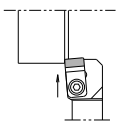
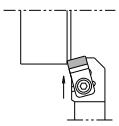
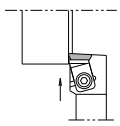
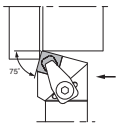
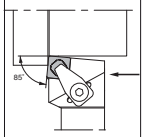
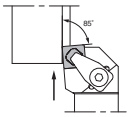
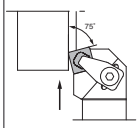
Toolholders for Ceramic Tools

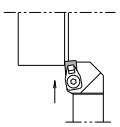
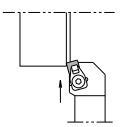
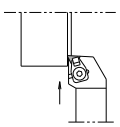
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Cutting Edge Angle	95°	97.5°	Special	93°	107.5°	Special	45°	45°
Top Clamp	CCLN	CELN	CRSN	CDJN		CRDN	CSDN	CSSN
Ref. Page	**D22**	**D23**	**D27**	**D23**		**D27**	**D25**	**D24**
With dimple Top Clamp	CCLN-GX			CDJN-GX	CDHN-GX		CSDN-GX	CSSN-GX
Ref. Page	**D28**			**D29**	**D29**		**D30**	**D30**

Toolholders for Solid CBN Tools

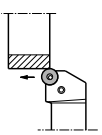
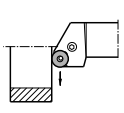
Application	External / Facing		External / Copying	External / Chamfering	External / Facing / Chamfering	External		
Cutting Edge Angle	95°	Special	Special	45°	45°	75°		93°
Top Clamp	CCLN-A	CRSN-A	CRDN-A	CSDN-A	CSSN-A	CCRN-A	CSRN-A	CTJN-A
Ref. Page	**D32**	**D33**	**D33**	**D35**	**D35**	**D32**	**D34**	**D36**

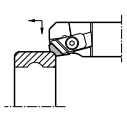
	VN..	DN.. TN..	VN..	SN..	TN..	SN..	SN..	TN..	SN..	TN..
	External / Copying			External / Chamfering		External / Facing / Chamfering	External		Facing	
	72.5°	93°	95°	45°	60°	45°	75°	91°	15°	-1°
	 PVVN (Pin Lock)	 PDJN	 PVLN (Pin Lock)	 PSDN		 PSSN	 PSBN	 PTGN	 PSKN	 PTFN
	D18	**D11**	**D18**	**D13**		**D13**	**D12**	**D14**	**D12**	**D14**
	 MVVN	 WTJN-N	 MVLN		 WTEN-N					
	D17	**D15**	**D17**		**D15**					
	 DVVN	 DDJN	 DVLN				 DSBN	 DTGN		
	D16	**D10**	**D16**				**D12**	**D14**		

	External			Facing		
	75°	85°	93°	5°	15°	-3°
	 CSRN	 CS-N	 CTJN	 CSYN	 CSKN	 CTUN
	D24	**D24**	**D26**	**D24**	**D24**	**D26**
	 CSRN-GX	 CS-N-GX		 CSYN-GX	 CSKN-GX	
	D30	**D31**		**D31**	**D31**	

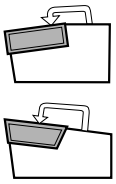
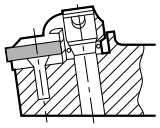
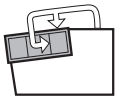
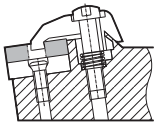
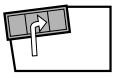
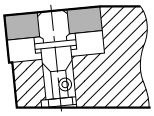
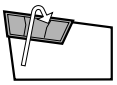
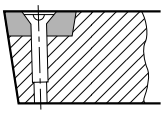
	Facing		
	5°	15°	-3°
	 CSYN-A	 CSKN-A	 CTUN-A
	D34	**D34**	**D36**

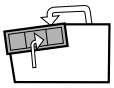
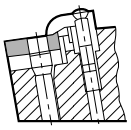
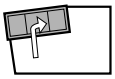
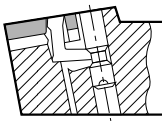
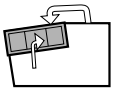
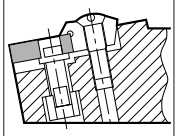
Toolholders for Bearing Machining

Application	External	Facing
Cutting Edge Angle	Special	Special
Lever Lock	 PRGC-BE	 PRGC-BF
Ref. Page	**D37**	**D37**

Application	R Chamfering
Cutting Edge Angle	Special
Top Clamp	 CBSN
Ref. Page	**D38**

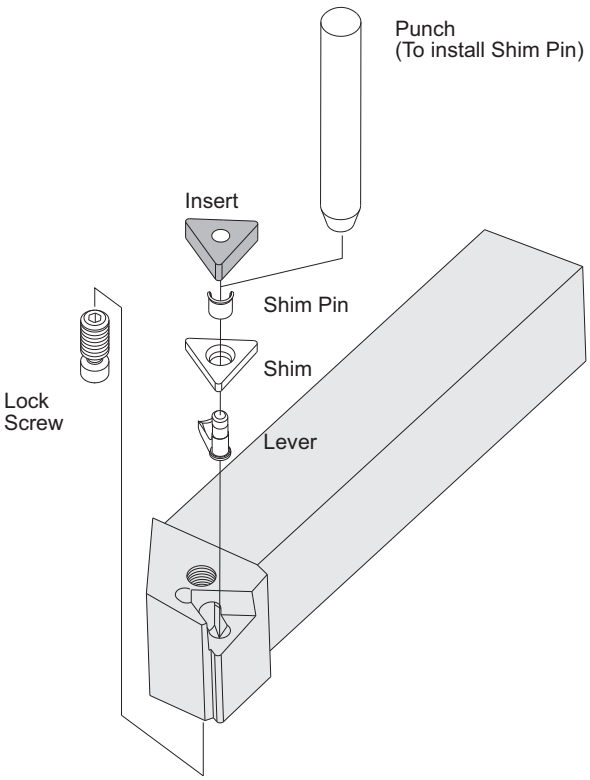
Clamping system

Series	Design		Features
Clamp On (C)			• Rigid Clamping • Negative Insert … Medium to Heavy Cutting • (Mainly for Ceramic Insert) • Positive Insert : Low Cutting Resistance
Double Clamp (D)			• Firmly clamp the insert in two directions with one action
Pin Lock (P)			• Firm Clamping • High precision • Easy Insert Replacement
Screw Clamp (S)			• Simple Mechanism • Fewer Parts • Finishing to Medium Cutting

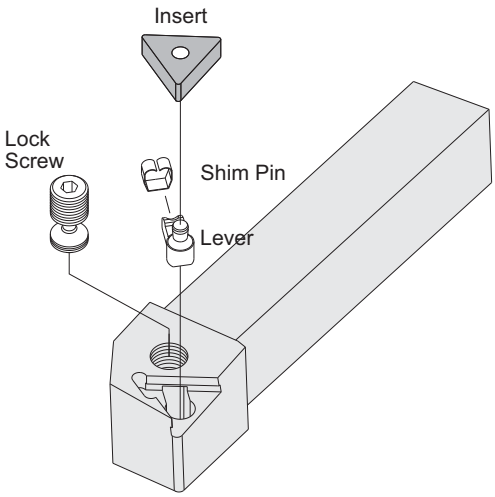
Series	Design		Features
Clamp and Lock Pin (M)			• Combination of Top Clamp and Pin Lock • Rigid Clamping • Heavy Cutting
Lever Lock (P)			• Firm Clamping • High precision • Easy Insert Replacement • General Use
Wedge Lock (W)			• Rigid Clamping • Heavy Cutting

● Lever Lock

PCLN
PWLN
PTGN-16, 22 / PTFN-16, 22
PDJN / PDHN
PSBN / PSKN / PSSN / PSDN
PRGN
PRGC / PRXC



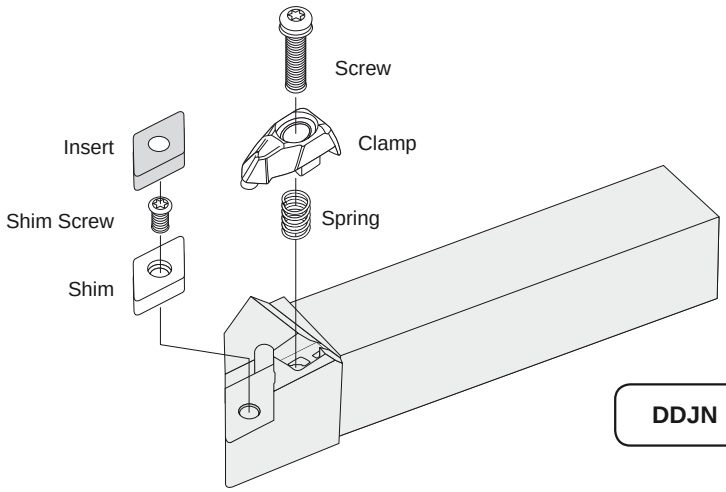
With Shim



Without Shim

PTGN-11 / PTFN-11

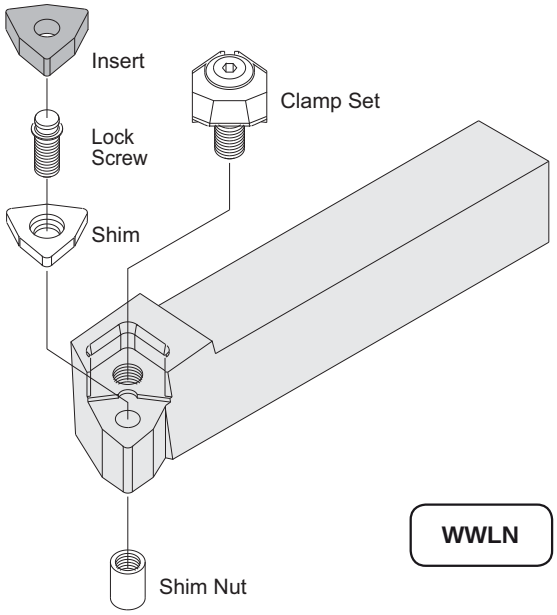
Double Clamp



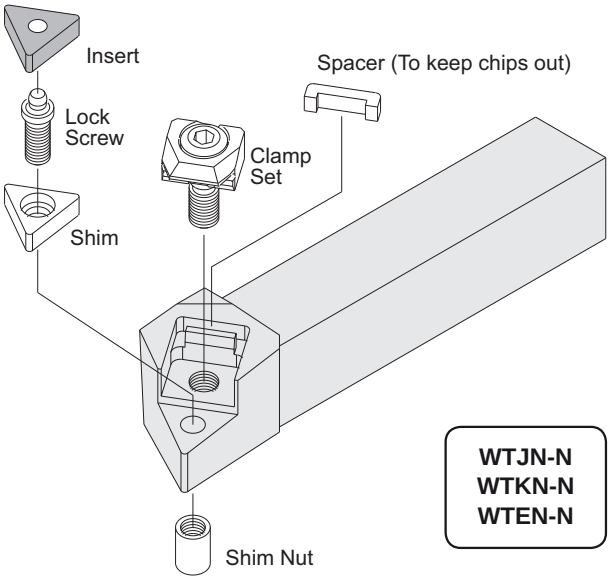
DDJN

DCLN
DDJN / DDHN
DSBN
DTGN
DVLN / DVPN / DVVN
DWLN

Wedge Lock

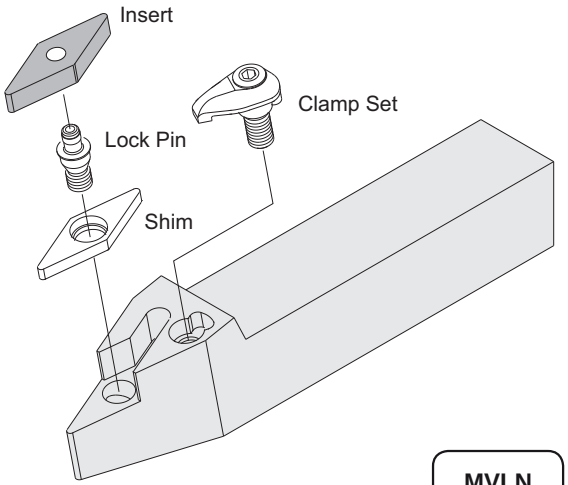


WWLN



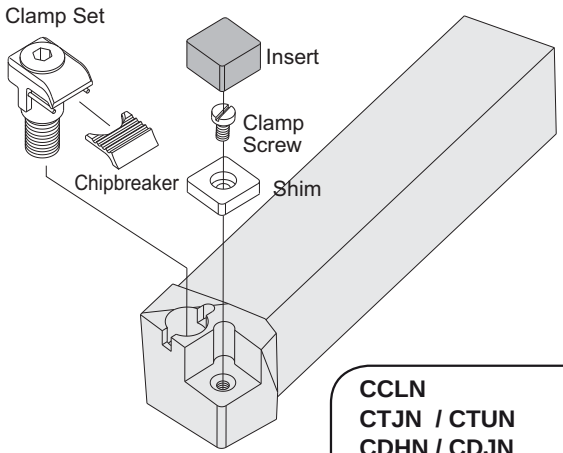
WTJN-N
WTKN-N
WTEN-N

Multi Lock



MVLN
MVVN

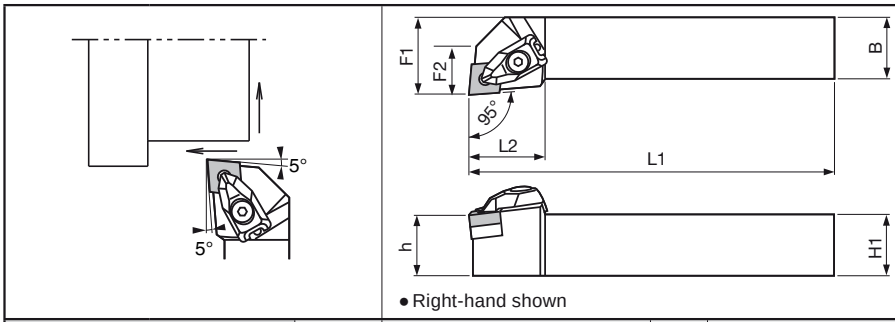
Top Clamp



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

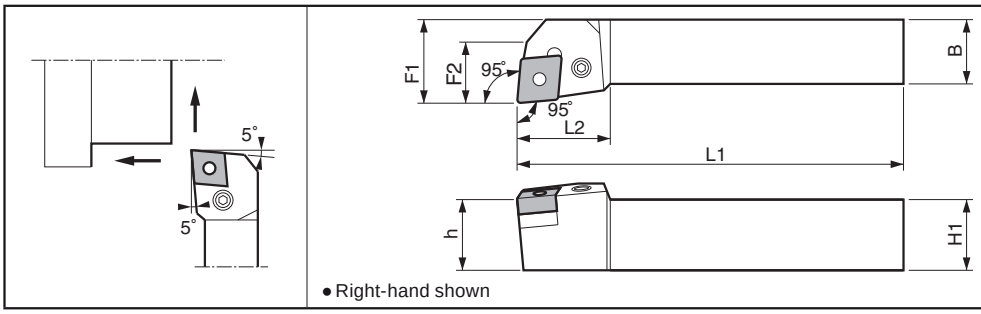
Side Rake Angle: -6°
Angle of Inclination: -6°

● Applicable Inserts

Toolholder	Description	
DCLN R/L...-12	CN ○ A CN ○ G CN ○ M	1204..

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DCLN R/L	2020K-12	●	●	20	20	125	33	25	20	0.8	CP-3D	CS-3D	SP-3D	DC-44	SB-4085TR	LW-3	FT-15
	2525M-12	●	●	25	25	150		32									

PCLN (External / Facing)



● Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

● Applicable Inserts

Toolholder	Description	
PCLN R/L...-09	CN ○ G	0904..
PCLN R/L...-12	CN ○ A	1204..
PCLN R/L...-16	CN ○ G	1606..
PCLN R/L...-19	CN ○ M	1906..

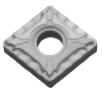
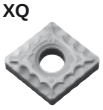
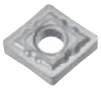
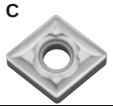
● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PCLN R/L	1616H-09	●	●	16	16	100		20	14							
	2020K-09	●	●	20	20	125	22	25	15	0.8	LL-1N	LS-1N	LC-32N	LSP-1	PC-1	FH-2.5
	2525M-09	●	●	25	25	150		32	18							
	1616H-12	●	●	16	16	100		20	17							
	2020H-12*	●		20	20	100		25								
	2020K-12	●	●	20	20	125	27	25	20	0.8	LL-2N	LS-2N	LC-42N	LSP-2	PC-2	LW-3
	2525M-12	●	●	25	25	150		32								
	3225P-12	●	●	32	25	170		32								
	2525M-16	●	●	25	25	150	32	32	25	0.8	LL-5N	LS-4N	LC-53N	LSP-3	-	LW-3
	3232P-16	●	●	32	32	170		40	27							
	3232P-19			32	32	170	40	40	27	0.8	LL-6	LS-5	LC-63	LSP-4	-	LW-4
	4040R-19	●		40	40	200		50		1.6						

* mark indicates short shank type.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

Application	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing
Insert	**WP** (Wiper) 	**WQ** (Wiper) 	**GP** 	**HQ** 	**CQ** 	**CJ** 	**TK** 	**GS** 	**PS** 
Size	12	12	09,12	09,12	12,16	12,16	12	09,12	12,16
Page	**B14**	**B14**	**B14**	**B14**	**B14**	**B14**	**B14**	**B15**	**B15**
Application	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing	Roughing	Roughing	One side / Roughing• High Feed Rate	Finishing	Medium
Insert	**HS** 	**CS** 	**PT** 	**GT** 	**Standard** 	**PH** 	**PX** 	⁀-S 	⁀ 
Size	12,16	12	12,16	12,19	12,16	12,16	12,16	09	09,12
Page	**B15**	**B15**	**B15**	**B15**	**B16**	**B16**	**B16**	**B18**	**B18**
Application	Medium-Roughing / Low Cutting Resistance type	Soft Steel Finishing	Soft Steel / Medium cutting	Soft Steel / Roughing	Stainless Steel	Stainless Finishing	Stainless Medium-Roughing	Stainless Medium-Roughing	Stainless Medium-Roughing
Insert	⁀-25R 	**XP** (-T) 	**XQ** 	**XS** 	**GU** 	**MQ** 	**MS** 	**MU** 	**TK** 
Size	12	12	12	12	12	12	12	12,16	12
Page	**B18**	**B16**	**B16**	**B16**	**B17**	**B17**	**B17**	**B17**	**B17**
Application	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	**C** 	**ZS** 	**GC** 	Without Chipbreaker 	**Ceramic** 	**AH** 	**A3** 	**PCD** 	**CBN** 
Size	12,16	12	12	12	12	12	12	12	12
Page	**B17**	**B17**	**B17**	**B17**	**B81**	**B18**	**B18**	**C17**	**C5**

For recommended cutting conditions, see page **D39~D40**

Short shank toolholder for **small lathe and turning mill**

Length of 100mm for 20mm square shank

- Optimal toolholder length for small lathe, conventionally for which shank was cut off
- Available also as toolholder for quick change system of turning mill

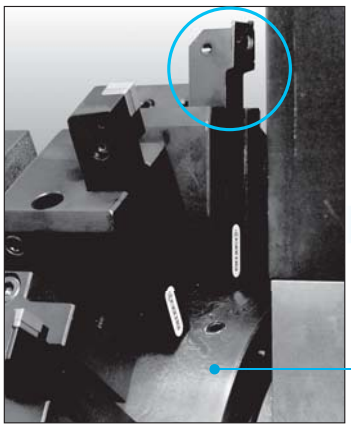


Short shank **PCLNR2020H-12**



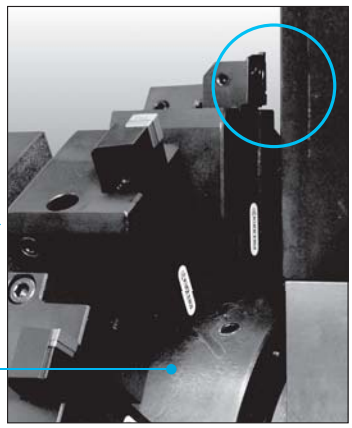
Conventional toolholder **PCLNR2020K-12**

Conventional Toolholder



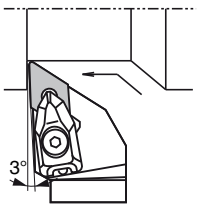
Large overhang length due to contact of shank with toolpost drum.

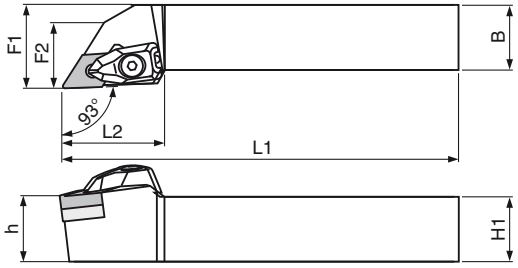
Short Shank



May be set to optional overhang length since there is no interference with toolpost drum.

DDJN (External / Copying)





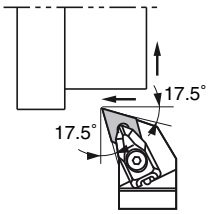
Side Rake Angle: -6°
Angle of Inclination: -7°

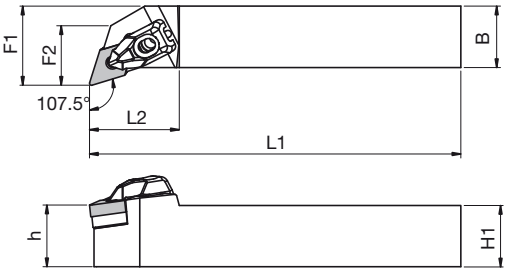
● Right-hand shown

● Applicable Inserts

Toolholder	Description	
DDJN$^{R/L}$...-1504	DN ○ A DN ○ G DN ○ M	1504.. (1506..)
DDJN$^{R/L}$...-1506		1506.. (1504..)

DDHN (External / Face Grooving / Copying)



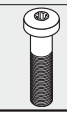
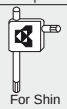


Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

● Applicable Inserts

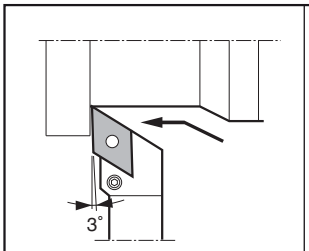
Toolholder	Description	
DDHN$^{R/L}$...-1504	DN ○ A DN ○ G DN ○ M	1504.. (1506..)
DDHN$^{R/L}$...-1506		1506.. (1504..)

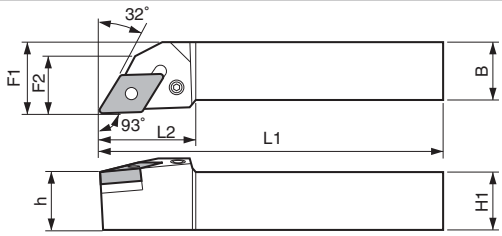
Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
																 For Clamp	 For Shin
DDJN$^{R/L}$	2020K-1504	●	●	20	20	125	39	25	-	0.8	CP-3D	CS-3D	SP-3D	DD-44 (DD-43)	SB-4085TR	LW-3	FT-15
	2525M-1504	●	●	25	25	150		32	25								
DDJN$^{R/L}$	2020K-1506	●	●	20	20	125		25	-					DD-43 (DD-44)			
	2525M-1506	●	●	25	25	150		32	25								
DDHN$^{R/L}$	2020K-1504	●	●	20	20	125	37	25	22					DD-44 (DD-43)			
	2525M-1504	●	●	25	25	150		32									
DDHN$^{R/L}$	2020K-1506	●	●	20	20	125		25						DD-43 (DD-44)			
	2525M-1506	●	●	25	25	150		32									

Shims indicated within brackets () are not included in toolholder. To change insert thickness, please purchase it separately.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PDJN (External / Copying)





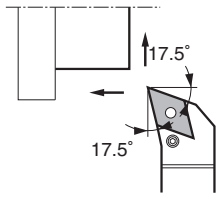
● Right-hand shown

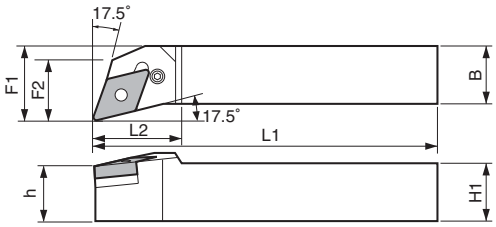
Side Rake Angle: -6°
Angle of Inclination: -7°

● Applicable Inserts

Toolholder	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	1506.. (1504..)

PDHN (External / Face Grooving / Copying)





● Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

● Applicable Inserts

Toolholder	Description	
PDHN$^{R}_{L}$...15	DN ○ A DN ○ G DN ○ M	1504.. (1506..)

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PDJN$^{R}_{L}$	1616H -11	●	●	16	16	100	28	20	-	0.4	LL-1DN	LS-1N	LD-32N	LSP-1	PC-1	FH-2.5
	2020K -11	●	●	20	20	125		25	-							
	2525M -11	●	●	25	25	150		32	27							
	2020H -15*	●		20	20	100	36	25	-	0.8	LL-3N	LS-2N	LD-42 *LD-42-20	LSP-2	PC-2	LW-3
	2020K -15	●	●	20	20	125		25	-							
	2525M -15	●	●	25	25	150		32	25							
	3225P -15	●	●	32	25	170		32	25							
	2525M -15U	●	●	25	25	150	36	32	25	0.8	LL-4	LS-3	LD-42 *LD-42-20 (LD-43) (*LD-43-20)	LSP-2	PC-2	LW-3
	3232P -15U	●	●	32	32	170		40	28							
PDHN$^{R}_{L}$	2020K -15	●	●	20	20	125	36	25	22	0.8	LL-4	LS-3	LD-43 *LD-43-20 (LD-42) (*LD-42-20)	LSP-2	PC-2	LW-3
	2525M -15	●	●	25	25	150		32	24							

* mark indicates short shank type.
・Shim: PDJN$^{R}_{L}$-15U...LD-42 is attached to PDJNR / L-15U. When using DN □□ 1504 type insert, prepare LD-43 separately.
PDHN ...LD-43 is attached to PDHN. When using DN □□ 1506 type Insert, prepare LD-42 separately.
・When using inserts whose corner R(rε) 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

Application	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Roughing	Roughing	Roughing
Insert	GP	HQ	CQ	CJ	TK	GS	PS	PT	GT	Standard	PH
Size	1104,1504,1506	1104,1504,1506	1504,1506	1504,1506	1506	1104,1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506
Page	B19	B19	B19	B19	B19	B20	B20	B20	B20	B20	B21

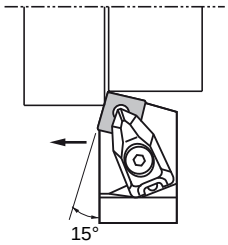
Application	One side / Roughing• High Feed Rate	Finishing	Medium	Soft Steel Finishing	Soft Steel / Medium cutting	Soft Steel / Roughing	Stainless Steel	Stainless Finishing	Stainless Medium to Roughing	Stainless Medium to Roughing
Insert	PX	$^{R}_{L}$-S	$^{R}_{L}$	XP (-T)	XQ	XS	GU	MQ	MS	MU
Size	1504,1506	1104	1104,1504	1504	1504	1504	1504,1506	1504,1506	1504,1506	1504,1506
Page	B21	B23	B23	B21	B21	B21	B22	B22	B22	B22

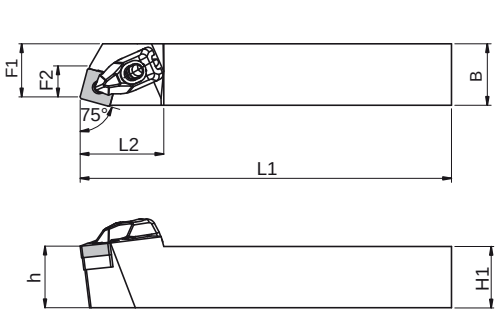
Application	Stainless Steel	Stainless Medium to Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	$^{R}_{L}$-ST	TK	C	ZS	GC	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
Size	1506	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504,1506	1504	1504	1504,1506
Page	B22	B22	B23	B23	B23	B82	B23	B23	C17	C6

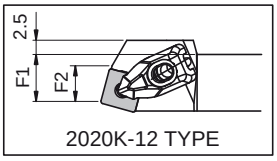
For recommended cutting conditions, see page ➔ D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DSBN (External)







Side Rake Angle: -6°
Angle of Inclination: -6°

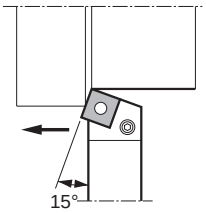
● Right-hand shown

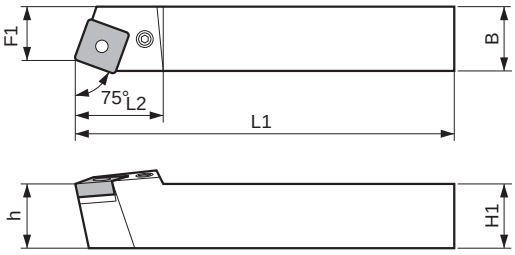
● Applicable Inserts

Toolholder	Description	
DSBN$^{R/L}$...-12	SN○A SN○G SN○M	1204..

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Series Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DSBN$^{R/L}$	2020K -12	●	●	20	20	125	34	17	13	0.8	CP-3D	CS-3D	SP-3D	DS-44	SB-4085TR	LW-3	FT-15
	2525M -12	●	●	25	25	150		22									

PSBN (External)

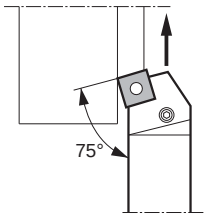


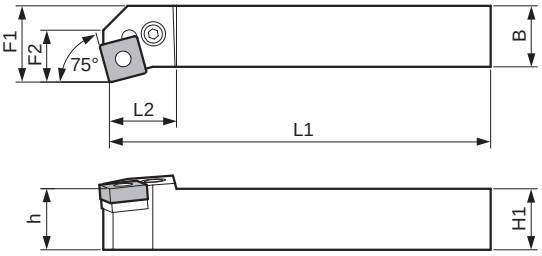


Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

PSKN (Facing)





Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

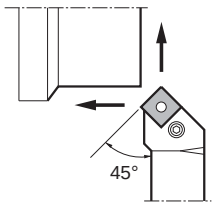
● Toolholder Dimensions

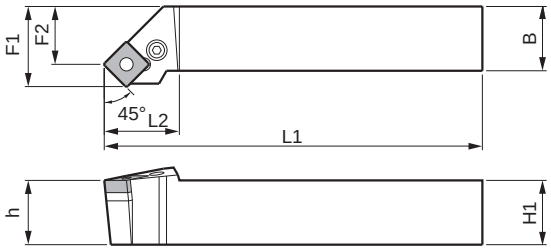
Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PSBN$^{R/L}$	1616H -09	●	●	16	16	100	21	13	-	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K -12	●	●	20	20	125	27	17	-	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M -12	●	●	25	25	150	24	22								
PSKN$^{R/L}$	1616H -09	●	●	16	16	100	19	20	12.7	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K -12	●	●	20	20	125	22.5	25	17	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M -12	●	●	25	25	150		32	19							

・PSKN$^{R/L}$: L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PSSN (External / Facing / Chamfering)

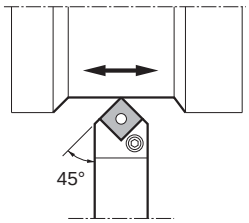


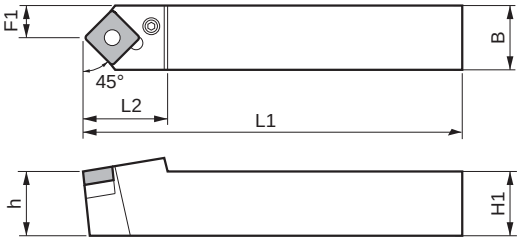


Side Rake Angle : -8°
Angle of Inclination: 0°

● Right-hand shown

PSDN (External / Chamfering)





Back Rake Angle: -8.5°

Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(re)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PSSNR/L	1616H-09	●		●	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	125	29	25	16.4	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M-12	●		●	25	25	150		32	23.4							
PSDNN	1616H-09		●		16	16	100	21	8	-	0.8	LL-1N	LS-1N	LS-32	LSP-1	PC-1	FH-2.5
	2020K-12		●		20	20	125	30	10	-	0.8	LL-2N	LS-2N	LS-42	LSP-2	PC-2	LW-3
	2525M-12		●		25	25	150		12.5								

Applicable Inserts

Toolholder	Description	
PSBNR/L...-09	SN○G	0903..
PSKNR/L...-09		
PSSNR/L...-09		
PSDNN...-09		
PSBNR/L...-12	SN○A SN○G SN○M	1204..
PSKNR/L...-12		
PSSNR/L...-12		
PSDNN...-12		

Application	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing	Roughing	Roughing	One side / Roughing • High Feed Rate
Insert	HQ	PS	HS	PT	HT	Standard	PH	PX
Size	12	12	12	12	12	09, 12	12,15	12,15
Page	B25	B25	B25	B25	B25	B25	B25	B26
Application	Finishing-Roughing	Medium-Roughing / Low Cutting Resistance type	Soft Steel Finishing	Soft Steel / Roughing	Soft Steel / Roughing	Stainless Finishing	Stainless Medium-Roughing	Cast Iron
Insert	R/L-□	R/L-25R	XP	XQ	XS	MQ	MS	C
Size	09, 12	12	12	12	12	12	12	12
Page	B27	B27	B26	B26	B26	B26	B26	B27
Application	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Hard Materials			
Insert	ZS	GC	Without Chipbreaker	Ceramic	CBN			
Size	12	12	12	12	12			
Page	B27	B27	B27	B84	C7			

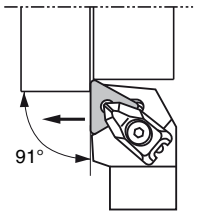
・PSSNR/L: At External Turning, R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder
At Facing, L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder

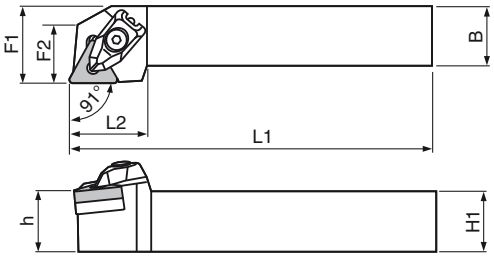
For recommended cutting conditions, see page ➡ D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

D
External

DTGN (External)





● Right-hand shown

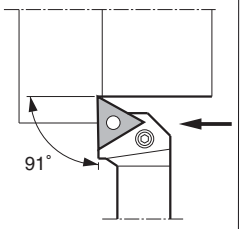
Side Rake Angle: -6°
Angle of Inclination: -6°

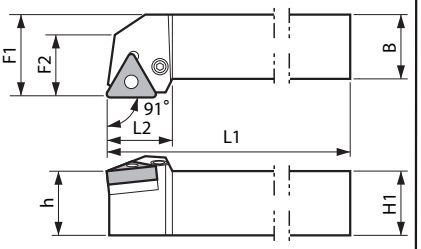
● Applicable Inserts

Toolholder	Description	
DTGN$^{R}_{L}$...-16	TN○A TN○G TN○M	1604..

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DTGN$^{R}_{L}$	2020K -16	●	●	20	20	125	25	25	20	0.8	CP-2D	CS-2D	SP-2D	DT-32	SB-3080TR	LW-2.5	FT-10
	2525M -16	●	●	25	25	150		32									

PTGN (External)

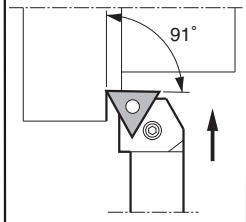


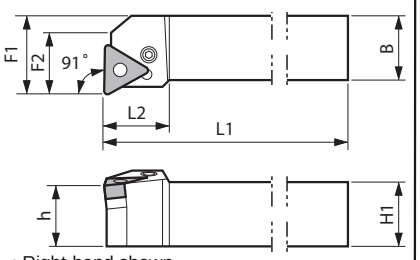


● Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

PTFN (Facing)





● Right-hand shown

Side Rake Angle: -6°
Angle of Inclination: -6°

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PTGN$^{R}_{L}$	1212F -11	●	●	12	12	80	18	16	12	0.8	LL-03N	LS-03N	-	P-03	-	FH-2
	1616H -11	●	●	16	16	100		20	14							
	2020K -11	●	●	20	20	125	22	25	20	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
	2525M -11	●	●	25	25	150		32	22							
	1616H -16	●	●	16	16	100		20	17							
	2020H -16*	●	●	20	20	100	24	25	20	0.8	LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
	2020K -16	●	●	20	20	125		25	20							
	2525M -16	●	●	25	25	150		32	20							
	2525M -22	●	●	25	25	150	29	32	24	0.8	LL-2N	LS-2N	LT-42N *LT-42N-20	LSP-2	PC-2	LW-3
	3225P -22		●	32		170										
PTFN$^{R}_{L}$	1212F -11	●	●	12	12	80	15	16	12	0.8	LL-03N	LS-03N	-	P-03	-	FH-2
	1616H -11	●	●	16	16	100		20	15							
	2020K -11	●	●	20	20	125	22.5	25	19	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
	2525M -11	●	●	25	25	150		32	25							
	2020K -16	●	●	20	20	125	24	25	21	0.8	LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
	2525M -16	●	●	25	25	150		32	22							
	2525M -22	●	●	25	25	150	29	32	25	0.8	LL-2N	LS-2N	LT-42N *LT-42N-20	LSP-2	PC-2	LW-3

* mark indicates short shank type.
• When using inserts whose corner R(rε) 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

Toolholder	Description	
PT○N$^{R}_{L}$12...-11	TN○G	1103..
PT○N$^{R}_{L}$...-11		1104..
PT○N$^{R}_{L}$...-16	TN○A TN○G TN○M	1604..
PT○N$^{R}_{L}$...-22		2204..

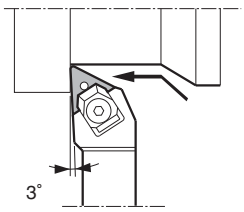
PTGN$^{R}_{L}$1212F-11
PTFN$^{R}_{L}$1212F-11
} Insert applicable for above

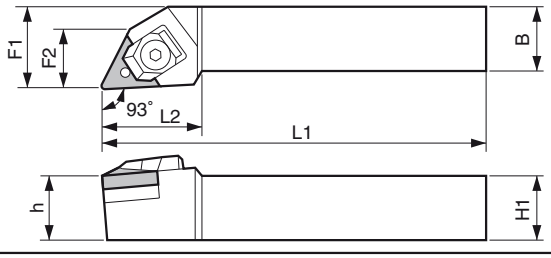
TN □□ 1103-type Insert is applicable.

• PTFN$^{R}_{L}$: L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

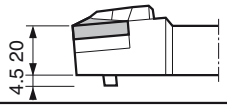
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

WTJN (External / Copying)



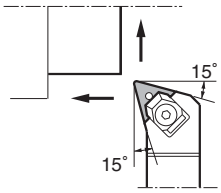


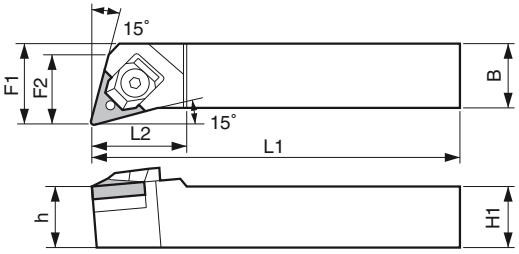
Side Rake Angle: -6°
Angle of Inclination: -6°
WTJN$^{R}_{L}$2020K types,
Shim Nut sticks out as shown below.



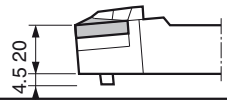
• Right-hand shown

WTKN (External / Facing / Copying)



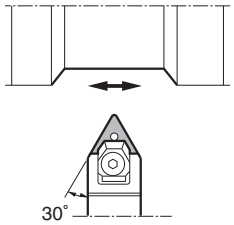


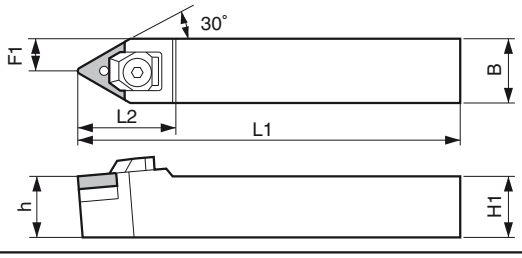
Side Rake Angle: -6°
Angle of Inclination: -6°
WTKN$^{R}_{L}$2020K types,
Shim Nut sticks out as shown below.



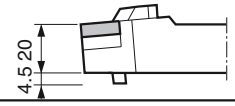
• Right-hand shown

WTEN-N (External / Chamfering)





Back Rake Angle: -8.5°
WTENN$^{R}_{L}$2020K types,
Shim Nut sticks out as shown below.



Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Spacer
WTJN$^{R}_{L}$	2020K-16N	●		●	20	20	125	32	25	24	0.8	WCS-1N	WTN-33 *WTN -33-20	WP-1S	WN-1	LW-3	WSP-1
	2525M-16N	●		●	25	25	150		32								
WTKN$^{R}_{L}$	2020K-16N	●		●	20	20	125	32	25	-							
	2525M-16N	●		●	25	25	150		32	30							
WTENN	2020K-16N		●		20	20	125	32	10	-							
	2525M-16N		●		25	25	150		12.5	-							

• When using inserts whose corner R(rε) 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

Toolholder	Description	
WTJN$^{R}_{L}$...-16N	TN○A TN○G TN○M	1604..
WTKN$^{R}_{L}$...-16N		
WTENN...-16N		

Application	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing• High Feed Rate	Medium-Roughing• High Feed Rate
Insert	GP	HQ	CQ	TK	GS	PS	HS	PT	GT
Size	1104,16	1104,16	16,22	16	1104,16	16,22	16,22	16	16
Page	B28	B28	B28	B28	B28	B28	B29	B29	B29

Application	Roughing	One side / Roughing• High Feed Rate	Roughing	Finishing-Roughing	Finishing-Roughing	Medium-Roughing / Low Cutting Resistance type	Soft Steel Finishing	Soft Steel / Medium cutting	Soft Steel / Roughing
Insert	PH	PX	Standard	$^{R}_{L}$-S	$^{R}_{L}$-□	$^{R}_{L}$-25R	XP(-T)	XQ	XS
Size	16,22	16,22	16,22	1104,16	1103,1104,16,22	16	16	16	16
Page	B29	B29	B29	B32	B32	B32	B29	B30	B30

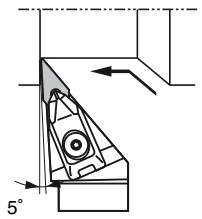
Application	Stainless Finishing	Stainless Medium to Roughing	Stainless Medium to Roughing	Stainless Medium to Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	MQ	MS	MU	TK	C	ZS	GC	Without Chipbreaker	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
Size	16	16	16	16	16	16	16	1103,16,22	16	16	16	16	16
Page	B30	B30	B30	B30	B31	B31	B31	B31	B86	B31	B31	C17	C7

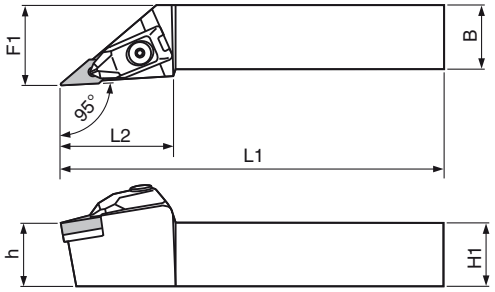
• In wedge lock, use of ceramic insert other than TN30 / PV30 and silicon nitride insert is not recommended due to strong restraint force.

For recommended cutting conditions, see page D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DVLN (External / Copying)





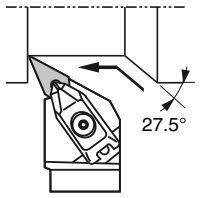
● Right-hand shown

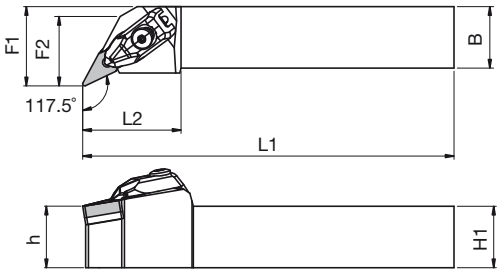
Side Rake Angle: -6°
Angle of Inclination: -9°

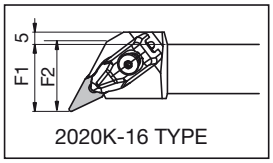
● Applicable Inserts

Toolholder	Description	
DVLN$^{R/L}$...-16	VN ○ A VN ○ G	1604..

DVPN (External / Facing / Copying / Undercutting)







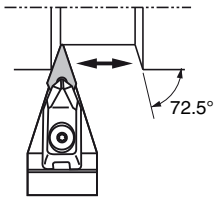
● Right-hand shown

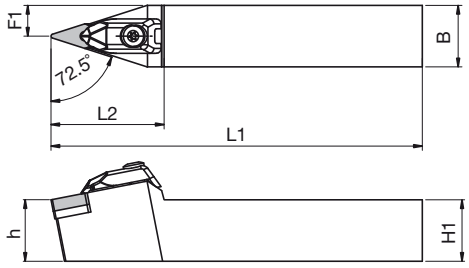
Side Rake Angle: -13°
Angle of Inclination: -10°

● Applicable Inserts

Toolholder	Description	
DVPN$^{R/L}$...-16	VN ○ A VN ○ G	1604..

DVVN (External / Copying)





Back Rake Angle: -11°

● Applicable Inserts

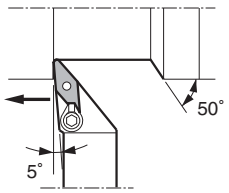
Toolholder	Description	
DVVNN...-16	VN ○ A VN ○ G	1604..

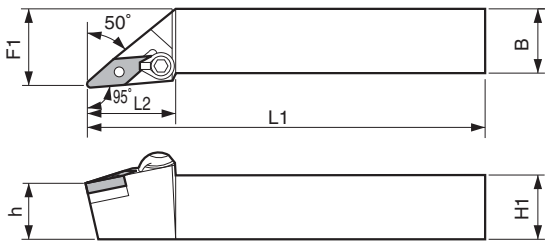
Description		Std.			Dimension (mm)						Standard Corner-R(rε)	Spare Parts						
												Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
		R	N	L	H1=h	B	L1	L2	F1	F2							 For Clamp	 For Shin
DVLN$^{R/L}$	2020K-16	●		●	20	20	125	45	25	-	0.8	CP-5D	CS-5D	SP-5D	DV-33	SB-4085TR	LW-3	FT-15
	2525M-16	●		●	25	25	150		32									
DVPN$^{R/L}$	2020K-16	●		●	20	20	125	40	27	28								
	2525M-16	●		●	25	25	150		32									
DVVNN	2020K-16		●		20	20	125	46	10	-								
	2525M-16		●		25	25	150		12.5									

• Modification on tool holder and shim is required when using R1.6mm insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MVLN (External / Copying)

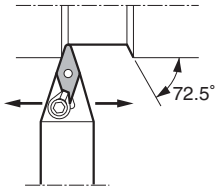


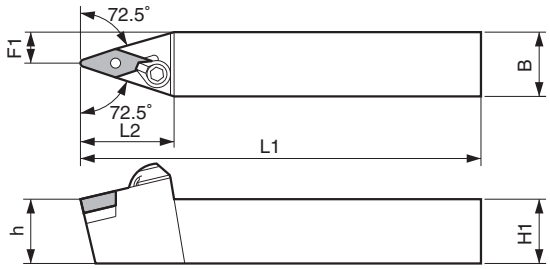


Side Rake Angle: -6°
Angle of Inclination: -9°

● Right-hand shown

MVVN (External / Copying)





Back Rake Angle: -11°

Toolholder Dimensions

Description	Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	Standard Corner-R(ε)	Spare Parts: Clamp Set	Wrench	Shim	Lock Pin	Wrench
MVLN R/L 2020K-16	●		●	20	20	125	37	25	0.8	CPS-5 R/L	FH-2.5	MVN-32	TS-3S	FH-2
MVLN R/L 2525M-16	●		●	25	25	150		32						
MVVNN 2020K-16		●		20	20	125	39	10	0.8	CPS-5R	FH-2.5	MVN-32	TS-3S	FH-2
MVVNN 2525M-16		●		25	25	150		12.5						

• Clamp Set : CPS-5R for Right-hand Toolholder, CPS-5L for Left-hand Toolholder.
• Modification on tool holder and shim is required when using R1.6mm insert.

Applicable Inserts

Toolholder	Description	
MVLN R/L...-16 MVVNN...-16	VN ○ A VN ○ G VN ○ M	1604..

Application	Finishing	Finishing-Medium	Finishing-Medium	Medium	Roughing	Finishing-Medium	Low Carbon Steel	Stainless Steel
Insert	GP	VF	HQ	TN-V	Standard	R/L	XP	GU
Size	16	16	16	16	16	16	16	16
Page	B33	B33	B33	B33	B33	B34	B33	B34
Application	Stainless Finishing	Stainless Medium to Roughing	Stainless Medium to Roughing	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials	
Insert	MQ	MS	MU	Without Chipbreaker	Ceramic	PCD	CBN	
Size	16	16	16	16	16	16	16	
Page	B34	B34	B34	B34	B87	C17	C8	

For recommended cutting conditions, see page D39~D40

Regarding revolution directions of the clamp set



MVVNN type
(Neutral)



MVLNR type
(R-hand Toolholder)

Clamp set: (CPS-5R) has R-hand thread.
When clamping the insert, rotate it to the arrow direction (clockwise).
When remove the insert, rotate it to the opposite side of arrow (counterclockwise).

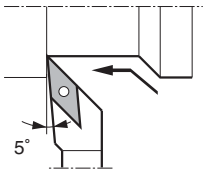


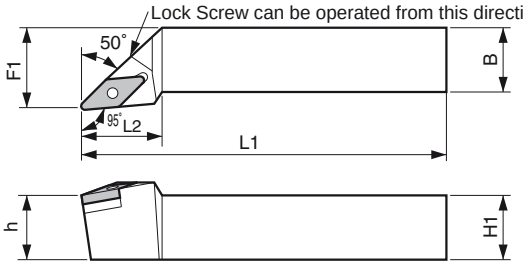
MVLNL type
(L-hand Toolholder)

Clamp set: (CPS-5L) has L-hand thread.
When clamping the insert, rotate it to the arrow direction (counterclockwise).
When remove the insert, rotate it to the opposite side of arrow (clockwise).

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PVLN (External / Copying)

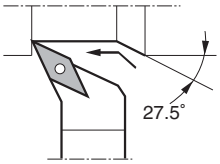


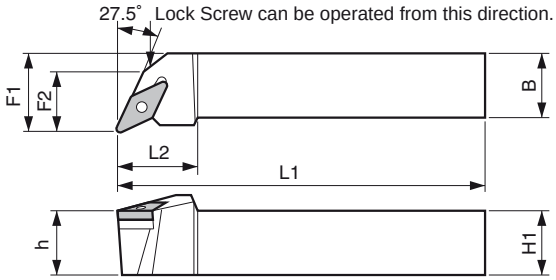


Side Rake Angle: -6°
Angle of Inclination: -9°

● Right-hand shown

PVPN (External / Facing / Copying / Undercutting)

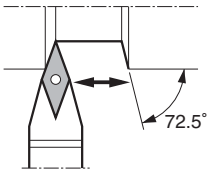


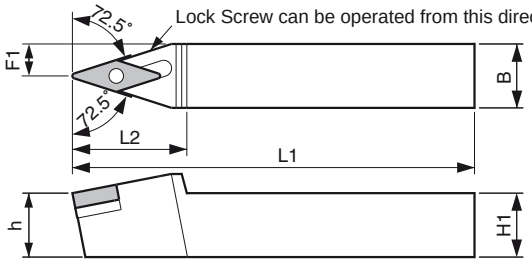


Side Rake Angle: -13°
Angle of Inclination: -10°

● Right-hand shown

PVVN (External / Copying)





Back Rake Angle: -11°

Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts Lock Pin	Lock Screw	Shim	Wrench		
PVLN R/L	2525M-16Q	●		●	25	25	150	37	32	-	0.8	LP-6S	LS-15	KVN-32	LW-3		
PVPN R/L	2020K-16Q	●		●	20	20	125	30	25	22	0.8	LP-2S	LS-11	KVN-32	LW-3		
	2525M-16Q	●		●	25	25	150		32	28		LP-6S					
PVVNN	2020K-16Q		●		20	20	125	35	10	-	0.8	LP-2S	LS-15	KVN-32	LW-3		
	2525M-16Q		●		25	25	150	40	12.5			LP-6S					

• Modification on tool holder and shim is required when using R1.6mm insert.

Applicable Inserts

Toolholder	Description	
PVLN R/L...-16Q	VN○A	1604..
PVPN R/L...-16Q	VN○G	
PVVNN...-16Q	VN○M	

Application	Finishing	Finishing-Medium	Finishing-Medium	Medium	Roughing	Finishing-Medium	Low Carbon Steel	Stainless Steel
Insert	GP	VF	HQ	TN-V	Standard	R/L	XP	GU
Size	16	16	16	16	16	16	16	16
Page	B33	B33	B33	B33	B33	B34	B33	B34

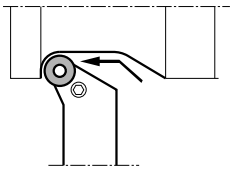
Application	Stainless Finishing	Stainless Medium-Roughing	Stainless Medium to Roughing	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials	
Insert	MQ	MS	MU	Without Chipbreaker	Ceramic	PCD	CBN	
Size	16	16	16	16	16	16	16	
Page	B34	B34	B34	B34	B87	C17	C8	

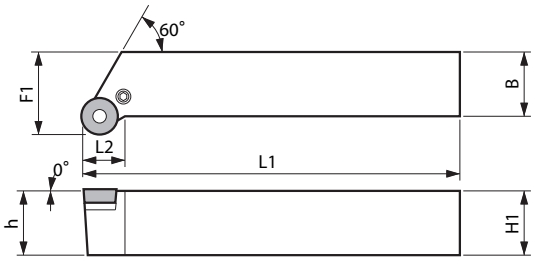
For recommended cutting conditions, see page ➡ D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PRGC / PRXC / PRGN (External / Facing / Undercutting)

PRGC

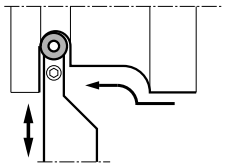


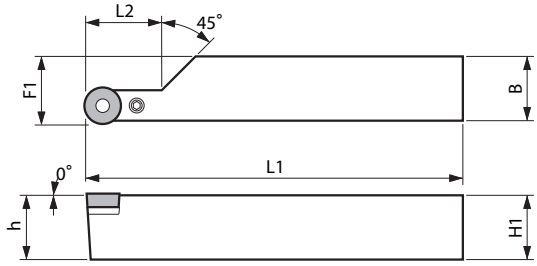


Side Rake Angle: 0°
Angle of Inclination: 0°

● Right-hand shown

PRXC

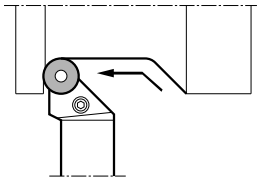


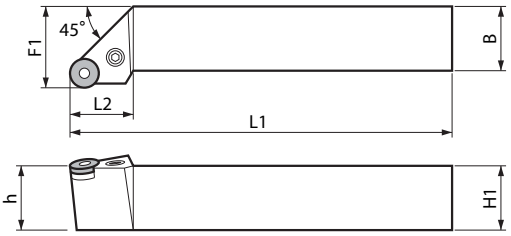


Side Rake Angle: 0°
Angle of Inclination: 0°

● Right-hand shown

PRGN





Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PRGC R/L	2020K-10	●	●	20	20	125	15	25	-	LL-05C	LS-05	LR-10C	LSP-1	PC-1	FH-2
	2525M-10	●	●	25	25	150	15	32							
	2020K-12	●	●	20	20	125	14	25	-	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5
	2525M-12	●	●	25	25	150	17	32							
PRXC R/L	2020K-10	●	●	20	20	125	25	20.5	-	LL-05C	LS-05	LR-10C	LSP-1	PC-1	FH-2
	2525M-10	●	●	25	25	150	30	25.5							
	2525Q-10	●	●	25	25	180	30	25.5							
	2525M-12	●	●	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	125	19	25	-	LL-1N	LS-1N	LR-80	LSP-1	PC-1	FH-2.5
	2525M-12	●	●	25	25	150	26	32	-	LL-2N	LS-2N	LR-81	LSP-2	PC-2	LW-3

Applicable Inserts

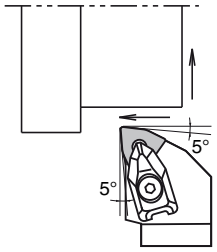
Toolholder	Description	
PRGC R/L...-10	RCGX RCMX	1003M0
PRGC R/L...-12		1204M0
PRXC R/L...-10		1003M0
PRXC R/L...-12		1204M0
PRGN R/L...-09	RNMG	090300
PRGN R/L...-12		120400

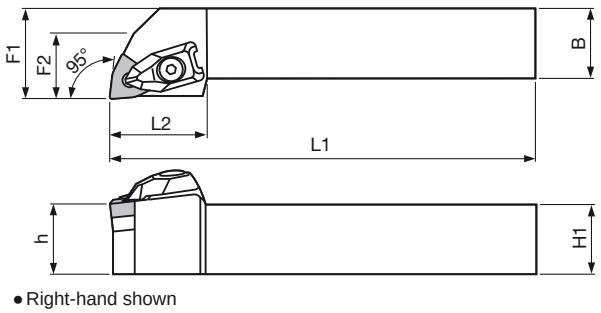
Application	Medium	Non-ferrous Metals
Insert	Standard 	AQ 
Size	10, 12	10
Page	B57	B57
Application	Medium-Roughing	
Insert	Conventional 	
Size	09, 12, 15	
Page	B24	

For recommended cutting conditions, see page ➡ D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DWLN (External / Facing)





● Right-hand shown

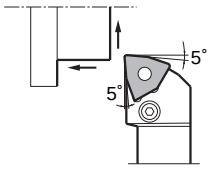
Side Rake Angle: -6°
Angle of Inclination: -6°

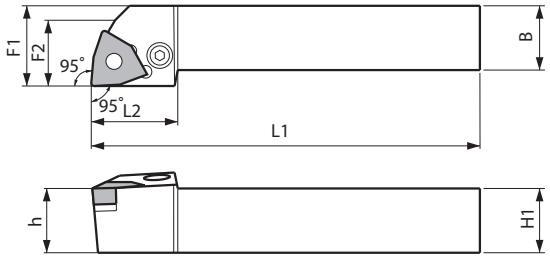
● Applicable Inserts

Toolholder	Description	
DWLN$^{R/L}$...-08	WN ○ A WN ○ G WN ○ M	0804...

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp	Screw	Spring	Shim	Shim Screw	Wrench	Wrench (sold separately)
DWLN$^{R/L}$	2020K -08	●	●	20	20	125	34	25	20	0.8	CP-3D	CS-3D	SP-3D	DW-44	SB-4085TR	LW-3	FT-15
	2525M -08	●	●	25	25	150		32									

PWLN (External / Facing)





● Right-hand shown

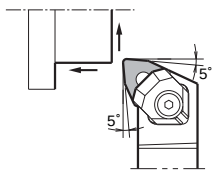
Side Rake Angle: -6°
Angle of Inclination: -6°

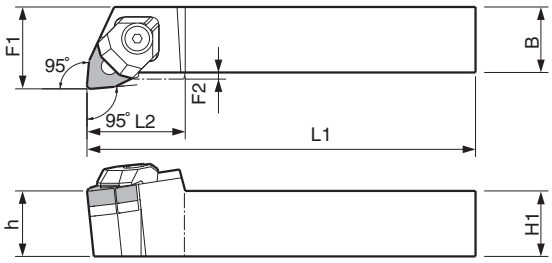
● Applicable Inserts

Toolholder	Description	
PWLN$^{R/L}$...-06	WN ○ A WN ○ G WN ○ M	0604..
PWLN$^{R/L}$...-08		0804..

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
PWLN$^{R/L}$	1616H -06	●	●	16	16	100	23	20	-	0.8	LL-1N	LS-1N	LW-32N	LSP-1	PC-1	FH-2.5
	2020K -06	●	●	20	20	125		25								
	2525M -06	●	●	25	25	150		32								
	2020K -08	●	●	20	20	125	27	25	-	0.8	LL-2N	LS-2N	LW-42N	LSP-2	PC-2	LW-3
	2525M -08	●	●	25	25	150		32	23							

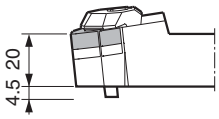
WWLN (External / Facing)





● Right-hand shown

WWLN$^{R/L}$2020K types, Shim Nut sticks out as below.



Side Rake Angle: -6°
Angle of Inclination: -6°

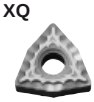
● Applicable Inserts

Toolholder	Description	
WWLN$^{R/L}$...-08	WN ○ A WN ○ G WN ○ M	0804..

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set	Shim	Shim Pin	Shim Nut	Wrench
WWLN$^{R/L}$	2020K -08	●	●	20	20	125	30	25	-	1.2	WCS-8	WWN-42	WP5X15	WN-1	LW-3
	2525M -08	●	●	25	25	150		32	2.5						

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

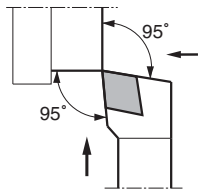
Application	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing
Insert	**WP** (Wiper) 	**WQ** (Wiper) 	**GP** 	**HQ** 	**CQ** 	**CJ** 	**TK** 	**GS** 	**PS** 	**PT** 
Size	08	08	06,08	06,08	08	08	08	06,08	08	08
Page	**B35**	**B35**	**B35**	**B35**	**B35**	**B35**	**B35**	**B35**	**B36**	**B36**
Application	Medium-Roughing	Roughing	Finishing	Medium	Soft Steel Finishing	Soft Steel / Medium cutting	Soft Steel / Roughing	Stainless Steel	Stainless Finishing	Stainless Medium to Roughing
Insert	**GT** 	**Standard** 	**R/L-S** 	**R/L** 	**XP** 	**XQ** 	**XS** 	**GU** 	**MQ** 	**MS** 
Size	08	08	06	06	08	08	08	08	08	08
Page	**B36**	**B36**	**B37**	**B37**	**B36**	**B36**	**B36**	**B36**	**B37**	**B37**
Application	Stainless Medium to Roughing	Stainless Medium to Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Insert	**MU** 	**TK** 	**C** 	**ZS** 	**GC** 	Without Chipbreaker 	**Ceramic** 	**AH** 	**PCD** 	**CBN** 
Size	08	08	08	08	08	08	08	08	08	08
Page	**B37**	**B37**	**B37**	**B37**	**B37**	**B37**	**B87**	**B37**	**C17**	**C8**

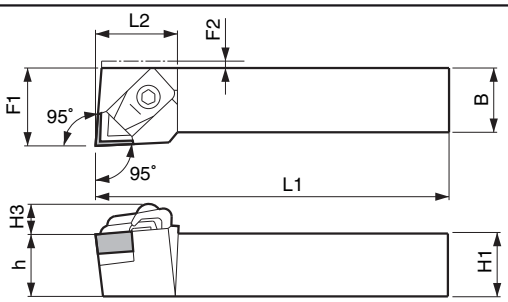
• In wedge lock, use of ceramic insert other than TN30 / PV30 and silicon nitride insert is not recommended due to strong restraint force.

For recommended cutting conditions, see page **D39~D40**

Toolholders for Ceramic Tools [CN □□ Insert]

CCLN (External / Facing)





Side Rake Angle: -6°
Angle of Inclination: -6°

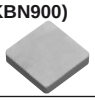
● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CCLN R/L	2020K -12	●	●	20	14	20	125	32	27	5	0.8	CB-16	CE-010	LW-4	SP-441 (SP-443)	M3X8 (M3X12)
	2525M-12	●	●	25		25	150		32	-						
	2525M-16	●		25	14	25	150	35	32	-	0.8	CB-17	CE-220	LW-4	SP-454	M4X10
	3225P -16	●		32			170									

・Shim & Shim Screw : When using CN □□ 1204 Insert, purchase spare parts in ( ) separately.

Applicable Inserts

Applications	Cast Iron / Hard Materials	Cast Iron / Hard Materials
Reference Pace	B81	C9
Insert / Toolholder	Ceramic 	CBN(KBN900) 
CCLN R/L...-12	CNGN1207..(CNGN1204..) CNMN1207	(CNMN1204)
CCLN R/L...-16	CNGN1607..	-

For recommended cutting conditions, see page ➔ D39~D40

Selection of Ceramic Insert

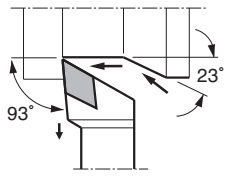
Select the suitable Ceramic Insert and specifications (Corner-R(rε), Feed Rate, Chamfer, etc.) from the table below.

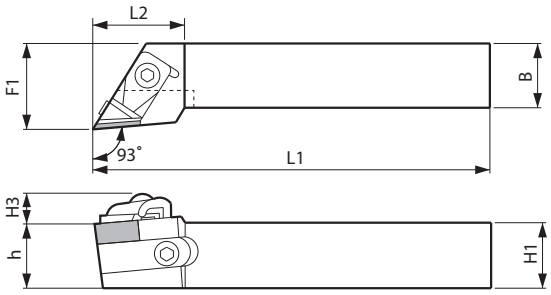
(FC250, Cutting Edge Angle: 0°-15°)

Insert Shape		Corner-R (rε)	f (mm/rev) 0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	ap ap [mm]
●	RN	–	→	→	→	→	→	→	→	→	→	→	0.3~4
■	SN	2.0	→	→	→	→	→	→	→	→	→	→	0.3~4
		1.6	→	→	→	→	→	→	→	→			
		1.2	→	→	→	→	→	→					
◆	EN CN	0.8	→	→	→	→							
		0.4	→	→									
▲	TN	1.6	→	→	→	→	→	For Finishing					0.3~2
		1.2	→	→	→	→							
◆	DN	0.8	→	→	→								
Chamfer			0.05mm×20°		(0.1~0.2)mm×(20°~25°)				0.3mm×30°				–
Insert Thickness			7.94mm										

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CDJN (External / Copying / Back Turning)





Side Rake Angle: -5°
Angle of Inclination: -8°

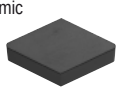
● Right-hand shown

Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CDJN$^{R}_{L}$ 2525M-15	●	●	25	16	25	150	32	32		0.8	**CB-14 / 15**	**CE-010**	**LW-4**	**556C$^{R}_{L}$**	**HH5X16**
3225P -15	●	●	32			170									

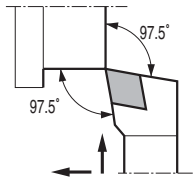
・Chipbreaker : CB-14 for Right-hand Toolholder, and CB-15 for Left-hand Toolholder.
・Shim : 556CR for Right-hand Toolholder, and 556CL for Left-hand Toolholder.

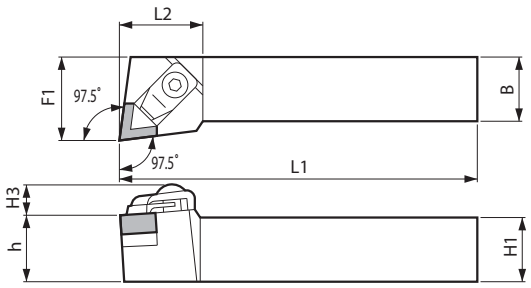
Applicable Inserts

Applications	Cast Iron / Hard Materials
Ref. Page	**B82**
Insert / Toolholder	Ceramic 
CDJN$^{R}_{L}$...-15	DNGN1507..

For recommended cutting conditions, see page **D39~D40**

CELN (External / Facing)





Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CELN$^{R}_{L}$ 2525M-13	●	●	25	15	25	150	32	32		0.8	**CB-16**	**CE-010**	**LW-4**	**SP-342**	**M3X8**

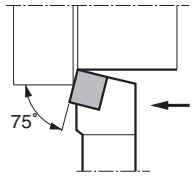
Applicable Inserts

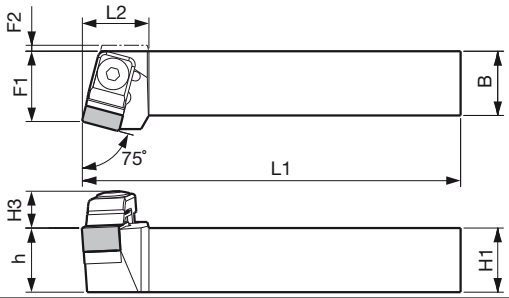
Applications	Cast Iron / Hard Materials
Ref. Page	**B83**
Insert / Toolholder	Ceramic 
CELN$^{R}_{L}$...-13	ENGN1307..

For recommended cutting conditions, see page **D39~D40**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CSRN (External)

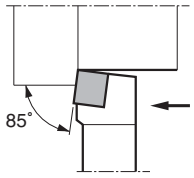


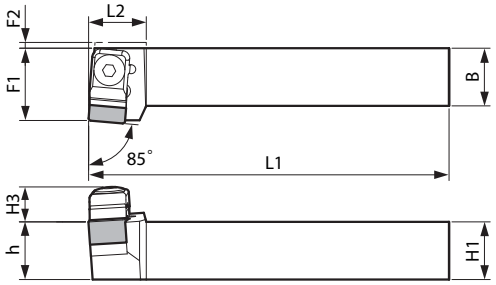


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CS-N (External)

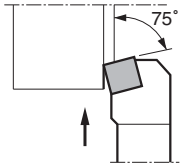


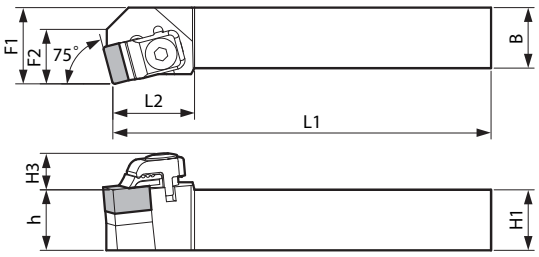


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CSKN (Facing)

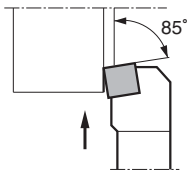


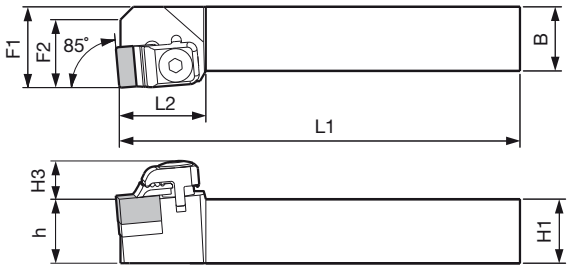


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CSYN (Facing)

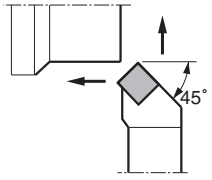


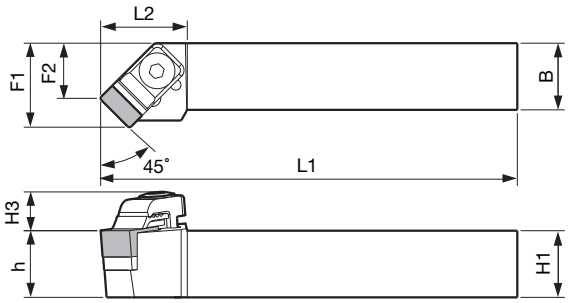


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CSSN (External / Facing / Chamfering)

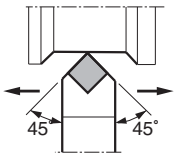


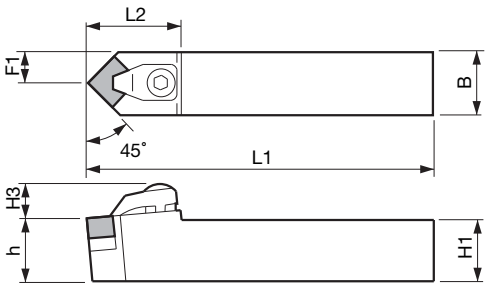


Side Rake Angle: -6°
Angle of Inclination: 0°

● Right-hand shown

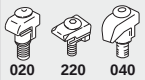
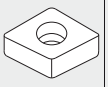
CSDN (External / Chamfering)





Back Rake Angle: -8.5°

Toolholder Dimensions

Description		Std.			Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
													Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
		R	N	L	H1=h	H3	B	L1	L2	F1	F2			 020 220 040			
CSRN$^{R}_{L}$	2020K -12	●		●	20		20	125		22	2						
	2525M -12	●		●	25	12	25	150	22	27	-	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	3225P -12	●		●	32		25	170		27	-						
	3225P -15	●			32	15	25	170	30	32	-	0.8	CB-51	CE-220	LW-4	SP-162	M4X10
	4040R -15	●		●	40		40	200		43							
CS-N$^{R}_{L}$	2020K -12	●		●	20	12	20	125	20	25	2	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M -12	●		●	25		25	150		32	-						
CSKN$^{R}_{L}$	2020K -12	●		●	20	12	20	125	27	25	18	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M -12	●		●	25		25	150		32							
	3225P -15	●			32	15	25	170	37	32	20	0.8	CB-51	CE-220	LW-4	SP-162	M4X10
CSYN$^{R}_{L}$	2020K -12	●		●	20	12	20	125	27	25	21	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M -12	●		●	25		25	150		32							
CSSN$^{R}_{L}$	2020K -12	●		●	20	12	20	125	26	25	17	0.8	CB-11	CE-020	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	2525M -12	●		●	25		25	150		32	23						
CSDNN	2020K -12		●		20		20	125		10							
	2525M -12		●		25	13	25	150	32	12.5	-	0.8	-	CE-040	LW-4	SP-141 (SP-143)	M3X8 (M3X12)
	3225P -12		●		32		25	170		12.5							

・Shim & Shim Screw : When using **SN** □□ **1204** Insert, purchase spare parts in ( ) separately.

Applicable Inserts

Applications	Cast Iron / Hard Materials	Cast Iron
Ref. Page	**B84, B85**	**B27**
Insert / Toolholder	**Ceramic** 	**Coating** 
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..)

Cast Iron / Hard Materials	When using as toolholder for **CBN** tools (**KBN900**), prepare spare parts below separately.		
C9	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**

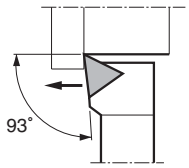
・**CSDNN...-12** : Clamp Set **CE-040** is used continuously.

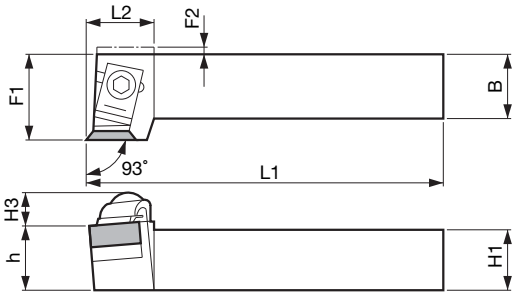
For recommended cutting conditions, see page **D39~D40**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Ceramic Tools [TN □□ Insert]

CTJN (External)

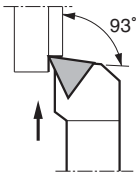


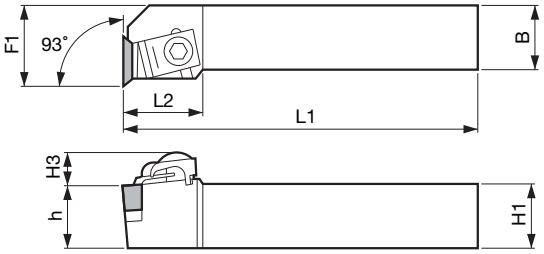


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CTUN (Facing)





Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
CTJN R/L	2020K-16	●	●	20	11	20	125	21	25	2	0.8	CB-12 / 13	CE-020	LW-4	SP-221 (SP-223)	M3X8 (M3X12)
	2525M-16	●	●	25		25	150		32	-						
CTUN R/L	2020K-16	●	●	20	11	20	125	27	25	-	0.8	CB-13 / 12	CE-020	LW-4	SP-221 (SP-223)	M3X8 (M3X12)
	2525M-16	●	●	25		25	150		32							

* CTJN (Chipbreaker): **CB-12** for **R**-hand Toolholder, **CB-13** for **L**-hand Toolholder.
  CTJN (Chipbreaker): **CB-13** for **R**-hand Toolholder, **CB-12** for **L**-hand Toolholder.
* Shim & Shim Screw : When using **TN** □□ **1604** Insert, purchase spare parts in ( ) separately.

Applicable Inserts

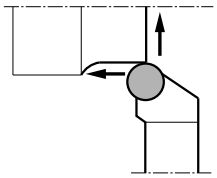
Applications	Cast Iron / Hard Materials	Cast Iron / Hard Materials	Cast Iron
Ref. Page	**B86, B87**	**C9**	**B31**
Insert / Toolholder	**Ceramic**	**CBN(KBN900)**	**Coated**
CTJN R/L...-16	TNGN1607..(TNGN1604..) (TNMN1604..)	(TNMN1604..)	(TNGN1604..)
CTUN R/L...-16			

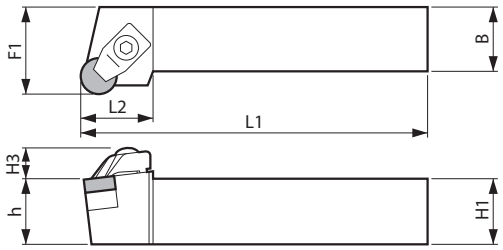
For recommended cutting conditions, see page **D39~D40**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Ceramic Tools [RN □□ Insert]

CRSN (External / Facing)

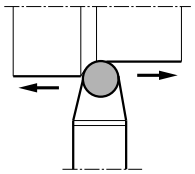


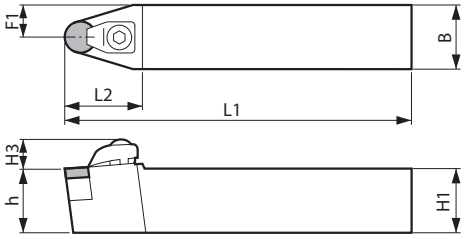


Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

CRDN (External / Copying)





Back Rake Angle: -8.5°

Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
CRSN R/L	2020K -12	●		●	20		20	125		25					
	2525M -12	●		●	25	11	25	150	26	32	-	CE-030	LW-4	SP-841 (SP-843)	M3X8 (M3X12)
	3225P -12	●		●	32		25	170		32					
CRDNN	2020K -12		●		20		20	125		10					
	2525M -12		●		25	11	25	150	28	12.5	-	CE-030	LW-4	SP-841 (SP-843)	M3X8 (M3X12)
	3225P -12		●		32		25	170		12.5					
	3232P -15		●		32	13	32	170	35	16	-	CE-040	LW-4	SP-861	M4X10
	4040R -15		●		40		40	200		20					

* Shim & Shim Screw : When using **RN □□ 1204** Insert, purchase spare parts in ( ) separately.

Applicable Inserts

Applications / Ref. Page / Toolholder \ Insert	Cast Iron / Hard Materials B83 Ceramic	Cast Iron / Hard Materials C9 CBN(KBN900)	When using as toolholder for **CBN** tools (**KBN900**), prepare spare parts below separately. Clamp Set	Shim	Shim Screw
CRSN R/L ...-12	RNGN120700(RNGN120400)	(RNMN120400)	CE-030A	SP-843	M3X12
CRDNN ...-12	RNGN120700(RNGN120400)	(RNMN120400)	CE-030A	SP-843	M3X12
CRDNN ...-15	RNGN150700	-	-		

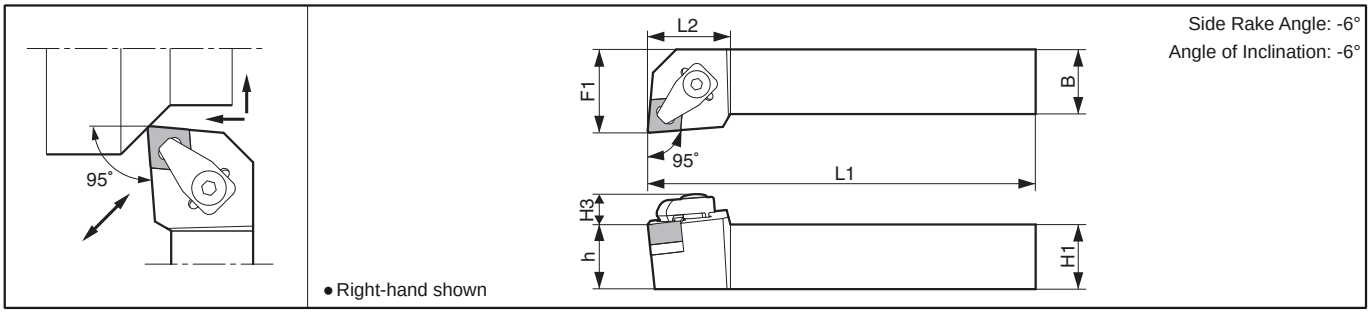
For recommended cutting conditions, see page D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

D

External

CCLN-GX (External / Facing / Back Turning)



Toolholder Dimensions

Description	Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	
CCLN R/L 2525M-12GX	●	●	25	13	25	150	30	32		1.2	CE-410	LW-4	SP-441	M3X8	

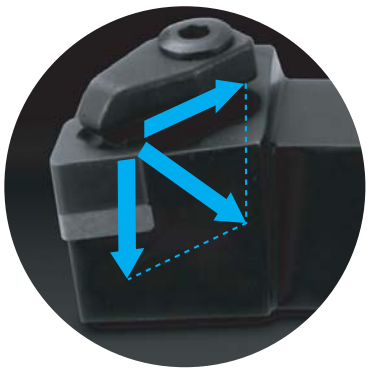
Applicable Inserts

Applications	Cast Iron
Ref. Page	B81
Insert / Toolholder	Ceramic 
CCLN R/L...12GX	CNGX1207..

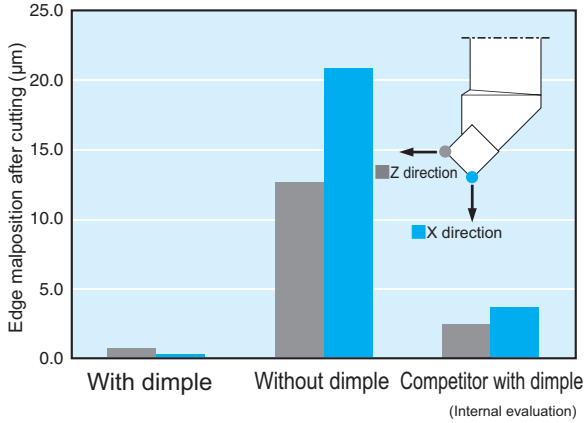
For recommended cutting conditions, see page ⇒ D39~D40

Features

1. Improved clamping stability due to the dimple design.
2. Improve machining stability and machinability

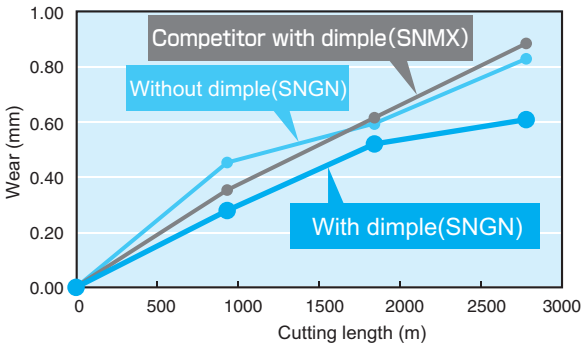


Edge displacement



(Internal evaluation)

Cutting Capability

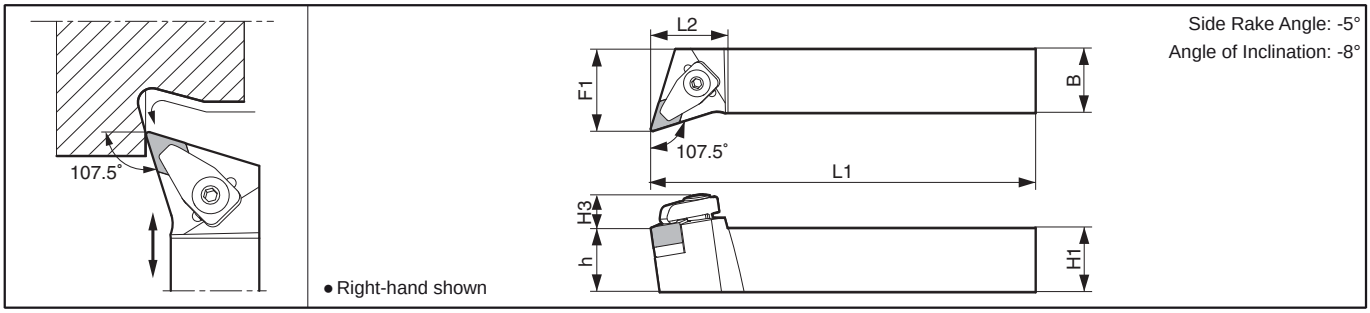


Vc=800m/min, ap=1.5~2.0 mm, f=0.6mm/rev
FC250 with scale, Dry

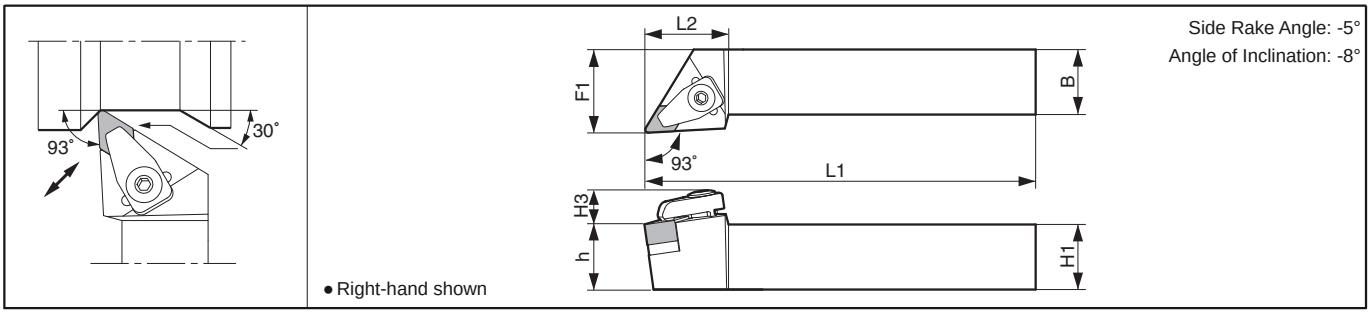
(Internal evaluation)

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CDHN-GX (External / Copying / Back Turning)



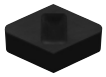
CDJN-GX (External / Copying / Back Turning)



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
CDHN R/L	2525M-12GX	●	●	25	14	25	150	30	32	1.2	CE-410	LW-4	SP-521	M3X8
	2525M-15GX	●	●	25	15	25	150	33	32	1.2	CE-430		SP-541	M3X8
CDJN R/L	2525M-12GX	●	●	25	14	25	150	32	32	1.2	CE-410	LW-4	SP-521	M3X8
	2525M-15GX	●	●	25	15	25	150	38	32	1.2	CE-430		SP-541	M3X8

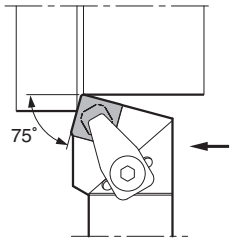
Applicable Inserts

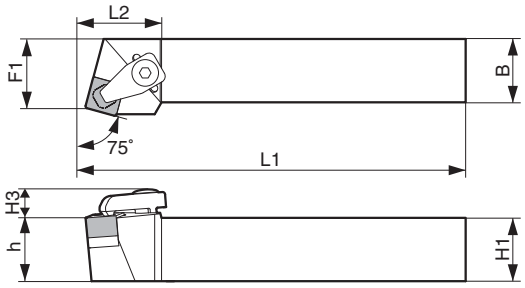
Applications		Cast Iron
Ref. Page		B82
Toolholder \ Insert		Ceramic 
CDHN R/L	2525M-12GX	DNGX1207 ···
	2525M-15GX	DNGX1507 ···
CDJN R/L	2525M-12GX	DNGX1207 ···
	2525M-15GX	DNGX1507 ···

For recommended cutting conditions, see page ➔ **D39~D40**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CSRN-GX (External)

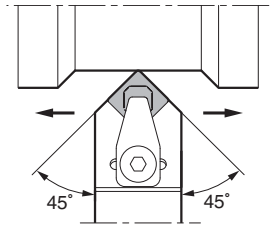


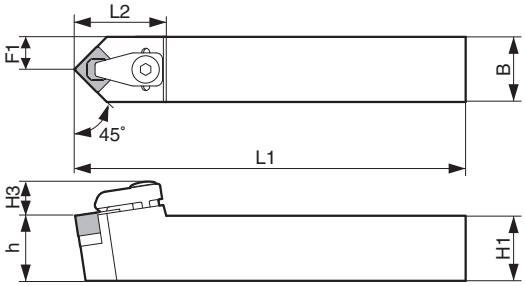


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

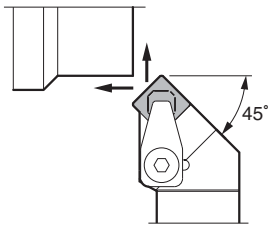
CSDN-GX (External / Chamfering)

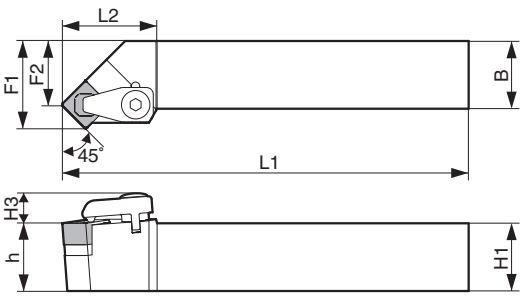




Back Rake Angle: -8.5°

CSSN-GX (External / Facing / Chamfering)





Side Rake Angle: -6°
Angle of Inclination: -0°

● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
CSRN R/L	2525M-12GX	●		●	25	12	25	150	30	27	-	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●		●	25	13	25	150	35	27	-	1.2	CE-410	LW-4	SP-162	M4X10
CSDNN	2525M-12GX		●		25	13	25	150	35	12.5	-	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX		●		25	14	25	150	40	12.5	-	1.2	CE-410	LW-4	SP-162	M4X10
CSSN R/L	2525M-12GX	●		●	25	12	25	150	35	32	23	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●		●	25	13	25	150	40	32	21	1.2	CE-410	LW-4	SP-162	M4X10

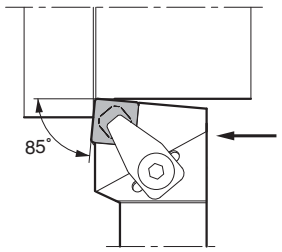
Applicable Inserts

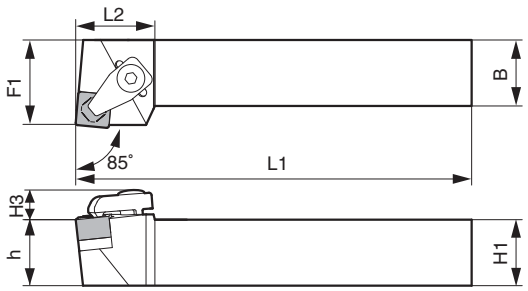
Applications		Cast Iron
Ref. Page		B85
Toolholder \ Insert		Ceramic 
CSRN R/L	2525M-12GX	SNGX1207 ···
	2525M-15GX	SNGX1507 ···
CSDNN	2525M-12GX	SNGX1207 ···
	2525M-15GX	SNGX1507 ···
CSSN R/L	2525M-12GX	SNGX1207 ···
	2525M-15GX	SNGX1507 ···

For recommended cutting conditions, see page D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CS-N-GX (External)

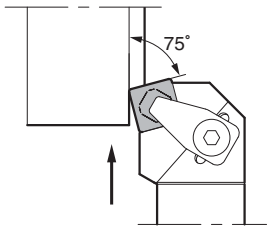


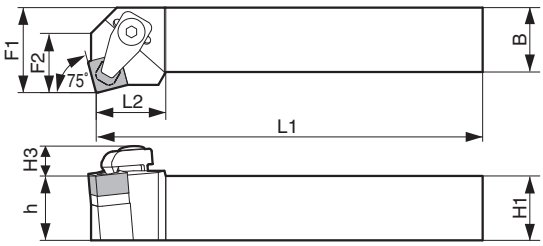


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CSKN-GX (Facing)

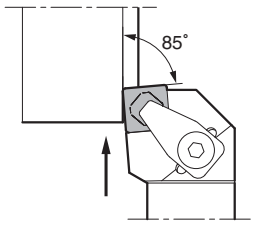


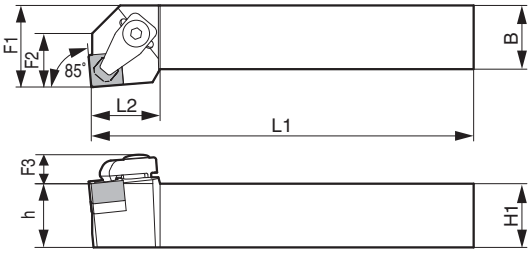


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CSYN-GX (Facing)





Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
CS-N R/L	2525M-12GX	●	●	25	12	25	150	30	32	-	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●	●	25	13	25	150	30	32	-	1.2	CE-410	LW-4	SP-162	M4X10
CSKN R/L	2525M-12GX	●	●	25	12	25	150	27	32	23	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●	●	25	13	25	150	28	32	23	1.2	CE-410	LW-4	SP-162	M4X10
CSYN R/L	2525M-12GX	●	●	25	12	25	150	27	32	21	1.2	CE-410	LW-4	SP-141	M3X8
	2525M-15GX	●	●	25	13	25	150	29	32	23	1.2	CE-410	LW-4	SP-162	M4X10

● Applicable Inserts

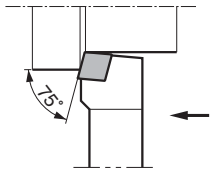
Applications		Cast Iron
Ref. Page		B85
Toolholder \ Insert		Ceramic 
CS-N R/L	2525M-12GX	SNGX1207 ···
	2525M-15GX	SNGX1507 ···
CSKN R/L	2525M-12GX	SNGX1207 ···
	2525M-15GX	SNGX1507 ···
CSYN R/L	2525M-12GX	SNGX1207 ···
	2525M-15GX	SNGX1507 ···

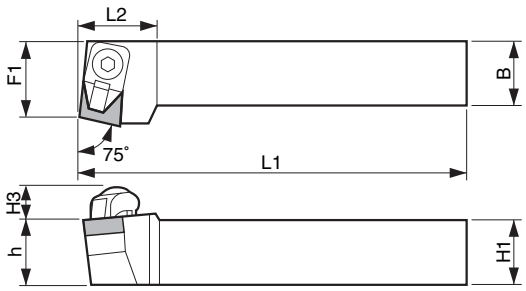
For recommended cutting conditions, see page D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Solid CBN Tools [CNMN Insert]

CCRN-A (External)

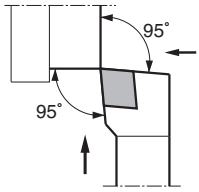


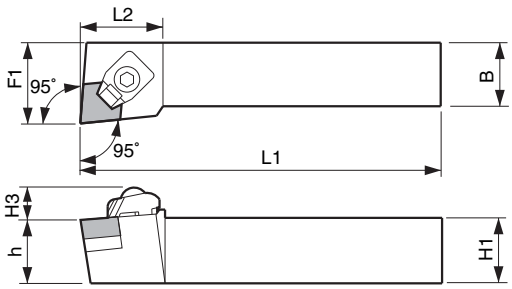


Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

CCLN-A (External / Facing)

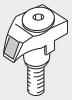




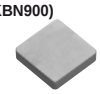
Side Rake Angle: -5°
Angle of Inclination: -5°

● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(ε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	
																
CCRN$^{R}_{L}$	**2525M-09A**	●	●	25	11	25	150	27	27		0.8	**CE-030A**	**LW-4**	**SP-429**	**HH3X12**	
CCLN$^{R}_{L}$	**2525M-09A**	●	●	25	11	25	150	35	32		0.8	**CE-030A**	**LW-4**	**SP-429**	**HH3X12**	
	3225P -09A	●	●	32			170									

Applicable Inserts

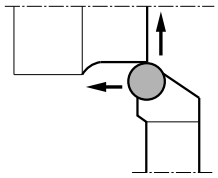
Applications	Cast Iron / Hard Materials
Ref. Page	**C9**
Insert / Toolholder	**CBN(KBN900)** 
CCRN$^{R}_{L}$...-09A	CNMN0903..
CCLN$^{R}_{L}$...-09A	

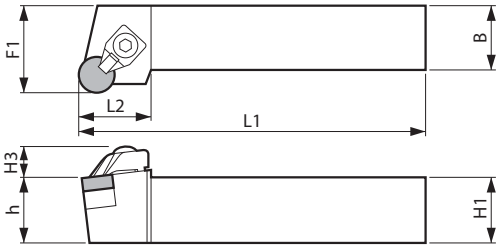
***** For **CNMN1204** Insert holder, see page **D22**.

For recommended cutting conditions, see page **D39~D40**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CRSN-A (External / Facing)

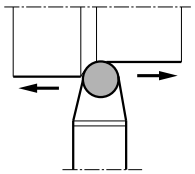


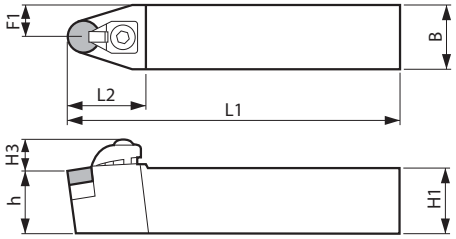


Side Rake Angle: -6°
Angle of Inclination: -6°

● Right-hand shown

CRDN-A (External / Copying)





Back Rake Angle: -8.5°

Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim		Shim Screw
																	HH / BH
CRSN$^{R/L}$	2525M-09A	●		●	25	11	25	150	26	32		-	CE-030A	LW-4	SP-829	-	HH3X12
	3225P -09A	●		●	32			170									
	2525M-12A	●		●	25	11	25	150	26	32		-			-	SP-849 (SP-843)	BH3X12
	3225P -12A	●		●	32			170									
CRDNN	2525M-09A		●		25	11	25	150	29	12.5		-	CE-030A	LW-4	SP-829	-	HH3X12
	3225P -09A		●		32			170									
	2525M-12A		●		25	11	25	150	29	12.5		-			-	SP-849 (SP-843)	BH3X12
	3225P -12A		●		32			170									

・12A Holder Shim: When using RN □□ 1204 Insert, purchase spare parts: SP-843 in ( ) separately.

Applicable Inserts

Applications	Cast Iron / Hard Materials	Cast Iron / Hard Materials
Ref. Page	C9	B83
Insert / Toolholder	CBN(KBN900)	Ceramic
CRSN$^{R/L}$...-09A	RNMN090300	RNGN090300
CRSN$^{R/L}$...-12A	RNMN120300 (RNMN120400)	-
CRDNN...-09A	RNMN090300	RNGN090300
CRDNN...-12A	RNMN120300 (RNMN120400)	-

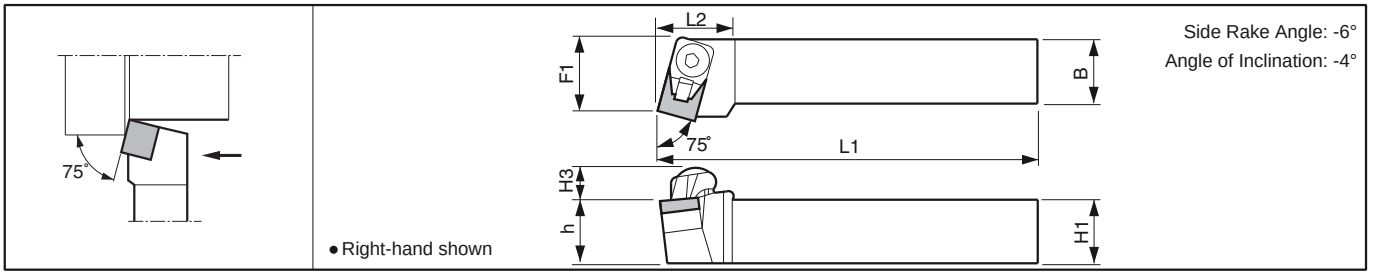
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, prepare spare parts below separately.	
B83	Shim	Shim Screw
Ceramic		
(RNGN090400)	SP-826	-
(RNGN120400)	SP-843	M3X12
(RNGN120700)	SP-841	M3X8
(RNGN090400)	SP-826	-
(RNGN120400)	SP-843	M3X12
(RNGN120700)	SP-841	M3X8

For recommended cutting conditions, see page D39~D40

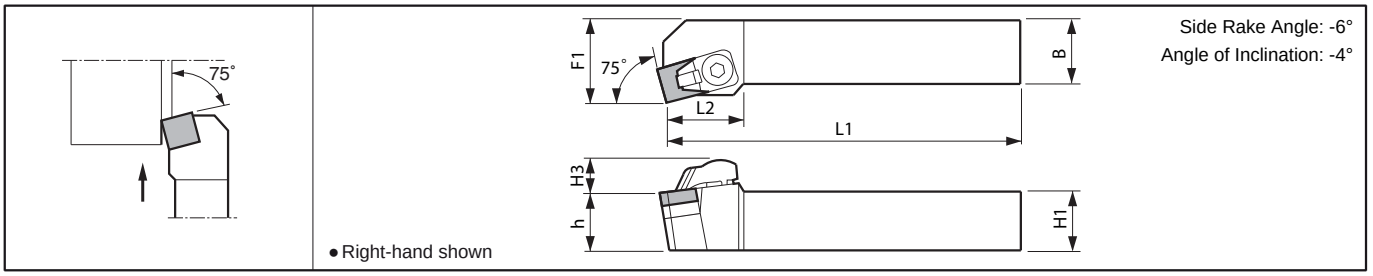
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Solid CBN Tools [SNMN Insert]

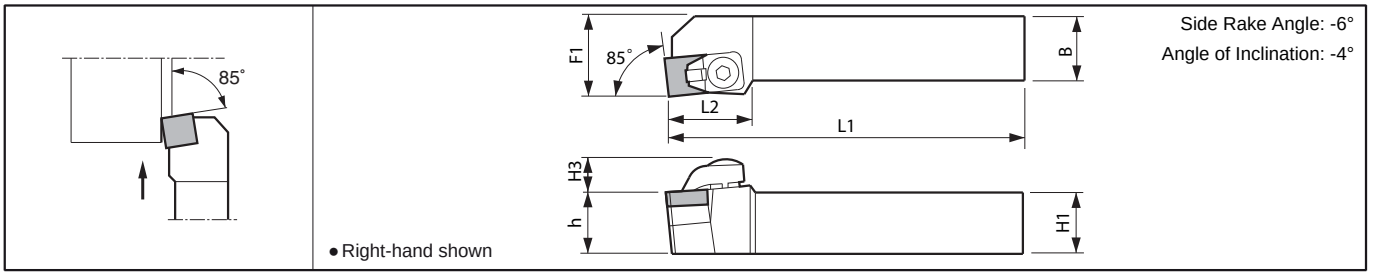
CSRN-A (External)



CSKN-A (Facing)



CSYN-A (Facing)



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim		Shim Screw HH	Shim Screw BH
CSRN R/L	2525M-09A	●	●	25	11	25	150	22	27	0.8	CE-030A	LW-4	SP-129	-	HH3X12	
	2525M-12A	●	●	25	11	25	150	22	27				-	SP-148 (SP-143)		BH3X12
CSKN R/L	2525M-09A	●		25	11	25	150	27	32	0.8	CE-030A	LW-4	SP-129	-	HH3X12	
	2525M-12A	●		25	11	25	150	27	32				-	SP-148 (SP-143)		BH3X12
CSYN R/L	2525M-09A	●	●	25	11	25	150	26	32	0.8	CE-030A	LW-4	SP-129	-	HH3X12	
	2525M-12A	●	●	25	11	25	150	26	32				-	SP-148 (SP-143)		BH3X12

・12A Holder Shim: When using SN □□ 1204 Insert, purchase spare parts: SP-143 in ( ) separately.

Applicable Inserts

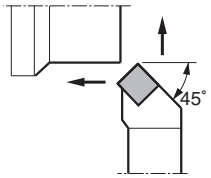
Applications	Cast Iron / Hard Materials	Cast Iron
Ref. Page	C9	B27
Insert / Toolholder	CBN(KBN900)	coated Carbide
CSRN R/L...-09A	SNMN0903..	-
CSRN R/L...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSKN R/L...-09A	SNMN0903..	-
CSKN R/L...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSYN R/L...-09A	SNMN0903..	-
CSYN R/L...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)

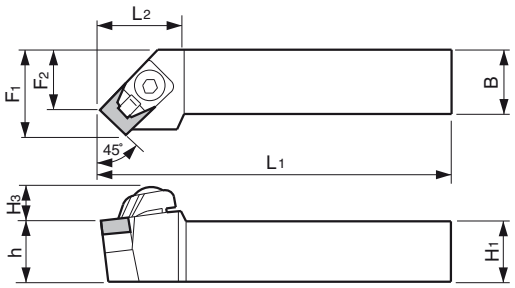
Cast Iron / Hard Materials	When using as toolholder for ceramic tools, prepare spare parts below separately.			
B84, B85	Chipbreaker	Clamp Set	Shim	Shim Screw
Ceramic				
-	-			
(SNGN1204..) (SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..) (SNMN1207..)			SP-141	M3X8
-	-			
(SNGN1204..) (SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..) (SNMN1207..)			SP-141	M3X8
-	-			
(SNGN1204..) (SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207. .) (SNMN1207..)			SP-141	M3X8

For recommended cutting conditions, see page D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CSSN-A (External / Facing / Chamfering)

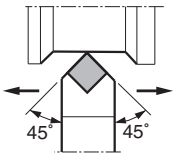


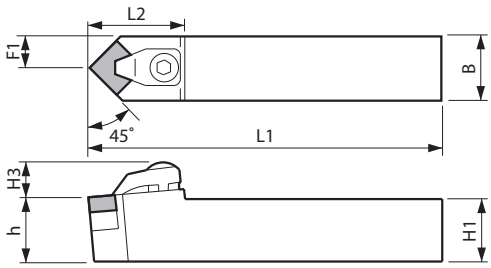


Side Rake Angle: -6°
Angle of Inclination: 0°

● Right-hand shown

CSDN-A (External / Chamfering)





Back Rake Angle: -8.5°

Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set 030A / 040	Spare Parts: Wrench	Spare Parts: Shim	Spare Parts: Shim	Spare Parts: Shim Screw HH	Spare Parts: Shim Screw BH
CSSN$^{R}_{L}$	2525M-09A	●		●	25	11	25	150	27	32	25	0.8	CE-030A	LW-4	SP-129	-	HH3X12	
	2525M-12A	●		●	25	11	25	150	27	32	23				-	SP-148 (SP-143)	BH3X12	
CSDNN	2525M-09A 3225P -09A		● ●		25 32	13	25	150 170	33	12.5	-	0.8	CE-040	LW-4	SP-129	-	HH3X12	
	2525M-12A		●		25	13	25	150	33	12.5	-					SP-148 (SP-143)	BH3X12	

・12A Holder Shim: When using SN □□ 1204 Insert, purchase spare parts: SP-143 in ( ) separately.

Applicable Inserts

Applications / Ref. Page / Insert \ Toolholder	Cast Iron / Hard Materials C9 CBN(KBN900)	Cast Iron B27 coated Carbide
CSSN$^{R}_{L}$...-09A	SNMN0903..	-
CSSN$^{R}_{L}$...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)
CSDNN...-09A	SNMN0903..	-
CSDNN...-12A	SNMN1203.. (SNMN1204..)	(SNMN1204..)

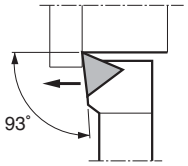
Cast Iron / Hard Materials B84, B85 Ceramic	When using as toolholder for ceramic tools, prepare spare parts below separately. Chipbreaker	Clamp Set	Shim	Shim Screw
-	-			
(SNGN1204..) (SNMN1204..)	CB-11	CE-020	SP-143	M3X12
(SNGN1207..) (SNMN1207..)			SP-141	M3X8
-	-			
(SNGN1204..) (SNMN1204..)	-	-	SP-143	M3X12
(SNGN1207..) (SNMN1207..)			SP-141	M3X8

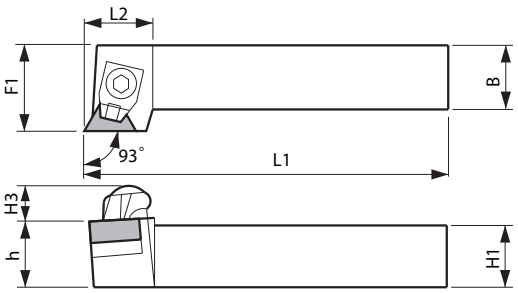
For recommended cutting conditions, see page D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Solid CBN Tools [TNMN Insert]

CTJN-A (External)

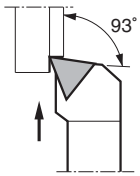


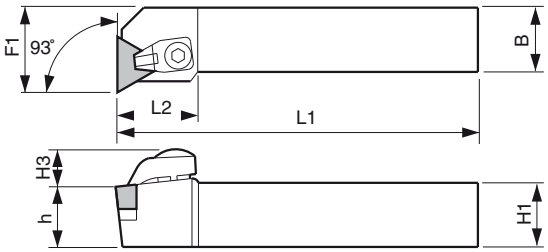


Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

CTUN-A (Facing)

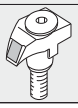




Side Rake Angle: -6°
Angle of Inclination: -4°

● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	
																
CTJN$^{R}_{L}$	**2525M-11A**	●	●	25	11	25	150	22	32		0.8	**CE-030A**	**LW-4**	**SP-219**	**HH3X12**	
CTUN$^{R}_{L}$	**2525M-11A**	●	●	25	11	25	150	28	32		0.8	**CE-030A**	**LW-4**	**SP-219**	**HH3X12**	
	3225P -11A	●		32			170									

Applicable Inserts

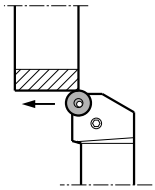
Applications	Cast Iron / Hard Materials	Cast Iron / Hard Materials
Ref. Page	**C9**	**B86**
Insert / Toolholder	**CBN(KBN900)** 	**Ceramic** 
CTJN$^{R}_{L}$...-11A	TNMN1103..	TNGN1103..
CTUN$^{R}_{L}$...-11A		

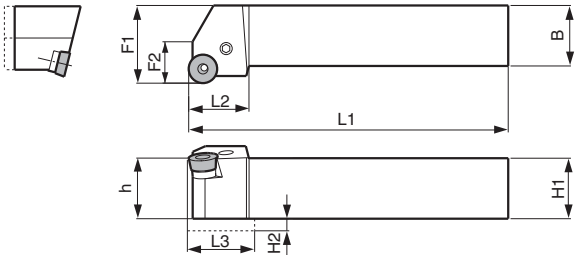
* TNMN1604 Insert holder is described in **D26**.

For recommended cutting conditions, see page **D39~D40**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

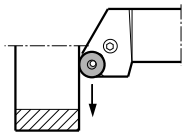
PRGC-BE (External)

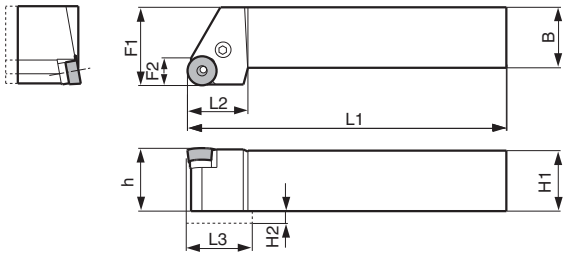




● Right-hand shown

PRGC-BF (Facing)



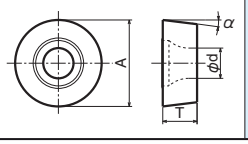


● Right-hand shown

Toolholder Dimensions

Description		Std.		Dimension (mm)								Spare Parts						Applicable Inserts ➡B73
												Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	
		R	L	H1=h	H2	B	L1	L2	L3	F1	F2							
PRGC R/L	2020K-12BE	●	●	20	-	20	125	22	-	25	15	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5	RCMT 1204M0-BB
	2525M-12BE	●	●	25	-	25	150	25	-	32	17							
	2020K-16BE	●	●	20	5	20	125	27	27	29	22	LL-2C	LS-1T	LR-16C	LSP-2	PC-2	FH-2.5	RCMT 1606M0-BB
	2525M-16BE	●	●	25	-	25	150	27	-	32	22							
PRGC R/L	2020K-12BF	●	●	20	-	20	125	22	-	25	10	LL-1CN	LS-1N	LR-12C	LSP-1	PC-1	FH-2.5	RCMT 1204M0-BB
	2525M-12BF	●	●	25	-	25	150	25	-	32	11							
	2020K-16BF	●	●	20	5	20	125	27	27	25	17	LL-2C	LS-1T	LR-16C	LSP-2	PC-2	FH-2.5	RCMT 1606M0-BB
	2525M-16BF	●	●	25	-	25	150	27	-	32	17							

Applicable Inserts

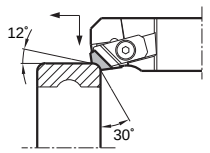
Insert			Description	Dimension (mm)				Angle (°)
				A	T	ød	rε	α
			RCMT 1204M0-BB 1606M0-BB	12.0 16.0	4.76 6.35	4.2 5.5	-	7°

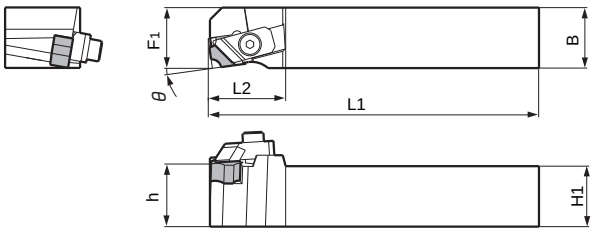
For recommended cutting conditions, see page ➡D39~D40

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Bearing Machining [SNMF Insert]

CBSN (External Round Chamfering)

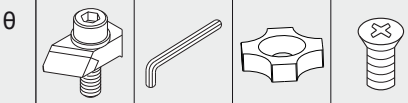




● Right-hand shown

Toolholder Dimensions

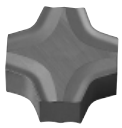
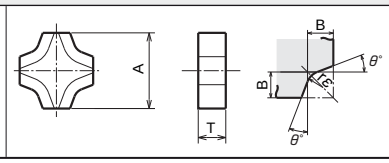
Description	Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	θ	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	Applicable Inserts
CBSN R/L 2020K-12	●	●	20	20	125	32	20	9°	**CP-RC R/L**	**LW-5**	**SP-RC**	**SP3X8**	SNMF1204 ○○-21
2525M-12	●	●	25	25	150	32	25						



Applicable Inserts ➡ B73

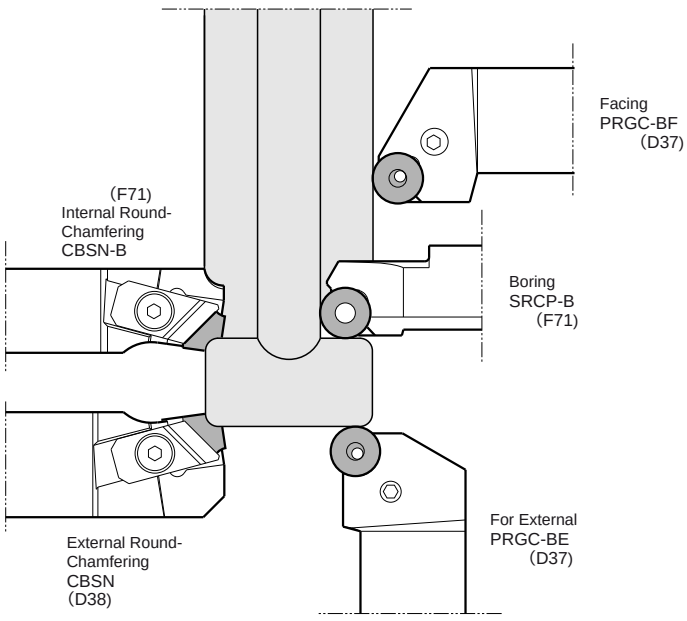
* Clamp Set : RP-RCR for Right-hand Toolholder, and CP-RCL for Left-hand Toolholder.

Applicable Inserts

Insert	Description	Dimension (mm) A	T	B	ε	Angle (°) θ
 	**SNMF 120406-21**	12.70	4.76	1.5	0.6	21°
	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

For recommended cutting conditions, see page ➡ D39~D40



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

Recommended Cutting Conditions - External Turning (Negative Insert)

(ap indicates radius)

ISO Classification	Workpiece Material	Hardness	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Corner-R (rε)	Lower Limit - Recommendation - Upper Limit		
								Vc(m/min)	ap(mm)	f(mm/rev)
P	Low-carbon Steel Low-carbon Alloy	HB ≦ 300	Finishing (Gloss Oriented)	Continuous	XP	TN6020	0.4	250 - 320 - 380	0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2
				Interruption	XP-T	TN6020	0.4	200 - 280 - 320	0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2
			Finishing (Finish Oriented)	Continuous	XP	PV7010	0.4	250 - 300 - 350	0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2
				Interruption	XP-T	PV90	0.4	200 - 260 - 300	0.2 - 0.5 - 0.7	0.07 - 0.12 - 0.2
			Finishing-Medium (Gloss Oriented)	Continuous	XQ	TN6020	0.4	250 - 300 - 350	0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3
				Interruption		TN6020	0.8	180 - 240 - 300	0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3
			Finishing-Medium (Finish Oriented)	Continuous	XQ	PV7010	0.8	250 - 300 - 350	0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3
				Interruption		CA5515	0.8	160 - 220 - 280	0.5 - 1.0 - 1.5	0.17 - 0.25 - 0.3
			Medium-Roughing	Continuous	XS	PV7020	0.8	200 - 250 - 300	0.8 - 1.5 - 2.0	0.25 - 0.3 - 0.4
				Interruption		CA5515	0.8	160 - 210 - 260	0.8 - 1.5 - 2.0	0.25 - 0.3 - 0.4
			Roughing	Continuous	PS	CA5515	0.8	180 - 220 - 260	1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4
				Interruption		CA5525	1.2	150 - 200 - 240	1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4
			Medium-Roughing High Feed Rate	Continuous	PT	CA5515	0.8	150 - 200 - 240	1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45
				Interruption		CA5525	1.2	120 - 180 - 220	1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous	PH	CA5515	1.2	150 - 200 - 240	2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8
				Interruption		CA5525	1.6	120 - 180 - 220	2.0 - 5.0 - 8.0	0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous	PX (Single Side)	CA5515	1.2	150 - 200 - 240	2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8
				Interruption		CA5525	1.6	120 - 180 - 220	2.0 - 5.0 - 8.0	0.3 - 0.5 - 0.7
	Medium-carbon Steel Medium-carbon Alloy	HB ≦ 300	Finishing (Time Oriented)	Continuous	WP (Wiper)	PV7010	0.8	200 - 250 - 300	0.3 - 0.5 - 1.0	0.2 - 0.3 - 0.4
				Interruption		CA5515	0.8	160 - 220 - 280	0.3 - 0.5 - 1.0	0.2 - 0.3 - 0.4
			Finishing-Medium (Time Oriented)	Continuous	WQ (Wiper)	PV7010	0.8	180 - 220 - 260	1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.4
				Interruption		CA5525	0.8	130 - 180 - 240	1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.4
			Finishing (Gloss Oriented)	Continuous	GP	TN6010	0.4	200 - 250 - 300	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		TN6010	0.8	180 - 230 - 280	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing (Finish Oriented)	Continuous	GP	PV7010	0.4	200 - 250 - 300	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		CA5515	0.8	180 - 220 - 260	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium (Gloss Oriented)	Continuous	CQ	TN6010	0.8	180 - 230 - 270	0.5 - 1.5 - 2.5	0.1 - 0.2 - 0.25
				Interruption		TN6020	1.2	150 - 210 - 250	0.5 - 1.5 - 2.5	0.1 - 0.15 - 0.2
			Finishing-Medium (Finish Oriented)	Continuous	CQ	PV7010	0.8	160 - 210 - 260	0.5 - 1.5 - 2.5	0.1 - 0.2 - 0.25
				Interruption		CA5525	0.8	140 - 200 - 240	0.5 - 1.5 - 2.5	0.1 - 0.15 - 0.2
			Medium-Roughing	Continuous	GS	CA5515	0.8	150 - 200 - 240	1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.5
				Interruption		CA5525	1.2	120 - 180 - 220	1.0 - 2.0 - 3.0	0.15 - 0.2 - 0.3
			Roughing	Continuous	PS	CA5515	0.8	150 - 200 - 240	1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4
				Interruption		CA5525	1.2	120 - 160 - 200	1.0 - 2.5 - 3.5	0.2 - 0.3 - 0.4
			Medium-Roughing High Feed Rate	Continuous	PT	CA5515	0.8	120 - 180 - 230	1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45
				Interruption		CA5525	1.2	100 - 150 - 200	1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous	PH	CA5515	1.2	120 - 180 - 230	2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8
				Interruption		CA5525	1.6	100 - 150 - 200	2.0 - 5.0 - 8.0	0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous	PX (Single Side)	CA5515	1.2	120 - 180 - 230	2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8
				Interruption		CA5525	1.6	100 - 150 - 200	2.0 - 5.0 - 8.0	0.3 - 0.5 - 0.7
	High-carbon Alloy	HB ≦ 280	Finishing (Gloss Oriented)	Continuous	GP	TN6010	0.4	150 - 200 - 250	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		TN6020	0.8	120 - 180 - 220	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing (Finish Oriented)	Continuous	GP	PV7010	0.4	120 - 180 - 240	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		CA5515	0.8	100 - 150 - 200	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous	CQ	CA5515	0.8	120 - 160 - 220	0.5 - 1.5 - 2.5	0.15 - 0.25 - 0.3
				Interruption		CA5525	0.8	100 - 140 - 180	0.5 - 1.5 - 2.5	0.15 - 0.2 - 0.25
			Medium-Roughing	Continuous	PS	CA5515	0.8	120 - 150 - 200	1.0 - 2.0 - 3.0	0.2 - 0.3 - 0.5
				Interruption		CA5525	0.8	100 - 130 - 180	1.0 - 2.0 - 3.0	0.15 - 0.2 - 0.3
			Medium-Roughing High Feed Rate	Continuous	PT	CA5515	0.8	100 - 140 - 180	1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45
				Interruption		CA5525	1.2	80 - 120 - 160	1.5 - 3.0 - 4.5	0.25 - 0.35 - 0.45
			Roughing High Feed Rate	Continuous	PH	CA5515	1.2	100 - 140 - 180	2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8
				Interruption		CA5525	1.6	80 - 120 - 160	2.0 - 5.0 - 8.0	0.3 - 0.5 - 0.7
			Roughing (Low Cutting Force)	Continuous	PX (Single Side)	CA5515	1.2	100 - 140 - 180	2.0 - 5.0 - 8.0	0.4 - 0.6 - 0.8
				Interruption		CA5525	1.6	80 - 120 - 160	2.0 - 5.0 - 8.0	0.3 - 0.5 - 0.7

Recommended Cutting Conditions

Recommended Cutting Conditions - External Turning (Negative Insert)

(ap indicates radius)

ISO Classification	Workpiece Material	Hardness	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Corner-R (rε)	Lower Limit - Recommendation - Upper Limit		
								vc(m/min)	ap(mm)	f(mm/rev)
M	Stainless Steel	HB ≦ 220	Finishing (Gloss Oriented)	Continuous	HQ	TN6020	0.8	120 - 160 - 200	0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2
				Interruption		TN6020	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	HB ≦ 300	Finishing (Gloss Oriented)	Continuous	HQ	TN6020	0.8	100 - 120 - 150	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
				Interruption		TN6020	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 Cutting	Continuous	Without Chipbreaker	KBN60M	0.8	400 - 700 - 900	0.05 - 0.2 - 0.5	0.03 - 0.05 - 0.1
				Continuous		KBN900	1.2	500 - 900 -1200	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		TN6020	0.8	100 - 150 - 200	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
				Interruption		PT600M	0.8	300 - 450 - 600	0.3 - 0.5 - 1.0	0.1 - 0.2 - 0.3
			Medium (Ceramic)	Continuous		KS6000	1.2	250 - 400 - 500	1.0 - 2.0 - 3.0	0.15 - 0.25 - 0.35
				Interruption		KS6000	1.2	250 - 400 - 500	1.0 - 2.0 - 3.0	0.15 - 0.2 - 0.3
			Medium	Continuous	Standard	CA4010	0.8	200 - 250 - 300	0.5 - 2.0 - 2.5	0.1 - 0.2 - 0.3
				Interruption		CA4010	1.2	150 - 200 - 250	0.5 - 2.0 - 2.5	0.08 - 0.15 - 0.2
			Roughing	Continuous	ZS	CA4010	0.8	200 - 250 - 300	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
				Interruption		CA4010	1.2	150 - 200 - 250	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
	Nodular Cast Iron	HB ≦ 270	High Speed Cutting	Continuous	Without Chipbreaker	KBN60M	0.4	200 - 300 - 400	0.1 - 0.3 - 0.5	0.1 - 0.15 - 0.2
				Interruption		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		TN6020	0.8	100 - 150 - 180	0.5 - 1.0 - 1.5	0.08 - 0.15 - 0.2
			Medium	Continuous	Standard	CA4115	0.8	150 - 200 - 250	0.5 - 2.0 - 2.5	0.1 - 0.2 - 0.3
				Interruption		CA4120	1.2	120 - 180 - 220	0.5 - 2.0 - 2.5	0.08 - 0.15 - 0.2
			Roughing	Continuous	ZS	CA4115	0.8	150 - 200 - 250	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
				Interruption		CA4120	1.2	120 - 180 - 220	1.0 - 2.0 - 4.0	0.2 - 0.3 - 0.4
N	Non-ferrous Metals	HB ≦ 100	High Speed Cutting (Rainbow Surface Gross)	Continuous	Without Chipbreaker	KPD001	0.4	300 - 800 -2000	0.05 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Finishing	Continuous	A3	KW10	0.8	400 - 500 - 700	0.5 - 1.0 - 2.0	0.1 - 0.2 - 0.25
				Interruption		KW10	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		KW10	0.8	200 - 300 - 500	1.0 - 2.0 - 3.5	0.1 - 0.3 - 0.4
S	Titanium Alloy	HB ≦ 400	Precision Cutting (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		KPD001	0.4	70 - 120 - 150	0.05 - 0.3 - 0.5	0.03 - 0.07 - 0.1
			Finishing	Continuous	A3	KW10	0.4	30 - 50 - 70	0.5 - 1.5 - 2.5	0.07 - 0.15 - 0.25
				Interruption		KW10	0.4	30 - 50 - 70	0.5 - 1.5 - 2.5	0.07 - 0.15 - 0.2
			Medium	Continuous	AH	KW10	0.8	30 - 50 - 70	1.0 - 2.0 - 3.5	0.1 - 0.25 - 0.35
				Interruption		KW10	0.8	30 - 50 - 70	1.0 - 2.0 - 3.5	0.1 - 0.2 - 0.3
	Heat-resistant Alloys	HB ≦ 350	Finishing	Continuous	MQ	CA6515	0.4	40 - 60 - 80	0.2 - 0.5 - 1.0	0.03 - 0.08 - 0.12
				Interruption	Standard	CA6525	0.8	40 - 60 - 80	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium	Continuous	MS	CA6515	0.8	40 - 60 - 80	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.15
				Interruption	Standard	CA6525	1.2	40 - 60 - 80	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2
H	Hard Materials	40 ~ 50 HRC	Finishing	Continuous	HQ	CA5515	0.8	60 - 100 - 120	0.1 - 0.3 - 0.5	0.05 - 0.08 - 0.1
				Interruption	Standard	CA5515	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		Interruption		PT600M	1.2	30 - 40 - 60	0.2 - 0.5 - 0.7	0.05 - 0.1 - 0.15
		50~68 HRC	Finishing	Continuous	Without Chipbreaker SET,MET	KBN10M	0.8	100 - 150 - 200	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1
				Interruption		KBN25M	1.2	80 - 120 - 160	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1
			Medium	Continuous	Without Chipbreaker	KBN900	1.2	80 - 100 - 120	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.2
				Interruption		KBN900	Radius Plus	70 - 90 - 110	0.3 - 0.7 - 1.0	0.05 - 0.1 - 0.15

E

Small Tools

E1~E32

Summary of Turning E2~E3

Toolholder for Small Double Sided Tooling E4~E5

CN ☐ U Insert E4
DN ☐ U Insert E4
TN ☐ U Insert E5

Toolholders for Back Turning E6~E11

TKFB Insert E6
ABS Insert E8
ABW Insert E9

External Toolholders (Back Clamp / Screw Clamp / Sleeve Holders) E12~E27

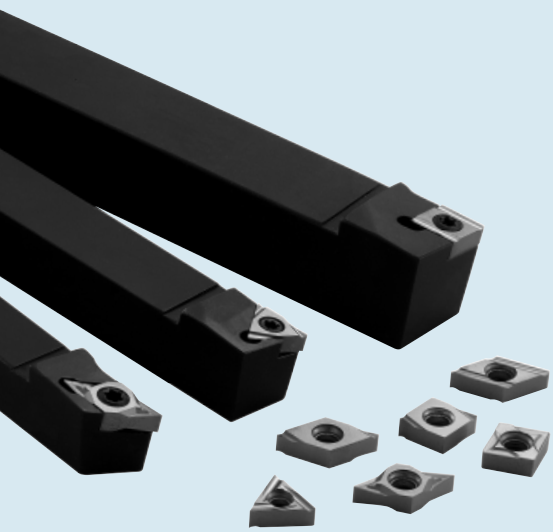
CC ☐☐ Insert E12
DC / DP ☐☐ Insert E14
TC / TP ☐☐ Insert E22
VB / VC / VP ☐☐ Insert E23
YP ☐☐ Insert E27

External Toolholders (Top Clamp) E28~E29

SP ☐ R / SP ☐ N Insert E28
TP ☐ R / TP ☐ N Insert E29

Technical Information E30~E31

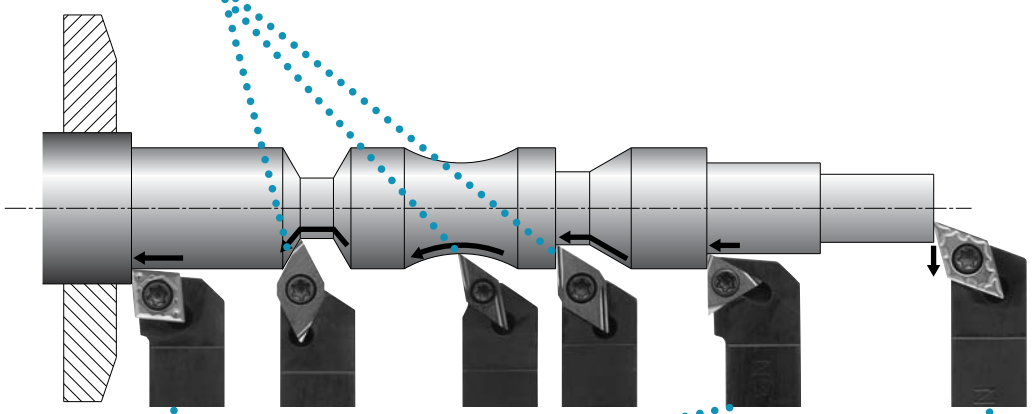
Recommended Cutting Conditions E30



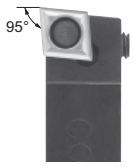
Summary of Turning

External / Copying

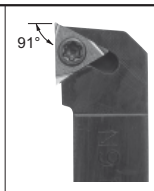
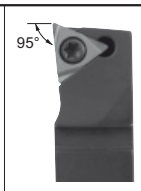
							
ADJC-F	SDJC-F	SDJC	SDLC-FF SDLP-F	SDLN-FF	ADNC-F	SDNC-F	SDNC
Back Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp With Offset	Screw Clamp Without Offset	Screw Clamp Without Offset	Back Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp With Offset
E14	E15	E15	E16	E4	E20	E21	E21



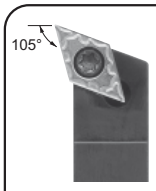
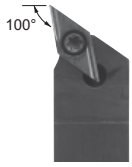
External / Facing

		
ACLC-F	SCLC	SCLN-FF
Back Clamp Without Offset	Screw Clamp With Offset	Screw Clamp Without Offset
E11	E12	E4

External

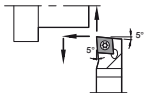
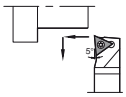
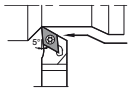
		
SCAC	STGC(P)	STLN-FF
Screw Clamp Without Offset	Screw Clamp With Offset	Screw Clamp Without Offset
E12	E22	E5

External / Facing / Copying

	
SDXC	SYXP-F
Screw Clamp With Offset	Screw Clamp Without Offset
E17	E27

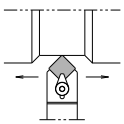
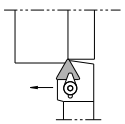
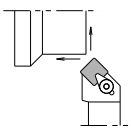
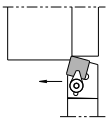
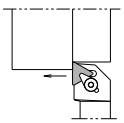
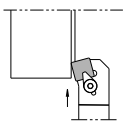
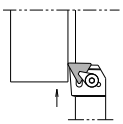
Toolholders for Small Double Sided Tooling (Screw Clamp)



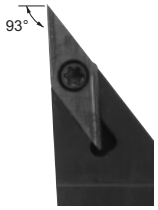
Machining type	External / Facing	External / Up Facing	External / Copying
Cutting Edge Angle	95°	95°	95°
Screw Clamp (Without Offset)			
Ref. Page	E4	E5	E4

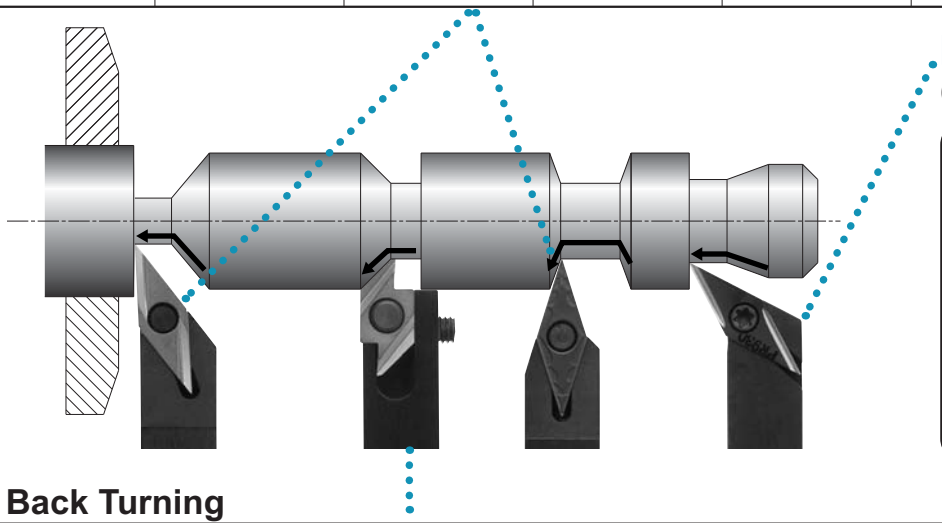
The double-sided design offers less cost per insert and more stability with newly-designed negative inserts. Sharp cutting performance equivalent to conventional positive inserts.

Top Clamp (For Insert without Hole)

Machining type	External / Chamfering		External / Facing / Chamfering	External		Facing	
Cutting Edge Angle	45°	60°	45°	75°	91°	15°	-1°
Top Clamp							
	CSDP	CTTP	CSSP	CSBP	CTGP	CSKP	CTFP
Ref. Page	E28	E29	E28	E28	E29	E28	E29

External / Copying

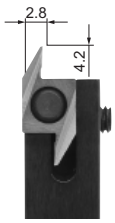
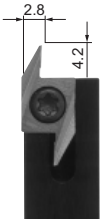
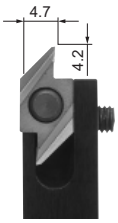
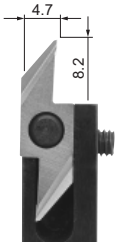
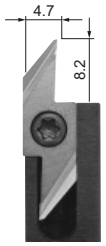
					
AVVB-F	SVVB	AVJB-F	SVJB-F	SVJB	SVLP-F
Back Clamp Without Offset	Screw Clamp With Offset	Back Clamp Without Offset	Screw Clamp Without Offset	Screw Clamp With Offset	Screw Clamp Without Offset
E23	E23	E24	E24	E24	E25



External / Facing / Copying / Undercutting

	
SVPB	SVPP
Screw Clamp With Offset	Screw Clamp With Offset
E24	E26

Back Turning

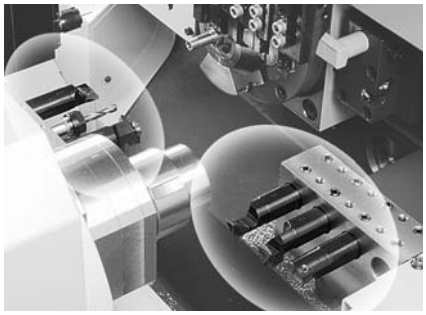
						
AABS-40F	SABS-40F	AABW-40F	SABW-40F	AABW-50F	SABW-50F	KTKF
Back Clamp Edge Width:2.8 ap:~4.0	Screw Clamp Edge Width:2.8 ap:~4.0	Back Clamp Edge Width:4.7 ap:~4.0	Screw Clamp Edge Width:4.7 ap:~4.0	Back Clamp Edge Width:4.7 ap:~5.0	Screw Clamp Edge Width:4.7 ap:~5.0	Screw Clamp Edge Width:1.5~3.8 ap:1.8~5.5
E8	E8	E9	E9	E10	E10	E6

External Sleeve Holders

More tools attachable to CNC Automatic lathe

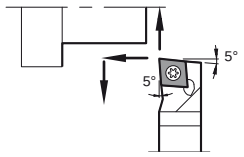
Limit to attachable tools at intricate part machining▶ ▶ ▶Use sleeve holders

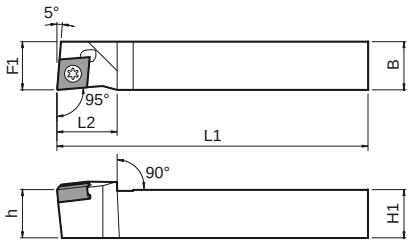
			
S...SCLC	S...SDUC	S...SDLC	S...SVUB(C)
Screw Clamp Shank Dia. ø12~ø25.4	Screw Clamp Shank Dia. ø14~ø25.4	Screw Clamp Shank Dia. ø12~ø25.4	Screw Clamp Shank Dia. ø12~ø25.4
E13	E18	E18	E27



See Page **R34~R40 for Tooling Layout and Automatic Lathe List by Manufacturer.**

SCLN (External / Facing)





Side Rake Angle: -6°
Angle of Inclination: -6°

• Right-hand shown

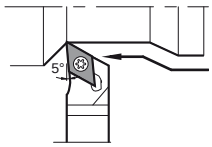
Toolholder Dimensions

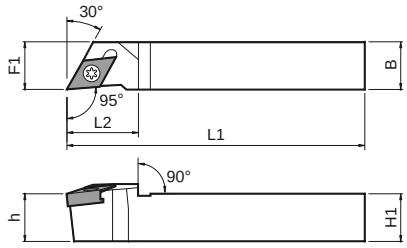
Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	F1				Clamp Screw	Wrench	
SCLNR	1010K-07FF	●	10	10	120	15	10			0.2	SB-3080TR	LTW-10SS	CNGU0703.. CNMU0703..
	1212F-07FF	●	12	12	85		12						
	1212K-07FF	●			120								
	1616K-07FF	●	16	16			16						

Applicable Inserts

Applications	Finishing-Medium	Medium-Roughing	Finishing	Low Feed
Ref. Page	B38	B38	B38	B38
Insert / Toolholder	SK	GK	FR-F	(F / E) R-U
SCLNR...-07FF	CNGU0703..	CNMU0703..	CNGU0703..	CNGU0703..

SDLN (External / Copying)





Side Rake Angle: -6°
Angle of Inclination: -7°

• Right-hand shown

Toolholder Dimensions

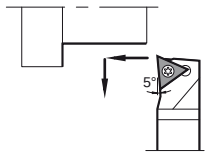
Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	F1				Clamp Screw	Wrench	
SDLNR	1010K-08FF	●	10	10	120	18	10			0.2	SB-3080TR	LTW-10SS	DNGU0803.. DNMU0803..
	1212F-08FF	●	12	12	85		12						
	1212K-08FF	●			120								
	1616K-08FF	●	16	16			16						

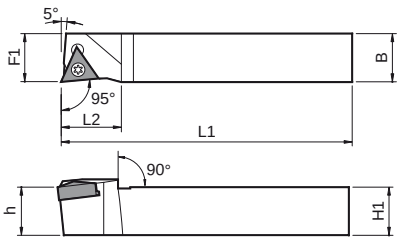
Applicable Inserts

Applications	Finishing-Medium	Medium-Roughing	Finishing	Low Feed
Ref. Page	B39	B39	B39	B39
Insert / Toolholder	SK	GK	FR-F	(F / E) R-U
SDLNR...-08FF	DNGU0803..	DNMU0803..	DNGU0803..	DNGU0803..

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

STLN (External / Up Facing)





Side Rake Angle: -6°
Angle of Inclination: -7°

• Right-hand shown

Toolholder Dimensions

Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts		Applicable Inserts
			H1=h	B	L1	L2	F1				Clamp Screw	Wrench	
STLNR	1010K-09FF	●	10	10	120	15	10			0.2	SB-2570TR	LTW-8SS	TNGU0903..
	1212F-09FF	●	12	12	85		12						
	1212K-09FF	●			120								
	1616K-09FF	●	16	16			16						

Applicable Inserts

Applications	Finishing	Low Feed
Ref. Page	B39	B39
Insert / Toolholder	FR-F 	(E / F) R-U 
STLNR...-09FF	TNGU0903..	TNGU0903..

Smaller double sided tooling for precision machining

TNGU09 Type



Small Negative Insert

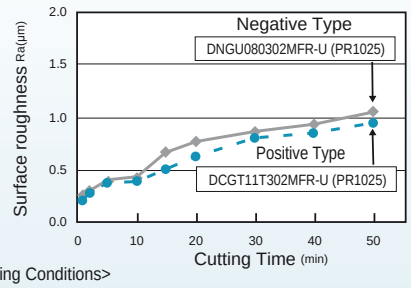
TNGG16 Type



Negative Insert

Double-sided design allows all edges to be used. Compared to the positive type, the double-sided design offers less cost per insert and more stability.

●Surface roughness comparison (Sharp edge)



<Cutting Conditions>
Workpiece Material : C45 Vc=100m/min, ap=1.5mm, f=0.03mm/rev, Wet

Internal evaluation

Recommended Cutting Conditions

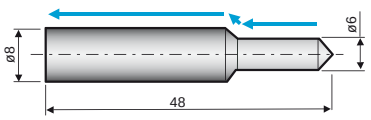
Workpiece Material	Material	
	PR1005	PR1025
Free-cutting steel	● Vc=100m/min (60~150)	
Carbon Steel Alloy Steel	◔ Vc=100m/min (60~150)	● Vc=100m/min (60~150)
Stainless Steel		● Vc=100m/min (60~150)

●Continuous to Light Interruption / 1st Choice
◔Continuous to Light Interruption / 2nd Choice

Case Studies

X10CrNiS18 9 (SUS303)

・Spool
<Dia 6mm portion>
・Vc=66m/min
・ap=1.25mm
・f=0.025mm/rev
・Wet
<Dia 8mm portion>
・Vc=130m/min
・ap=0.25mm
・f=0.025mm/rev
・Wet



Required Surface Roughness: 0.8μmRa

DNGU080302MF-SK (PR1025)	60,000 pcs/insert (4 corners)
Competitor D (DCGT type)	20,000 pcs/insert (2 corners)

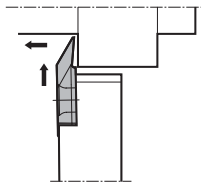
Competitor D (DCGT type) machined 10,000 pcs/edge. PR1025 machined 15,000 pcs/edge resulting in 3 times longer tool life per insert.

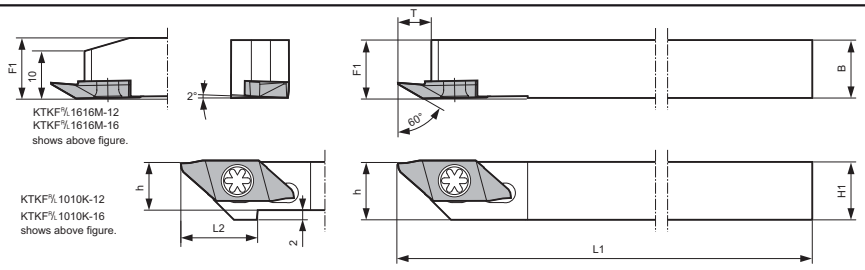
Evaluation by the user

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Back Turning (TKFB Insert)

KTKF





• Right-hand Shown

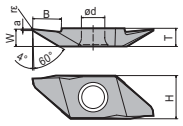
R-hand Insert for R-hand Toolholder.

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts		Applicable Inserts
									Clamp Screw	Wrench	
		R	H1=h	B	L1	L2	F1	T			
KTKFR	1010K-12	●	10	10	125	15	10	6	SB-4590TRWN	LTW-10S	TKFB12R …
	1212F-12	●	12	12	85	-	12				
	1212M-12	●			150						
	1616M-12	●	16	16			16				
KTKFR	1010K-16	●	10	10	125	20	10	8	SB-4590TRWN	LTW-10S	TKFB16R …
	1212F-16	●	12	12	85	-	12				
	1212M-16	●			150						
	1616M-16	●	16	16			16				

・ Dimension T shows the distance from the toolholder to the cutting edge.
Note1) When using back turning insert, only right hand toolholder (R) is applicable.

Applicable Inserts

Insert Right-hand Shown		Description		Dimension (mm)							Insert Grade		Applicable Toolholders
				W	a	B	rε	T	H	ød	PVD Coated Carbide	Carbide	
											PR1025	KW10	
		TKFB	12R15005M	1.5	0.25	2.6	<0.05	3	8.7	5.2	●	●	KTKFR…12
			12R28005M	2.8	0.3	4.6	<0.05				●	●	
			12R28010M				<0.1				●	●	
		TKFB	16R38005M	3.8	0.3	6.3	<0.05	4	9.5	5.2	●	●	KTKFR…16
			16R38010M				<0.1				●	●	

Inserts Identification System (See Table.1)

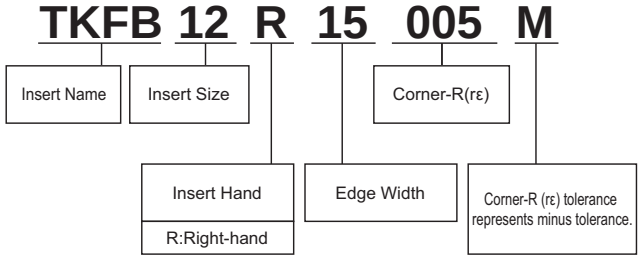
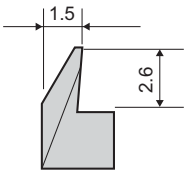
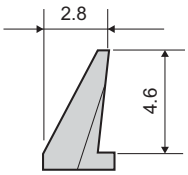
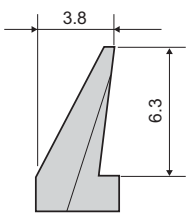


Table1

For small ap	For general cutting	For large ap
		
TKFB12R15..	TKFB12R28..	TKFB16R38..

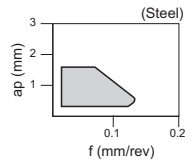
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

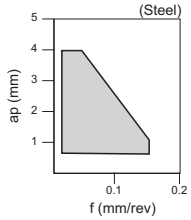
Workpiece Material		Recommended Insert Grade				Remarks
		PVD Coated Carbide		Carbide		
		PR1025		KW10		
		Grooving	Traversing	Grooving	Traversing	
Carbon Steel	Vc (m/min)	60 ~ 150		-		Coolant
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.15	-		
Alloy Steel	Vc (m/min)	60 ~ 150		-		
	f (mm/rev)	0.01 ~ 0.03	0.02 ~ 0.15	-		
Stainless Steel	Vc (m/min)	50 ~ 120		-		
	f (mm/rev)	0.01 ~ 0.02	0.02 ~ 0.1	-		
Cast Iron	Vc (m/min)	-		50 ~ 100		
	f (mm/rev)	-		0.01 ~ 0.02	0.02 ~ 0.15	
Non-ferrous Metals	Vc (m/min)	-		200 ~ 450		
	f (mm/rev)	-		0.01 ~ 0.03	0.02 ~ 0.15	
Brass	Vc (m/min)	-		100 ~ 200		
	f (mm/rev)	-		0.01 ~ 0.05	0.02 ~ 0.2	

Applicable Chipbreaker Range

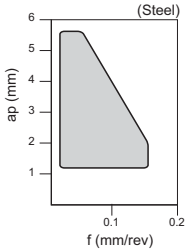
TKFB12R15..



TKFB12R28..



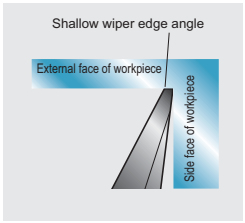
TKFB16R38..



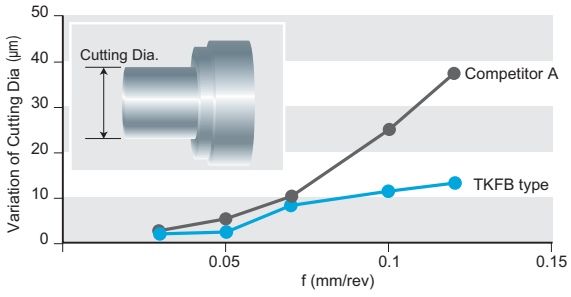
Advantages of TKFB type for Back Turning

1. Minimal deflection due to lower cutting force
2. Smooth chip control
3. Better surface finish by optimum wiper edge angle

TKFB edge shape

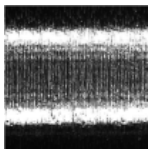
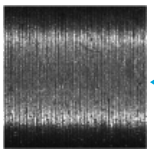
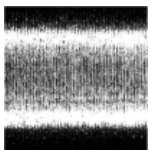
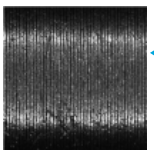


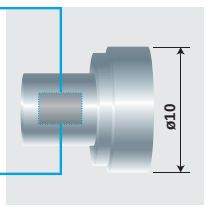
Variation of Cutting Dia (Transfer of Cutting Edge)



Cutting Conditions: Vc=80m/min ap=1mm f=0.03~0.12mm/rev WET C45

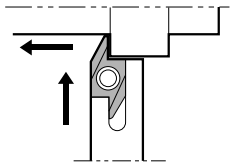
Comparison of surface finish

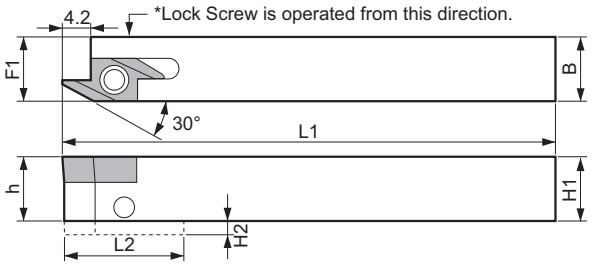
	TKFB type	Competitor **B**
Feed Rate (mm/rev) f=0.05	 Rz=3.3µm	 Rz=11.2µm
Feed Rate (mm/rev) f=0.07	 Rz=4.6µm	 Rz=14.2µm



Cutting Conditions: Vc=80m/min ap=1mm WET (oil-based) C45

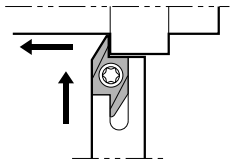
AABS-40F (Edge Width: 2.8mm, MAX Depth: 4mm)

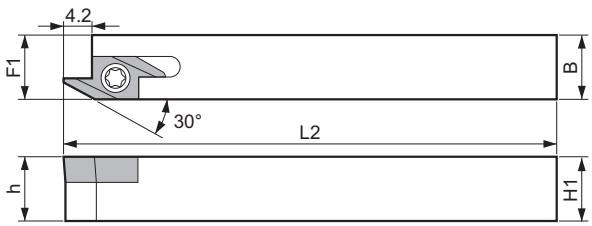




● Right-hand shown

SABS-40F (Edge Width: 2.8mm, MAX Depth: 4mm)



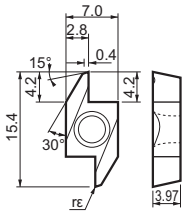


● Right-hand shown

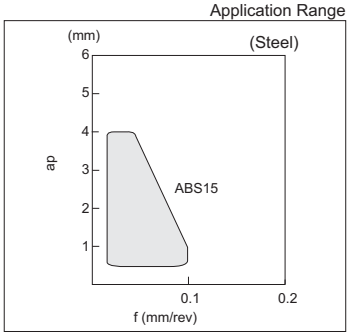
● Toolholder Dimensions

Description		Std.	Dimension (mm) H1=h	H2	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Clamp Screw	Wrench
AABSR	**0810K -40F**	●	8	2	10	125	18.5	10.2	0.15	LPA-11	HSB4X8R	-	FH-2
	1010K -40F	●	10	-	10	125	-	10.2					
	1212M -40F	●	12	-	12	150	-	12.2		LPA-13			
	1616M -40F	●	16	-	16	150	-	16.2		LPA-17			
SABSR	**0810K -40F**	●	8		10	125		10.2	0.15	-	-	SB-3080TR	FT-10
	1010K -40F	●	10		10	125		10.2					
	1212F -40F	●	12	-	12	85	-	12.2					
	1212M -40F	●	12		12	150		12.2					
	1616M -40F	●	16		16	150		16.2					
	2020K -40F	●	20		20	125		20.2					

● Applicable Inserts

Insert		Description	Corner-R (rε: mm)	Reference Page
		**ABS15R4005**	0.05	**B72**
		15R4015	0.15	
		ABS15R4005M	< 0.05	
		15R4015M	< 0.15	

Application Range



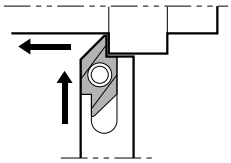
◆ Recommended Cutting Conditions

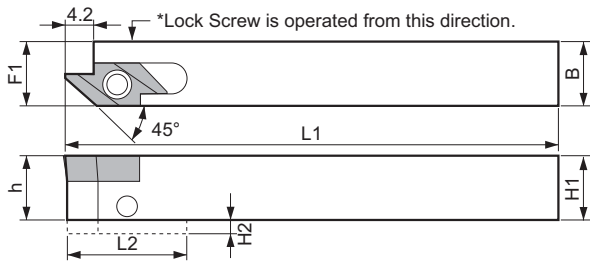
Workpiece Material		Grooving	Traversing
Carbon Steel Alloy Steel	Vc (m/min)	80~100	
	f (mm/rev)	0.02	0.02~0.07
Stainless Steel	Vc (m/min)	30~50	
	f (mm/rev)	0.02	0.02~0.05
Non-ferrous Metals	Vc (m/min)	150~200	
	f (mm/rev)	0.02	0.02~0.10

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Back Turning [ABW15 Insert]

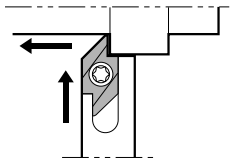
AABW-40F (Edge Width: 4.7mm, MAX Depth: 4mm)

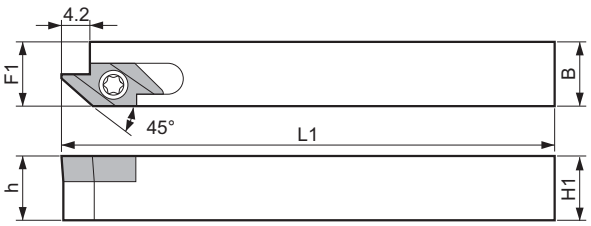




• Right-hand shown

SABW-40F (Edge Width: 4.7mm, MAX Depth: 4mm)





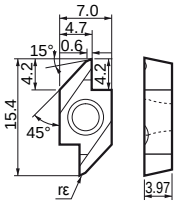
• Right-hand shown

Toolholder Dimensions

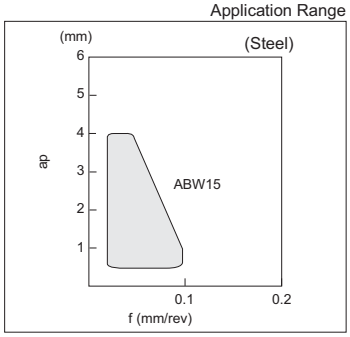
Description		Std.	Dimension (mm) H1=h	H2	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Clamp Screw	Wrench
AABWR	**0810K -40F**	●	8	2	10	125	18.5	10.2	0.15	LPA-11	HSB4X8R/L	-	FH-2
	1010K -40F	●	10	-	10	125	-	10.2		LPA-13			
	1212M -40F	●	12	-	12	150	-	12.2		LPA-17			
	1616M -40F	●	16	-	16	150	-	16.2					
SABWR	**0810K -40F**	●	8		10	125		10.2	0.15	-	-	SB-3080TR	FT-10
	1010K -40F	●	10		10	125		10.2					
	1212M -40F	●	12	-	12	150	-	12.2					
	1616M -40F	●	16		16	150		16.2					
	2020K -40F	●	20		20	125		20.2					

• Lock Screw: HSB4x8R for R-hand Toolholder, HSB4x8L for L-hand Toolholder.

Applicable Inserts

Insert		Description	Corner-R (rε: mm)	Reference Page
		**ABW15R4005**	0.05	**B72**
		15R4015	0.15	
		ABW15R4005M	< 0.05	
		15R4015M	< 0.15	

Application Range



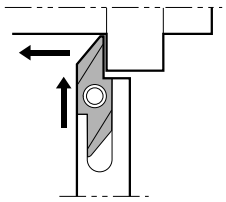
Recommended Cutting Conditions

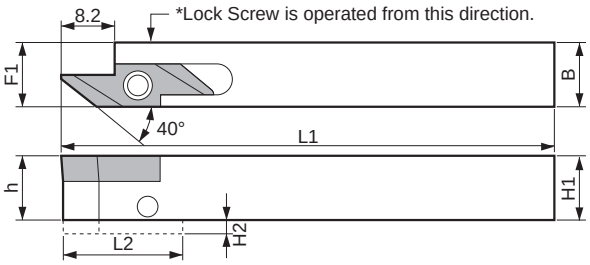
Workpiece Material		Grooving	Traversing
Carbon Steel Alloy Steel	Vc (m/min)	80~100	
	f (mm/rev)	0.02	0.02~0.07
Stainless Steel	Vc (m/min)	30~50	
	f (mm/rev)	0.02	0.02~0.05
Non-ferrous Metals	Vc (m/min)	150~200	
	f (mm/rev)	0.02	0.02~0.10

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholders for Back Turning [ABW23 Insert]

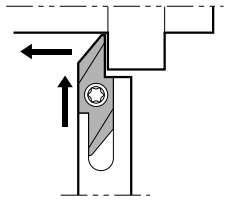
AABW-50F (Edge Width: 4.7mm, MAX Depth: 5mm)

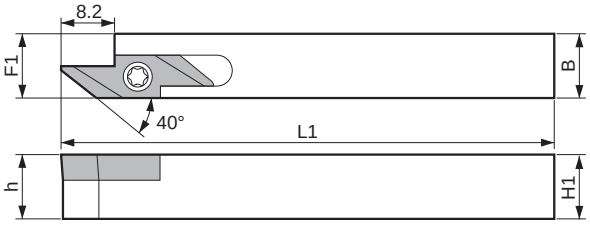




● Right-hand shown

SABW-50F (Edge Width: 4.7mm, MAX Depth: 5mm)



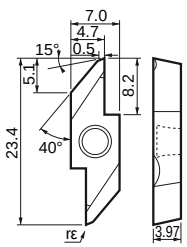


● Right-hand shown

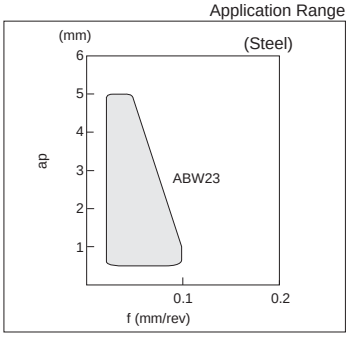
● Toolholder Dimensions

Description		Std.	Dimension (mm) H1=h	H2	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Clamp Screw	Wrench
AABWR	**0810K -50F**	●	8	2	10	125	18.5	10.2	0.15	LPA-11	HSB4X8R	-	FH-2
	1010K -50F	●	10	-	10	125	-	10.2					
	1212M -50F	●	12	-	12	150	-	12.2		LPA-13			
	1616M -50F	●	16	-	16	150	-	16.2		LPA-17			
SABWR	**0810K -50F**	●	8		10	125		10.2	0.15	-	-	SB-3080TR	FT-10
	1010K -50F	●	10		10	125		10.2					
	1212M -50F	●	12	-	12	150	-	12.2					
	1616M -50F	●	16		16	150		16.2					
	2020K -50F	●	20		20	125		20.2					

● Applicable Inserts

Insert		Description	Corner-R (rε: mm)	Reference Page
		**ABW23R5005** **23R5015**	0.05 0.15	**B72**
		ABW23R5005M **23R5015M**	<0.05 <0.15	

Application Range



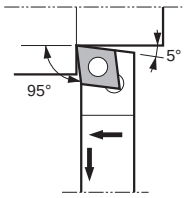
◆ Recommended Cutting Conditions

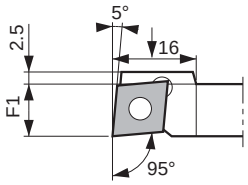
Workpiece Material		Grooving	Traversing
Carbon Steel Alloy Steel	Vc (m/min)	80~100	
	f (mm/rev)	0.02	0.02~0.07
Stainless Steel	Vc (m/min)	30~50	
	f (mm/rev)	0.02	0.02~0.05
Non-ferrous Metals	Vc (m/min)	150~200	
	f (mm/rev)	0.02	0.02~0.10

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Toolholders [CC □□ Insert]

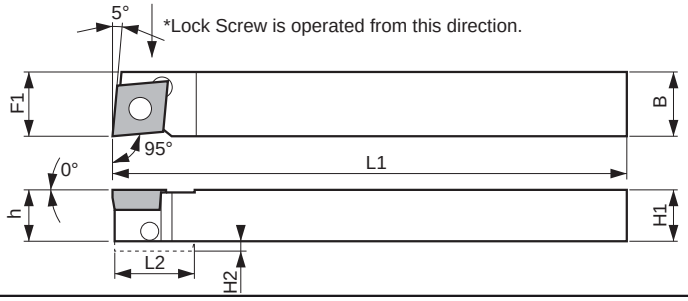
ACLC-F (External / Facing)





ACLC$^{R}_{L}$1010K-09F shows above figure.

• Right-hand shown

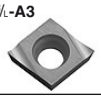


Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Wrench		
																
ACLC$^{R}_{L}$	0810K -06F	●	●	8	2	10	125	19	10.5		0.2	LPF-11	HSB4X8$^{R}_{L}$	FH-2		
	1010K -06F	●	●	10	-			-								
	1010K -09F	●	●	10	2	10	125	16	10.0		0.2	LPF-13				
	1212M -09F	●	●	12	-	12	150	-	12.5							
	1616M -09F	●	●	16	-	16	150	-	16.5			LPF-17				

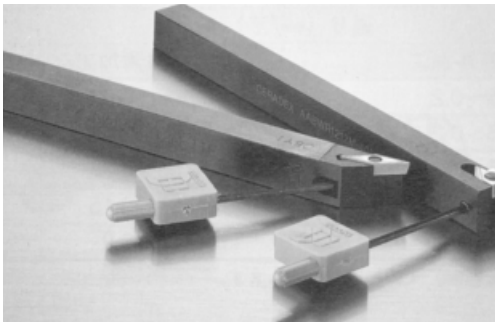
・Lock Screw : HSB4×8R for Right-hand Toolholder, and HSB4×8L for Left-hand Toolholder.

Applicable Inserts

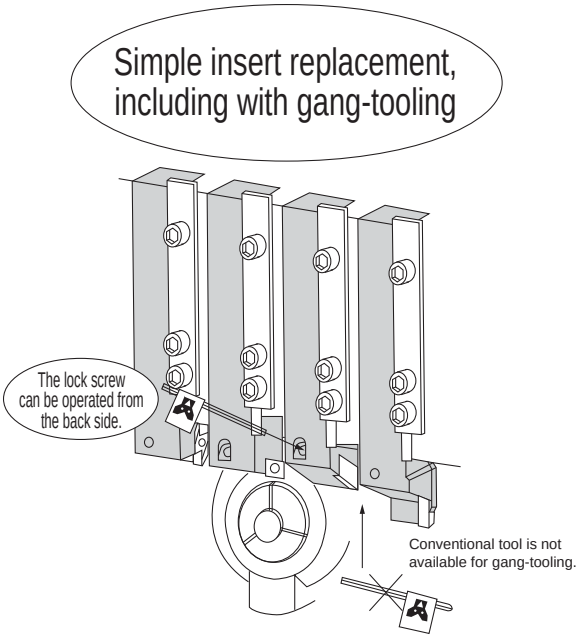
Applications	Finishing	Finishing-Medium	Finishing-Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B45	B45	B45	B48	B46	B47	B46	B46	C18	C10
Insert / Toolholder	GF	GK	GQ	(E / F) $^{R}_{L}$-U	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
										
ACLC$^{R}_{L}$...-06F	CCGT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
ACLC$^{R}_{L}$...-09F	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

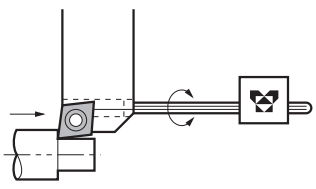
For recommended cutting conditions, see page E30~E31

Back Clamp Holders

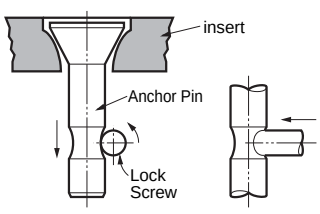


1. The lock screw can be operated from the back side and allows simple insert replacement on Swiss type automatic lathes. (Fig.1)
2. Simple insert replacement by slightly turning the wrench.
3. Rigid clamping with anchor pin and lock screw. (Fig.2)





(Fig.1)

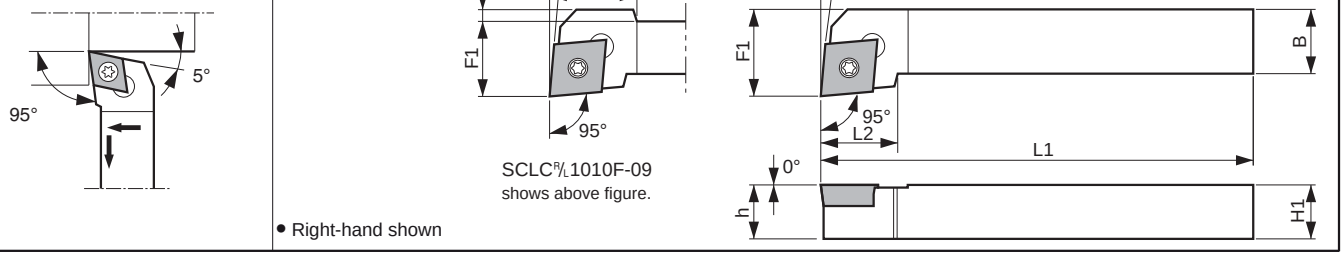


(Fig.2)

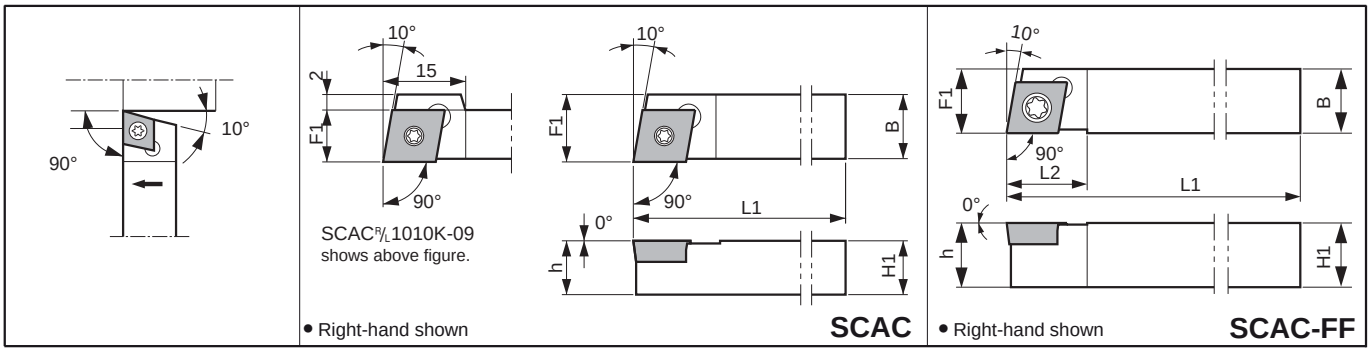
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Toolholders [CC □□ Insert]

SCLC (External / Facing)



SCAC (External) / SCAC-FF (Without Offset) (External)



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Wrench	Wrench		
SCLCR/L	0808E -06	●	●	8	8	70	9	10			0.2	SB-2570TR	FT-8	-		
	1010F -06	●	●	10	10	80		12								
	1010F -09	●	●	10	10	80	14	14			0.2	SB-4085TR	FT-15	-		
	1212H -09	●	●	12	12	100	14	16								
	1616H -09	●	●	16	16	100	15	20								
	2020K -09	●	●	20	20	125	20	25								
	2525M -09	●	●	25	25	150	22	32								
	1616H -12	●	●	16	16	100	20	20			0.4	SB-5090TR	-	LTW-20		
	2020K -12	●	●	20	20	125	22	25								
	2525M -12	●	●	25	25	150	22	32								
SCACR/L	0808K -06	●	●	8	8	125	-	8.5			0.2	SB-2570TR	FT-8	-		
	1010K -06	●	●	10	10	125		10.5								
	1010K -09	●	●	10	10	125		10.5			0.2	SB-4085TR	FT-15	-		
	1212M -09	●	●	12	12	150	-	12.5								
	1616M -09	●	●	16	16	150		16.5								
SCACR/L	1212F -09FF	●		12	12	85	15	12			0.2	SB-4085TR	FT-15	-		

Applicable Inserts

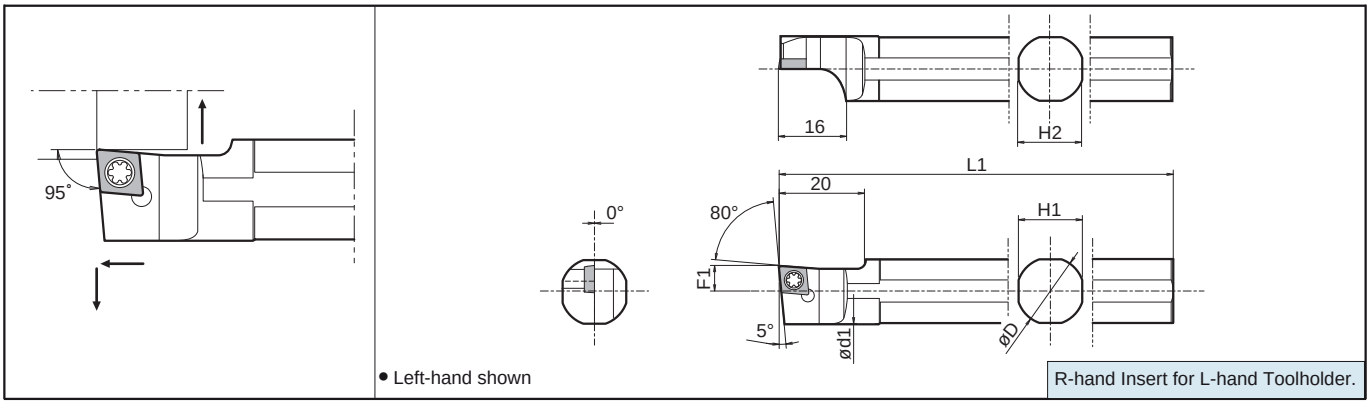
Applications	Finishing	Finishing-Medium	Finishing-Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B45	B45	B45	B48	B46	B47	B46	B46	C18	C10
Insert / Toolholder	GF	GK	GQ	(E/F) R/L-U	MQ	Without Chipbreaker	AH	R/L-A3	PCD	CBN
SCLCR/L...-06	CCGT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
SCLCR/L...-09	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..
SCLCR/L...-12	-	CCMT1204..	-	-	-	-	-	CCGT1204..	CCMT1204..	-
SCACR/L...-06	CCGT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
SCACR/L...-09 ...-09FF	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

For recommended cutting conditions, see page ➡ E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Sleeve Holders [CC □□ Insert]

S...SCLC (External / Facing)



● Left-hand shown

R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
		øD	L1	F1	ød1	H1=H2				Clamp Screw	Wrench			
S12F -SCLCL06	●	12.0	80	6	13.4	11			0.4	SB-2560TR	FT-8			
S14H -SCLCL06	●	14.0	100			13								
S15F -SCLCL06	●	15.875	85		15.4	15				SB-2570TR				
S16F -SCLCL06	●	16.0												
S19G -SCLCL06	●	19.05	90		18.4	17								
S19K -SCLCL06	●		120											
S20G -SCLCL06	●	20.0	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	●	20.0	90		19.4	18								
S20K -SCLCL09	●		120											
S25.0H-SCLCL09	●	25.0	100		24.4	23								
S25K -SCLCL09	●	25.4	120		24.8									

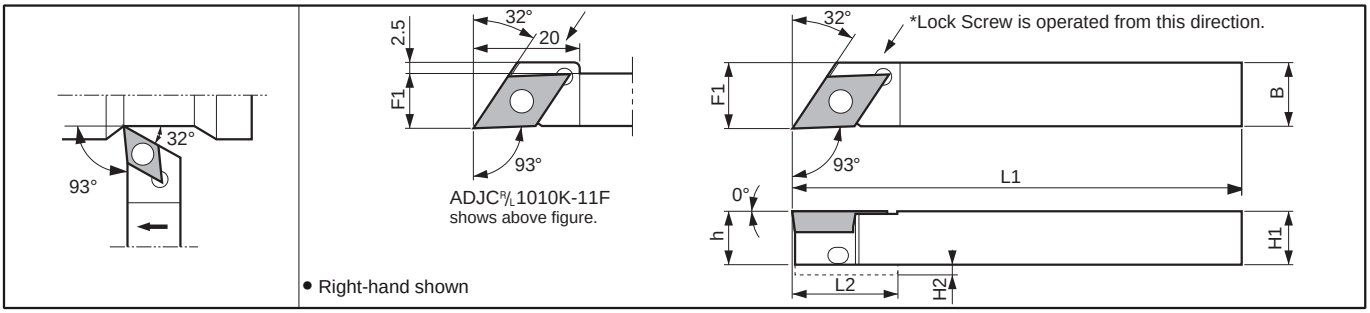
Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing-Medium	Low Feed	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	**B45**	**B45**	**B45**	**B48**	**B46**	**B47**	**B46**	**B46**	**C18**	**C10**
Toolholder \ Insert	**GF**	**GK**	**GQ**	**(E / F) R-U**	**MQ**	Without Chipbreaker	**AH**	**R-A3**	**PCD**	**CBN**
S...SCLCL06	CCGT0602..	CCMT0602..	CCGT0602..	CCGT0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
S...SCLCL09	CCGT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

For recommended cutting conditions, see page **E30~E31**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

ADJC-F (External / Copying)



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	B	L1	L2	F1		Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Wrench		
ADJCR/L	0810K -07F	●	●	8	2	10	125	19	10.5		0.2	LPF-11	HSB4X8R/L	FH-2		
	1010K -07F	●	●	10	-	10	125	-	10.5							
	1010K -11F	●	●	10	2	10	125	20	10.5		0.2	LPF-13				
	1212M -11F	●	●	12	-	12	150	-	12.5							
	1616M -11F	●	●	16	-	16	150	-	16.5			LPF-17				

・Lock Screw : HSB4×8R for Right-hand Toolholder, and HSB4×8L for Left-hand Toolholder.

Applicable Inserts

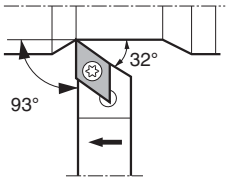
Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing	Finishing / Precision	Low Feed	Finishing / Precision
Ref. Page	B50	B50	B51	B51	B52	B51	B53	B53	B54	B54
Insert / Toolholder	CF	GF	GK	GQ	FN-Z	Standard	R/L-F	R/L-FSF	(E / F) R/L-U	FR/L-USF
ADJCR/L...-07F	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
ADJCR/L...-11F	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

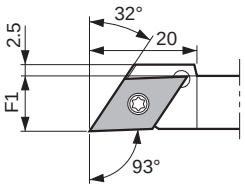
Applications	Low Feed	Low Feed / Precision	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B55	B55	B52	B52	B52	B55	B55	B55	C19	C11
Insert / Toolholder	(E / F) R/L-J	FR/L-JSF	XP	XQ	MQ	Without Chipbreaker	AH	R/L-A3	PCD	CBN
ADJCR/L...-07F	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
ADJCR/L...-11F	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

For recommended cutting conditions, see page E30~E31

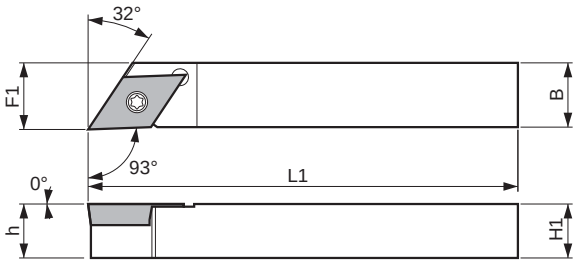
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SDJC-F (External / Copying)



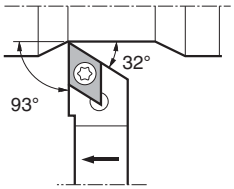


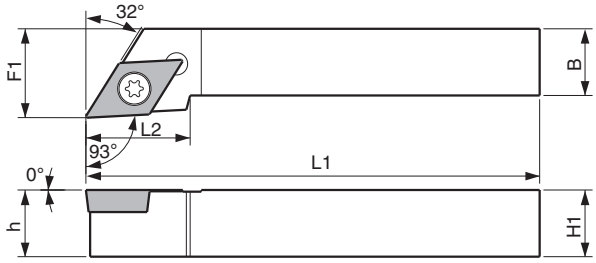
SDJC$^{R}_{L}$1010F-11F shows above figure.



● Right-hand shown

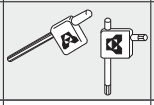
SDJC (External / Copying)





● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench			
																
SDJC$^{R}_{L}$	0808F -07F	●	●	8	8	80	-	8.5			0.2	SB-2570TR	FT-8			
	1010F -07F	●	●	10	10			10.5								
	1010F -11F	●	●	10	10	80		10.0								
	1212H -11F	●	●	12	12	100	-	12.5			0.2	SB-4085TR	FT-15			
	1616H -11F	●	●	16	16	100		16.5								
SDJC$^{R}_{L}$	1010F -07	●	●	10	10	80	12	12			0.2	SB-2570TR	FT-8			
	1010F -11	●	●	10	10	80		12								
	1212H -11	●	●	12	12	100		16								
	1616H -11	●	●	16	16	100	18	20			0.2	SB-4085TR	FT-15			
	2020K -11	●	●	20	20	125		25								
	2525M -11	●	●	25	25	150		32								

Applicable Inserts

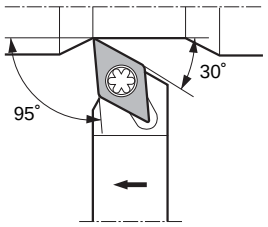
Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing	Finishing / Precision	Low Feed	Finishing / Precision
Ref. Page	B50	B50	B51	B51	B52	B51	B53	B53	B54	B54
Insert / Toolholder	CF	GF	GK	GQ	FN-Z	Standard	$^{R}_{L}$-F	$^{R}_{L}$-FSF	(E / F) $^{R}_{L}$-U	F$^{R}_{L}$-USF
SDJC$^{R}_{L}$...-07F	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
SDJC$^{R}_{L}$...-11F	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..
SDJC$^{R}_{L}$...-07	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
SDJC$^{R}_{L}$...-11	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

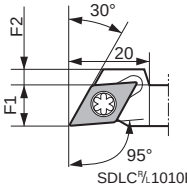
Applications	Low Feed	Low Feed / Precision	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B55	B55	B52	B52	B52	B55	B55	B55	C19	C11
Insert / Toolholder	(E / F) $^{R}_{L}$-J	F$^{R}_{L}$-JSF	XP	XQ	MQ	Without Chipbreaker	AH	$^{R}_{L}$-A3	PCD	CBN
SDJC$^{R}_{L}$...-07F	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDJC$^{R}_{L}$...-11F	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
SDJC$^{R}_{L}$...-07	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDJC$^{R}_{L}$...-11	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

For recommended cutting conditions, see page E30~E31

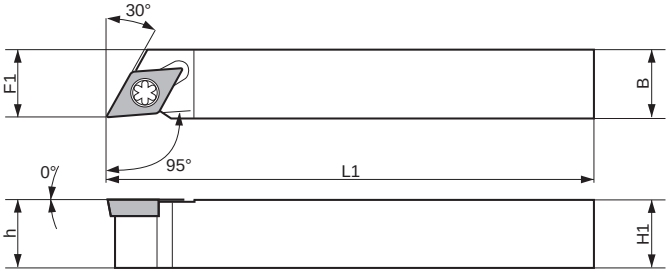
SDLC-FF / SDLP-FF (Without Offset) (External / Copying)



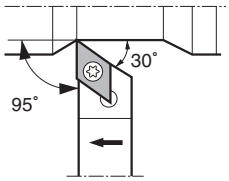


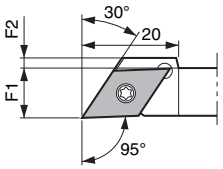
SDLC$^{R/L}$1010F-11FF
SDLC$^{R/L}$1212○-11FF
SDLP$^{R/L}$1212F-11FF
shows above figure.

● Right-hand shown



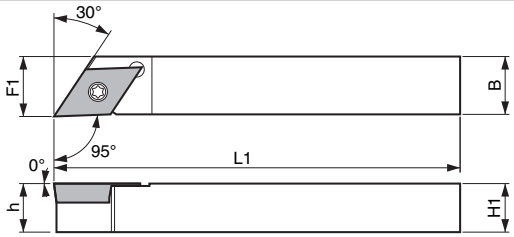
SDLP-F (External / Copying)



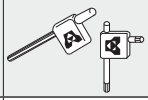


SDLP$^{R/L}$1010F-11F
shows above figure.

● Right-hand shown



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	F1	F2			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench			
																
SDLC$^{R/L}$	1010F -07FF	●	●	10	10	80	10									
	1212F -07FF	●		12	12	85	12	-			0.1	SB-2570TR	FT-8			
	1212H -07FF	●	●	12	12	100	12									
	1616H -07FF	●	●	16	16	100	16									
SDLC$^{R/L}$	1010F -11FF	●	●	10	10	80	10	4								
	1212F -11FF	●		12	12	85	12	2			0.1	SB-4085TR	FT-15			
	1212H -11FF	●	●	12	12	100	12	2								
	1616H -11FF	●	●	16	16	100	16	-								
SDLP$^{R/L}$	1212F -11FF	●		12	12	85	12	2			0.2	SB-4085TR	FT-15			
SDLP$^{R/L}$	0808F -07F	●	●	8	8	80	8.5	-			0.2	SB-2570TR	FT-8			
	1010F -07F	●	●	10	10	80	10.5									
	1010F -11F	●	●	10	10	80	10.5	2								
	1212H -11F	●	●	12	12	100	12.5	-			0.2	SB-4085TR	FT-15			
	1616H -11F	●	●	16	16	100	16.5	-								

Applicable Inserts (SDLC-FF)

Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing	Finishing / Precision	Low Feed	Finishing / Precision
Ref. Page	B50	B50	B51	B51	B52	B51	B53	B53	B54	B54
Insert / Toolholder	CF	GF	GK	GQ	FN-Z	Standard	$^{R/L}$-F	$^{R/L}$-FSF	(E / F) $^{R/L}$-U	F$^{R/L}$-USF
SDLC$^{R/L}$...-07FF	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
SDLC$^{R/L}$...-11FF	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

Applications	Low Feed	Low Feed / Precision	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B55	B55	B52	B52	B52	B55	B55	B55	C19	C11
Insert / Toolholder	(E / F) $^{R/L}$-J	F$^{R/L}$-JSF	XP	XQ	MQ	Without Chipbreaker	AH	$^{R/L}$-A3	PCD	CBN
SDLC$^{R/L}$...-07FF	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDLC$^{R/L}$...-11FF	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

Applicable Inserts (SDLP-F) (SDLP-FF)

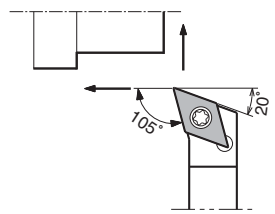
Applications	Finishing / Precision	Low Feed / Precision
Ref. Page	B56	B56
Insert / Toolholder	$^{R/L}$-FSF	F$^{R/L}$-USF
SDLP$^{R/L}$...-07F	DPET0702..	DPET0702..
SDLP$^{R/L}$...-11F/-11FF	DPET11T3..	DPET11T3..

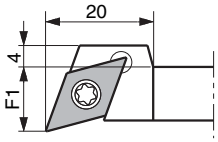
For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Toolholders [DC □□ Insert]

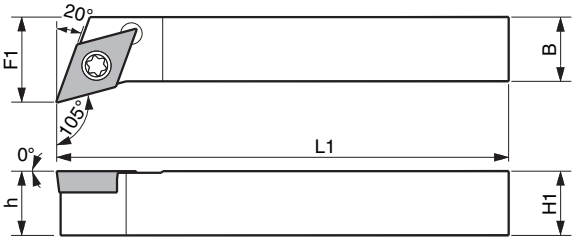
SDXC (External / Face Grooving / Copying)





SDXC$^{R/L}$1010F-11
shows above figure.

• Right-hand shown



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	F1				Standard Corner-R(ε)	Spare Parts: Clamp Screw	Spare Parts: Wrench			
SDXC$^{R/L}$	1010F -07	●	●	10	10	80	12				0.2	SB-2570TR	FT-8			
	1010F -11	●	●	10	10	80	12				0.2	SB-4085TR	FT-15			
	1212H -11	●	●	12	12	100	16									
	1616H -11	●	●	16	16	100	20									

Applicable Inserts

Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing	Finishing / Precision	Low Feed	Finishing / Precision
Ref. Page	B50	B50	B51	B51	B52	B51	B53	B53	B54	B54
Insert / Toolholder	CF	GF	GK	GQ	FN-Z	Standard	$^{R/L}$-F	$^{R/L}$-FSF	(E / F) $^{R/L}$-U	F$^{R/L}$-USF
SDXC$^{R/L}$...-07	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
SDXC$^{R/L}$...-11	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

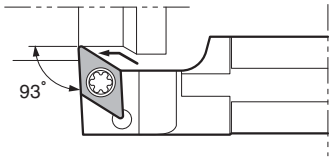
Applications	Low Feed	Low Feed / Precision	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B55	B55	B52	B52	B52	B55	B55	B55	C19	C11
Insert / Toolholder	(E / F) $^{R/L}$-J	F$^{R/L}$-JSF	XP	XQ	MQ	Without Chipbreaker	AH	$^{R/L}$-A3	PCD	CBN
SDXC$^{R/L}$...-07	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDXC$^{R/L}$...-11	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

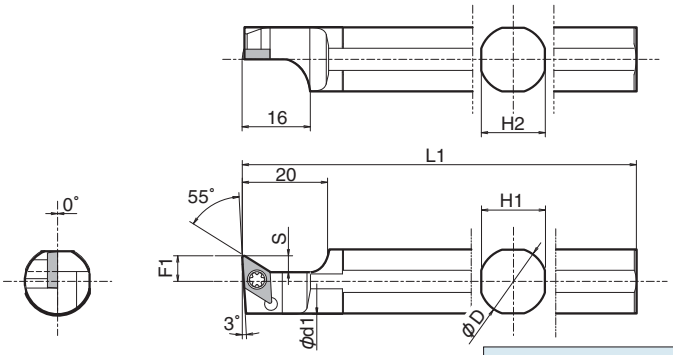
For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Sleeve Holders [DC □□ Insert]

S...SDUC (External / Copying)

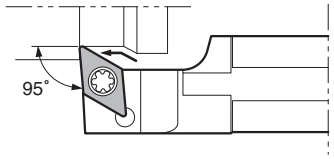


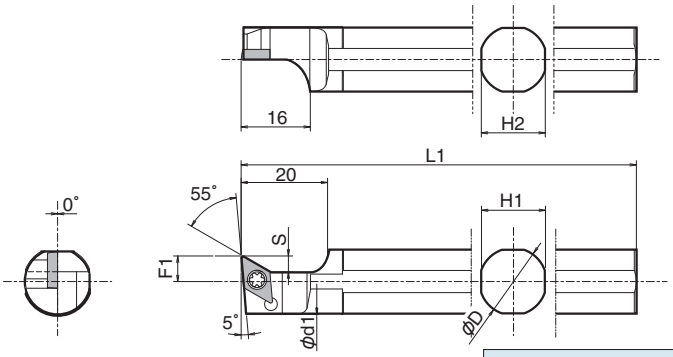


● Left-hand Shown

R-hand Insert for L-hand Toolholder.

S...SDLC (External / Copying)

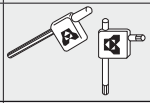




● Left-hand Shown

R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	Std.	Dimension (mm)						Standard Corner-R(rε)	Spare Parts				
									Clamp Screw	Wrench			
		øD	L1	F1	ød1	H1=H2	S						
S14H -SDUCL07	●	14.0	100	6	13.4	13	3.8	0.4	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	●	20.0	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	●	20.0	90		19.4	18							
S20K -SDUCL11	●		120										
S22K -SDUCL11	●	22.0	120		21.4	20							
S25.0H-SDUCL11	●	25.0	100		24.4	23							
S25K -SDUCL11	●	25.4	120		24.8								
S12F -SDLCL07	●	12.0	80	6	13.4	11	3.8	0.4	SB-2560TR	FT-8			
S14H -SDLCL07	●	14.0	100			13							
S15F -SDLCL07	●	15.875	85		15.4	15							
S16F -SDLCL07	●	16.0											
S19G -SDLCL07	●	19.05	90		18.4	17							
S19K -SDLCL07	●		120										
S20G -SDLCL07	●	20.0	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	●	20.0	90		19.4	18							
S20K -SDLCL11	●		120										
S22K -SDLCL11	●	22.0	120		21.4	20							
S25.0H-SDLCL11	●	25.0	100		24.4	23							
S25K -SDLCL11	●	25.4	120		24.8								

Applicable Inserts

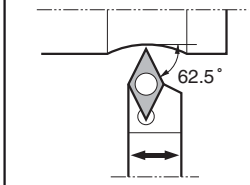
Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing	Finishing / Precision	Low Feed	Finishing / Precision
Ref. Page	**B50**	**B50**	**B51**	**B51**	**B52**	**B51**	**B53**	**B53**	**B54**	**B54**
Insert / Toolholder	**CF**	**GF**	**GK**	**GQ**	**FN-Z**	**Standard**	**R-F**	**R-FSF**	**(E / F) R-U**	**FR-USF**
S...SDUCL07	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
S...SDUCL11	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..
S...SDLCL07	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
S...SDLCL11	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

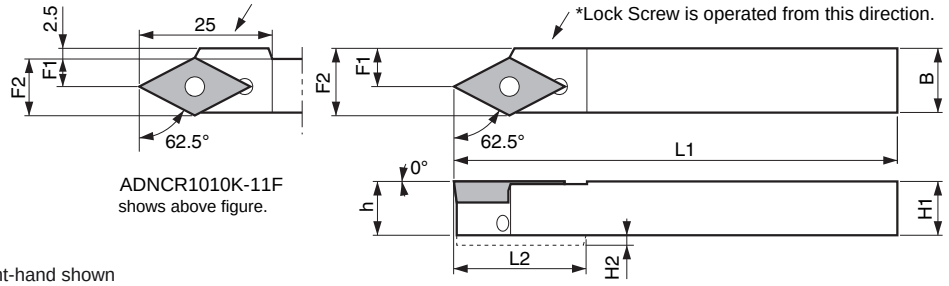
Applications	Low Feed	Low Feed / Precision	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	**B55**	**B55**	**B52**	**B52**	**B52**	**B55**	**B55**	**B55**	**C19**	**C11**
Insert / Toolholder	**(E / F) R-J**	**FR-JSF**	**XP**	**XQ**	**MQ**	Without Chipbreaker	**AH**	**R-A3**	**PCD**	**CBN**
S...SDUCL07	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
S...SDUCL11	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
S...SDLCL07	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
S...SDLCL11	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

For recommended cutting conditions, see page **E30~E31**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

ADNC-F (External / Copying)





• Right-hand shown

Toolholder Dimensions

Description		Std.	Dimension (mm)							Standard Corner-R(rε)	Spare Parts				
			H1=h	H2	B	L1	L2	F1	F2		Anchor Pin	Lock Screw	Wrench		
															
ADNCR	**0810K -07F**	●	8	2	10	125	19	7.0	10.5	0.2	LPF-11	HSB4X8R	FH-2		
	1010K -07F	●	10	-			-								
	1010K -11F	●	10	2	10	125	25	4.5	10.5	0.2	LPF-13				
	1212M -11F	●	12	-	12	150	-	7	12.5						
	1616M -11F	●	16	-	16	150	-	11	16.5		LPF-17				

Applicable Inserts

Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing	Finishing / Precision	Low Feed	Finishing / Precision
Ref. Page	**B50**	**B50**	**B51**	**B51**	**B52**	**B51**	**B53**	**B53**	**B54**	**B54**
Insert / Toolholder	**CF**	**GF**	**GK**	**GQ**	**FN-Z**	**Standard**	**F-**	**FSF**	**(E / F) U**	**F USF**
ADNCR...-07F	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
ADNCR...-11F	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

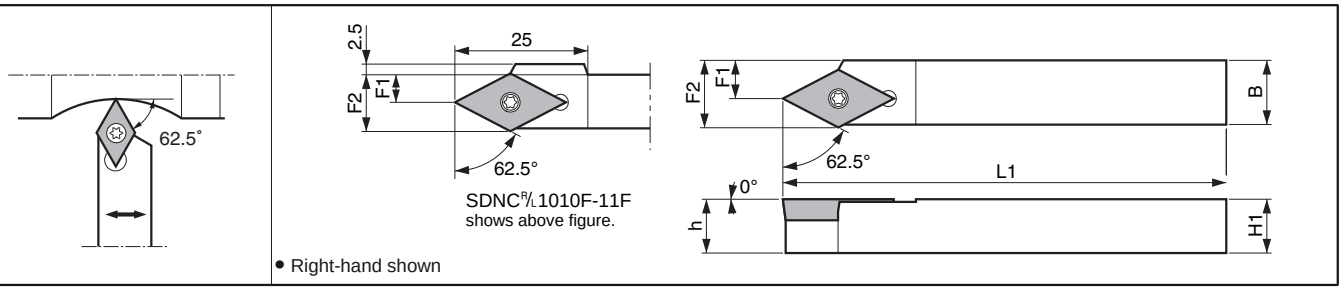
Applications	Low Feed	Low Feed / Precision	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	**B55**	**B55**	**B52**	**B52**	**B52**	**B55**	**B55**	**B55**	**C19**	**C11**
Insert / Toolholder	**(E / F) -J**	**F -JSF**	**XP**	**XQ**	**MQ**	Without Chipbreaker	**AH**	**-A3**	**PCD**	**CBN**
ADNCR...-07F	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
ADNCR...-11F	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

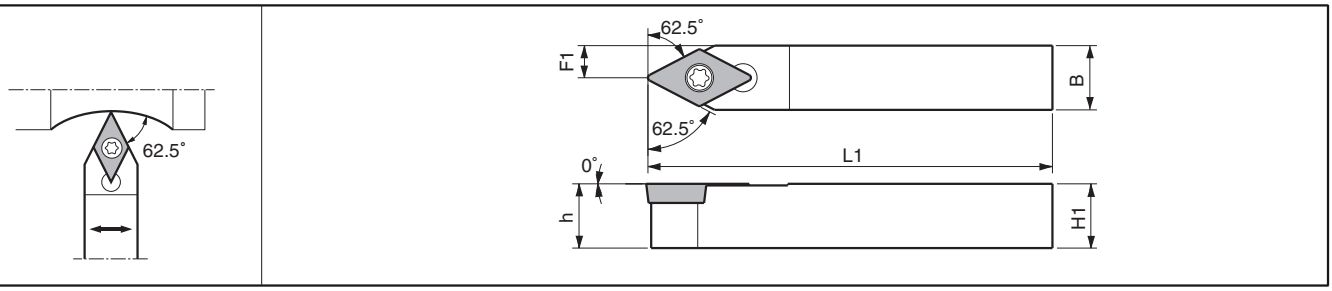
External Toolholders [DC □□ Insert]

SDNC-F (External / Copying)



• Right-hand shown

SDNC (External / Copying)



Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	F1	F2			Standard Corner-R(re)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SDNCR/L	0808F -07F	●		●	8	8	80	5	8.5			0.2	SB-2570TR	FT-8
	1010F -07F	●		●	10	10	80	7	10.5					
	1010F -11F	●		●	10	10	80	4.5	10.5			0.2	SB-4085TR	FT-15
	1212H -11F	●		●	12	12	100	7	12.5					
	1616H -11F	●		●	16	16	100	11	16.5					
SDNCN	0808E -07		●		8	8	70	4				0.2	SB-2570TR	FT-8
	1010F -07		●		10	10	80	5	-					
	1212H -07		●		12	12	100	6						
	1010F -11		●		10	10	80	5				0.2	SB-4085TR	FT-15
	1212H -11		●		12	12	100	6	-					
	1616H -11		●		16	16	100	8						

Applicable Inserts

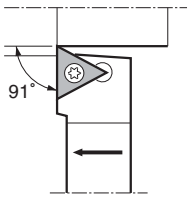
Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. Page	B50	B50	B51	B51	B52	B51	B53	B53	B54	B54
Insert / Toolholder	CF	GF	GK	GQ	FN-Z	Standard	R/L-F	R/L-FSF	(E / F) R/L-U	FR/L-USF
SDNCR/L...-07F	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
SDNCR/L...-11F	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..
SDNCN...-07	DCGT0702..	DCGT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
SDNCN...-11	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCGT11T3..	DCGT11T3.. DCMT11T3	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

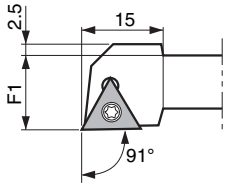
Applications	Low Feed	Low Feed / Precision	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B55	B55	B52	B52	B52	B55	B55	B55	C19	C11
Insert / Toolholder	(E / F) R/L-J	FR/L-JSF	XP	XQ	MQ	Without Chipbreaker	AH	R/L-A3	PCD	CBN
SDNCR/L...-07F	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDNCR/L...-11F	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
SDNCN...-07	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
SDNCN...-11	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

For recommended cutting conditions, see page E30~E31

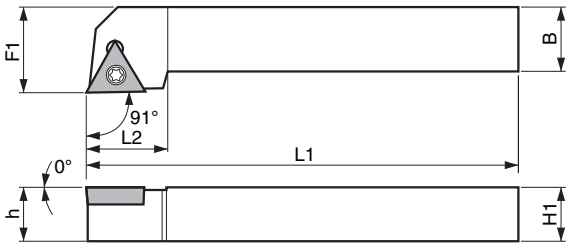
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

STGC(P) (External)





STGC(P)R/L1010F-11
shows above figure.



• Right-hand Shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench			
STGCR/L	0808E -08	●	●	8	8	70	12	10			0.2	SB-2050TR	FT-6			
	1010F -08	●	●	10	10	80		12								
	1010F -11	●	●	10	10	80	15	14			0.4	SB-2570TR	FT-8			
	1212H -11	●	●	12	12	100	15	16								
	1616H -11	●	●	16	16	100	15	20								
	2020K -11	●	●	20	20	125	15	25								
	2525M -11	●	●	25	25	150	20	32								
STGPR/L	0808E -08	●	●	8	8	70	12	10			0.2	SB-2050TR	FT-6			
	1010F -08	●	●	10	10	80		12								
	1010F -11	●	●	10	10	80		14			0.2	SB-3080TR	FT-10			
	1212H -11	●	●	12	12	100	15	16								
	1616H -11	●	●	16	16	100		20								

Applicable Inserts (STGC)

Applications	Low Feed	Low Feed / Precision	Cast Iron	Non-ferrous Metals	Non-ferrous Metals					
Ref. Page	B60	B60	B60	B60	C19,C20					
Insert / Toolholder	(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)

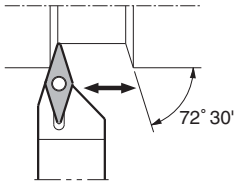
Applications	Minute ap	Finishing-Medium	Finishing	Finishing / Precision	Low Feed / Precision	Medium cutting	Low Carbon Steel Finishing	Low Carbon Steel Finishing-Medium	Cast Iron	Non-ferrous Metals
Ref. Page	B61	B61	B62	B63	B63	B62	B61	B61	B63	C20,C21
Insert / Toolholder	CF	HQ	R/L	R/L-FSF	FR/L-USF	R/L-H	XP	XQ	Without Chipbreaker	PCD
STGPR/L...-08	TPGT0802..	-	TPGH0802..	TPET0802..	TPET0802..	-	-	-	TPGB0802..	TPMH0802.. TPGB0802..
STGPR/L...-11	-	TPMT1103..	TPGH1103..	TPET1103..	TPET1103..	TPGH1103..	TPMT1103..	TPMT1103..	TPGB1103..	TPMH1103.. TPGB1103..

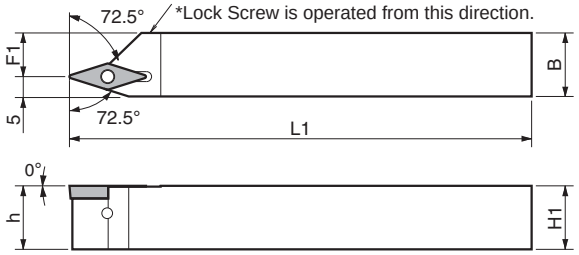
Applications	Hard Materials
Ref. Page	C12
Insert / Toolholder	CBN
STGPR/L...-08	TPGB0802..
STGPR/L...-11	TPGB1103..

For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

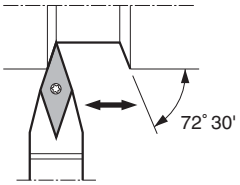
AVVB-F (External / Copying)

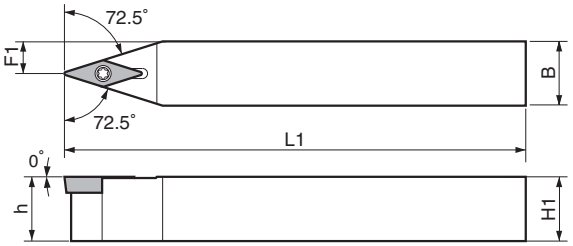




• Right-hand Shown

SVVB (External / Copying)





Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	B	L1	F1	Standard Corner-R(ε)	Spare Parts: Anchor Pin	Lock Screw	Clamp Screw	Wrench	Shim	Shim Screw	Wrench
AVVB R/L	1010K-11F	●		●	10	10	125	5	0.4	LPF-11	HSB4X8 R/L	-	FH-2	-	-	-
	1212M-11F	●		●	12	12	150	7		LPF-1113						
	1616M-11F	●		●	16	16	150	11		LPF-1117						
SVVBN	1010F-11		●		10	10	80	5	0.4	-	-	SB-2570TR	FT-8	-	-	-
	1212H-11		●		12	12	100	6								
	1616H-11		●		16	16	100	8								
	2020K-11		●		20	20	125	10								
	2525M-11		●		25	25	150	12.5								
	2020K-16N		●		20	20	125	10	0.8	-	-	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
	2525M-16N		●		25	25	150	12.5								

• Lock Screw: HSB4x8R for R-hand Toolholder, HSB4x8L for L-hand Toolholder

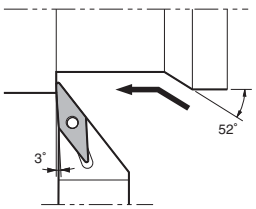
Applicable Inserts

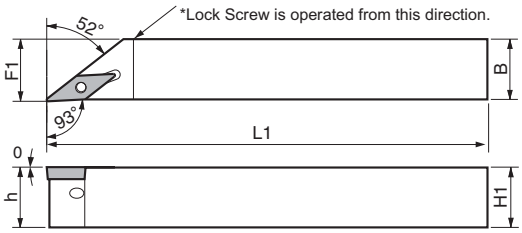
Application	Finishing	Finishing-Medium	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Medium	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B66	B66	B66, B67	B66	B66	B67	B66, B67	B67	B67	C22	C13, C14
Insert / Toolholder	GP	VF	HQ	R/L-F	R/L-FSF	R/L-Y	FN-Z	AH	R/L-A3	PCD	CBN
AVVB R/L...-11F	VBMT1103..	VBMT1103..	VBMT1103.. VCMT1103..	VBGT1103..	VBET1103..	VBGT1103.. VCGT1103..	VBGT1103.. VCGT1103..	-	-	VBMT1103..	VBGW1103..
SVVBN...-11	VBMT1103..	VBMT1103..	VBMT1103.. VCMT1103..	VBGT1103..	VBET1103..	VBGT1103.. VCGT1103..	VBGT1103.. VCGT1103..	-	-	VBMT1103..	VBGW1103..
SVVBN...-16N	VBMT1604..	VBMT1604..	VBMT1604.. VCMT1604..	-	-	VBGT1604.. VCGT1604..	VBGT1604.. VCGT1604..	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604.. VCGW1604..

For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

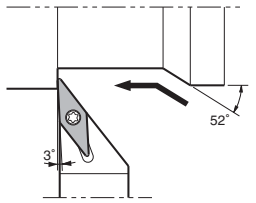
AVJB-F (External / Copying)

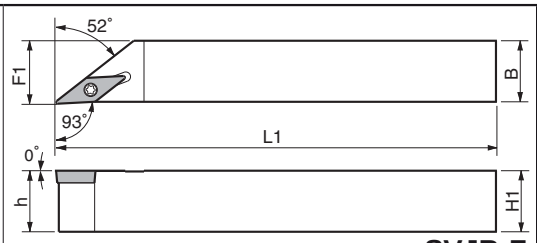




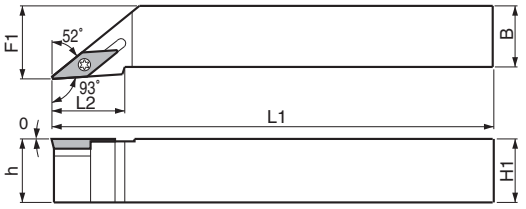
● Right-hand shown

SVJB-F / SVJB (External / Copying)



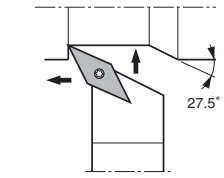


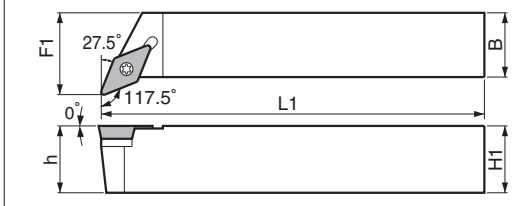
● Right-hand Shown **SVJB-F**



● Right-hand Shown **SVJB**

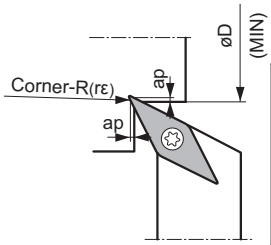
SVPB (External / Facing / Copying / Undercutting)





● Right-hand shown

● Undercutting diameter of SVPB



Corner-R (rε)	ap	øD (MIN)
0.4	0.5	ø25
	1	ø30
0.8	0.5	ø45
	1	ø55

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1			Standard Corner-R(rε)	Spare Parts: Anchor Pin	Lock Screw	Clamp Screw	Wrench	Shim	Shim Screw	Wrench
AVJB R/L	1010K-11F	●	●	10	10	125		10.5				LPF-11						
	1212M-11F	●	●	12	12	150	-	12.5			0.4	LPF-1113	HSB4X8 R/L	-	FH-2	-	-	-
	1616M-11F	●	●	16	16	150		16.5				LPF-1117						
SVJB R/L	1010F-11F	●	●	10	10	80		10.5										
	1212H-11F	●	●	12	12	100	-	12.5			0.4	-	-	SB-2570TR	FT-8	-	-	-
	1616H-11F	●	●	16	16	100		16.5										
SVJB R/L	2020K-11	●	●	20	20	125	30	25			0.4	-	-	SB-2570TR	FT-8	-	-	-
	2525M-11	●	●	25	25	150	35	32										
	2020 K-16N	●	●	20	20	125	30	25			0.8	-	-	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
	2525M-16N	●	●	25	25	150		32										
SVPB R/L	1010F-11	●	●	10	10	80		14.5										
	1212H-11	●	●	12	12	100		16.5										
	1616H-11	●	●	16	16	100	-	20.5			0.4	-	-	SB-2570TR	FT-8	-	-	-
	2020K-11	●	●	20	20	125		25										
	2525M-11	●	●	25	25	150		32										
	2020K-16N	●	●	20	20	125	-	25			0.8	-	-	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
	2525M-16N	●	●	25	25	150		32										

・Lock Screw : HSB4×8R for Right-hand Toolholder, and HSB4×8L for Left-hand Toolholder.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

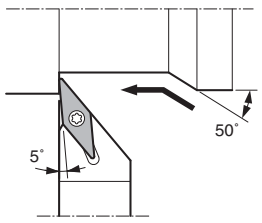
External Toolholders [VP □□ Insert]

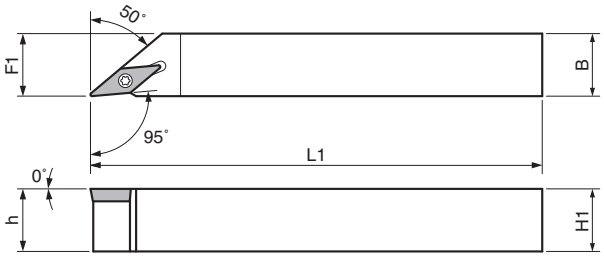
Applicable Inserts (AVJB-F / SVJB-F / SVJB / SVPB)

Application	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Medium	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B66	B66	B66, B67	B66	B66	B67	B66, B67	B67	B67	C22	C13, C14
Insert / Toolholder	GP	VF	HQ	R/L-F	R/L-FSF	R/L-Y	FN-Z	AH	R/L-A3	PCD	CBN
AVJBR/L ...-11F	VBMT1103..	VBMT1103..	VBMT1103.. VCMT1103..	VBGT1103..	VBET1103..	VBGT1103.. VCGT1103..	VBGT1103.. VCGT1103..	-	-	VBMT1103..	VBGW1103..
SVJBR/L ...-11F / -11	VBMT1103..	VBMT1103..	VBMT1103.. VCMT1103..	VBGT1103..	VBET1103..	VBGT1103.. VCGT1103..	VBGT1103.. VCGT1103..	-	-	VBMT1103..	VBGW1103..
SVJBR/L ...-16N	VBMT1604..	VBMT1604..	VBMT1604.. VCMT1604..	-	-	VBGT1604.. VCGT1604..	VBGT1604.. VCGT1604..	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604.. VCGW1604..
SVPBR/L ...-11	VBMT1103..	VBMT1103..	VBMT1103.. VCMT1103..	VBGT1103..	VBET1103..	VBGT1103.. VCGT1103..	VBGT1103.. VCGT1103..	-	-	VBMT1103..	VBGW1103..
SVPBR/L ...-16N	VBMT1604..	VBMT1604..	VBMT1604.. VCMT1604..	-	-	VBGT1604.. VCGT1604..	VBGT1604.. VCGT1604..	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604.. VCGW1604..

For recommended cutting conditions, see page E30~E31

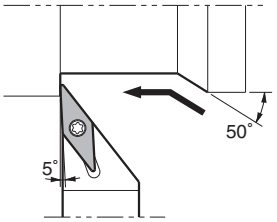
SVLP-FF (Without Offset) (External / Copying)

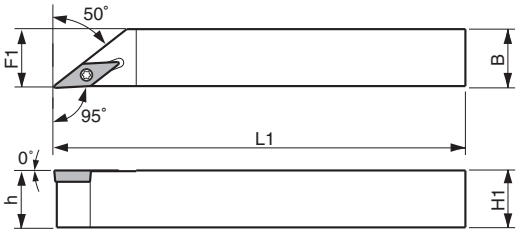




• Right-hand shown

SVLP-F (External / Copying)





• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	L3	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SVLPR/L	1010F -08FF	●	●	10	10	80	-	-	10	-	0.1	SB-2050TR	FT-6
	1212F -08FF	●		12	12	85			12				
	1212H -08FF	●	●	12	12	100			12				
	1616H -08FF	●	●	16	16	100			16				
	1212F -11FF	●		12	12	85	-	-	12	-	0.2	SB-2570TR	FT-8
SVLPR/L	1010F -11F	●	●	10	10	80	-	-	10.5	-	0.2	SB-2570TR	FT-8
	1212H -11F	●	●	12	12	100			12.5				
	1616H -11F	●	●	16	16	100			16.5				

Applicable Inserts

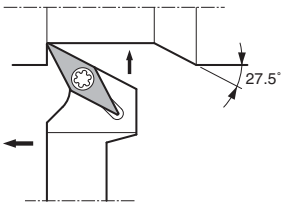
Applications	Minute ap	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. Page	B68	B68	B68	B69	B77	B69
Insert / Toolholder	CF	CK	GF	R/L-FSF	FR/L-U	FR/L-USF
SVLPR/L...-08FF	-	VPGT0802..	-	VPET0802..	-	VPET0802..
SVLPR/L...-11FF	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPGT1103..	VPET1103..
SVLPR/L...-11F	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPGT1103..	VPET1103..

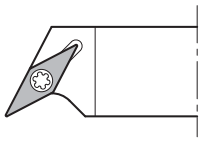
For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

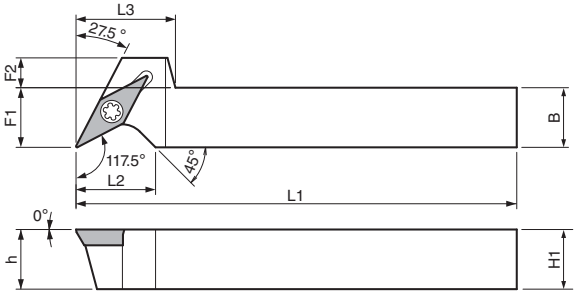
External Toolholders [VP □□ Insert]

SVPP-FF (Without Offset) (External / Facing / Copying / Undercutting)



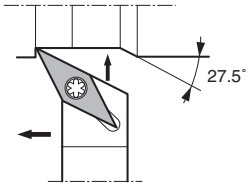


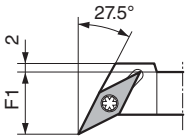
SVPPR1616H-08FF
shows above figure.



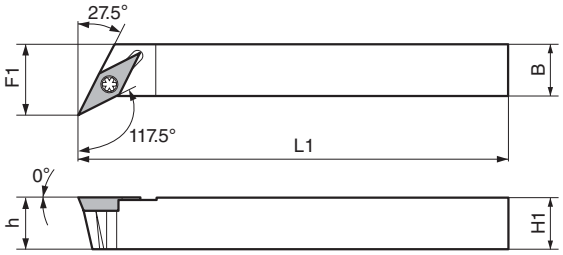
• Right-hand shown

SVPP (With Offset) (External / Facing / Copying / Undercutting)





SVPPR1010F-11
shows above figure.



• Right-hand shown

Toolholder Dimensions

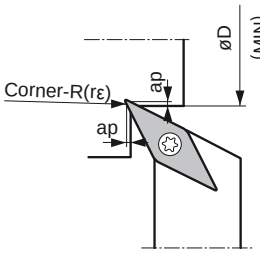
Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	L3	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
SVPPR	1010F -08FF	●		10	10	80	12	16	10	4	0.1	SB-2050TR	FT-6
	1212F -08FF	●		12	12	85		16	12	2			
	1212H -08FF	●		12	12	100		16	12	2			
	1616H -08FF	●		16	16	100		-	16	-			
	1010F -11FF	●		10	10	80	16	20	10	8	0.2	SB-2570TR	FT-8
	1212F -11FF	●		12	12	85			12	6			
	1212H -11FF	●		12	12	100			12	6			
	1616H -11FF	●		16	16	100			16	2			
SVPPR/L	1010F -11	●	●	10	10	80	-	-	14.5	-	0.2	SB-2570TR	FT-8
	1212H -11	●	●	12	12	100			16.5				
	1616H -11	●	●	16	16	100			20.5				

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. Page	B68	B68	B68	B69	B77	B69
Insert / Toolholder	CF	CK	GF	R/L-FSF	FR/L-U	FR/L-USF
SVPPR...-08FF	-	VPGT0802..	-	VPET0802..	-	VPET0802..
SVPPR...-11FF	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPGT1103..	VPET1103..
SVPPR/L...-11	VPGT1103..	VPGT1103..	VPGT1103..	VPET1103..	VPGT1103..	VPET1103..

For recommended cutting conditions, see page E30~E31

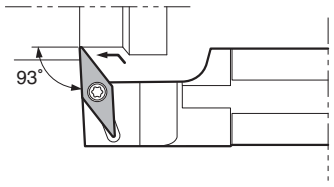
Undercutting diameter of SVPP-FF / SVPP

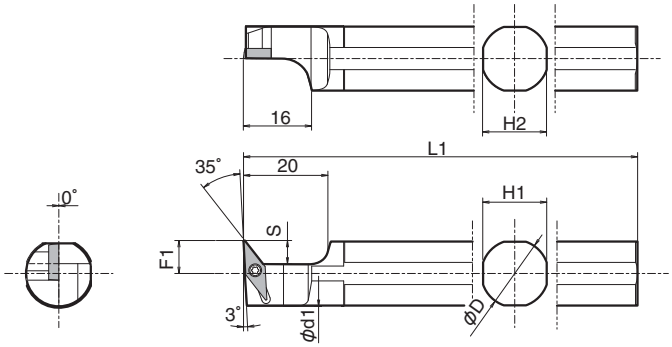


Corner-R (rε)	ap	øD (MIN)
0.2	0.5	ø20
	1	ø25

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S...SVUB(C) (External / Copying)





• Left-hand shown

R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

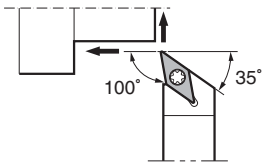
Description	Std.	Dimension (mm) øD	L1	F1	ød1	H1=H2	S		Standard Corner-R(rε)	Spare Parts Clamp Screw	Wrench			
S12F -SVUCL08	●	12.0	80	7.5	13.4	11	5.5		0.4	SB-2050TR	FT-6			
S14H -SVUCL08	●	14.0	100			13								
S15F -SVUCL08	●	15.875	85	8	15.4	15								
S16F -SVUCL08	●	16.0												
S19G -SVUBL11	●	19.05	90	10.5	18.4	17	8		0.4	SB-2570TR	FT-8			
S19K -SVUBL11	●		120											
S20G -SVUBL11	●	20.0	90		19.4	18								
S20K -SVUBL11	●		120											
S25.0H-SVUBL11	●	25.0	100		24.4	23								
S25K -SVUBL11	●	25.4	120		24.8									

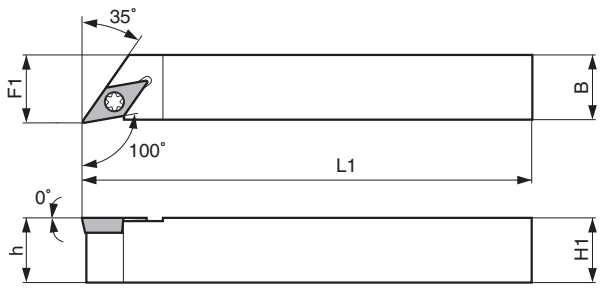
Applicable Inserts

Applications	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Medium	Non-ferrous Metals	Hard Materials	
Ref. Page	**B66**	**B66, B67**	**B66, B67**	**B66**	**B66**	**B67**	**B66, B67**	**C22**	**C13, C14**	
Insert / Toolholder	**GP**	**VF**	**HQ**	**R-F**	**R-FSF**	**R-Y**	**FN-Z**	**PCD**	**CBN**	
S...SVUCL08	–	VCMT0802..	VCMT0802..	-	-	-	-	VCMT0802..	VCGW0802..	
S...SVUBL11	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	VBGT1103.. VCGT1103..	VBMT1103..	VBGW1103..	

For recommended cutting conditions, see page E30~E31

SYXP-F (External / Facing / Copying)





• Right-hand shown

Toolholder Dimensions

Description	Stock R	L	Dimension (mm) H1=h	B	L1	F1	Standard Corner-R(rε)	Spare Parts Clamp Screw	Wrench
SYXP$^{R}_{L}$ 0808F-06F	○	○	8	8	80	8.5	0.2	SB-2050TR	FT-6
SYXP$^{R}_{L}$ 1010H-06F	○	○	10	10	100	10.5			

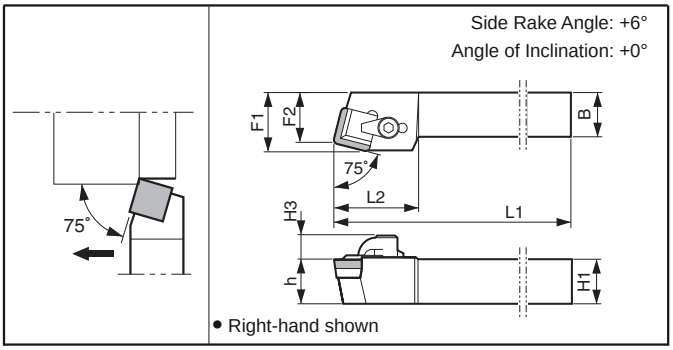
Applicable Inserts

Applications	Finishing	Low Feed
Ref. Page	**B78**	**B78**
Insert / Toolholder	**F$^{R}_{L}$-F**	**F$^{R}_{L}$-U**
SYXP$^{R}_{L}$...-06F	YPGT0602..	YPGT0602..

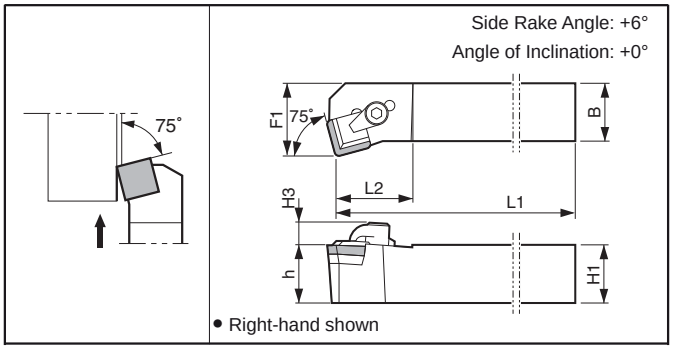
For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

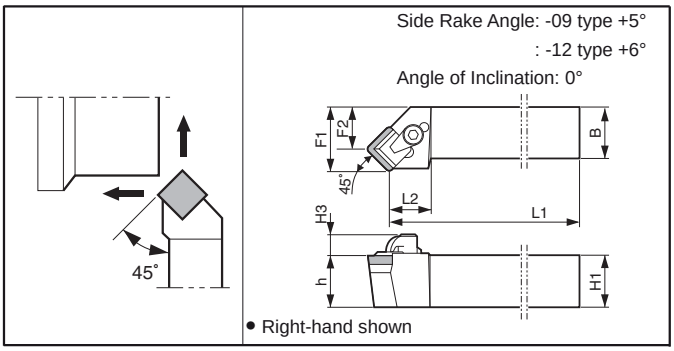
CSBP (External)



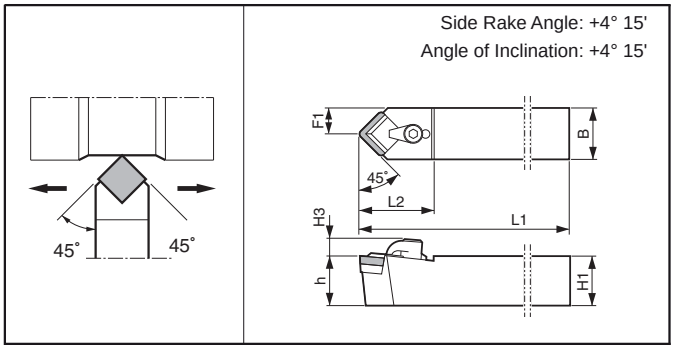
CSKP (Facing)



CSSP (External / Facing / Chamfering)



CSDP (External / Chamfering)



Toolholder Dimensions

Description		Std. R	Std. N	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	F2	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	Chipbreaker
CSBP R/L	1212F -09N	●		●	12	7.5	12	80	23	15.7	13	0.4	CPS-2P	LW-2.5	-	-	CB-S3220
CSKP R/L	1616H -09N	●			16	7.5	16	100	21	20	-	0.4	CPS-2P	LW-2.5	-	-	CB-S3220
	2020K -12N	●			20	8.5	20	125	28	25	-	0.8	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
	2525M -12N	●			25		25	150		32							
CSSP R/L	1212F -09N	●		●	12	7.5	12	80	15	16	9	0.4	CPS-2P	LW-2.5	-	-	CB-S3220
	1616H -09N	●		●	16		16	100	16	20	13						
	2020K -12N	●		●	20	8.5	20	125	19	25	16	0.8	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
	2525M -12N	●		●	25		25	150		32	23						
CSDPN	2020K -12N		●		20	8.5	20	125	32	10	-	0.8	CPS-3	LW-3	KPS-42	SP3X8	CB-S4220
	2525M -12N		●		25		25	150		12.5							

・Chipbreaker is not included. Purchase separately.

Applicable Inserts

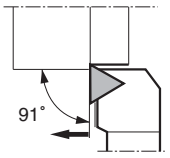
Applications	Medium cutting	Medium cutting	Finishing-Medium	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials			
Ref. Page	B58	B58	B58	B58	B88	C23	C15			
Insert / Toolholder	G	Standard	R/L	Without Chipbreaker	Ceramic	PCD	CBN			
CSBP R/L...-09N	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-	SPGN0903..			
CSKP R/L...-09N	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-	SPGN0903..			
CSKP R/L...-12N	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..	SPGN1203..			
CSSP R/L...-09N	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-	SPGN0903..			
CSSP R/L...-12N	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..	SPGN1203..			
CSDPN...-12N	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..	SPGN1203..			

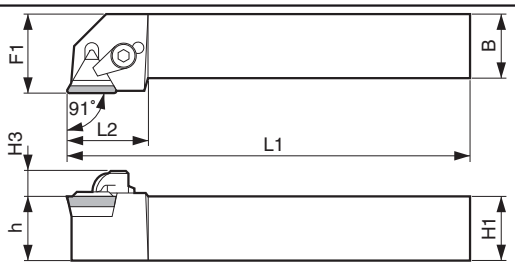
・CSKP R/L: L-hand Insert for R-hand Toolholder.
・CSSP R/L: At External Turning, R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.
At Facing, L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CTGP (External)

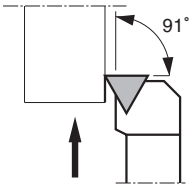


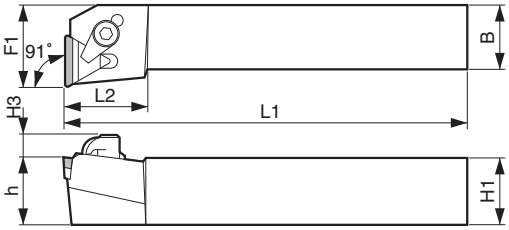


Side Rake Angle: +6°
Angle of Inclination: 0°

• Right-hand shown

CTFP (Facing)

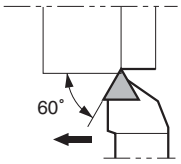


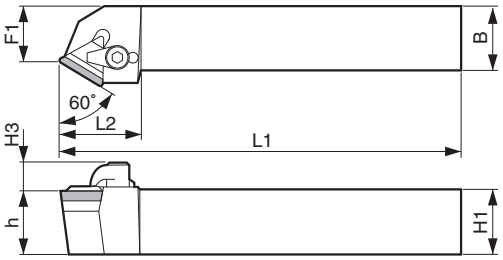


Side Rake Angle: +6°
Angle of Inclination: 0°

• Right-hand shown

CTTP (External / Chamfering)





Side Rake Angle: +6°
Angle of Inclination: 0°

• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	Standard Corner-R(rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw	Chipbreaker
CTGP R/L	1212F -11N	●	●	12	8	12	80	18	16	0.4	CPS-2P	LW-2.5	-	-	CB-T2212
	1616H -11N	●	●	16		16	100		20						
	2020K -16N	●	●	20	8.5	20	125	26	25	0.8	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
	2525M -16N	●	●	25		25	150		32						
CTFP R/L	1212F -11N	●	●	12	8	12	80	18	16	0.4	CPS-2P	LW-2.5	-	-	CB-T2212
	1616H -11N	●	●	16		16	100		20						
	2020K -16N	●	●	20	8.5	20	125	22	25	0.8	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
	2525M -16N	●	●	25		25	150		32						
CTTP R/L	1212F -11N	●	●	12	8	12	80	22.5	9	0.4	CPS-2P	LW-2.5	-	-	CB-T2212
	1616H -11N	●	●	16		16	100		13						
	2020K -16N	●	●	20	8.5	20	125	28	17	0.8	CPS-3	LW-3	KPT-32	SP3X8	CB-T3220
	2525M -16N	●	●	25		25	150		22						

• Chipbreaker is not included. Purchase separately.

Applicable Inserts

Applications	Finishing	Finishing	Finishing-Medium	Medium cutting	Medium cutting	Finishing-Medium	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. Page	B64	B64	B64	B64	B64	B64	B65	B88	C23	C15
Insert / Toolholder	GP	DP	HQ	G	Standard	R/L- □	Without Chipbreaker	Ceramic	PCD	CBN
CTGP R/L...-11N	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
CTGP R/L...-16N	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..
CTFP R/L...-11N	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
CTFP R/L...-16N	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..
CTTP R/L...-11N	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPMR1103..	TPGR1103..	TPMN1103.. TPGN1103..	TPGN1103..	TPGN1103..	TPGN1103..
CTTP R/L...-16N	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPMR1603..	TPGR1603..	TPMN1603.. TPGN1603..	TPGN1603..	TPGN1603..	TPGN1603..

· CTFP R/L: L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

For recommended cutting conditions, see page E30~E31

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

Recommended Cutting Conditions - External Turning (Positive Insert)

ISO Classification	Workpiece Material	Hardness	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Corner-R (rε)	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	FSF	PR1025	0.05	80 - 100 - 120	0.05 - 0.07 - 0.15	0.03 - 0.05 - 0.1
				Interruption		PR1025	0.2	60 - 80 - 100	0.05 - 0.1 - 0.2	0.03 - 0.1 - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1025	0.2	80 - 100 - 120	0.02 - 0.05 - 0.1	0.02 - 0.05 - 0.12
			Finishing	Continuous	GF	PR1025	0.2	80 - 100 - 120	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		PR1025	0.4	60 - 80 - 100	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous	GQ	PR1025	0.2	80 - 120 - 150	0.3 - 1.5 - 3.0	0.03 - 0.05 - 0.1
				Interruption		PR1025	0.4	60 - 80 - 100	0.3 - 1.0 - 2.0	0.03 - 0.05 - 0.1
			Low Feed & Large *ap*	Continuous	J , U	PR1025	0.2	60 - 80 - 100	0.5 - 2.0 - 3.5	0.02 - 0.05 - 0.1
			Back Turning	Continuous	(ABW) (ABS)	PR1025	0.15	60 - 80 - 100	0.5 - 2.0 - 4.0	0.02 - 0.04 - 0.07
					TKFB 12R15…	PR1025	0.05	60 - 100 - 150	0.5 - 1.0 - 1.5	0.02 - 0.05 - 0.12
					TKFB 12R28…	PR1025	0.1	60 - 100 - 150	0.8 - 2.0 - 4.0	0.02 - 0.1 - 0.15
					TKFB 12R38…	PR1025	0.1	60 - 100 - 150	1.1 - 3.0 - 5.5	0.02 - 0.1 - 0.15
	Medium Carbon Steel Medium Carbon Alloy	HB ≦ 330	Precision Finishing	Continuous	FSF	PR1025	0.05	80 - 100 - 120	0.05 - 0.07 - 0.15	0.03 - 0.05 - 0.1
				Interruption		PR1025	0.2	60 - 80 - 100	0.05 - 0.1 - 0.2	0.03 - 0.1 - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1025	0.2	80 - 100 - 120	0.02 - 0.05 - 0.1	0.02 - 0.05 - 0.12
			Finishing	Continuous	GF	PR1025	0.2	80 - 100 - 120	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		PR1025	0.4	60 - 80 - 100	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous	GQ	PR1025	0.2	80 - 120 - 150	0.3 - 1.5 - 3.0	0.03 - 0.05 - 0.1
				Interruption		PR1025	0.4	60 - 80 - 100	0.3 - 1.0 - 2.0	0.03 - 0.05 - 0.1
			Low Feed & Large *ap*	Continuous	J , U	PR1025	0.2	60 - 80 - 100	0.5 - 2.0 - 3.5	0.02 - 0.05 - 0.1
			Back Turning	Continuous	(ABW) (ABS)	PR1025	0.15	60 - 80 - 100	0.5 - 2.0 - 4.0	0.02 - 0.04 - 0.07
					TKFB 12R15…	PR1025	0.05	60 - 100 - 150	0.5 - 1.0 - 1.5	0.02 - 0.05 - 0.12
					TKFB 12R28…	PR1025	0.1	60 - 100 - 150	0.8 - 2.0 - 4.0	0.02 - 0.1 - 0.15
					TKFB 12R38…	PR1025	0.1	60 - 100 - 150	1.1 - 3.0 - 5.5	0.02 - 0.1 - 0.15
	High Carbon Alloy	HB ≦ 280	Precision Finishing	Continuous	FSF	PR1025	0.05	80 - 100 - 120	0.05 - 0.07 - 0.15	0.03 - 0.05 - 0.1
				Interruption		PR1025	0.2	60 - 80 - 100	0.05 - 0.1 - 0.2	0.03 - 0.1 - 0.15
			Precision Finishing (Molded Chipbreaker)	Continuous	CF	PR1025	0.2	80 - 100 - 120	0.02 - 0.05 - 0.1	0.02 - 0.05 - 0.12
			Finishing	Continuous	GF	PR1025	0.2	80 - 100 - 120	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		PR1025	0.4	60 - 80 - 100	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous	GQ	PR1025	0.2	80 - 100 - 120	0.3 - 1.5 - 3.0	0.03 - 0.05 - 0.1
				Interruption		PR1025	0.4	60 - 80 - 100	0.3 - 1.0 - 2.0	0.03 - 0.05 - 0.1
			Low Feed & Large *ap*	Continuous	J , U	PR1025	0.2	60 - 80 - 100	0.5 - 2.0 - 3.5	0.02 - 0.05 - 0.1
			Back Turning	Continuous	(ABW) (ABS)	PR1025	0.15	60 - 80 - 100	0.5 - 2.0 - 4.0	0.02 - 0.04 - 0.07
					TKFB 12R15…	PR1025	0.05	60 - 100 - 150	0.5 - 1.0 - 1.5	0.02 - 0.05 - 0.12
					TKFB 12R28…	PR1025	0.1	60 - 100 - 150	0.8 - 2.0 - 4.0	0.02 - 0.1 - 0.15
					TKFB 12R38…	PR1025	0.1	60 - 100 - 150	1.1 - 3.0 - 5.5	0.02 - 0.1 - 0.15

*For machining free-cutting steels, such as 11SMn (SUM), etc., use **PR1005** at Vc=200m/min or less. For ap and f, refer to specs for low carbon steels.

Recommended Cutting Conditions - External Turning (Positive Insert)

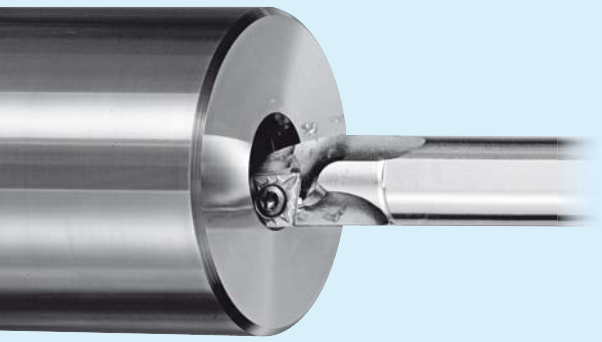
ISO Classification	Workpiece Material	Hardness	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Corner-R (rε)	Lower Limit - Recommendation - Upper Limit		
								Vc (m/min)	ap (mm)	f (mm/rev)
M	Stainless Steel	HB ≦ 220	Finishing	Continuous	MQ	PR1125	0.2	80 - 100 - 120	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption		PR1125	0.4	60 - 80 - 100	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium cutting	Continuous	GK	PR1025	0.2	80 - 100 - 120	0.5 - 1.0 - 2.0	0.07 - 0.12 - 0.15
				Interruption		PR1025	0.4	60 - 80 - 100	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
	Stainless Steel	HB ≦ 300	Finishing	Continuous	MQ	PR1125	0.2	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption		PR1125	0.4	30 - 50 - 70	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium cutting	Continuous	GK	PR1025	0.2	40 - 60 - 80	0.5 - 1.0 - 2.0	0.07 - 0.12 - 0.15
				Interruption		PR1025	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	CA4010	0.4	100 - 120 - 150	0.2 - 0.5 - 1.0	0.1 - 0.15 - 0.2
				Interruption		CA4010	0.4	80 - 100 - 120	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium cutting	Continuous	Standard	CA4010	0.4	100 - 120 - 150	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2
				Interruption		CA4010	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	CA4115	0.4	80 - 100 - 120	0.2 - 0.5 - 1.0	0.1 - 0.15 - 0.2
				Interruption		CA4120	0.4	60 - 80 - 100	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Medium cutting	Continuous	Standard	CA4115	0.4	80 - 100 - 120	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2
				Interruption		CA4120	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 Alloy	HB ≦ 100	High Speed Finishing (Rainbow-colored finish)	Continuous	Without Chipbreaker	KPD001	0.2	150 - 250 - 350	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			Finishing	Continuous	F , FSF	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 cutting	Continuous	U , USF	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 Alloy	HB ≦ 400	Precision Finishing (Rainbow-colored finish)	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 cutting	Continuous	FSF,USF	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 Alloy	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	PR1125	0.4	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption		PR1125	0.8	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
H	Hard Materials	40~50 HRC	Finishing	Continuous	GK	PR1025	0.2	40 - 60 - 80	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1
				Interruption		PR1025	0.4	40 - 60 - 80	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1
		50~68 HRC	Finishing	Continuous	SE	KBN25M	0.2	80 - 120 - 150	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1
				Interruption	SET,MET	KBN25M	0.4	60 - 100 - 120	0.1 - 0.3 - 0.5	0.02 - 0.07 - 0.1

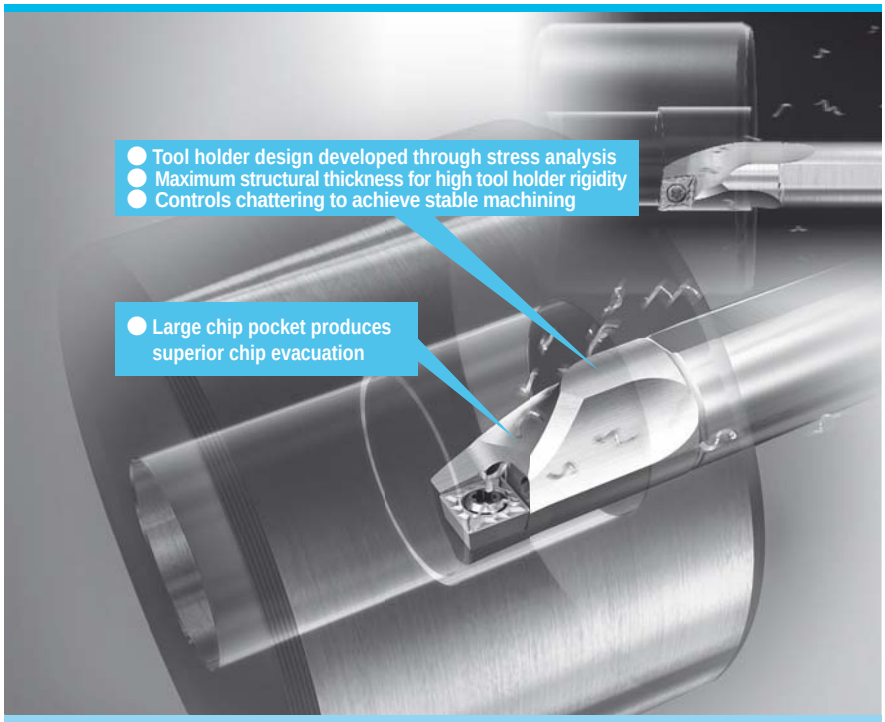
F

Boring

F1~F78

New Products / Guide Line		**F2~F4**
Identification System		**F5**
Product Lineup		**F6~F7**
Solid Tip-Bars for Micro Boring		**F8~F21**
Twin Bar	TWB / TWBT	F8
System Bar	VNB-S / VNB / VNBT / VNBX-S	F10
2 Edges Tip-Bar	HPB / HPBT	F18
Tip-Bar	PSB-S / PSBT-S → will be switched to HPB / HPBT.	F20
Dynamic Bars		**F22~F41**
Dynamic Bars Lineup		F22
CC □□ Insert		F24
CP □□ Insert		F26
DC □□ Insert		F28
TB / TP □□ Insert		F32
TC □□ Insert		F34
VB / VC / VP □□ Insert		F36
WB / WP □□ Insert		F40
AD Bars		**F42~F45**
CN □□ Insert		F42
DN □□ Insert		F43
TN □□ Insert		F43
CC □□ Insert		F44
DC □□ Insert		F44
Boring Adapter	(with coolant hole / anti-vibration damper system)	F45
Boring Bars for General Purpose		**F46~F70**
Boring Bars Lineup for General Purpose		F46
CC / CP □□ Insert		F48
DC □□ Insert		F51
JC □□ Insert		F53
TB / TP □□ Insert		F54
YP □□ Insert		F59
SP □□ Insert		F60
TP □□ Insert (without Hole)		F61
VB / VC / VP □□ Insert		F62
WB / WP □□ Insert		F64
CN □□ Insert		F66
DN □□ Insert		F67
TN □□ Insert		F68
WN □□ Insert		F69
Boring Toolholders for Bearing Machining (Square Shank)		**F71**
Boring Bars for Ceramic Tools		**F72~F73**
Boring Bars for Solid CBN Tools		**F74**
Sleeves (for Boring Bars)	PH type / SH type / SHC type / SJS type	**F75~F76**
Recommended Cutting Conditions		**F77~F78**



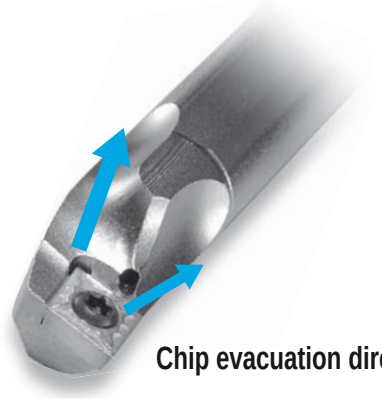


Dynamic design driven by the latest computer simulation technology

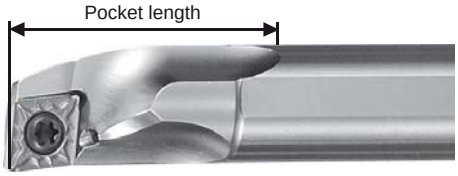
Superior chip evacuation (External coolant)

	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.

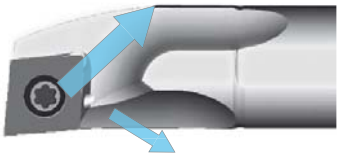
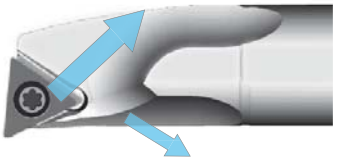


Comparison of pocket length



Description	Pocket length (mm)	
	Dynamic Bar	Competitor A
A16-SCLPR09-18 type	37	29
A20-SCLCR09-22 type	48	32

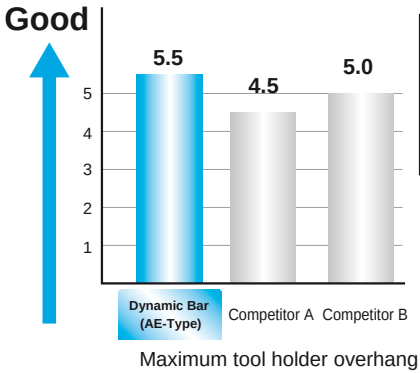
Chip evacuation direction

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 through the use of a special alloy and stress analysis technology. Previously unattained surface finish and dimensional accuracy are now achieved.

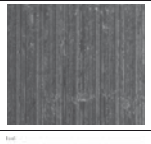
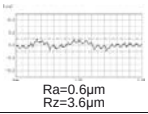
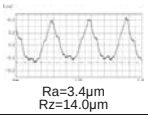
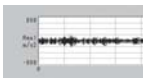
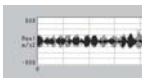
Anti chatter vibration performance



<Cutting Condition>
15CrMo5
Vc=150m/min
ap=0.5mm
f=0.1mm/rev
S16-SCLPR09 type
CPMH090304L-Y

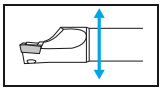
Comparison of surface finish

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			

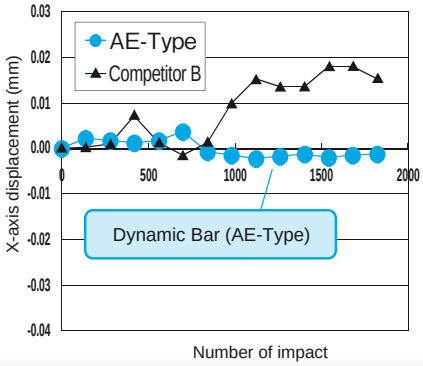
<Cutting Condition>
15CrMo5
Vc=210m/min
ap=0.5mm
f=0.1mm/rev
A16Q-SCLPR09-18 type
CPMT090304XP(PV7020)
L/D=4
External coolant

Direction of vibration measurement



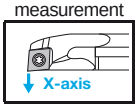
Cutting Point Precision

The AE Dynamic Bar maintains precise cutting edge positional accuracy through the use of a special alloy, thereby achieving high precision machining.



<Cutting Condition>
34CrMo4
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)

Excelent Bar with coolant hole (internal coolant) (A..AE) provides better chip evacuation.



• Steel Bar

The steel shank bar (without coolant hole) provides superior cost performance



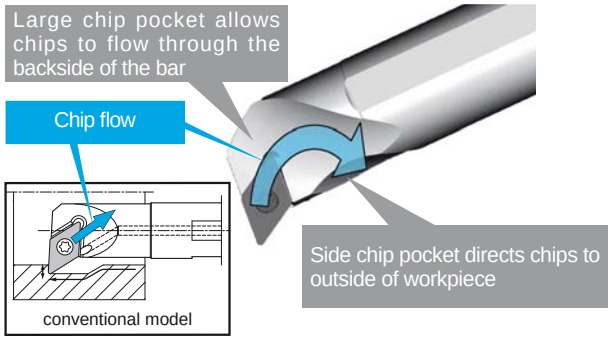
F

Boring

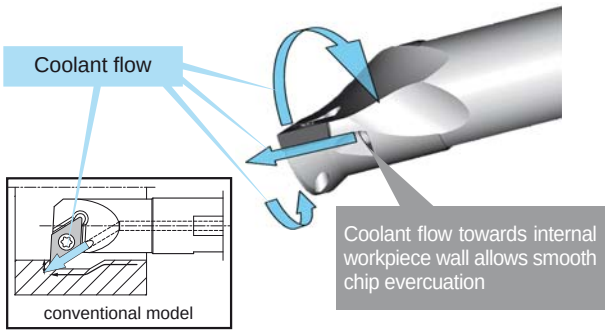
Advantages of Dynamic Bar SDUC

New design and concept focusing on chip evacuation

New design Streamlined pocket provides effective chip evacuation



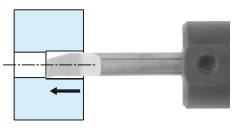
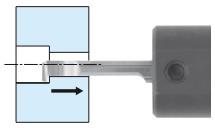
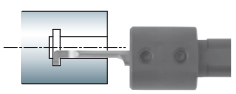
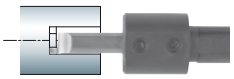
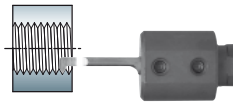
New concept Coolant flows toward workpiece internal wall



HP Type 2-Edges Tip-Bar for Micro Boring

- Economically excellent 2-Edges
- Min. Bore Dia. Line Up from ø2.0 to Up
- Easy-to-Use Adjustable Overhang Length
- Integral No. shank is adopted to enable installation to standard sleeves
- Special sleeves to fit to target machine makers specifications are fulfilled



Boring	Back boring	Grooving	Face Grooving	Threading
				
HPB F18	**HPBT** F18	**HPG** G30	**HPFG** G53	**HPT** J24
Min. Bore Dia.: ø2~ø7 Corner-R (rε): 0.05	Min. Bore Dia.: ø4~ø5 Corner-R (rε): 0.05	Min. Bore Dia.: ø4~ø7 Edge Width: 1.0~2.0 mm Depth: 1.0~2.0 mm	Min. Face Groove Dia.: ø8 Edge Width: 1.0~3.0mm Depth: 2.0~3.0mm	Min. Pilot Hole Dia.: ø4.5~ø8 M: 0.75~1.5 mm UN: 28~16 TPI W: 24~18 TPI Rc: 28~19 TPI

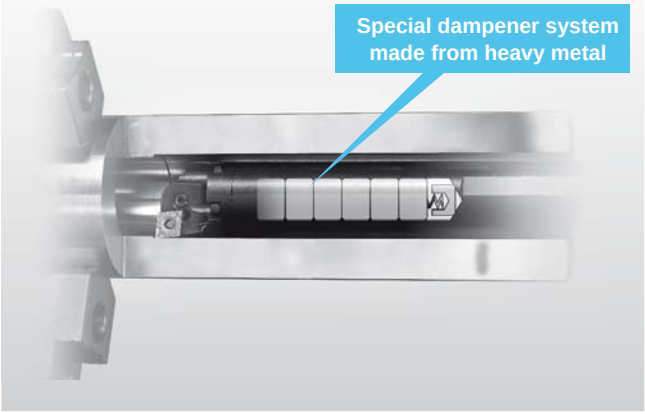
Interchangeable head boring bars with anti-vibration dampener system

- The AD (Advanced Dampener) system provides a maximum overhang of 6times L/D.
- Achieve high efficient machining: Anti-vibration dampener effect allows for large depths of cut and high feed rates.
- Applicable for a variety of machining conditions due to the interchangeable head design



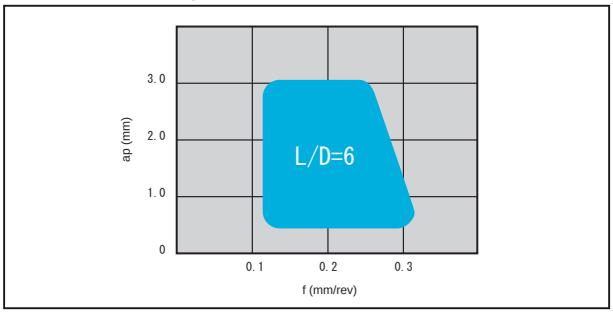


Structure of Anti-Vibration dampener system



Possible machining area

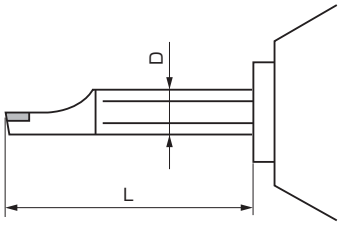
(34CrMo4 Vc=150m/min ap=0.5~3mm f=0.1~0.3mm/rev TNMG160408)



Guide Line for Boring Bars

Guide Line for Overhang Length of Boring Bar (Workpiece: C45)

Shank Material	L/D	Toolholder Type Example
Steel	3	S…SCLP
Steel (Dynamic Bar)	4	S…SCLP-A
Excellent Bar	5	S…SCLP-E
Excellent Bar (Dynamic Bar)	5.5	A…SCLP-AE
Anti-vibration dampener system (AD Bar)	6	HA…PCLN
Carbide	7	C…SCLP



D: Bar Diameter
L: Overhang Length

Carbide Shank Boring Bar

○ Short Shank Series

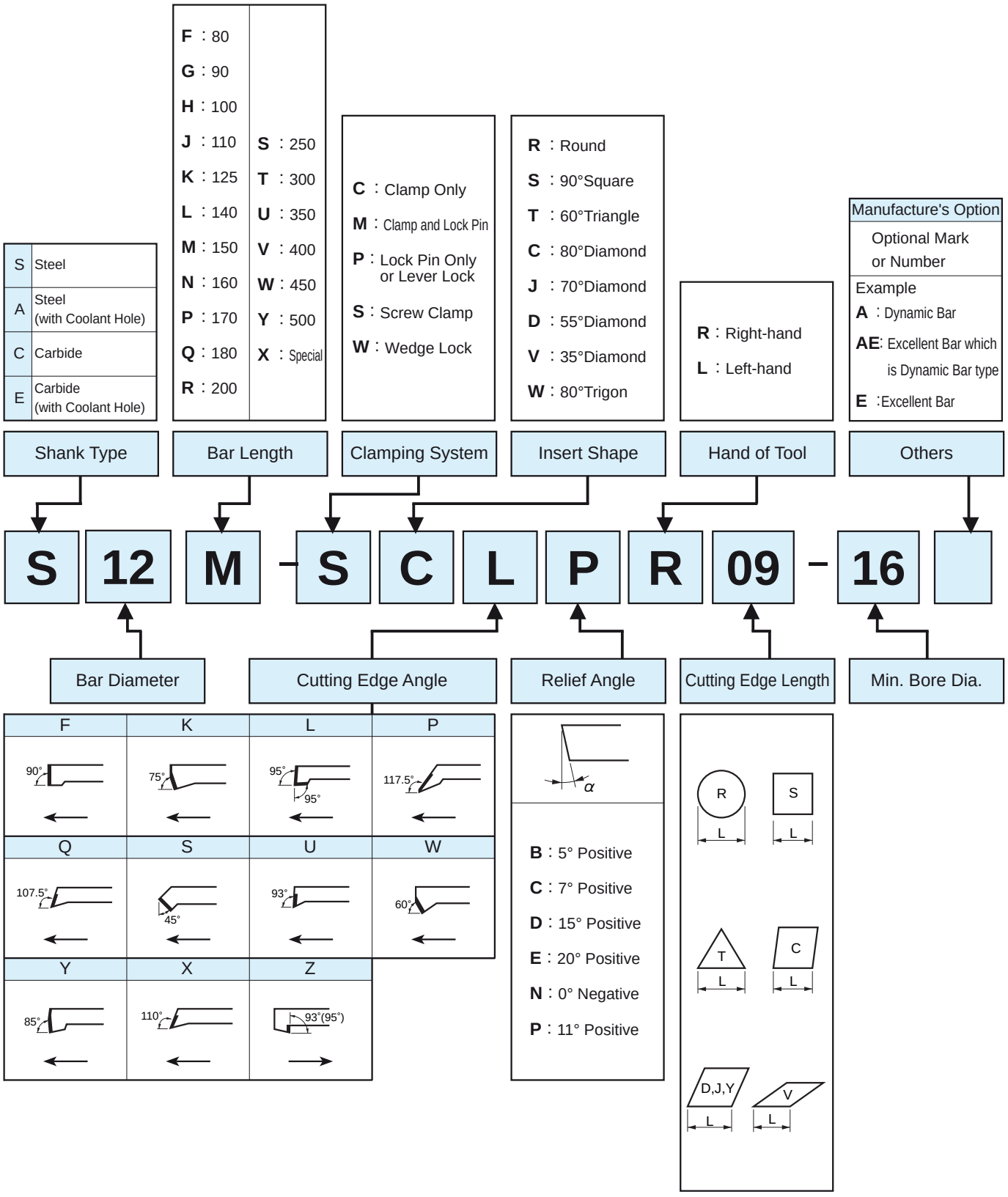
- Short Shank Type with length of 1/2 and 2/3 of standard type are available. (-1/2 or -2/3 is shown at the end of the description)
- Economical


Standard Size


←2/3 Size


←1/2 Size

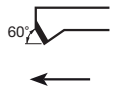
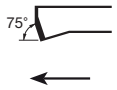
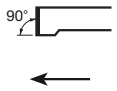
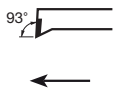
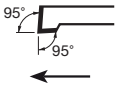
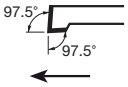
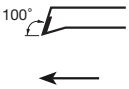
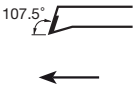
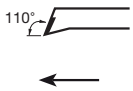
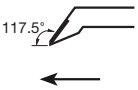
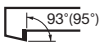
Boring Bar Identification System (Round Shank)



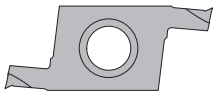
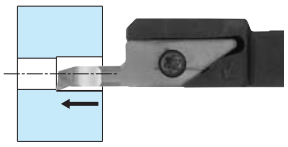
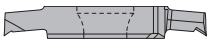
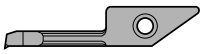
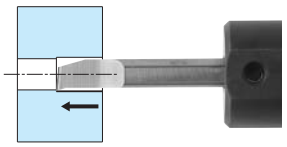
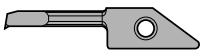
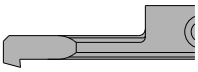
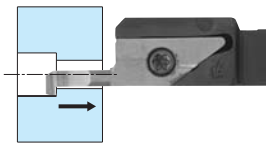
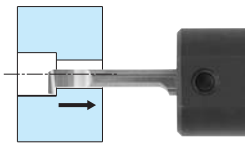
Anti-vibration interchangeable head mechanism Boring Bar "AD Bar"

For boring interchangeable head identification system, see page **F42**.

Boring Bars

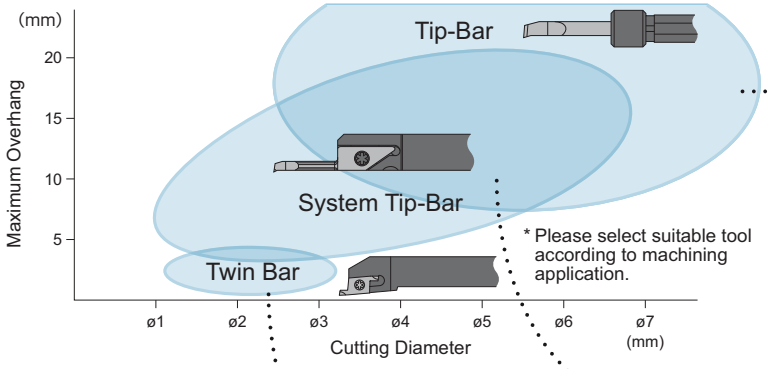
Cutting Edge Angle	Type	Dynamic Bar (-A Type) (-AE Type)	AD Bar		Boring Bars for General Purpose					Solid Tip-Bar
			Screw Only	Lever Lock	Screw Only	Lever Lock Wedge Lock	Clamp Only	for Ceramic Tools	for CBN Tools	
	See Page for Toolholder	F22~F41	F44	F42~F43	F46~F65	F66~F70	F60~F61	F72~F73	F74	F8~F21
60°		-	-	-	-STWP Type	-	-	-	-	-
75°		-	-	-	-SSKP Type	-	S-CSKP Type	S-CSKN Type	S-CSKN-A Type	-
90°		-	-	HA-PTFN Type	-	-	-	-	-	-
93°		-SDUC Type -SVU○ Type -SWU○ Type	HA32SDUC Type	HA-PDUN Type	-SDUC Type -STU○ Type -SVU○ Type -SWU○ Type	-PDUN Type -PTUN Type	S-CTUP Type	S-CDUN Type S-CTUC Type	S-CTUN-A Type	-
95°		-SCL○ Type -STL○ Type	HA32SCLC Type	HA-PCLN Type	-SCL○ Type -SJLC Type	-PCLN Type -PWLN Type -WWLN Type	-	S-CCLN Type	S-CCLN-A Type	HPB Type PSB Type
97.5°		-	-	-	-	-	-	S-CELN Type	-	-
100°		-	-	-	-SYXP Type	-	-	-	-	TWB Type TWBT Type VNB Type VNBX Type
107.5°		-SDQC Type	-	-	-SDQC Type	-	-	-	-	-
110°		-	-	-	-STX○ Type	-	-	-	-	-
117.5°		-SVP○ Type	-	-	-SVP○ Type	-	-	-	-	-
142°	 Internal Spherical Machining	-SVJ○ Type	-	-	-SVJ○ Type	-	-	-	-	-
93° (95°)	 Back Boring	-SDZC Type -SVZ○ Type	-	-	-SDZC Type -SJZC Type -STZB Type -SVZ○ Type	-	-	-	-	HPBT Type PSBT Type VNBT Type

Solid Tip-Bars for Micro Boring

Application	Solid Tip-Bar Type	Shape	Shank Type Max. Overhang Length (L/D)	Min. Bore Dia. øA 1	1.5	2	2.5	3	3.5	4	5	6	7	Ref. Page for Toolholder	Summary
Boring	**TWB** Twin Bar → F8		Solid	●	●	●	●	●						F9	
	TWBT Twin Bar → F8		Solid	●	●	●	●	●							
	VNB-S System Tip-Bar → F10		Solid	●	●	●		●		●				F12 F13 F14	
	VNB System Tip-Bar → F10		Solid			●		●		●	●	●	●		
	VNB-X System Tip-Bar → F16		Solid	●	●	●		●	●	●				F17	
	HPB 2-Edges Tip-Bar → F18		Solid L/D=~5			●		●		●	●	●	●	F19	
	PSB-S Tip-Bar → F20		Solid L/D=~5			●		●		●	●	●	●	F21	
Back Boring	**VNBT** System Tip-Bar → F10		Solid							●	●			F12 F13 F14	
	HPBT 2-Edges Tip-Bar → F18		Solid L/D=~5							●	●			F19	
	PSBT-S Tip-Bar → F20		Solid L/D=~5							●	●			F21	

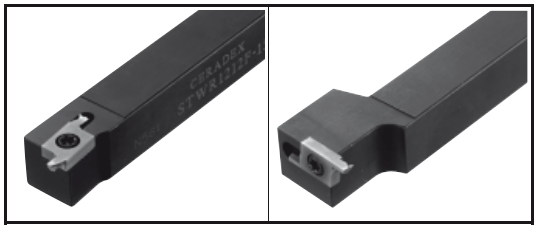
Toolholder Dimension

Solid Tip-Bar Type: Minimum cutting Dia. 1mm



2-Edges Tip-Bar HPB





Twin Bar → F8



SVN Type → F12~13

Square Shank (Straight)



S…SVN Type → F14

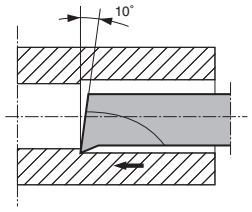
Round Shank Standard Type

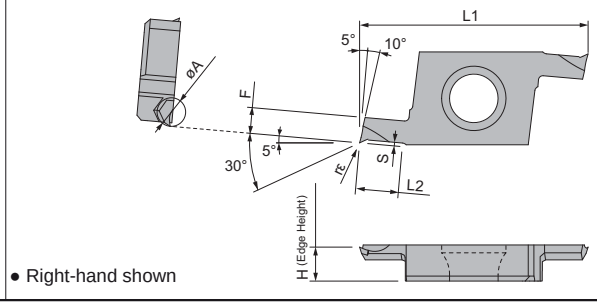


SVNS Type → F12~13

System Tip-Bar → F10

TWB (Micro Boring : Lay-down type) [Corner-R (rε) Tolerance: +0/−0.02mm, +0/−0.03mm]



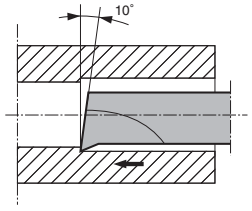


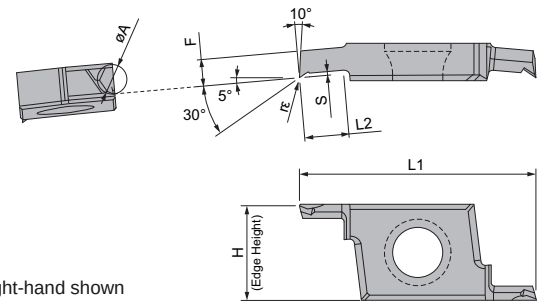
• Right-hand shown



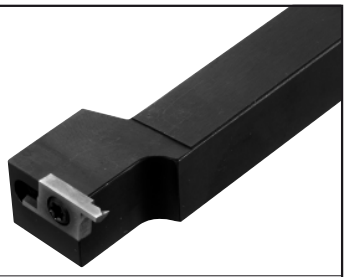
Example of installing insert for straight square shank

TWBT (Micro Boring : Up-right type) [Corner-R (rε) Tolerance: +0/−0.02mm, +0/−0.03mm]





• Right-hand shown



Example of installing insert for L-shape square shank

Insert Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Insert Grade			Ref. Page for Toolholder
											PVD Coated Carbide		Carbide	
		øA	H	L1	L2	F	S	rε			PR1025		KW10	
TWBR	01003-005	1.0	2.38	16	3	0.85	0.2	+0 -0.02 0.05			●		●	F9
	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	2.38	16	3	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				●		●	
TWBTR	01003-005	1.0	6.4	16	3	0.85	0.2	+0 -0.02 0.05			●		●	F9
	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	6.4	16	3	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				●		●	

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)		TWBR01003 Type TWBR01503 Type TWBTR01003 Type TWBTR01503 Type		TWBR02003 Type TWBR02503 Type TWBR03003 Type TWBTR02003 Type TWBTR02503 Type TWBTR03003 Type		Remarks
	PVD Coated Carbide	Carbide	Cut: ap (mm), Feed: f (mm/rev)				
	PR1025	KW10	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	
Non-ferrous Metals		★ ~100	~0.1	~0.02	~0.2	~0.05	

★ : 1st Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Twin Bars are sold in 5 piece boxes.

STW (Square shank for Lay-down type insert)



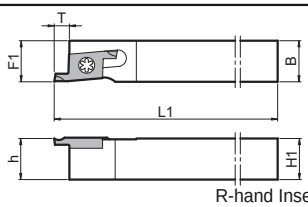


Fig.1

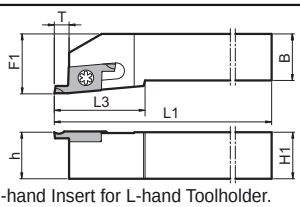


Fig.2

● Right-hand shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Insert
			H1=h	B	L1	L2	L3	F1	F2	T		Clamp Screw	Wrench	
STWR	1010F-15	●	10	10	80	-	-	10	-	3	Fig.1	SB-3080TR	LTW-10S	F8
	1212F-15	●	12	12				12						
	1010K-15	●	10	10	125			10						
	1212K-15	●	12	12				12						
	1616K-15	●	16	16				16						
	2020K-15	●	20	20			25	25			Fig.2			
	2525M-15	●	25	25	150			32						

S..-STW (Round shank for Lay-down type insert)



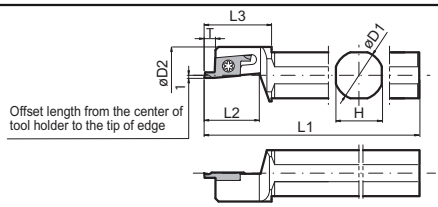


Fig.1

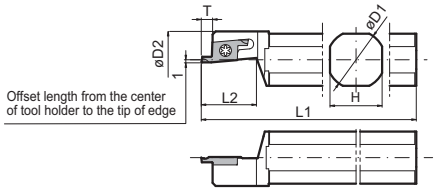


Fig.2

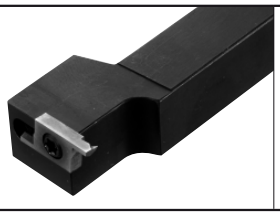
● Right-hand shown

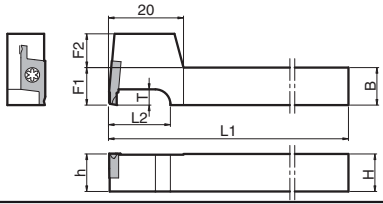
R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std.	Dimension (mm)							Drawing	Spare Parts		Applicable Insert
			øD1	øD2	H	L1	L2	L3	T		Clamp Screw	Wrench	
S12F-	STWR15	●	12	20	11	80	18	22	3	Fig.1	SB-3080TR	LTW-10S	F8
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							

STWS (Square shank for Up-right type insert: L-shape type)





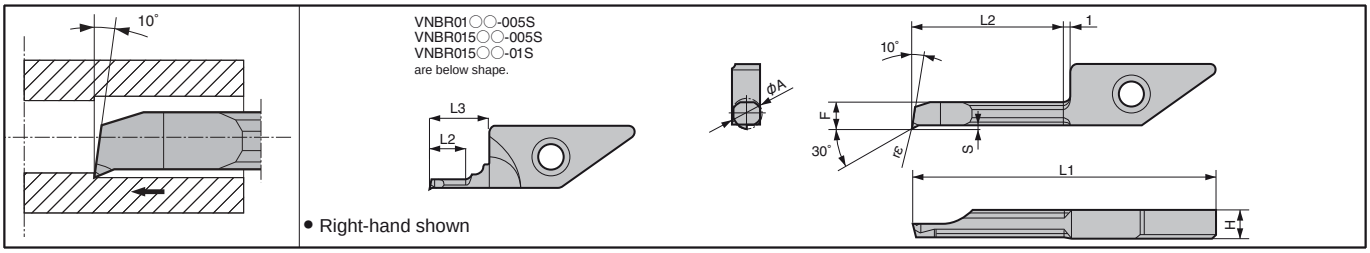
● Right-hand shown

Toolholder Dimensions

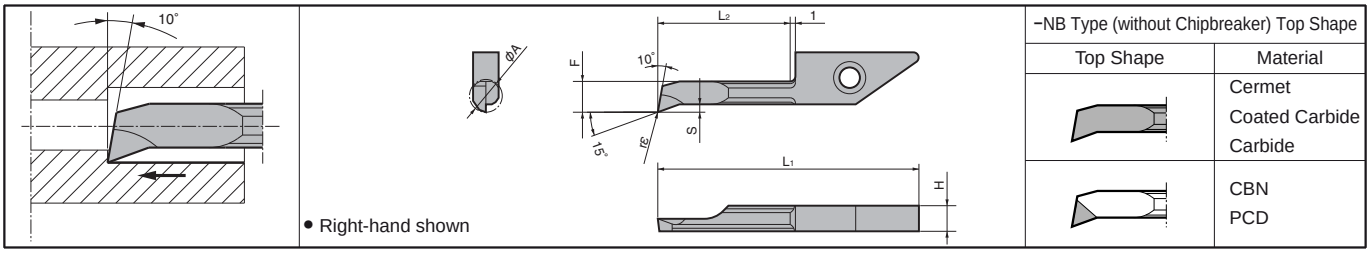
Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Insert
			H1=h	B	L1	L2	L3	F1	F2	T		Clamp Screw	Wrench	
STWSR	1010F-15T	●	10	10	80	16	-	10	9	3	-	SB-3080TR	LTW-10S	F8 G54
	1212F-15T	●	12	12				12	7					
	1010K-15T	●	10	10	125			10	9					
	1212K-15T	●	12	12				12	7					
	1616K-15T	●	16	16		20		16	3					

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

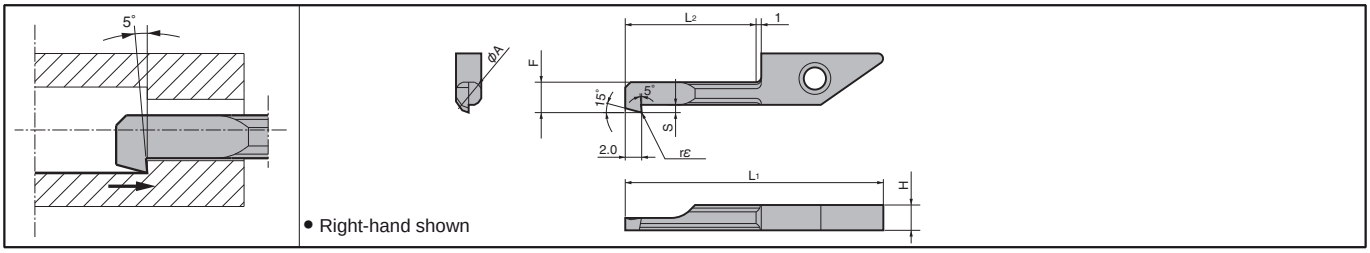
VNB-S (Boring) [Corner- R (rε) Tolerance: + 0/−0.025mm]



VNB (Boring)



VNBT (Back Boring)



Insert Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Insert Grade						
											Cermet	PVD Coated Carbide		Carbide	CBN	PCD	
		øA	H	L1	L2	L3	F	S	rε +0 -0.025		TC60	PR915	PR930	KW10	KBN510	KPD001	KPD010
VNBR	0103-005S	1.0	3.9	26.5	3	7	0.85	0.2	0.05				●				
	0105-005S				5								●				
	01503-005S	1.5			3		1.3						●				
	01505-005S				5								●				
	0206-005S	2.0			6	-	1.8	0.25					●				
	025075-005S	2.5		28.1	7.5		2.1	0.4					●				
	0311-005S	3.0		30.8	11		2.6	0.4					●				
	03515-005S	3.5		34.8	15		2.9	0.5					●				
	0411-005S	4.0		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	0.1				●				
	01505-01S				5								●				
	0206-01S	2.0			6	-	1.8	0.25					●				
	025075-01S	2.5		28.1	7.5		2.1	0.4					●				
	0311-01S	3.0		30.8	11		2.6	0.4					●				
	03515-01S	3.5		34.8	15		2.9	0.5					●				
	0411-01S	4.0		30.8	11		3.5	0.5					●				
	0420-01S			39.8	20								●				
VNBR	0411-02S	4.0	3.9	30.8	11	-	3.5	0.5	0.2				●				
	0420-02S			39.8	20								●				

Recommended Cutting Conditions (In the case of VNB-S)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)							VNB01-S Type VNB015-S Type		VNB02-S Type ⟨ VNB04-S Type		Remarks
	Cermet	PVD Coated Carbide		Carbide	CBN	PCD		Cut: ap (mm), Feed: f (mm/rev)				
	TC60	PR915	PR930	KW10	KBN510	KPD001	KPD010	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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

System-Tip-Bars are sold in 5 piece boxes.

Insert Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Insert Grade						
											Cermet	PVD Coated Carbide		Carbide	CBN	PCD	
		øA	H	L1	L2	F	S	rε			TC60	PR915	PR930	KW10	KBN510	KPD001	KPD010
VNBR	0206-003	2	3.9	26.5	6	1.8	0.25	0.03					●	●			
	0311-003	3		30.8	11	2.6	0.4						●	●			
	0411-003	4		30.8	11	3.5	0.5				●		●	●			
	0420-003			39.8	20						●		●	●			
	0511-003	5		30.8	11	4.5	0.7				●		●	●			
	0520-003			39.8	20						●		●	●			
	0620-003	6		39.8	20	5.3	1.0				●		●	●			
	0630-003			49.8	30						●		●	●			
	0720-003	7		39.8	20	6.2	1.0				●		●	●			
	0730-003			49.8	30						●		●	●			
VNBR	0206-02	2	3.9	26.5	6	1.8	0.25	0.2					●	●			
	0311-02	3		30.8	11	2.6	0.4					●	●	●			
	0411-02	4		30.8	11	3.5	0.5					●	●	●			
	0420-02			39.8	20								●	●			
	0511-02	5		30.8	11	4.5	0.7						●	●			
	0520-02			39.8	20								●	●			
	0620-02	6		39.8	20	5.3	1.0						●	●			
	0630-02			49.8	30								●	●			
	0720-02	7		39.8	20	6.2	1.0						●	●			
	0730-02			49.8	30								●	●			
VNBR	0206-01	2	3.9	26.5	6	1.8	0.25	0.1					●	●			
	0311-01	3		30.8	11	2.6	0.4						●	●			
	0411-01	4				3.5	0.5						●	●			
	0420-01			39.8	20								●	●			
	0511-01	5		30.8	11	4.5	0.7						●	●			
	0520-01			39.8	20								●	●			
	0620-01	6				5.3	1.0						●	●			
	0630-01			49.8	30								●	●			
	0720-01	7		39.8	20	6.2	1.0						●	●			
	0730-01			49.8	30								●	●			
VNBR	0206-003NB	2	3.9	26.5	6	1.8	0.25	0.03					●	●			
	0311-003NB	3		30.8	11	2.6	0.4						●	●			
	0411-003NB	4		30.8	11	3.5	0.5						●	●			
	0420-003NB			39.8	20								●	●			
	0511-003NB	5		30.8	11	4.5	0.7						●	●			
	0520-003NB			39.8	20								●	●			
	0620-003NB	6		39.8	20	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						●			
	0311-02NB	3		30.8	11	2.6	0.4							●			
	0411-02NB	4		30.8	11	3.5	0.5							●		●	●
	0420-02NB			39.8	20									●		●	●
	0511-02NB	5		30.8	11	4.5	0.7							●		●	●
	0520-02NB			39.8	20									●		●	●
	0620-02NB	6		39.8	20	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	3.9	30.8	11	3.6	1.0	0.03					●	●			
	0420-003			39.8	20								●	●			
	0511-003	5		30.8	11	4.6	1.3						●	●			
	0520-003			39.8	20								●	●			
VNBTR	0411-01	4	3.9	30.8	11	3.6	1.0	0.1					●	●			
	0420-01			39.8	20								●	●			
	0511-01	5		30.8	11	4.6	1.3						●	●			
	0520-01			39.8	20								●	●			

Recommended Cutting Conditions (In the case of VNB / VNB-NB / VNBT)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)							VNB02 Type		VNB03 Type		VNB04 VNBT04 Type		VNB05 VNB06 VNB07 VNBT05 Type		Remarks
	Cermet	PVD Coated Carbide		Carbide	CBN	PCD		Cut: ap(mm), Feed: f(mm/rev)								
	TC60	PR915	PR930	KW10	KBN510	KPD001	KPD010	ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	☆ 60~120	☆ 50~150	★ 30~100					~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	☆ 50~100	☆ 50~150	★ 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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

System-Tip-Bars are sold in 5 piece boxes.

SVN-N (without side stopper)

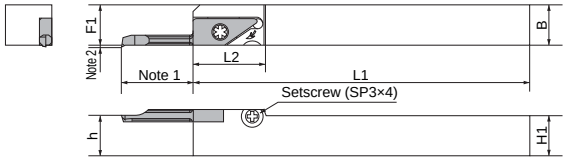


Fig.1 (SVN-N)

SVNS-N (without side stopper / without setscrew)

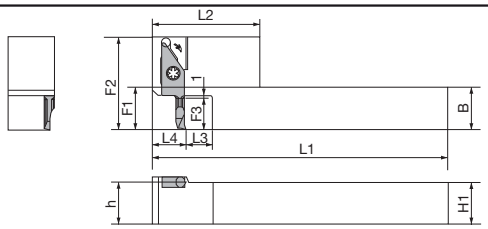


Fig.2 (SVNS-N)

● Right-hand shown

R-hand Insert for R-hand Toolholder.

Note 1 & Note 2 : For insert dimensions, see page ➔ **F10~F11**

Toolholder Dimensions

Description		Std.	Dimension (mm)									Drawing	Spare Parts			Applicable Inserts
			H1=h	B	L1	L2	L3	L4	F1	F2	F3		Clamp Screw	Wrench	Setscrew	➔ **F10~F11** ➔ **G33** ➔ **G56** ➔ **J27**
														FT  LTW		
SVNR	**1010H-12N**	●	10	10	100	22	-	-	10	-	-	Fig.1	SB-3080TR	FT-10	SP3×4	VNBR○○○○-○○○
	1212K-12N	●	12	12					12							VNBTR○○○○-○○○
	1616K-12N	●	16	16	125				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	29	6	Fig.2	SB-3080TR	LTW-10S	-	(VNBR○○06-○○○)*
	1010K-12-11N	●	10	10	125		10	12	10	33	11					(VNBR○○11-○○○)* (VNBTR○○11-○○○)* (VNGR○○○○-11)* (VNTR○○○-11)*
	1212M-12-06N	●	12	12	150		10	12	12	29	6					(VNBR○○06-○○○)*
	1212M-12-11N	●	12	12	150		10	12	12	33	11					(VNBR○○11-○○○)* (VNBTR○○11-○○○)* (VNGR○○○○-11)* (VNTR○○○-11)*
	1212M-12-20N	●	12	12	150		10	13	12	42	20					(VNBR○○20-○○○)* (VNBTR○○20-○○○)* (VNGR○○○○-20)*
	1616M-12-06N	●	16	16	150		16	12	16	29	6					(VNBR○○06-○○○)*
	1616M-12-11N	●	16	16	150		16	12	16	33	11					(VNBR○○11-○○○)* (VNBTR○○11-○○○)* (VNGR○○○○-11)* (VNTR○○○-11)*
	1616M-12-20N	●	16	16	150		16	13	16	42	20					(VNBR○○20-○○○)* (VNBTR○○20-○○○)* (VNGR○○○○-20)*

1. SVN-N (without side stopper) retains high index accuracy by simple restraint.
2. SVN-N (without side stopper) has a setscrew SP3X4. Changing the setscrew SP3X4 to a screw HS3X4 (sold separately) enables the holder to be used as a binding effect holder like with the side stopper holder.
3. In case of machining insert emphasizing on binding effect, (e.g. varying loading direction of under cutting, internal and external or face cutting by one tool) please use [SVN and SVNS Holders] with attached side stoppers.

All System Tip-Bar Inserts are used with a SVNSR-N Toolholder, 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 F3 dimension of the toolholder corresponds to the L2 dimension of the insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SVN Square Shank (Straight)

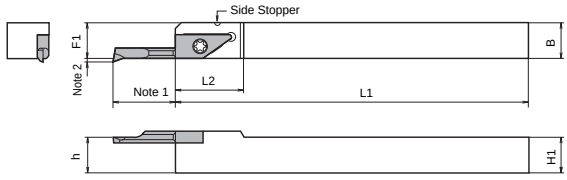


Fig.1 (SVN)

SVNS Square Shank (L-shape)

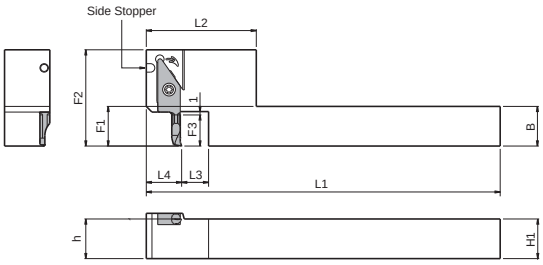


Fig.2 (SVNS)

• Right-hand shown

R-hand Insert for R-hand Toolholder.

Note 1 & Note 2 : For insert dimensions, see page F10~F11

Toolholder Dimensions

Description		Std.	Dimension (mm)									Drawing	Spare Parts				Applicable Inserts
			H1=h	B	L1	L2	L3	L4	F1	F2	F3		Clamp Screw	Wrench	Screw (Side Stopper)	Wrench	F10~F11 G33 G56 J27
SVNR	1010H-12	●	10	10	100	22	-	-	10	-	-	Fig.1	SB-3080TR	FT-10	HS3×4	LW-1.5	VNBR○○○○-○○○
	1212K-12	●	12	12	125				12								VNBTR○○○○-○○○
	1616K-12	●	16	16					16						HS3×8		VNGR○○○○-○○
	2020K-12	●	20	20					20						HS3×12		VNFGR○○○○-○○
	2525M-12	●	25	25	150				25						HS3×16		VNTR○○○-○○
SVNSR	1010K-12-06	●	10	10	125	45	10	12	10	29	6	Fig.2	SB-3080TR	LTW-10S	HS3×4	LW-1.5	(VNBR○○06-○○○)*
	1010K-12-11	●	10	10	125		10	12	10	33	11						(VNBR○○11-○○○)* (VNBTR○○11-○○○)* (VNGR○○○○-11)* (VNTR○○○-11)*
	1212M-12-06	●	12	12	150	45	10	12	12	29	6		SB-3080TR	LTW-10S	HS3×4	LW-1.5	(VNBR○○06-○○○)*
	1212M-12-11	●	12	12	150		10	12	12	33	11						(VNBR○○11-○○○)* (VNBTR○○11-○○○)* (VNGR○○○○-11)* (VNTR○○○-11)*
	1212M-12-20	●	12	12	150		10	12.5	12	42	20						(VNBR○○20-○○○)* (VNBTR○○20-○○○)* (VNGR○○○○-20)*
	1616M-12-06	●	16	16	150	45	16	12	16	29	6		SB-3080TR	LTW-10S	HS3×4	LW-1.5	(VNBR○○06-○○○)*
	1616M-12-11	●	16	16	150		16	12	16	33	11						(VNBR○○11-○○○)* (VNBTR○○11-○○○)* (VNGR○○○○-11)* (VNTR○○○-11)*
	1616M-12-20	●	16	16	150		16	12.5	16	42	20						(VNBR○○20-○○○)* (VNBTR○○20-○○○)* (VNGR○○○○-20)*

All System Tip-Bar Inserts are used with a SVNSR Toolholder, 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 F3 dimension of the toolholder corresponds to the L2 dimension of the insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S…SVN-N Round Shank (Standard, without side stopper)

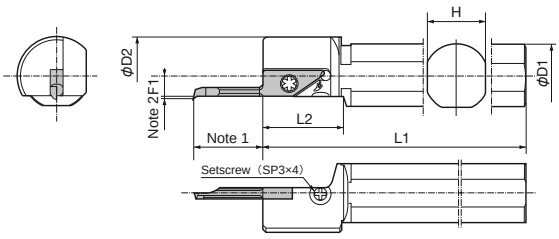


Fig.1 (S…SVN-N)

S…SVN-SN Round Shank (Straight, without side stopper)

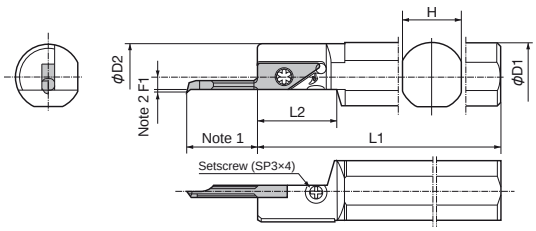


Fig.2 (S…SVN-SN)

● Right-hand shown

R-hand Insert for R-hand Toolholder.

Note 1 & Note 2 : For insert dimensions, see page ➔ **F10~F11**

S…SVN Round Shank (Standard)

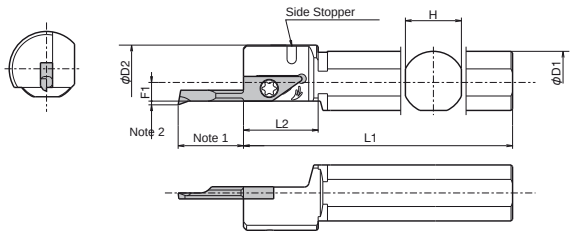


Fig.3 (S…SVN)

S…SVN-S Round Shank (Straight)

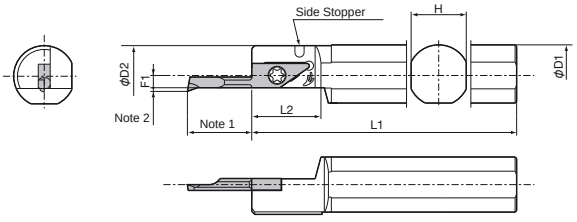


Fig.4 (S…SVN-S)

● Right-hand shown

R-hand Insert for R-hand Toolholder.

Note 1 & Note 2 : For insert dimensions, see page ➔ **F10~F11**

Toolholder Dimensions

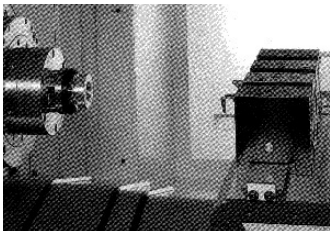
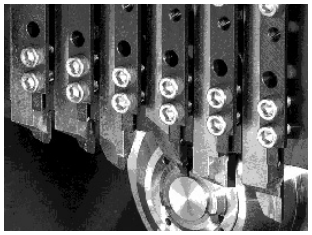
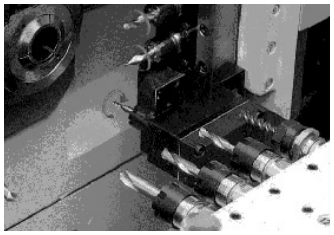
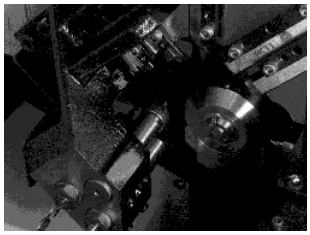
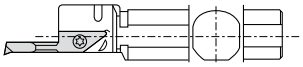
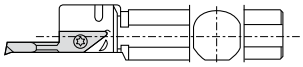
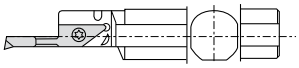
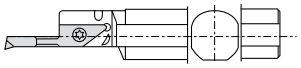
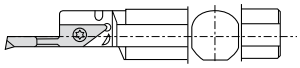
Description	Std.	Dimension (mm)							Drawing	Spare Parts					Applicable Inserts
		øD1	øD2	H	L1	L2	F1			Clamp Screw	Wrench	Screw (Side Stopper)	Setscrew	Wrench	➔ **F10~F11** ➔ **G33** ➔ **G56** ➔ **J27**
S12F-SVNR12N	●	12	20	11	80	23	4		Fig.1	SB-3080TR	FT-10	-	SP3X4	-	VNBR○○○○-○○ VNBTR○○○○-○○○ VNGR○○○○-○○ VNFGR○○○○-○○ VNTR○○○-○○
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										
S12F-SVNR12	●	12	20	11	80	23	4		Fig.3	SB-3080TR	FT-10	HS3X4	-	LW-1.5	
S14G-SVNR12	●	14	20	13	90										
S16H-SVNR12	●	16	24	15	100		6					HS3X8			
S19H-SVNR12	●	19.05	24	17	100	24									
S19N-SVNR12	●				160										
S20H-SVNR12	●	20	24	18	100										
S25H-SVNR12	●	25.4	30	23	100							HS3X12			
S25Q-SVNR12	●				180										
S19H-SVNR12S	●	19.05	18.5	17	100	23	4		Fig.4	SB-3080TR	FT-10	HS3X4	-	LW-1.5	
S20H-SVNR12S	●	20	19.5	18											
S22K-SVNR12S	●	22	21.5	20	125										
S25.0G-SVNR12S	●	25	24.5	23	90										

1. S…SVN-N and S…SVN-SN (without side stopper) retain high index accuracy by simple restrain.
2. S…SVN-N and S…SVN-SN (without side stopper) have a setscrew SP3X4. Changing the setscrew SP3X4 to a screw HS3X4 (sold separately) enables the holder to be used as a binding effect holder like with the side stopper holder.
3. In case of machining insert emphasizing on binding effect, (e.g. varying loading direction of under cutting, internal and external or face cutting by one tool) please use [S...SVN and S...SVN-S Holders] with attached side stoppers.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

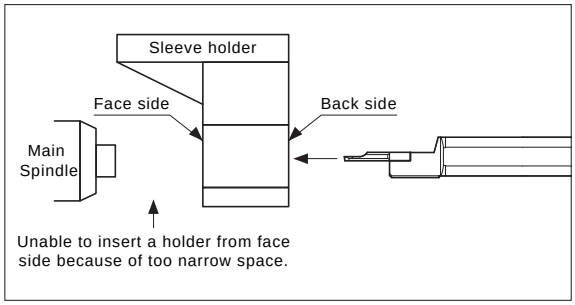
Selection of Solid Tip-Bars

Recommended toolholder may change according to machines used and actual position.
Automatic Lathes have various toolpost types other than those below.

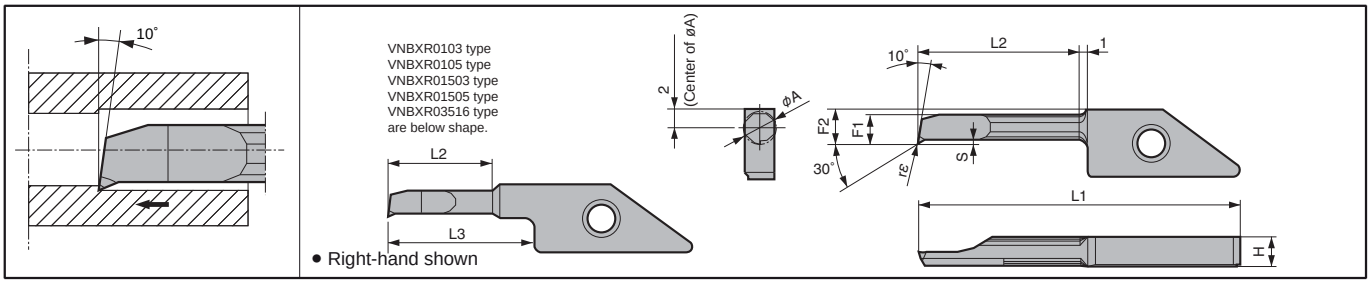
Gang-Type (Horizontal)	Gang-Type	Gang-Type (Front Loading Sleeve Type)	Gang-Type (Back Loading Sleeve Type)
			
Square Shank (Straight) 	Square Shank (L-shape) 	Square Shank	Square Shank
Round Shank (Standard) 		Round Shank (Standard) 	Round Shank (Standard)
Round Shank (Straight) 		Round Shank (Straight) 	Round Shank (Straight) 

Q: There are standard type (head dia. Is larger than shank) and straight type for round shank.
What are the usages for each one?

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. on the right).
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.



VNBX-S (Boring) [Corner-R (rε) Tolerance: ＋ 0/−0.025mm]



Insert Dimensions (VNBX-S)

Description		Min. Bore Dia.	Dimension (mm)								Insert Grade							
											Cermet	PVD Coated Carbide			Carbide	CBN	PCD	
		øA	H	L1	L2	L3	F1	F2	S	rε +0 -0.025	TC60	PR630	PR915	PR930	KW10	KBN510	KPD001	KPD010
VNBXR	0103-005S	1.0	3.9	26.5	3	7	0.85	2.5	0.2	0.05				●				
	0105-005S				5									●				
	01503-005S	1.5			3		1.3	2.75						●				
	01505-005S				5									●				
	0206-005S	2.0			6	-	1.8	3	0.25					●				
	0311-005S	3.0		30.8	11		2.6	3.5	0.4					●				
	03511-005S	3.5					3.1	3.75	0.45					●				
	03516-005S			39.8	16	21								●				
	0411-005S	4.0		30.8	11	-	3.5	4	0.5					●				
	0420-005S			39.8	20									●				
VNBXR	01503-01S	1.5	3.9	26.5	3	7	1.3	2.75	0.2	0.1				●				
	01505-01S				5									●				
	0206-01S	2.0			6	-	1.8	3	0.25					●				
	0311-01S	3.0		30.8	11		2.6	3.5	0.4					●				
	03511-01S	3.5					3.1	3.75	0.45					●				
	03516-01S			39.8	16	21								●				
	0411-01S	4.0		30.8	11	-	3.5	4	0.5					●				
	0420-01S			39.8	20									●				
VNBXR	0411-02S	4.0	3.9	30.8	11	-	3.5	4	0.5	0.2				●				
	0420-02S			39.8	20									●				

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								VNBX01-S Type VNBX015-S Type		VNBX02-S Type ⌇ VNBX04-S Type		Remarks
	Cermet	PVD Coated Carbide			Carbide	CBN	PCD		Cut: ap (mm), Feed: f (mm/rev)				
	TC60	PR630	PR915	PR930	KW10	KBN510	KPD001	KPD010	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

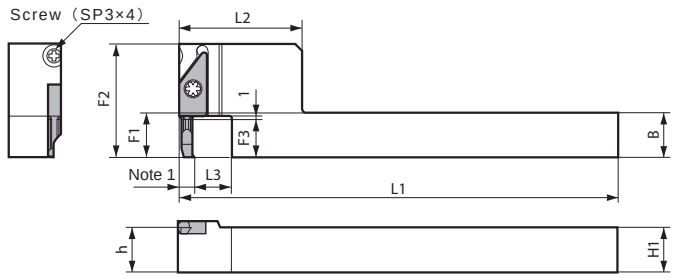
Attachment holder for VNBX-S System Tip-Bar

1. Attachment holder of VNBX-S System Tip-Bar is below three types (See page **F17**).
   ① SVNS-XN Type (without Side Stopper)
   ② S…SVN-XN Type (without Side Stopper)
   ③ S…SVN-SXN Type (without Side Stopper)
2. Above holders assure high index accuracy by easy restraint.
3. Clamp screws (SP3×4) are attached. Holders without Side Stopper can be used as a binding effect holder when removing the clamp screws and inserting screws (HS3×4: sold separately) with a wrench (LW-1.5: sold separately).

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

System-Tip-Bars are sold in 5 piece boxes.

SVNS-XN Square Shank (L-shape)



• Right-hand shown

R-hand insert for R-hand Toolholder.

Note 1 : The dimension of Note 1 is same size as the applicable insert (VNBX ➡ **F16**) F2 dimension.

Toolholder Dimensions (L-shape square shank applicable to gang tool post)

Description	Std.	Dimension (mm) H1=h	B	L1	L2	L3	F1	F2	F3	Spare Parts Clamp Screw	Wrench	Screw	* Applicable Inserts ➡ F16
SVNSR 1010K-12-06XN	●	10	10	125	45	10	10	29	6	SB-3080TR	LTW-10S	SP3×4	(VNBXR01..~02..)
1010K-12-11XN	●							33	11				(VNBXR○○11..)
1212M-12-06XN	●	12	12	150		10	12	29	6				(VNBXR01..~02..)
1212M-12-11XN	●							33	11				(VNBXR○○11..)
1212M-12-20XN	●							42	20				(VNBXR03516 / 0420..)
1616M-12-06XN	●	16	16			16	16	29	6				(VNBXR01..~02..)
1616M-12-11XN	●							33	11				(VNBXR○○11..)
1616M-12-20XN	●							42	20				(VNBXR03516 / 0420..)

* All System Tip-Bar Inserts are used with 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)

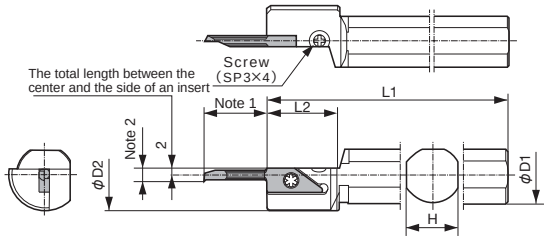


Fig.1 (S…SVN-XN)

S…SVN-SXN (Round Shank: Straight type)

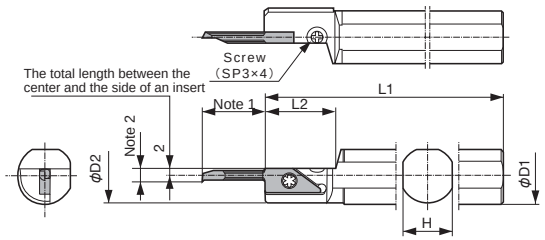


Fig.2 (S…SVN-SXN)

• Right-hand shown

R-hand insert for R-hand Toolholder.

Note 1 : The dimension of Note 1 shows the applicable insert (VNBX ➡ **F16**) L2 dimension + 1 mm.
Note 2 : The dimension of Note 2 is the same as the applicable insert (VNBX ➡ **F16**) F2 dimension.

Toolholder Dimensions (Holder center axis core and insert center are coaxial type)

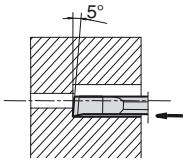
Description	Std.	Dimension (mm) øD1	øD2	H	L1	L2	Drawing	Spare Parts Clamp Screw	Wrench	Screw	Applicable Inserts ➡ F16
S12F -SVNR12XN	●	12	20	11	80	23	Fig.1	SB-3080TR	FT-10	SP3×4	VNBXR···
S14G -SVNR12XN	●	14		13	90						
S15H -SVNR12XN	●	15.875	24	15	100						
S16H -SVNR12XN	●	16									
S19H -SVNR12XN	●	19.05		17		24					
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		
S20H -SVNR12SXN	●	20	19.5	18							
S22K -SVNR12SXN	●	22	21.5	20	125						
S25.0G -SVNR12SXN	●	25	24.5	23	90						

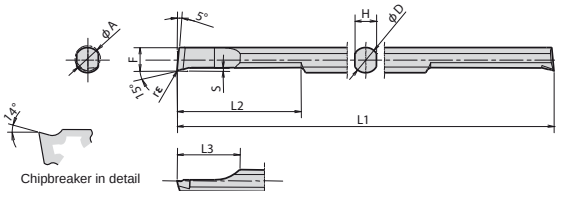
* Reminder of applicable insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

2 Edges Tip-Bar HPB / HPBT

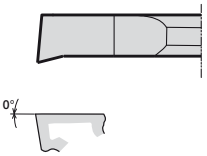
HPB (Boring)



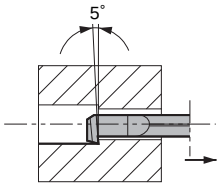


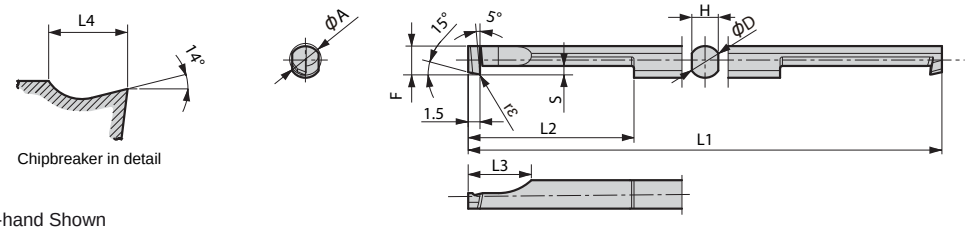
• Right-hand Shown

NB Type Top Shape (without Chipbreaker)



HPBT (Back Boring)





• Right-hand Shown

Tip-Bar Dimensions

Description		Min. Bore Dia.	Dimension (mm)								Insert Grade				Refer Page for Applicable Sleeve
											PVD Coated Carbide		Carbide		
											PR930		KW10		
		øA	øD	H	L1	L2	L3	F	S	rε	R	L	R	L	
HPB R/L	0202-005	2	2	1.7	50	10	5	1.75	0.25	0.05 +0 -0.02	●	●	●		F19
	0303-005	3	3	2.5		15	7	2.7	0.3		●	●	●		
	0404-005	4	4	3.35	60	20	10	3.65	0.5		●	●	●		
	0505-005	5	5	4.3	70	25	12	4.55			●	●	●		
	0606-005	6	6	5.2				5.5			●	●	●		
	0707-005	7	7	6.2	80			6.45			●	●	●		
HPB R/L	0202-005NB	2	2	1.7	50	10	5	1.75	0.25	0.05 +0 -0.02	●		●		F19
	0303-005NB	3	3	2.5		15	7	2.7	0.3		●		●		
	0404-005NB	4	4	3.35	60	20	10	3.65	0.5		●		●		
	0505-005NB	5	5	4.3	70	25	12	4.55			●		●		
	0606-005NB	6	6	5.2				5.5			●		●		
	0707-005NB	7	7	6.2	80			6.45			●		●		
HPBT R/L	0404-005	4	4	3.35	60	21	8	3.65	1.0	0.05 +0 -0.02	●	●	●	●	F19
	0505-005	5	5	4.3	70	26		4.55	1.3		●	●	●	●	

Recommended Cutting Conditions

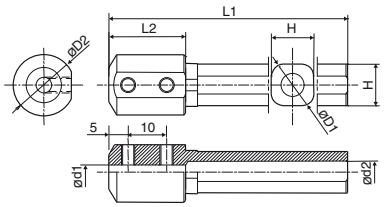
(Cut: ap (mm), Feed: f (mm/rev))

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)		HPB02 Type		HPB03 Type		HPB04 Type HPBT04 Type		HPB05 / 06 / 07 Type HPBT05 Type		Remarks
	PVD Coated Carbide	Carbide	Cut: ap (mm), Feed: f (mm/rev)								
	PR930	KW10	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	-	~0.3	~0.02	~0.4	~0.03	~0.45	~0.05	~0.5	~0.07	
Non-ferrous Metals	-	30~100	~0.3	~0.05	~0.4	~0.06	~0.45	~0.1	~0.5	~0.15	

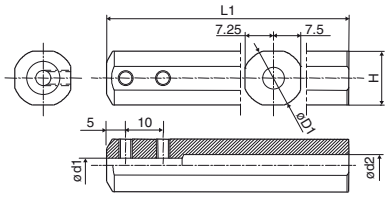
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Tip-Bar (PSG) is sold in 1 piece boxes.

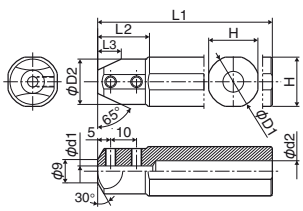
Applicable Sleeve



(2 Edges Tip-Bar installation side) Fig.1



(2 Edges Tip-Bar installation side) Fig.2



(2 Edges Tip-Bar installation side) Fig.3

Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Machine Manufacturer	Ref. Page for 2 Edges Tip-Bar (Ref. Page for Other Application 2 Edges Tip-Bar)
			*ød1	øD1	øD2	ød2	H	L1	L2	L3		Screw	Wrench		
PSH	0212-80	●	2	12	16	6	11	80	20	-	Fig.1	HS3×4P	LW-1.5	(General use)	Boring (HPB Type) ⇒ **F18** Internal Back Boring (HPBT Type) ⇒ **F18** Internal Grooving (HPG Type) ⇒ **G30** Internal Face Grooving (HPFG Type) ⇒ **G53** Internal Threading (HPT Type) ⇒ **J24**
	0312-80	●	3												
	0412-80	●	4									HS4×4P	LW-2		
	0512-80	●	5												
	0612-80	●	6			8									
	0712-80	●	7												
PSH	0216-100	●	2	16	-	6	15	100	-	-	Fig.2	HS3×4P	LW-1.5		
	0316-100	●	3												
	0416-100	●	4									HS4×4P	LW-2		
	0516-100	●	5												
	0616-100	●	6			8									
	0716-100	●	7												
PSH	0220-120	●	2	20	17.5	6	19	120	20	11	Fig.3	HS3×4P	LW-1.5	Amada Wasino Eguro Citizen Machinery Precision Tsugami Miyano (General use)	
	0320-120	●	3												
	0420-120	●	4							9		HS4×4P	LW-2		
	0520-120	●	5												
	0620-120	●	6			8				7.5					
	0720-120	●	7												
PSH	0225.0-135	●	2	25	18	6	24	135	23	11.5	Fig.3	HS3×4P	LW-1.5	Amada Wasino Eguro Precision Tsugami Miyano (General use)	
	0325.0-135	●	3												
	0425.0-135	●	4							9.5		HS4×4P	LW-2		
	0525.0-135	●	5												
	0625.0-135	●	6			8				8					
	0725.0-135	●	7												
PSH	0219-120	●	2	19.05	17.5	6	18	120	20	11	Fig.3	HS3×4P	LW-1.5	Citizen Machinery	
	0319-120	●	3												
	0419-120	●	4							9		HS4×4P	LW-2		
	0519-120	●	5												
	0619-120	●	6			8				7.5					
	0719-120	●	7												
PSH	0225-120	●	2	25.4	18	6	24.4	120	23	11.5	Fig.3	HS3×4P	LW-1.5		
	0325-120	●	3												
	0425-120	●	4							9.5		HS4×4P	LW-2		
	0525-120	●	5												
	0625-120	●	6			8				8					
	0725-120	●	7												
PSH	0222-135	●	2	22	18	6	21	135	22	11.5	Fig.3	HS3×4P	LW-1.5	Star Micronics Nomura VTC	
	0322-135	●	3												
	0422-135	●	4							9.5		HS4×4P	LW-2		
	0522-135	●	5												
	0622-135	●	6			8				8					
	0722-135	●	7												
PSH	0223-120	●	2	23	18	6	22	120	22	11.5	Fig.3	HS3×4P	LW-1.5	Nomura VTC	
	0323-120	●	3												
	0423-120	●	4							9.5		HS4×4P	LW-2		
	0523-120	●	5												
	0623-120	●	6			8				8					
	0723-120	●	7												

*: Length of ød1…20 mm (PH02, PH03, PH04 type)
…25 mm (PH05, PH06, PH07 type)

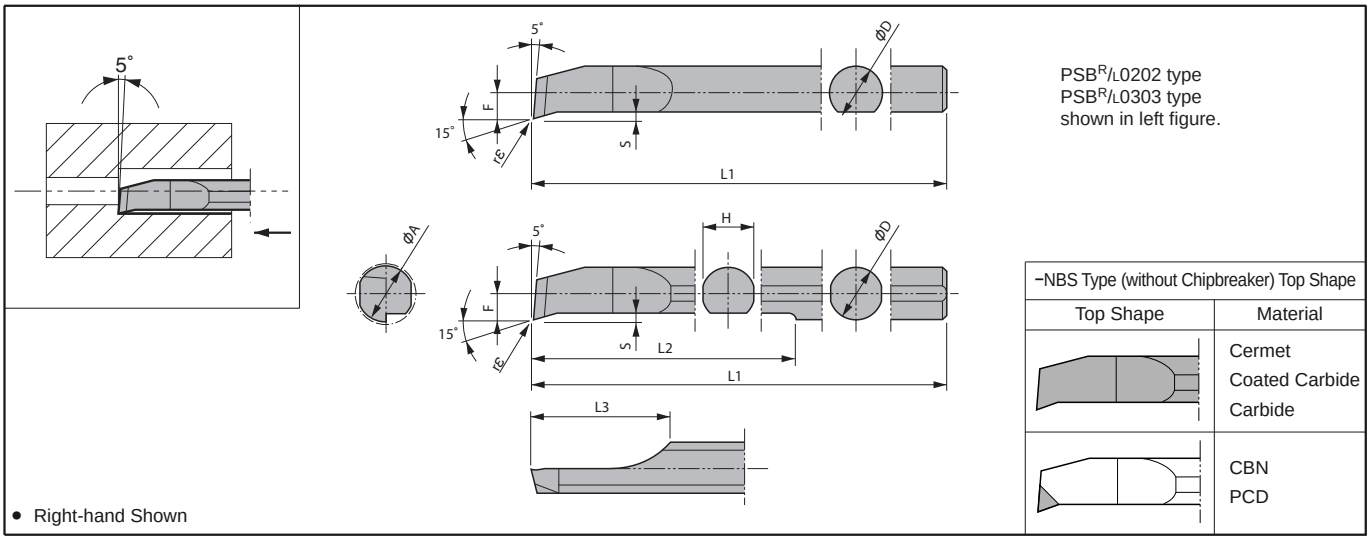
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

• Choose sleeves (ød1) to meet with øD dimension of 2 Edges Tip-Bar.
• Machine manufactures in random order.

Tip-Bar for Micro Boring

PSB-S (Boring) <Adjustable Overhang Length>

This insert will be switched to **HPB** Type (2 Edges. Ref. Page **F18**).



PSB$^{R}_{L}$0202 type
PSB$^{R}_{L}$0303 type
shown in left figure.

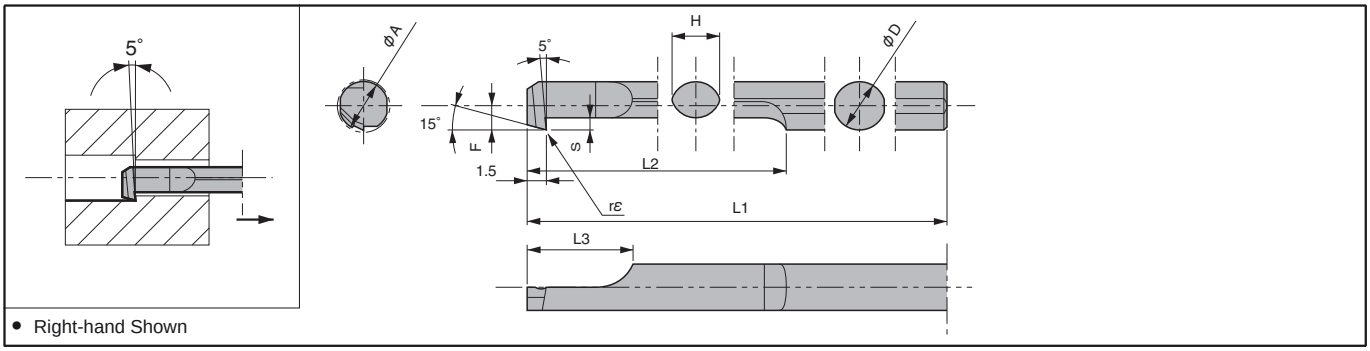
• Right-hand Shown

−NBS Type (without Chipbreaker) Top Shape

Top Shape	Material
	Cermet Coated Carbide Carbide
	CBN PCD

PSBT-S (Back Boring) <Adjustable Overhang Length>

This insert will be switched to HPBT Type (2 Edges. Ref. Page **F18**).



• Right-hand Shown

Tip-Bar Dimension

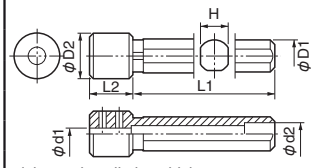
Description		Min. Bore Dia.	Dimension (mm)								Insert Grade										
											Cermet	PVD Coated			Carbide	CBN			PCD	
		øA	øD	H	L1	L2	L3	F	S	rε	TC60	PR630	PR915	PR930	KW10	KBN10B	KBN510	KBN525	KPD001	KPD010
PSB$^{R}_{L}$	0202-50S	2	1.8	-	50	-	5	0.9	0.25	0.05				●	R					
	0303-50S	3	2.8				7	1.4	0.3					●	R					
	0404-60S	4	3.8	3.6	60	30	10	1.9	0.5		R			●	R					
	0505-70S	5	4.8	4.4	70	40	12	2.4			R			●	R					
	0606-70S	6	5.8	5.2		45		2.9			R			●	R					
	0707-80S	7	6.8	6.2	80	50		3.4			R			●	R					
PSB$^{R}_{L}$	0202-50NBS	2	1.8	-	50	-	5	0.9	0.25	0.05				R	R					
	0303-50NBS	3	2.8				7	1.4	0.3					R	R	R	R	R		
	0404-60NBS	4	3.8	3.6	60	30	10	1.9	0.5		R			R	R	R	R	R	R	R
	0505-70NBS	5	4.8	4.4	70	40	12	2.4			R			R	R	R	R	R	R	R
	0606-70NBS	6	5.8	5.2		45		2.9			R			R	R	R	R	R	R	R
	0707-80NBS	7	6.8	6.2	80	50		3.4			R			R	R	R	R	R	R	R
PSBT$^{R}_{L}$	0415-60S	4	3.8	3.6	60	20	8	1.9	1.0	0.05				●	●					
	0515-70S	5	4.8	4.6	70			2.4	1.3					●	●					

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Tip-Bar (PSG) is sold in 1 piece boxes.

Applicable Sleeve

This sleeve is for 1-Edge Tip-Bar. For 2-Edges Tip-Bar, use → **F19**.

Shape	Description	(Previous Description)	Std.	Dimension (mm) øD1	øD2	ød1	ød2	H	L1	L2	Spare Parts Screw	Spare Parts Wrench	Applicable Tip-Bar → **F20**
 (Tip-Bar installation side)	**PH 0212-60**	**PH -0212**	●	12	19	1.8	6	11	60	20	HS3×4	LW-1.5	PSB[R]0202-50S / NBS
	0312-60	**-0312**	●			2.8							PSB[R]0303-50S / NBS
	0412-60	**-0412**	●			3.8					HS4×4	LW-2	PSB[R]0404-60S / NBS PSBT[R]0415-60S
	0512-60	**-0512**	●			4.8							PSB[R]0505-70S / NBS PSBT[R]0515-70S
	0612-60	**-0612**	●			5.8	8						PSB[R]0606-70S / NBS
	0712-60	**-0712**	●			6.8							PSB[R]0707-80S / NBS
	PH 0216-80	**PH -0216**	●	16	22	1.8	Rp¼ (PS¼)	14	80	20	HS3×4	LW-1.5	PSB[R]0202-50S / NBS
	0316-80	**-0316**	●			2.8							PSB[R]0303-50S / NBS
	0416-80	**-0416**	●			3.8					HS4×4	LW-2	PSB[R]0404-60S / NBS PSBT[R]0415-60S
	0516-80	**-0516**	●			4.8							PSB[R]0505-70S / NBS PSBT[R]0515-70S
	0616-80	**-0616**	●			5.8							PSB[R]0606-70S / NBS
	0716-80	**-0716**	●			6.8							PSB[R]0707-80S / NBS

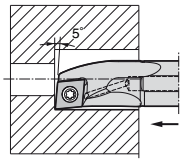
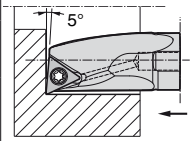
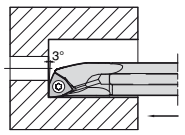
Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min) Cermet TC60	PVD Coated Carbide PR915	PR930	Carbide KW10	CBN KBN510 KBN525	PCD KPD001	KPD010	PSB02 Type		PSB03 Type		PSB04 PSBT04 Type		PSB05 PSB06 PSB07 PSBT05 Type		Remarks
								Cut: ap (mm), Feed: f (mm/rev)								
								ap	f	ap	f	ap	f	ap	f	
Carbon Steel / Alloy Steel	☆ 60~120		★ 30~100					~0.3	~0.03	~0.4	~0.04	~0.45	~0.07	~0.5	~0.1	Coolant
Stainless Steel	☆ 50~100		★ 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	
Hard Materials					★ ~100			-	-	~0.07	~0.03	~0.10	~0.05	~0.15	~0.07	

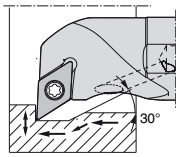
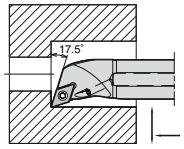
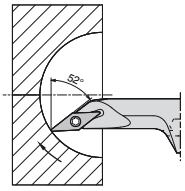
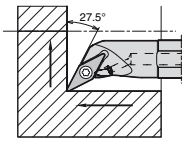
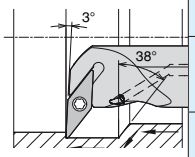
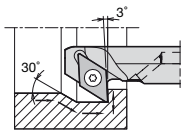
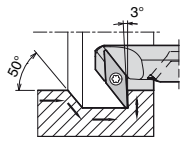
★: 1st Recommendation ☆: 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Dynamic Bar

Application	Overview Shape	Boring Bar Type	Shank Type / Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Min. Bore Dia. øA 5	6	7	8	10	12	13	14	16	18	20	22	23	25	26	27	30	31	32	34	40	50	Refer Page for Toolholder
Boring / Internal Facing		A...SCLC-AE	Excellent L/D = ~5.5	●						●	●		●		●		●				●							F24
		S...SCLC-AE	Excellent L/D = ~5.5		○	●	●	●	●																			
		S...SCLC-A	Steel L/D = ~4		○					●	●		●		●		●				●							
		C...SCLC-A	Carbide L/D = ~7		○	●	●	●	●																			
		E...SCLC-A	Carbide L/D = ~7	●						●	●		●		●		●				●							
		A...SCLP-AE	Excellent L/D = ~5.5	●							●		●	●	●		●				●							F26
		S...SCLP-A	Steel L/D = ~4		○						●		●	●	●		●				●							
		E...SCLP-A	Carbide L/D = ~7	●							●		●	●	●		●				●							
		E...STLP-A	Carbide L/D = ~7	●					●	●	●		●		●		●				●							F32
		C...STLB-A			○				●																			
		A...STLP-AE	Excellent L/D = ~5.5	●						●	●		●		●		●				●							
		S...STLB-AE			○				●																			
		S...STLB(P)-A	Steel L/D = ~4		○				●	●	●		●		●		●				●							
		A...STLC-AE	Excellent L/D = ~5.5	●						●	●		●		●		●											F34
		S...STLC-A	Steel L/D = ~4		○					●	●		●		●		●											
Boring		S...SWUB(P)-A	Steel L/D = ~4		○		●	●	●	●	●		●	●	●	●	●											F40
		S...SWUB-AE	Excellent L/D = ~5.5		○		●	●	●	●																		
		A...SWUB(P)-AE	Excellent L/D = ~5.5	●							●		●	●	●	●	●											
		C...SWUB-A	Carbide L/D = ~7		○		●	●	●																			
		E...SWUB(P)-A	Carbide L/D = ~7	●						●	●		●		●	●	●											

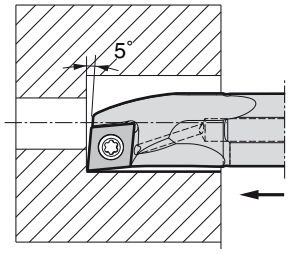
Dynamic Bar

Application	Overview Shape	Boring Bar Type	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Min. Bore Dia. øA 5	6	7	8	10	12	13	14	16	18	20	22	23	25	26	27	30	31	32	34	40	50	Refer Page for Toolholder
Copying		A...SDUC-AE	Excellent L/D = ~5.5	●									●	●		●		●			●			●				F28
		S...SDUC-A	Steel L/D = ~4		○								●	●		●		●			●			●				
		E...SDUC-A	Carbide L/D = ~7	●									●	●		●			●		●			●				
		A...SDQC-AE	Excellent L/D = ~5.5	●							●		●			●			●					●				F30
		S...SDQC-A	Steel L/D = ~4		○							●		●		●			●					●				
		E...SDQC-A	Carbide L/D = ~7	●								●		●		●			●		●			●				
		A...SVJB(C)-AE	Excellent L/D = ~5.5	●										●		●			●			●				●	●	F36
		A...SVJP-AE		●										●														
		S...SVJB(C)-A	Steel L/D = ~4		○									●		●			●			●				●	●	
		S...SVJP-A			○									●														
		A...SVPB(C)-AE	Excellent L/D = ~5.5	●										●	●		●			●			●			●		
		S...SVPB(C)-A	Steel L/D = ~4		○									●	●		●			●			●			●		
		E...SVPB(C)-A	Carbide L/D = ~7	●										●	●		●			●			●			●		
		A...SVUB(C)-AE	Excellent L/D = ~5.5	●										●		●			●						●	●		F38
		S...SVUB(C)-A	Steel L/D = ~4		○									●		●			●						●			
		E...SVUB(C)-A	Carbide L/D = ~7	●											●		●			●			●					
Back Copying		A...SDZC-AE	Excellent L/D = ~5.5	●									●	●		●		●			●			●				F31
		S...SDZC-A	Steel L/D = ~4		○								●	●		●		●			●			●				
		E...SDZC-A	Carbide L/D = ~7	●									●	●		●	●		●					●				
		A...SVZB(C)-AE	Excellent L/D = ~5.5	●										●		●			●						●	●		F38
		S...SVZB(C)-A	Steel L/D = ~4		○									●		●			●						●	●		

Dynamic Bar [CC □□ Insert]

A / S-SCLC-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



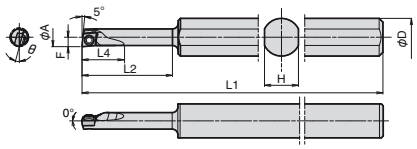


Fig.1

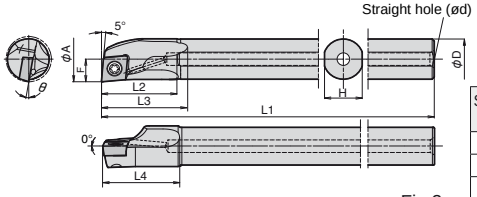


Fig.2

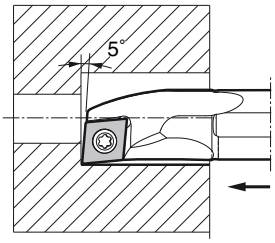
Shank Dia. øD	Straight hole Dia. ød
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SCLC-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



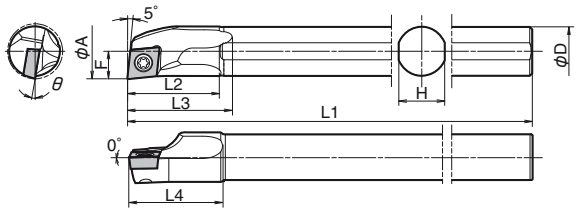


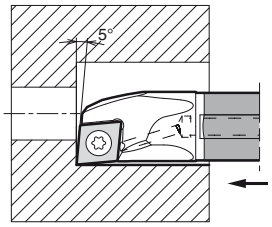
Fig.3

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

C / E-SCLC-A Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



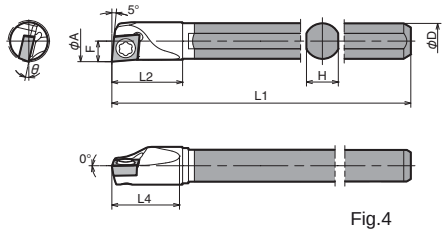


Fig.4

2° for C04G-SCLC□03-05A

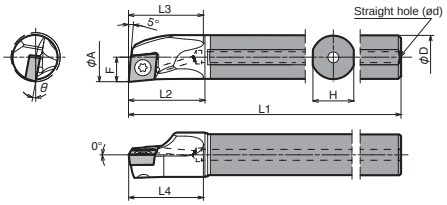


Fig.5

Shank Dia. øD	Straight hole Dia. ød
ø8	ø3
ø10	
ø12	ø4
ø16	
ø20	ø6
ø25	

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	θ	Standard Corner-R (re)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	S10H-SCLCR/L03-05AE	●	●	5	10	9	100	24	-	11	2.5	15°	0.2	No	Fig.1	SB-1635TR	FT-6
	S10H-SCLCR/L03-06AE	●	●	6				28		13	3	13°					
	S10H-SCLCR/L04-07AE	●	●	7				32		15	3.5					SB-2035TR	
	S10H-SCLCR/L04-08AE	●	●	8				37		15	4	11°					
	A08X-SCLCR/L06-10AE	●	●	10	8	7	120	16	20	17	5	14°	0.4	Yes	Fig.2	SB-2545TR	FT-8
	A10L-SCLCR/L06-12AE	●	●	12	10	9	140	20	25	21	6	12°					
	A12M-SCLCR/L06-14AE	●	●	14	12	11	150	24	30	25	7	10°					
	A16Q-SCLCR/L09-18AE	●	●	18	16	15	180	30	34	31	9					SB-4065TR	FT-15
	A20R-SCLCR/L09-22AE	●	●	22	20	19	200	36	49	37	11	8°					
	A25S-SCLCR/L09-27AE	●	●	27	25	24	250	46	55	46	13.5	6°					
Steel	S08X-SCLCR/L06-10A	●	●	10	8	7	120	16	20	17	5	14°	0.4	No	Fig.3	SB-2545TR	FT-6
	S10L-SCLCR/L06-12A	●	●	12	10	9	140	20	25	21	6	12°					
	S12M-SCLCR/L06-14A	●	●	14	12	11	150	24	30	25	7	10°					
	S16Q-SCLCR/L09-18A	●	●	18	16	15	180	30	34	31	9	10°				SB-4065TR	FT-15
	S20R-SCLCR/L09-22A	●	●	22	20	19	200	36	49	37	11	8°					
	S25S-SCLCR/L09-27A	●	●	27	25	24	250	46	55	46	13.5	6°					
Carbide	C04G-SCLCR/L03-05A	●	●	5	4	3.8	90	9	-	8	2.5	15°	0.2	No	Fig.4	SB-1635TR	FT-6
	C05H-SCLCR/L03-06A	●	●	6	5	4.4	100	11		11	3	13°					
	C06J-SCLCR/L04-07A	●	●	7	6	5.4	110	12		12	3.5	13°				SB-2035TR	
	C07K-SCLCR/L04-08A	●	●	8	7	6.4	125	13		13	4	11°					
	E08L-SCLCR/L06-10A	●	●	10	8	7	140	16	15	15	5	14°	0.4	Yes	Fig.5	SB2545TR	FT-8
	E08L-SCLCR/L06-10A-2 / 3	●					90										
	E10N-SCLCR/L06-12A	●	●	12	10	9	160	20	19	19	6	12°					
	E10N-SCLCR/L06-12A-2 / 3	●					105										
	E12Q-SCLCR/L06-14A	●	●	14	12	11	180	23	22	22	7	10°					
	E12Q-SCLCR/L06-14A-2 / 3	●					120										
	E16X-SCLCR/L09-18A	●	●	18	16	15	220	28	27	27	9	10°				SB-4065TR	FT-15
	E16X-SCLCR/L09-18A-2 / 3	●					145										
	E20S-SCLCR/L09-22A	●	●	22	20	19	250	32	31	31	11	8°					
	E20S-SCLCR/L09-22A-2 / 3	●					165										
	E25T-SCLCR/L09-27A	●	●	27	25	24	300	38	37	37	13.5	6°					
	E25T-SCLCR/L09-27A-2 / 3	●					200										

Applicable Inserts

Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing-Medium	Finishing	Finishing / Precision	Low Feed
Ref. Page	B45	B45	B45	B45	B46	B46	B45	B47	B47	B48
Insert / Toolholder	CF	GF	GK	HQ	FN-Z	Standard	GQ	R/L-F	R/L-FSF	(E / F) R/L-U
----SCLCR/L03----	CCGT0301..	-	-	-	-	-	-	CCGT0301..	CCET0301..	-
----SCLCR/L04----	CCGT0401..	-	-	-	-	-	-	CCGT0401..	CCET0401..	-
----SCLCR/L06----	-	CCGT0602..	CCMT0602..	CCMT0602..	CCGT0602..	CCGT0602..	CCGT0602..	-	-	CCGT0602..
----SCLCR/L09----	-	-	CCMT09T3..	CCMT09T3..	CCGT09T3..	CCGT09T3.. CCMT09T3..	-	-	-	CCGT09T3..

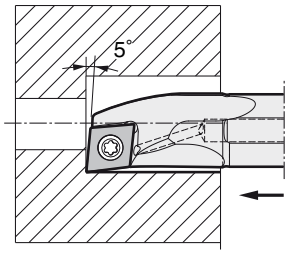
Applications	Low Feed / Precision	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B48	B46	B47	B46	B46	C18	C10
Insert / Toolholder	F R/L-USF	MQ	Without Chipbreaker	AH	A3	PCD	CBN
----SCLCR/L03----	-	-	-	-	-	-	CCMW0301..
----SCLCR/L04----	-	-	-	-	-	CCGW0401..	CCMW0401..
----SCLCR/L06----	CCET0602..	-	CCGW0602..	-	-	CCMT0602.. CCGW0602..	CCMW0602..
----SCLCR/L09----	CCET09T3..	CCMT09T3..	CCGW09T3..	CCGT09T3..	CCGT09T3..	CCMT09T3.. CCGW09T3..	CCMW09T3..

For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

A-SCLP-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



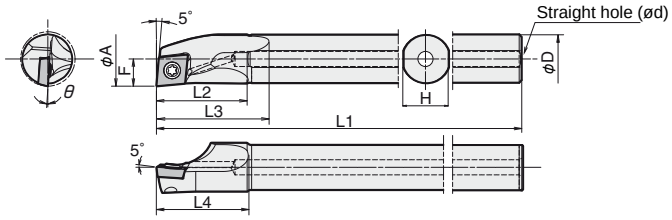


Fig.1

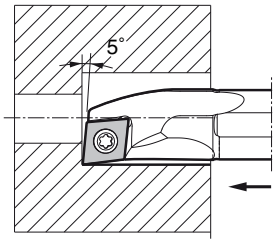
Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SCLP-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



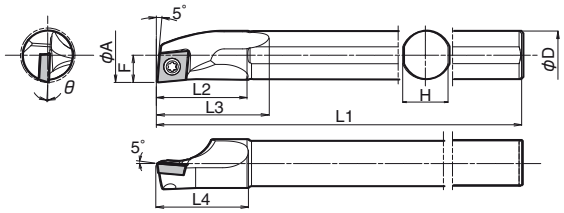


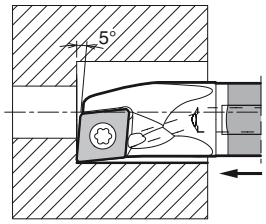
Fig.2

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E-SCLP - A Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



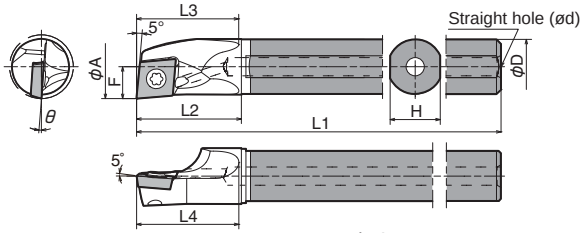


Fig.3

Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

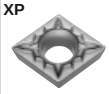
● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
																	
Excellent Bar	**A10L-SCLP$^{R}_{L}$08-12AE**	●	●	12	10	9	140	20	25	20	6	5°	0.4	Yes	Fig.1	SB-3060TR	FT-10
	A12M-SCLP$^{R}_{L}$08-14AE	●	●	14	12	11	150	24	29	24	7	4°					
	A12M-SCLP$^{R}_{L}$09-16AE	●	●	16					31	24	8					SB-4065TR	FT-15
	A16Q-SCLP$^{R}_{L}$09-18AE	●	●	18	16	15	180	30	37	30	9	3.5°					
	A20R-SCLP$^{R}_{L}$09-22AE	●	●	22	20	19	200	36	47	37	11	2°					
	A25S-SCLP$^{R}_{L}$09-27AE	●	●	27	25	24	250	46	55	46	13.5	0°					
Steel	**S10L-SCLP$^{R}_{L}$08-12A**	●	●	12	10	9	140	20	25	20	6	5°	0.4	No	Fig.2	SB-3060TR	FT-10
	S12M-SCLP$^{R}_{L}$08-14A	●	●	14	12	11	150	24	29	24	7	4°					
	S12M-SCLP$^{R}_{L}$09-16A	●	●	16					31	24	8					SB-4065TR	FT-15
	S16Q-SCLP$^{R}_{L}$09-18A	●	●	18	16	15	180	30	37	30	9	3.5°					
	S20R-SCLP$^{R}_{L}$09-22A	●	●	22	20	19	200	36	47	37	11	2°					
	S25S-SCLP$^{R}_{L}$09-27A	●	●	27	25	24	250	46	55	46	13.5	0°					
Carbide	**E10N-SCLP$^{R}_{L}$08-12A**	●	●	12	10	9	160	20	19	19	6	5°	0.4	Yes	Fig.3	SB-3060TR	FT-10
	E10N-SCLP$^{R}_{L}$08-12A-2 / 3	●					105										
	E10N-SCLP$^{R}_{L}$08-12A-1 / 2	●					80										
	E12Q-SCLP$^{R}_{L}$08-14A	●	●	14	12	11	180	23	22	22	7	4°					
	E12Q-SCLP$^{R}_{L}$08-14A-2 / 3	●					120										
	E12Q-SCLP$^{R}_{L}$08-14A-1 / 2	●					90										
	E16X-SCLP$^{R}_{L}$09-18A	●	●	18	16	15	220	28	27	27	9	3.5°				SB-4065TR	FT-15
	E16X-SCLP$^{R}_{L}$09-18A-2 / 3	●					145										
	E16X-SCLP$^{R}_{L}$09-18A-1 / 2	●					110										
	E20S-SCLP$^{R}_{L}$09-22A	●	●	22	20	19	250	32	31	31	11	2°					
	E20S-SCLP$^{R}_{L}$09-22A-2 / 3	●					165										
	E20S-SCLP$^{R}_{L}$09-22A-1 / 2	●					125										
	E25T-SCLP$^{R}_{L}$09-27A	●	●	27	25	24	300	38	37	37	13.5	0°					
	E25T-SCLP$^{R}_{L}$09-27A-2 / 3	●					200										

Applicable Inserts

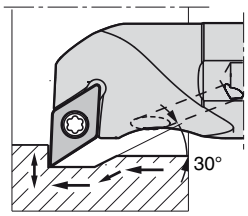
Applications	Finishing	Finishing-Medium	Medium	Finishing-Medium	Soft Steel Finishing	Soft Steel Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials	
Ref. Page	**B49**	**B49**	**B49**	**B49**	**B49**	**B49**	**B49**	**C18**	**C10**	
Insert / Toolholder	**GP** 	**HQ** 	**Standard** 	**$^{R}_{L}$-Y** 	**XP** 	**XQ** 	**Without Chipbreaker** 	**PCD** 	**CBN** 	
----SCLP$^{R}_{L}$08----	CPMT0802..	CPMH0802..	CPMH0802..	CPMH0802..	CPMT0802..	-	CPMB0802..	CPMH0802..	CPGB0802..	
----SCLP$^{R}_{L}$09----	CPMT0903..	CPMH0903..	CPMH0903..	CPMH0903..	CPMT0903..	CPMT0903..	CPMB0903..	CPMH0903..	CPGB0903..	

For recommended cutting conditions, see page **F77~F78**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

A-SDUC-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



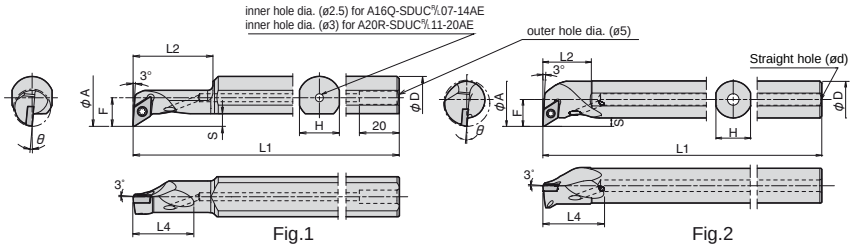


Fig.1 Fig.2

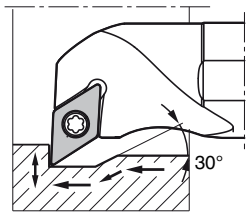
Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SDUC-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



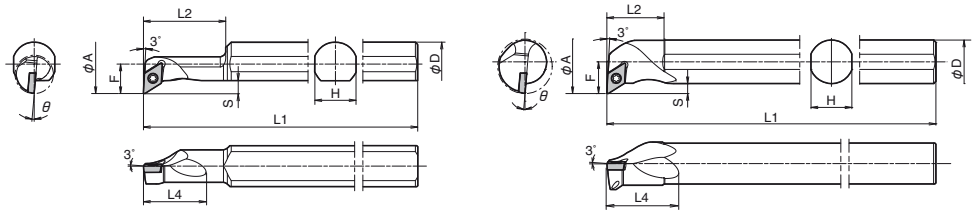


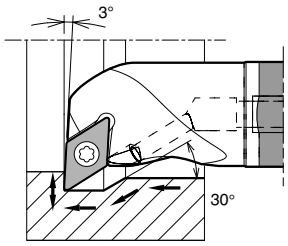
Fig.3 Fig.4

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E-SDUC-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



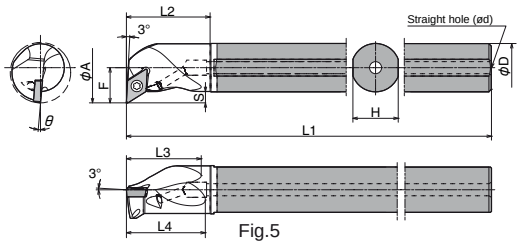


Fig.5

Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A16Q-SDUC$^{R/L}$07-14AE	●	●	14	16	15	180	28	-	23	10.8	4.4	5°	0.4	Yes	Fig.1	SB-2560TR	FT-8
	A20R-SDUC$^{R/L}$11-20AE	●	●	20	20	19	200	48	-	30	15.6	6.1					SB-4065TR	FT-15
	A10L-SDUC$^{R/L}$07-14AE	●	●	14	10	9	140	19	-	20	8.7	3.3	5°	0.4		Fig.2	SB-2560TR	FT-8
	A12M-SDUC$^{R/L}$07-16AE	●	●	16	12	11	150	21	-	24	9.7							
	A16Q-SDUC$^{R/L}$07-20AE	●	●	20	16	15	180		-	26	11.7							
	A16Q-SDUC$^{R/L}$11-23AE	●	●	23					-	31	14.5	6.1					SB-4065TR	FT-15
	A20R-SDUC$^{R/L}$11-27AE	●	●	27	20	19	200	23	-	36	16.5							
	A25S-SDUC$^{R/L}$11-32AE	●	●	32	25	24	250	24	-	39	19							
Steel	S16Q-SDUC$^{R/L}$07-14A	●	●	14	16	15	180	28	-	23	10.8	4.4	5°	0.4	No	Fig.3	SB-2560TR	FT-8
	S20R-SDUC$^{R/L}$11-20A	●	●	20	20	19	200	48	-	30	15.6	6.1					SB-4065TR	FT-15
	S10L-SDUC$^{R/L}$07-14A	●	●	14	10	9	140	19	-	20	8.7	3.3	5°	0.4		Fig.4	SB-2560TR	FT-8
	S12M-SDUC$^{R/L}$07-16A	●	●	16	12	11	150	21	-	24	9.7							
	S16Q-SDUC$^{R/L}$07-20A	●	●	20	16	15	180		-	26	11.7							
	S16Q-SDUC$^{R/L}$11-23A	●	●	23					-	31	14.5	6.1					SB-4065TR	FT-15
	S20R-SDUC$^{R/L}$11-27A	●	●	27	20	19	200	23	-	36	16.5							
	S25S-SDUC$^{R/L}$11-32A	●	●	32	25	24	250	24	-	39	19							
Carbide	E10N-SDUC$^{R/L}$07-14A	●	●	14	10	9	160	20	-	19	8.7	3.3	5°	0.4	Yes	Fig.5	SB-2560TR	FT-8
	E10N-SDUC$^{R/L}$07-14A-2 / 3	●					105											
	E12Q-SDUC$^{R/L}$07-16A	●	●	16	12	11	180	23	-	22	9.7							
	E12Q-SDUC$^{R/L}$07-16A-2 / 3	●					120											
	E16X-SDUC$^{R/L}$07-20A	●	●	20	16	15	220	28	-	26	11.7							
	E16X-SDUC$^{R/L}$07-20A-2 / 3	●					145											
	E16X-SDUC$^{R/L}$11-23A	●	●	23			220		-	27	14.5	6.1					SB-4065TR	FT-15
	E16X-SDUC$^{R/L}$11-23A-2 / 3	●					145											
	E20S-SDUC$^{R/L}$11-27A	●	●	27	20	19	250	32	-	31	16.5							
	E20S-SDUC$^{R/L}$11-27A-2 / 3	●					165											
	E25T-SDUC$^{R/L}$11-32A	●	●	32	25	24	300	38	-	37	19							
	E25T-SDUC$^{R/L}$11-32A-2 / 3	●					200											

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Medium-Roughing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. Page	B50	B50	B50	B51	B51	B51	B53	B53	B54	B54
Insert / Toolholder	CF	CK	GP	GK	HQ	Standard	$^{R/L}$-F	$^{R/L}$-FSF	(E / F) $^{R/L}$-U	F$^{R/L}$-USF
····SDUC$^{R/L}$07-····	DCGT0702..	DCGT0702..	DCMT0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
····SDQC$^{R/L}$07-····										
····SDZC$^{R/L}$07-····										
····SDUC$^{R/L}$11-····	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3.. DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..
····SDQC$^{R/L}$11-····										
····SDZC$^{R/L}$11-····										

Applications	Low Feed	Low Feed / Precision	Soft Steel Finishing	Soft Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B55	B55	B52	B52	B52	B55	B55	B55	C19	C11
Insert / Toolholder	(E / F) $^{R/L}$-J	F$^{R/L}$-JSF	XP	XQ	MQ	Without Chipbreaker	AH	$^{R/L}$-A3	PCD	CBN
...SDUC$^{R/L}$07-····	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
····SDQC$^{R/L}$07-····										
····SDZC$^{R/L}$07-····										
····SDUC$^{R/L}$11-····	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..
····SDQC$^{R/L}$11-····										
····SDZC$^{R/L}$11-····										

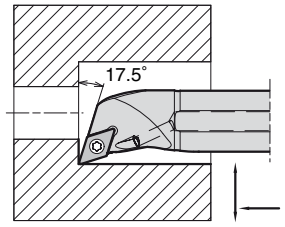
For recommended cutting conditions, see page F77~F78

● : Std. Item ● : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Dynamic Bar [DC □□ Insert]

A-SDQC-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



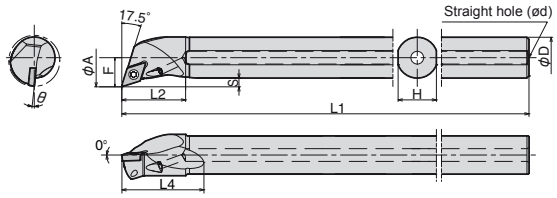


Fig.1

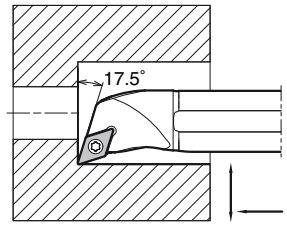
Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

• Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SDQC-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



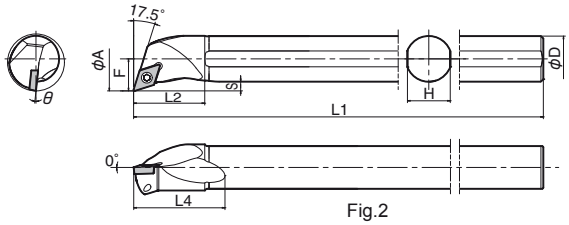


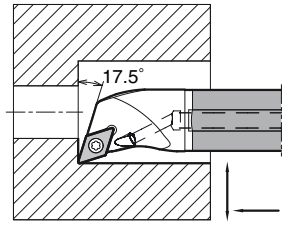
Fig.2

• Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E-SDQC-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



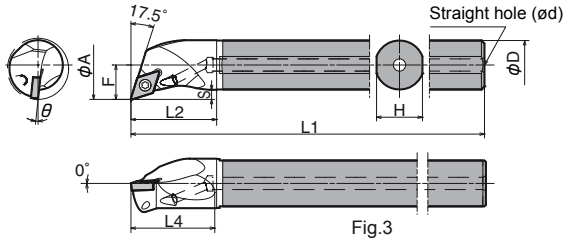


Fig.3

Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

• Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

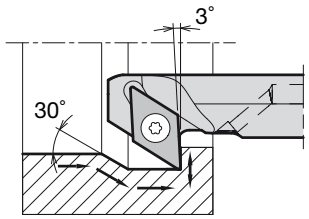
Toolholder Dimensions

	Description	Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A10L -SDQC[R/L]07-13AE	●	●	13	10	9	140	19		21	7.5	2.1	10°					
	A12M-SDQC[R/L]07-16AE	●	●	16	12	11	150	22		25	9.25	2.6	8°				SB-2560TR	FT-8
	A16Q-SDQC[R/L]07-20AE	●	●	20	16	15	180	25	-	32	11.3	2.6	6°	0.4	Yes	Fig.1		
	A20R-SDQC[R/L]11-25AE	●	●	25	20	19	200	31		37	14.4	3.7	5°				SB-4065TR	FT-15
	A25S-SDQC[R/L]11-30AE	●	●	30	25	24	250	38		45	16.9	3.7	4°					
Steel	S10L-SDQC[R/L]07-13A	●	●	13	10	9	140	19		21	7.5	2.1	10°					
	S12M-SDQC[R/L]07-16A	●	●	16	12	11	150	22		25	9.25	2.6	8°				SB-2560TR	FT-8
	S16Q-SDQC[R/L]07-20A	●	●	20	16	15	180	25	-	32	11.3	2.6	6°	0.4	No	Fig.2		
	S20R-SDQC[R/L]11-25A	●	●	25	20	19	200	31		37	14.4	3.7	5°				SB-4065TR	FT-15
	S25S-SDQC[R/L]11-30A	●	●	30	25	24	250	38		45	16.9	3.7	4°					
Carbide	E10N-SDQC[R/L]07-13A	●	●	13	10	9	160	20	-	19	7.5	2.1	10°					
	E10N-SDQC[R/L]07-13A-2 / 3	●					105											
	E12Q-SDQC[R/L]07-16A	●	●	16	12	11	180	23	-	22	9.25	2.6	8°				SB-2560TR	FT-8
	E12Q-SDQC[R/L]07-16A-2 / 3	●					120											
	E16X-SDQC[R/L]07-20A	●	●	20	16	15	220	28	-	27	11.3	2.6	6°	0.4	Yes	Fig.3		
	E16X-SDQC[R/L]07-20A-2 / 3	●					145											
	E20S-SDQC[R/L]11-25A	●	●	25	20	19	250	32	-	31	14.4	3.7	5°					
	E20S-SDQC[R/L]11-25A-2 / 3	●					165										SB-4065TR	FT-15
	E25T-SDQC[R/L]11-30A	●	●	30	25	24	300	38	-	37	16.9	3.7	4°					
	E25T-SDQC[R/L]11-30A-2 / 3	●					200											

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

A-SDZC-AE Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5.5



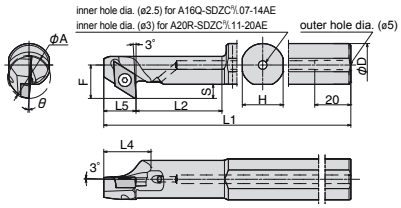


Fig.1

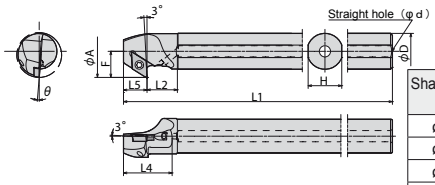


Fig.2

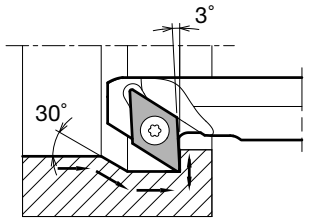
Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

S-SDZC-A Steel Bar (Back Boring)

Max. Overhang Length L/D=~4



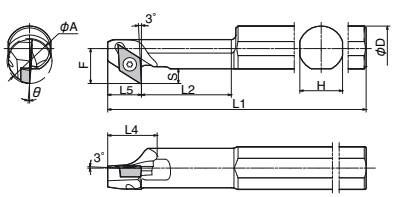


Fig.3

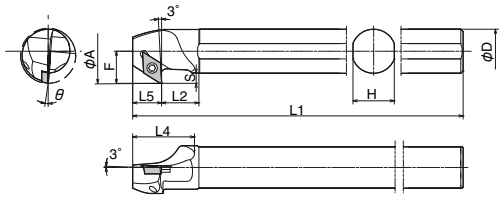


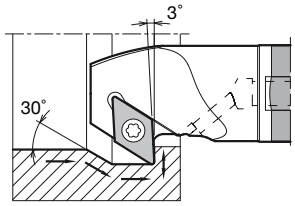
Fig.4

● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

E-SDZC-A Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7



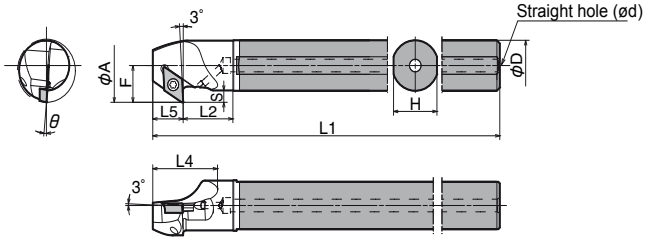


Fig.5

Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	
ø20	ø6

● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

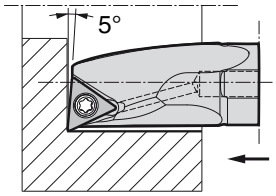
Toolholder Dimensions

	Description	Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	L4	L5	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A16Q-SDZC□07-14AE	●	●	14	16	15	180	30	17	10	10.8	4.4	5°	0.4	Yes	Fig.1	SB-2545TR	FT-8
	A20R-SDZC□11-20AE	●	●	20	20	19	200	40	24	15	15.6	6.1					SB-4065TR	FT-15
	A10L-SDZC□07-14AE	●	●	14	10	9	140	14	16	9.5	8.7	3.3	5°	0.4		Fig.2	SB-2545TR	FT-8
	A12M-SDZC□07-16AE	●	●	16	12	11	150	14	20	10.5	9.7	3.3					SB-2560TR	
	A16Q-SDZC□07-20AE	●	●	20	16	15	180	14	22	10.5	11.7	3.3						
	A16Q-SDZC□11-23AE	●	●	23	16	15	180	15	22	15	14.5	6.1					SB-4065TR	FT-15
	A20R-SDZC□11-27AE	●	●	27	20	19	200	15	25	15	16.5	6.1						
	A25S-SDZC□11-32AE	●	●	32	25	24	250	15	26	15	19	6.1						
Steel	S16Q-SDZC□07-14A	●	●	14	16	15	180	30	17	10	10.8	4.4	5°	0.4	No	Fig.3	SB-2545TR	FT-8
	S20R-SDZC□11-20A	●	●	20	20	19	200	40	24	15	15.6	6.1					SB-4065TR	FT-15
	S10L-SDZC□07-14A	●	●	14	10	9	140	14	16	9.5	8.7	3.3	5°	0.4		Fig.4	SB-2545TR	FT-8
	S12M-SDZC□07-16A	●	●	16	12	11	150	14	20	10.5	9.7	3.3					SB-2560TR	
	S16Q-SDZC□07-20A	●	●	20	16	15	180	14	22	10.5	11.7	3.3						
	S16Q-SDZC□11-23A	●	●	23	16	15	180	15	22	15	14.5	6.1					SB-4065TR	FT-15
	S20R-SDZC□11-27A	●	●	27	20	19	200	15	25	15	16.5	6.1						
	S25S-SDZC□11-32A	●	●	32	25	24	250	15	26	15	19	6.1						
Carbide	E10N-SDZC□07-14A	●		14	10	9	160	10.5	16	9.5	8.7	3.3	5°	0.4	Yes	Fig.5	SB-2545TR	FT-8
	E12Q-SDZC□07-16A	●		16	12	11	180	12.5	20	10.5	9.7	3.3					SB-2560TR	
	E16X-SDZC□07-20A	●		20	16	15	220	17.5	22	10.5	11.7	3.3						
	E16X-SDZC□11-23A	●		23	16	15	220	17	22	15	14.5	6.1					SB-4065TR	FT-15
	E20S-SDZC□11-27A	●		27	20	19	250	23	25	15	16.5	6.1						

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

A / S-STLB(P)-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



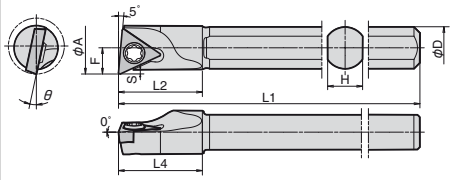


Fig.1

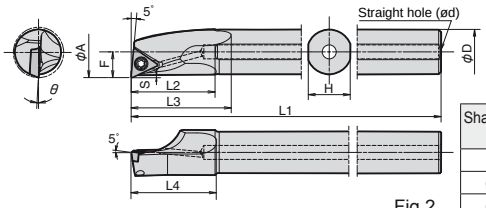


Fig.2

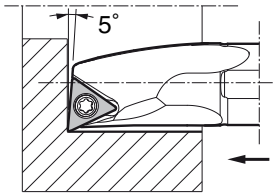
Shank Dia. øD	Straight hole Dia. ød
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-STLB(P)-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



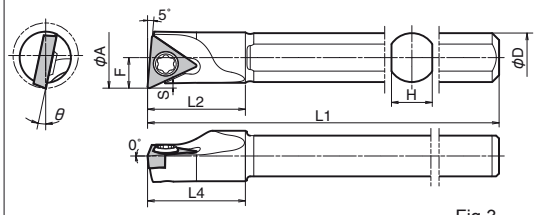


Fig.3

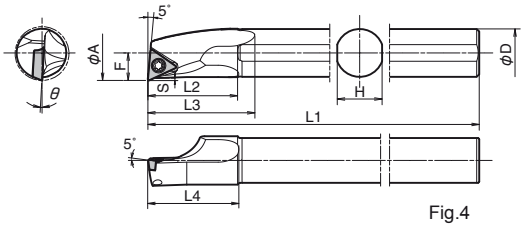


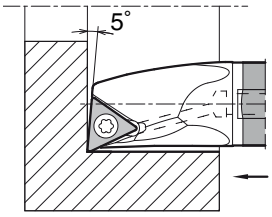
Fig.4

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E(C)-STLB(P)-A Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7



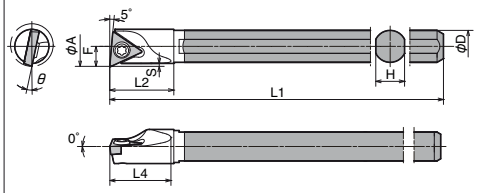


Fig.5

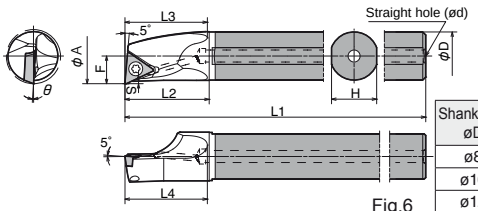


Fig.6

Shank Dia. øD	Straight hole Dia. ød
ø8	ø3
ø10	
ø12	ø4
ø16	
ø20	ø6
ø25	

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	S06H-STLBR/L06-08AE	●	●	8	6	5	100	12	-	12	3.8	0.5	12°	0.2	No	Fig.1	SB-2035TR	FT-6
	A08X-STLPR/L09-10AE	●	●	10	8	7	120	16	22	16	5	0.5	10°	0.4	Yes	Fig.2	SB-2545TR	FT-8
	A10L-STLPR/L09-12AE	●	●	12	10	9	140	20	25	20	6.2	0.9	8°					
	A10L-STLPR/L11-12AE	●	●						26		6	0.7	10°				SB-3060TR	FT-10
	A12M-STLPR/L11-14AE	●	●	14	12	11	150	24	30	24	7.2	0.8	7°					
	A16Q-STLPR/L11-18AE	●	●	18	16	15	180	30	36	30	9.2	0.7	3.5°					
	A20R-STLPR/L11-22AE	●	●	22	20	19	200	36	46	37	11.2		2°					
	A25S-STLPR/L16-27AE	●	●	27	25	24	250	46	55	46	13.7		0°				SB-4065TR	FT-15
Steel	S06H-STLBR/L06-08A	●	●	8	6	5	100	12	-	12	3.8	0.5	12°	0.2	No	Fig.3	SB-2035TR	FT-6
	S08X-STLPR/L09-10A	●	●	10	8	7	120	16	22	16	5	0.5	10°	0.4		Fig.4	SB-2545TR	FT-8
	S10L-STLPR/L09-12A	●	●	12	10	9	140	20	25	20	6.2	0.9	8°					
	S10L-STLPR/L11-12A	●	●						26		6	0.7	10°				SB-3060TR	FT-10
	S12M-STLPR/L11-14A	●	●	14	12	11	150	24	30	24	7.2	0.8	7°					
	S16Q-STLPR/L11-18A	●	●	18	16	15	180	30	36	30	9.2	0.7	3.5°					
	S20R-STLPR/L11-22A	●	●	22	20	19	200	36	46	37	11.2		2°					
	S25S-STLPR/L16-27A	●	●	27	25	24	250	46	55	46	13.7		0°				SB-4065TR	FT-15
Carbide	C06J-STLBR/L06-08A	●	●	8	6	5.4	110	12	-	12	3.8	0.5	12°	0.2	No	Fig.5	SB-2035TR	FT-6
	E08L-STLPR/L09-10A	●	●	10	8	7	140	16	15	15	5	0.5	10°	0.4	Yes	Fig.6	SB-2545TR	FT-8
	E10N-STLPR/L09-12A	●	●	12	10	9	160	20	19	19	6.2	0.9	8°					
	E10N-STLPR/L09-12A-2 / 3	●					105											
	E10N-STLPR/L09-12A-1 / 2	●					80											
	E10N-STLPR/L11-12A	●	●				160				6	0.7	10°				SB-3060TR	FT-10
	E10N-STLPR/L11-12A-2 / 3	●					105											
	E10N-STLPR/L11-12A-1 / 2	●					80											
	E12Q-STLPR/L11-14A	●	●	14	12	11	180	23	22	22	7.2	0.8	7°					
	E12Q-STLPR/L11-14A-2 / 3	●					120											
	E12Q-STLPR/L11-14A-1 / 2	●					90											
	E16X-STLPR/L11-18A	●	●	18	16	15	220	28	27	27	9.2	0.7	3.5°					
	E16X-STLPR/L11-18A-2 / 3	●					145											
	E16X-STLPR/L11-18A-1 / 2	●					110											
	E20S-STLPR/L11-22A	●	●	22	20	19	250	32	31	31	11.2		2°					
	E20S-STLPR/L11-22A-2 / 3	●					165											
	E20S-STLPR/L11-22A-1 / 2	●					125											
	E25T-STLPR/L16-27A	●	●	27	25	24	300	38	37	37	13.7		0°				SB-4065TR	FT-15
	E25T-STLPR/L16-27A-2 / 3	●					200											

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Medium	Low Feed / Precision	Soft Steel Finishing	Soft Steel Finishing-Medium
Ref. Page	B59, B61	B61	B59	B61	B59, B62	B63	B62	B63	B61	B61
Insert / Toolholder	CF	GP	DP	HQ	R/L	R/L-FSF	R/L-H	FR/L-USF	XP	XQ
...-STLBR/L06-...	TBGT0601..	–	TBMT0601..	–	TBGT0601..	–	–	–	–	–
...-STLPR/L09-...	TPGT0902..	TPMT0902..	–	TPMT0902..	TPGH0902..	–	–	–	TPMT0902..	–
...-STLPR/L11-...	–	TPMT1103..	–	TPMT1103..	TPGH1103..	TPET1103..	TPGH1103..	TPET1103..	TPMT1103..	TPMT1103..
...-STLPR/L16-...	–	TPMT1603..	–	TPMT1603..	TPGH1603..	–	TPGH1603..	–	TPMT1603..	TPMT1603..

Applications	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. Page	B59, B63	C19, C20, C21	C12
Insert / Toolholder	Without Chipbreaker	PCD	CBN
...-STLBR/L06-...	TBGW0601..	TBMT0601.. TBGW0601..	–
...-STLPR/L09-...	TPGB0902..	TPMH0902.. TPGB0902..	TPGB0902..
...-STLPR/L11-...	TPGB1103..	TPMH1103.. TPGB1103..	TPGB1103..
...-STLPR/L16-...	TPGB1603..	TPMH1603.. TPGB1603..	TPGB1603..

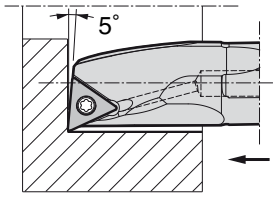
For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Dynamic Bar [TC □□ Insert]

A-STLC-AE Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5.5



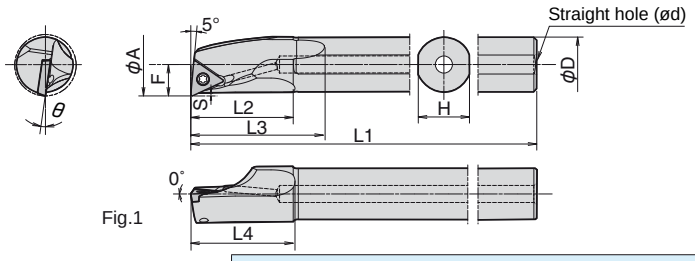


Fig.1

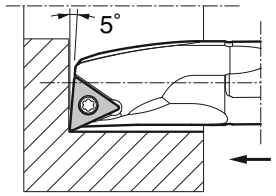
Shank Dia. øD	Straight hole Dia. ød
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-STLC-A Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~4



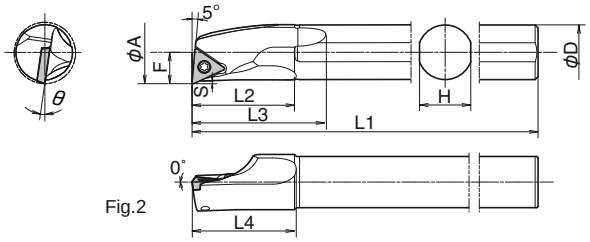


Fig.2

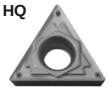
● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A08X-STLC R/L 09-10AE	●	●	10	8	7	120	16	22	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	26	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	30	25	7.2		10°					
	A16Q-STLC R/L 11-18AE	●	●	18	16	15	180	30	39	31	9.2	0.7	8°					
	A20R-STLC R/L 11-22AE	●	●	22	20	19	200	36	44	36	11.2		6°					
Steel	S08X-STLC R/L 09-10A	●	●	10	8	7	120	16	22	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	26	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	30	25	7.2		10°					
	S16Q-STLC R/L 11-18A	●	●	18	16	15	180	30	39	31	9.2	0.7	8°					
	S20R-STLC R/L 11-22A	●	●	22	20	19	200	36	44	36	11.2		6°					

Applicable Inserts

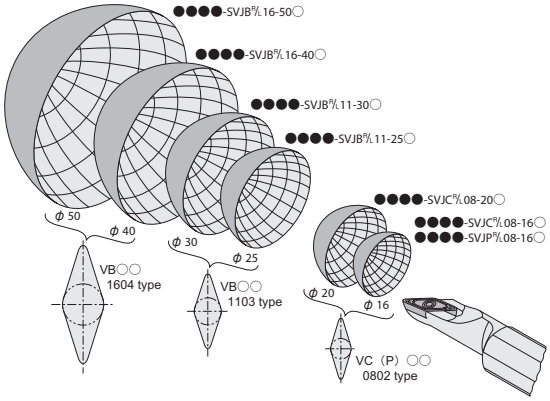
Applications	Finishing-Medium	Hard Materials								
Ref. Page	B59	C11								
Insert / Toolholder	HQ 	CBN 								
...-STLC R/L 09-...	TCMT0902..	–								
...-STLC R/L 11-...	TCMT1102..	TCMW1102..								

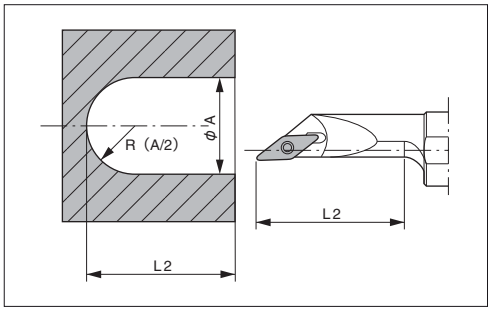
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Application of ○···SVJB（C）-○ , S···SVJP-○

[Toolholder Refer Page for details ➔ **F36** (Dynamic Bar), **F62**]

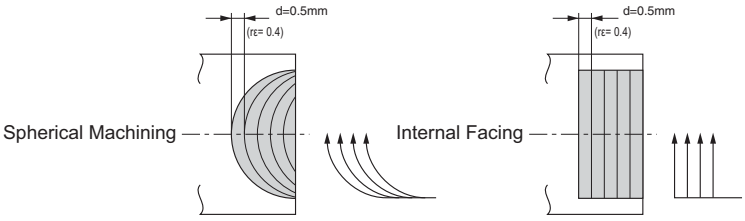
1. Application Range





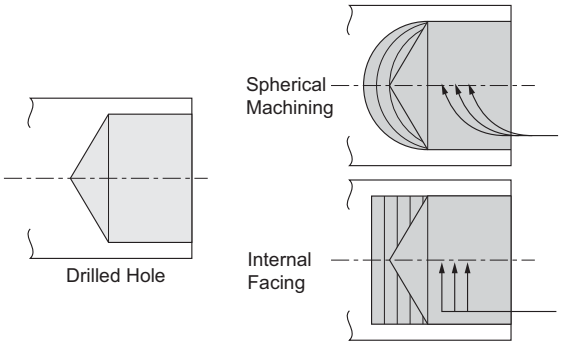
2. Machining method

Case with No Existing Hole



(Note) f shall be under 0.05mm/rev at internal facing.

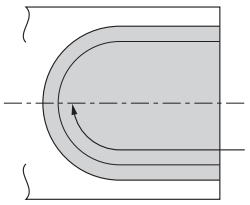
Case with Drilled Hole



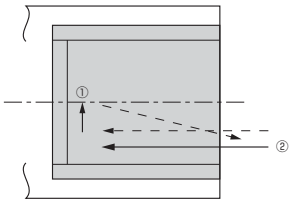
(Note) f shall be under 0.05mm/rev at internal facing.

Finishing

Spherical Machining

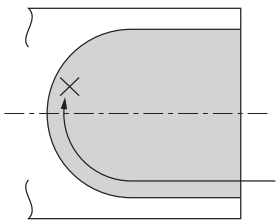


Internal Facing

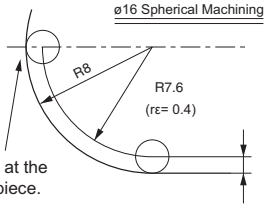


Machining Process
①Finish the internal face first.
②Next, finish the internal diameter.

3. Caution

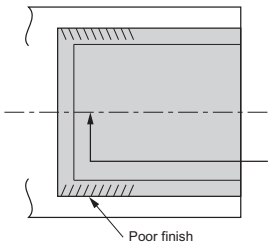


When machining past the center of the workpiece, insert breakage may occur.



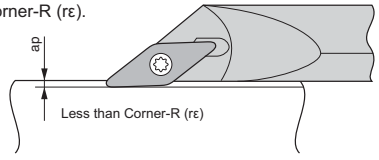
Fix the insert edge at the center of the workpiece.

Adjust the machining program of radius smaller by Corner-R (rε) value.



Machining of this kind is available, but the oblique part may be scratched by chips.

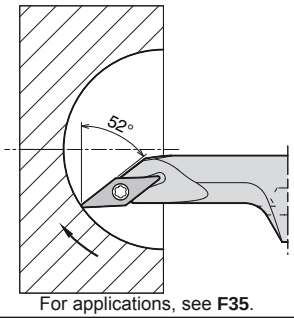
For internal profiling, ap should be less than the value of Corner-R (rε).



[Burs may occur, if ap is bigger than Corner-R (rε).]

A-SVJP(C)(B)-AE Excellent Bar (Internal Spherical Machining / Internal Facing)

Max. Overhang Length L/D=~5.5



For applications, see **F35**.

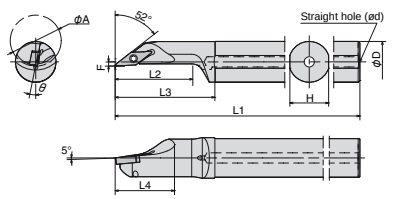


Fig.1

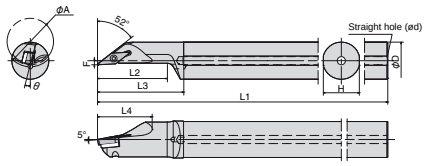


Fig.2

Shank Dia. øD	Straight hole Dia. ød
ø12	ø4
ø16	
ø20	ø5
ø25	
ø32	ø7
ø40	ø9

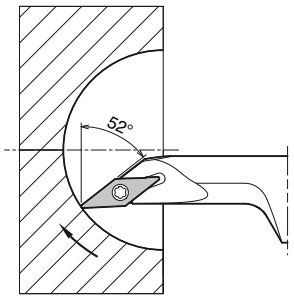
* No shim for SVJP(C)R/L08 type / SVJBR/L11 type.

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SVJP(C)(B)-A Steel Bar (Internal Spherical Machining / Internal Facing)

Max. Overhang Length L/D=~4



For applications, see **F35**.

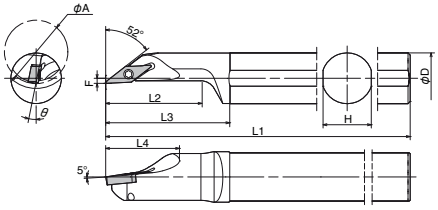


Fig.3

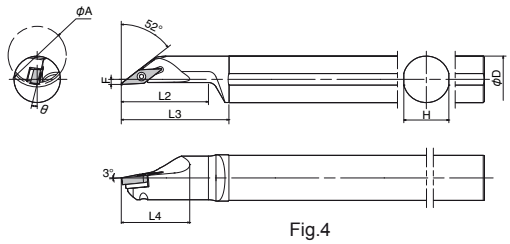


Fig.4

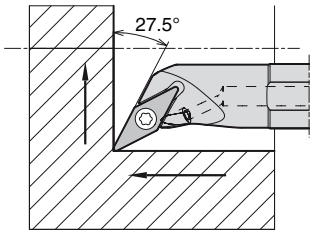
* No shim for SVJP(C)R/L08 type / SVJBR/L11 type.

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

A-SVPC(B)-AE Excellent Bar (Copying / Undercutting)

Max. Overhang Length L/D=~5.5



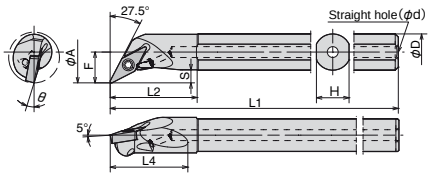


Fig.5

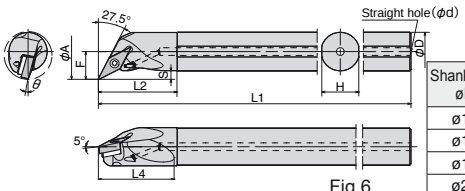


Fig.6

Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	ø5
ø20	
ø25	
ø32	

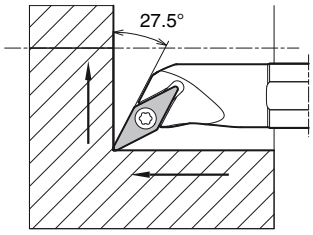
* No shim for SVPCR/L08 type / SVPBR/L11 type.

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SVPC(B)-A Steel Bar (Copying / Undercutting)

Max. Overhang Length L/D=~4



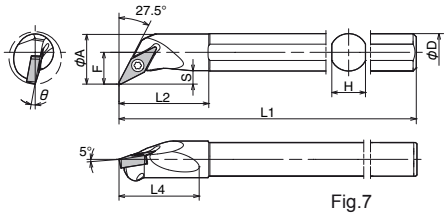


Fig.7

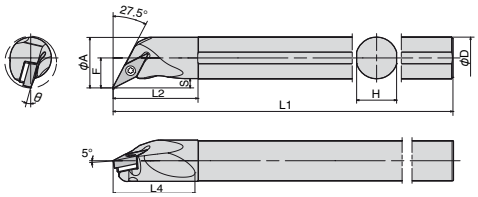


Fig.8

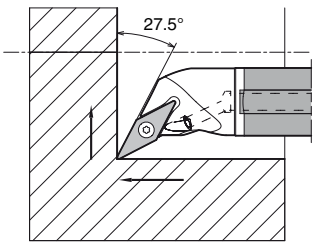
* No shim for SVPCR/L08 type / SVPBR/L11 type.

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E-SVPC(B)-A Carbide Shank Bar (Copying / Undercutting)

Max. Overhang Length L/D=~7



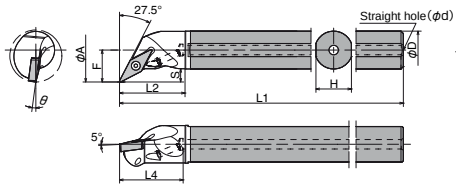


Fig.9

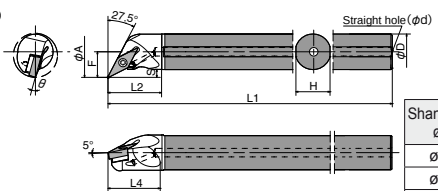


Fig.10

Shank Dia. øD	Straight hole Dia. ød
ø10	ø3
ø12	ø4
ø16	
ø20	ø6
ø25	

* No shim for SVPCR/L08 type / SVPCR/L11 type.

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	A12M-SVJP$^{R}_{L}$08-16AE	●	●	16	12	11	150	26	33	21	2	-	5°	0.2	Yes	Fig.1	SB-2050TR	FT-6
	A12M-SVJC$^{R}_{L}$08-16AE	●	●	16	12	11	150	26	33	20	2	-	5°	0.4				
	A16Q-SVJC$^{R}_{L}$08-20AE	●	●	20	16	15	180	36	43	22	2	-	5°					
	A20R-SVJB$^{R}_{L}$11-25AE	●	●	25	20	19	200	37.5	48	30	2	-	5°				SB-2570TR	FT-8
	A25S-SVJB$^{R}_{L}$11-30AE	●	●	30	25	24	250	45	58	33	3.5	-	5°					
	A32S-SVJB$^{R}_{L}$16-40AE	●	●	40	32	31	250	60	74	45	3.5	-	8°			Fig.2	SB-40125TRN	FT-15
	A40T-SVJB$^{R}_{L}$16-50AE	●	●	50	40	39	300	75	91	49	4.5	-	7°					
Steel	S12M-SVJP$^{R}_{L}$08-16A	●	●	16	12	11	150	26	33	21	2	-	5°	0.2	No	Fig.3	SB-2050TR	FT-6
	S12M-SVJC$^{R}_{L}$08-16A	●	●	16	12	11	150	26	33	20	2	-	5°	0.4				
	S16Q-SVJC$^{R}_{L}$08-20A	●	●	20	16	15	180	36	43	22	2	-	5°					
	S20R-SVJB$^{R}_{L}$11-25A	●	●	25	20	19	200	37.5	48	30	2	-	5°				SB-2570TR	FT-8
	S25S-SVJB$^{R}_{L}$11-30A	●	●	30	25	24	250	45	58	33	3.5	-	5°					
	S32S-SVJB$^{R}_{L}$16-40A	●	●	40	32	31	250	60	74	45	3.5	-	8°			Fig.4	SB-40125TRN	FT-15
	S40T-SVJB$^{R}_{L}$16-50A	●	●	50	40	39	300	75	91	49	4.5	-	7°					
Excellent Bar	A10L-SVPC$^{R}_{L}$08-14AE	●	●	14	10	9	140	24	-	21	8.5	3	8°	0.4	Yes	Fig.5	SB-2050TR	FT-6
	A12M-SVPB$^{R}_{L}$11-18AE	●	●	18	12	11	150	29	-	26	11	4.5	8°				SB-2570TR	FT-8
	A16Q-SVPB$^{R}_{L}$11-22AE	●	●	22	16	15	180	35	-	33	13.5	5	5°					
	A20R-SVPB$^{R}_{L}$11-26AE	●	●	26	20	19	200	41	-	39	15.5	5	5°					
	A25S-SVPB$^{R}_{L}$16-31AE	●	●	31	25	24	250	51	-	49	18	5	13°			Fig.6	SB-40125TRN	FT-15
	A32S-SVPB$^{R}_{L}$16-40AE	●	●	40	32	31	250	54	-	53	23	6.5	9°					
Steel	S10L-SVPC$^{R}_{L}$08-14A	●	●	14	10	9	140	24	-	21	8.5	3	8°	0.4	No	Fig.7	SB-2050TR	FT-6
	S12M-SVPB$^{R}_{L}$11-18A	●	●	18	12	11	150	29	-	26	11	4.5	8°				SB-2570TR	FT-8
	S16Q-SVPB$^{R}_{L}$11-22A	●	●	22	16	15	180	35	-	33	13.5	5	5°					
	S20R-SVPB$^{R}_{L}$11-26A	●	●	26	20	19	200	41	-	39	15.5	5	5°					
	S25S-SVPB$^{R}_{L}$16-31A	●	●	31	25	24	250	51	-	49	18	5	13°			Fig.8	SB-40125TRN	FT-15
	S32S-SVPB$^{R}_{L}$16-40A	●	●	40	32	31	250	54	-	53	23	6.5	9°					
Carbide	E10N-SVPC$^{R}_{L}$08-14A	●		14	10	9	160	20	-	18.5	8.5	3	8°	0.4	Yes	Fig.9	SB-2050TR	FT-6
	E12Q-SVPB$^{R}_{L}$11-18A	●		18	12	11	180	23	-	22	11	4.5	8°				SB-2570TR	FT-8
	E16X-SVPB$^{R}_{L}$11-22A	●		22	16	15	220	28	-	27	13.5	5	5°					
	E20S-SVPB$^{R}_{L}$11-26A	●		26	20	19	250	32	-	31	15.5	5	5°					
	E25T-SVPB$^{R}_{L}$16-31A	●		31	25	24	300	38	-	37	18	5	13°			Fig.10	SB-40125TRN	FT-15

Spare Parts

Description	Spare Parts: Shim	Spare Parts: Shim Screw	Spare Parts: Wrench (for Shim Screw)
●32S-SVJB$^{R}_{L}$16-40A●	SVN-32N	SS-4N	LW-4
●40T-SVJB$^{R}_{L}$16-50A●			
●25S-SVPB$^{R}_{L}$16-31A●			
●32S-SVPB$^{R}_{L}$16-40A●			

Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Low Feed / Precision	Non-ferrous Metals	Non-ferrous Metals
Ref. Page	B68	B66, B67	B66	B66, B67	B66	B66, B69	B67	B69	B67	B67
Insert / Toolholder	CK	VF	GP	HQ	$^{R}_{L}$-F	$^{R}_{L}$-FSF	$^{R}_{L}$-Y	F$^{R}_{L}$-USF	AH	$^{R}_{L}$-A3
...-SVJP$^{R}_{L}$08-...	VPGT0802..	-	-	-	-	VPET0802..	-	VPET0802..	-	-
...-SVJC$^{R}_{L}$08-...	-	VCMT0802..	-	VCMT0802..	-	-	-	-	-	-
...-SVJB$^{R}_{L}$11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	-
...-SVJB$^{R}_{L}$16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..	VCGT1604..
...-SVPC$^{R}_{L}$08-...	-	VCMT0802..	-	VCMT0802..	-	-	-	-	-	-
...-SVPB$^{R}_{L}$11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	-
...-SVPB$^{R}_{L}$16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..	VCGT1604..

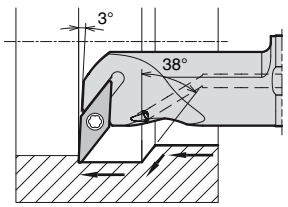
Applications	Non-ferrous Metals	Hard Materials
Ref. Page	C22	C13, C14
Insert / Toolholder	PCD	CBN
...-SVJP$^{R}_{L}$08-...	-	-
...-SVJC$^{R}_{L}$08-...	VCMT0802..	VCGW0802..
...-SVJB$^{R}_{L}$11-...	VBMT1103..	VBGW1103..
...-SVJB$^{R}_{L}$16-...	VBMT1604..	VBGW1604..
...-SVPC$^{R}_{L}$08-...	VCMT0802..	VCGW0802..
...-SVPB$^{R}_{L}$11-...	VBMT1103..	VBGW1103..
...-SVPB$^{R}_{L}$16-...	VBMT1604..	VBGW1604..

● : Std. Item ● : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

For recommended cutting conditions, see page ➡F77~F78

A-SVUC(B)-AE Excellent Bar (Copying)

Max. Overhang Length L/D=~5.5



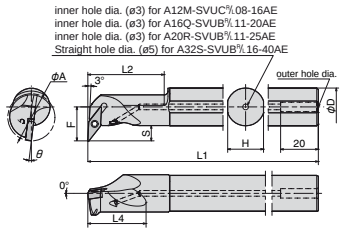


Fig.1

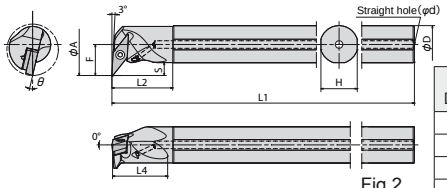


Fig.2

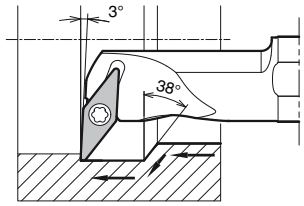
Shank Dia. øD	Outer hole Dia.	Straight hole Dia. ød
ø12	ø4	-
ø16	ø5	
ø20		
ø25	-	ø5
ø32		

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SVUC(B)-A Steel Bar (Copying)

Max. Overhang Length L/D=~4



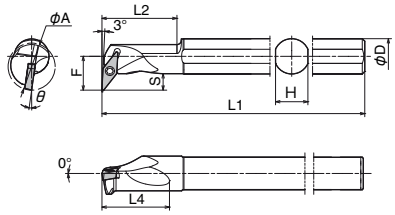


Fig.3

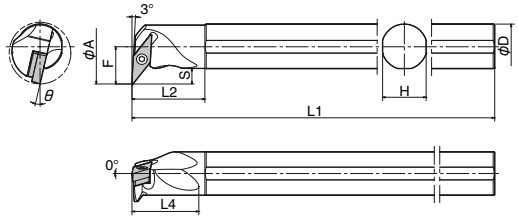


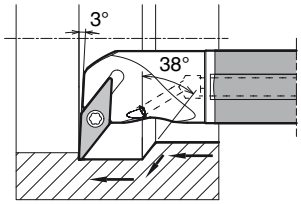
Fig.4

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E-SVUC(B)-A Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



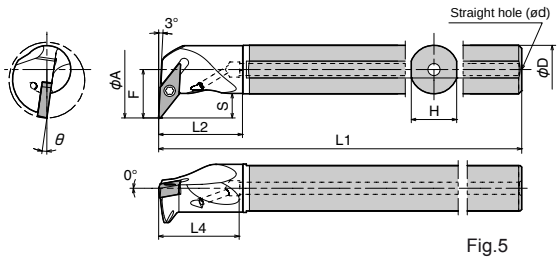


Fig.5

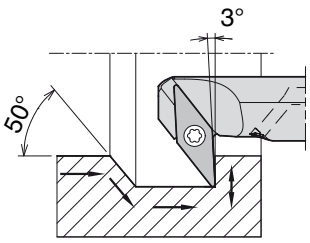
Shank Dia. øD	Straight hole Dia. ød
ø12	ø4
ø16	
ø20	ø6
ø25	

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

A-SVZC(B)-AE Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5.5



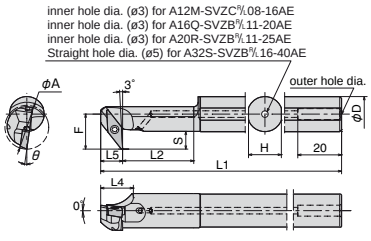


Fig.6

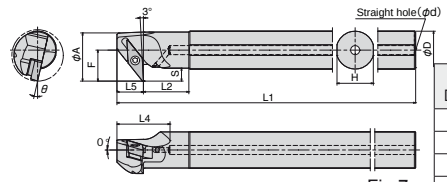


Fig.7

Shank Dia. øD	Outer hole Dia.	Straight hole Dia. ød
ø12	ø4	-
ø16	ø5	
ø20		
ø25	-	ø5
ø32		

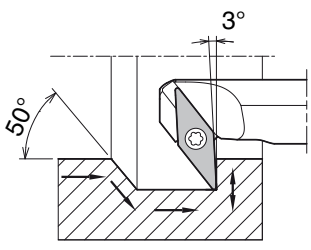
* No shim for SVZC R/L 08 type / SVZB R/L 11 type.

● Right-hand shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

S-SVZC(B)-A Steel Bar (Back Boring)

Max. Overhang Length L/D=~4



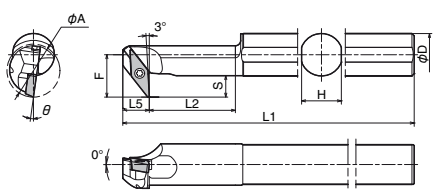


Fig.8

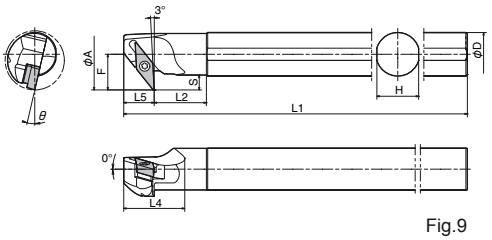


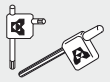
Fig.9

* No shim for SVZC R/L 08 type / SVZB R/L 11 type.

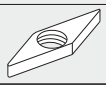
● Right-hand shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L4	L5	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw 	Spare Parts: Wrench 
Excellent Bar	A12M-SVUC R/L 08-16AE	●	●	16	12	11	150	25.5	23	-	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	27	-	16	8	8°				SB-2570TR	FT-8
	A20R-SVUB R/L 11-25AE	●	●	25	20	19	200	40.5	31	-	18	8	7°					
	A25S-SVUB R/L 16-34AE	●	●	34	25	24	250	40	37	-	20.5	8.5	13°			Fig.2	SB-40125TRN	FT-15
	A32S-SVUB R/L 16-40AE	●	●	40	32	31	250	84	47	-	28	12	9°			Fig.1		
Steel	S12M-SVUC R/L 08-16A	●	●	16	12	11	150	25.5	23	-	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	27	-	16	8	8°				SB-2570TR	FT-8
	S20R-SVUB R/L 11-25A	●	●	25	20	19	200	40.5	31	-	18	8	7°					
	S25S-SVUB R/L 16-34A	●	●	34	25	24	250	40	37	-	20.5	8.5	13°			Fig.4	SB-40125TRN	FT-15
	S32S-SVUB R/L 16-40A	●	●	40	32	31	250	84	47	-	28	12	9°			Fig.3		
Carbide	E12Q-SVUC R/L 08-18A	●		18	12	11	180	23	22	-	11.5	5.5	8°	0.4	Yes	Fig.5	SB-2050TR	FT-6
	E16X-SVUB R/L 11-25A	●		25	16	15	220	28	27	-	16	8	8°				SB-2570TR	FT-8
	E20S-SVUB R/L 11-29A	●		29	20	19	250	32	30	-	18	8	7°					
	E25T-SVUB R/L 16-34A	●		34	25	24	300	38	37	-	21	8.5	13°				SB-40125TRN	FT-15
Excellent Bar	A12M-SVZC R/L 08-16AE	●	●	16	12	11	150	25.5	14	7.5	11.5	5.5	8°	0.4	Yes	Fig.6	SB-2050TR	FT-6
	A16Q-SVZB R/L 11-20AE	●	●	20	16	15	180	32.5	20	10	16	8	8°				SB-2570TR	FT-8
	A20R-SVZB R/L 11-25AE	●	●	25	20	19	200	40.5	23	10	18	8	7°					
	A25S-SVZB R/L 16-34AE	●	●	34	25	24	250	30	34	17.5	20.5	8.5	13°			Fig.7	SB-40125TRN	FT-15
	A32S-SVZB R/L 16-40AE	●	●	40	32	31	250	72.5	36	17.5	28	12	9°			Fig.6		
Steel	S12M-SVZC R/L 08-16A	●	●	16	12	11	150	25.5	14	7.5	11.5	5.5	8°	0.4	No	Fig.8	SB-2050TR	FT-6
	S16Q-SVZB R/L 11-20A	●	●	20	16	15	180	32.5	20	10	16	8	8°				SB-2570TR	FT-8
	S20R-SVZB R/L 11-25A	●	●	25	20	19	200	40.5	23	10	18	8	7°					
	S25S-SVZB R/L 16-34A	●	●	34	25	24	250	30	34	17.5	20.5	8.5	13°			Fig.9	SB-40125TRN	FT-15
	S32S-SVZB R/L 16-40A	●	●	40	32	31	250	72.5	36	17.5	28	12	9°			Fig.8		

Spare Parts

Description	Spare Parts: Shim 	Shim Screw 	Wrench (for Shim Screw) 
A25S-SVUB R/L 16-34AE A32S-SVUB R/L 16-40AE A25S-SVZB R/L 16-34AE A32S-SVZB R/L 16-40AE	SVN-32N	SS-4N	LW-4

Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Low Feed / Precision	Non-ferrous Metals	Non-ferrous Metals
Ref. Page	-	B66, B67	B66	B66, B67	B66	B66	B67	-	B67	B67
Insert / Toolholder	CK 	VF 	GP 	HQ 	R/L-F 	R/L-FSF 	R/L-Y 	F R/L-USF 	AH 	R/L-A3 
...-SVUC R/L 08-...	-	VCMT0802..	-	VCMT0802..	-	-	-	-	-	-
...-SVUB R/L 11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	-
...-SVUB R/L 16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..	VCGT1604..
...-SVZC R/L 08-...	-	VCMT0802..	-	VCMT0802..	-	-	-	-	-	-
...-SVZB R/L 11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	-	-	-
...-SVZB R/L 16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	-	VCGT1604..	VCGT1604..

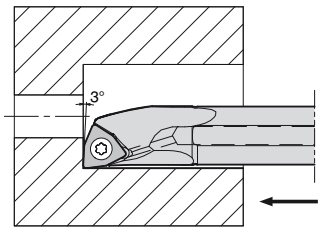
Applications	Non-ferrous Metals	Hard Materials
Ref. Page	C22	C13, C14
Insert / Toolholder	PCD 	CBN 
...-SVUC R/L 08-...	VCMT0802..	VCGW0802..
...-SVUB R/L 11-...	VBMT1103..	VBGW1103..
...-SVUB R/L 16-...	VBMT1604..	VBGW1604..
...-SVZC R/L 08-...	VCMT0802..	VCGW0802..
...-SVZB R/L 11-...	VBMT1103..	VBGW1103..
...-SVZB R/L 16-...	VBMT1604..	VBGW1604..

For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S / A-SWUB(P)-AE Excellent Bar (Boring)

Max. Overhang Length L/D=~5.5



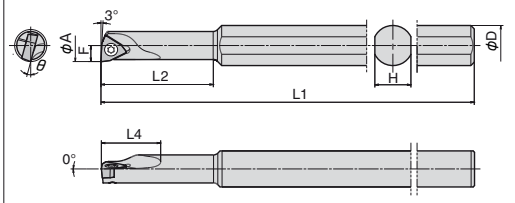
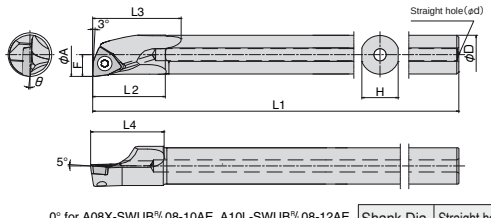


Fig.1



0° for A08X-SWUB□08-10AE, A10L-SWUB□08-12AE

Fig.2

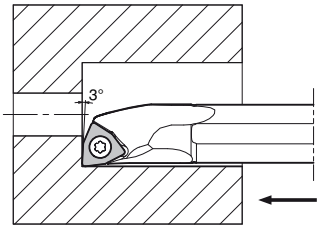
Shank Dia. øD	Straight hole Dia. ød
ø8	ø2.5
ø10	ø3
ø12	ø4
ø16	ø5
ø20	

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S-SWUB(P)-A Steel Bar (Boring)

Max. Overhang Length L/D=~4



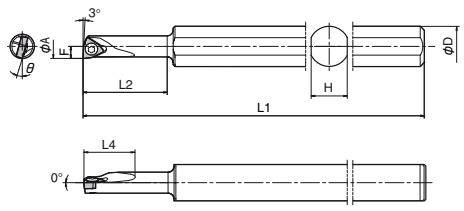
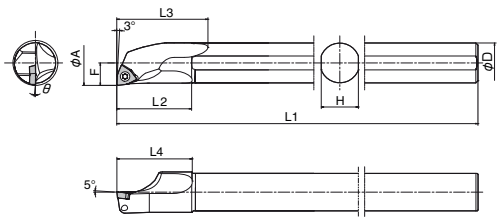


Fig.3



0° for S08X-SWUB□08-10A, S10L-SWUB□08-12A

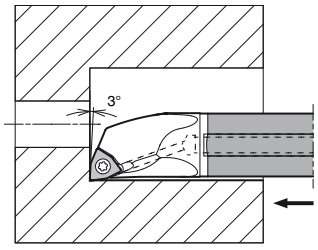
Fig.4

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E(C)-SWUB(P)-A Carbide Shank Bar (Boring)

Max. Overhang Length L/D=~7



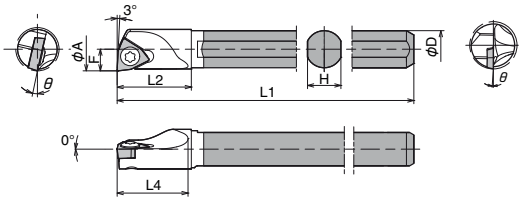
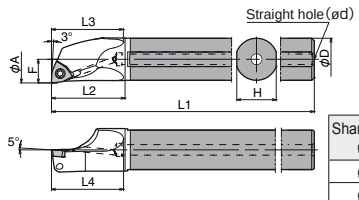


Fig.5



0° for E08L-SWUB□08-10A, E10N-SWUB□08-12A,
E10N-SWUB□08-12A-2/3, E10N-SWUB□08-12A-1/2

Fig.6

Shank Dia. øD	Straight hole Dia. ød
ø5	-
ø6	
ø7	
ø8	ø3
ø10	
ø12	ø4
ø16	
ø20	ø6

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

	Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Coolant Hole	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Excellent Bar	S10H-SWUBR/L06-06AE	●	●	6	10	9	100	21	-	13	3	-	15°	0.2	No	Fig.1	SB-2035TR	FT-6
	S10H-SWUBR/L06-07AE	●	●	7	10	9	100	24.5	-	15	3.5	-	13°					
	S10H-SWUBR/L08-08AE	●	●	8	10	9	100	28	-	15	4	-	15°					
	A08X-SWUBR/L08-10AE	●	●	10	8	7	120	16	21	16	5	-	13°		Yes	Fig.2	SB-2050TR	
	A10L-SWUBR/L08-12AE	●	●	12	10	9	140	20	25	20	6	-	10°					
	A12M-SWUPR/L11-14AE	●	●	14	12	11	150	24	30	24	7	-	4°	0.4			SB-2545TR	FT-8
	A16Q-SWUPR/L11-18AE	●	●	18	16	15	180	30	37	30	9	-	1°					
	A16Q-SWUPR/L16-18AE	●	●										3.5°	0.8			SB-4065TR	FT-15
	A20R-SWUPR/L16-22AE	●	●	22	20	19	200	36	46	37	11	-	2°					
Steel	S10H-SWUBR/L06-06A	●	●	6	10	9	100	21	-	13	3	-	15°	0.2	No	Fig.3	SB-2035TR	FT-6
	S10H-SWUBR/L06-07A	●	●	7	10	9	100	25	-	15	3.5	-	13°					
	S10H-SWUBR/L08-08A	●	●	8	10	9	100	28	-	15	4	-	15°					
	S08X-SWUBR/L08-10A	●	●	10	8	7	120	16	21	16	5	-	13°			Fig.4	SB-2050TR	
	S10L-SWUBR/L08-12A	●	●	12	10	9	140	20	25	20	6	-	10°					
	S12M-SWUPR/L11-14A	●	●	14	12	11	150	24	30	24	7	-	4°	0.4			SB-2545TR	FT-8
	S16Q-SWUPR/L11-18A	●	●	18	16	15	180	30	37	30	9	-	1°					
	S16Q-SWUPR/L16-18A	●	●										3.5°	0.8			SB-4065TR	FT-15
	S20R-SWUPR/L16-22A	●	●	22	20	19	200	36	46	37	11	-	2°					
Carbide	C05H-SWUBR/L06-06A	●	●	6	5	4.4	100	11	-	11	3	-	13°	0.2	No	Fig.5	SB-2035TR	FT-6
	C06J-SWUBR/L06-07A	●	●	7	6	5.4	110	12	-	12	3.5	-	13°					
	C07K-SWUBR/L08-08A	●	●	8	7	6.4	125	13	-	13	4	-	13°					
	E08L-SWUBR/L08-10A	●	●	10	8	7	140	16	15	15	5	-	13°		Yes	Fig.6	SB-2050TR	
	E10N-SWUBR/L08-12A	●	●	12	10	9	160	20	19	19	6	-	10°					
	E10N-SWUBR/L08-12A-2 / 3	●					105					-						
	E10N-SWUBR/L08-12A-1 / 2	●					80					-						
	E12Q-SWUPR/L11-14A	●	●	14	12	11	180	23	22	22	7	-	4°	0.4			SB-2545TR	FT-8
	E12Q-SWUPR/L11-14A-2 / 3	●					120					-						
	E12Q-SWUPR/L11-14A-1 / 2	●					90					-						
	E16X-SWUPR/L11-18A	●	●	18	16	15	220	28	27	27	9	-	1°					
	E16X-SWUPR/L11-18A-2 / 3	●					145					-						
	E16X-SWUPR/L11-18A-1 / 2	●					110					-						
	E16X-SWUPR/L16-18A	●	●				220					-	3.5°	0.8			SB-4065TR	FT-15
	E16X-SWUPR/L16-18A-2 / 3	●					145					-						
	E16X-SWUPR/L16-18A-1 / 2	●					110					-						
	E20S-SWUPR/L16-22A	●	●	22	20	19	250	32	31	31	11	-	2°					
	E20S-SWUPR/L16-22A-2 / 3	●					165					-						
	E20S-SWUPR/L16-22A-1 / 2	●					125					-						

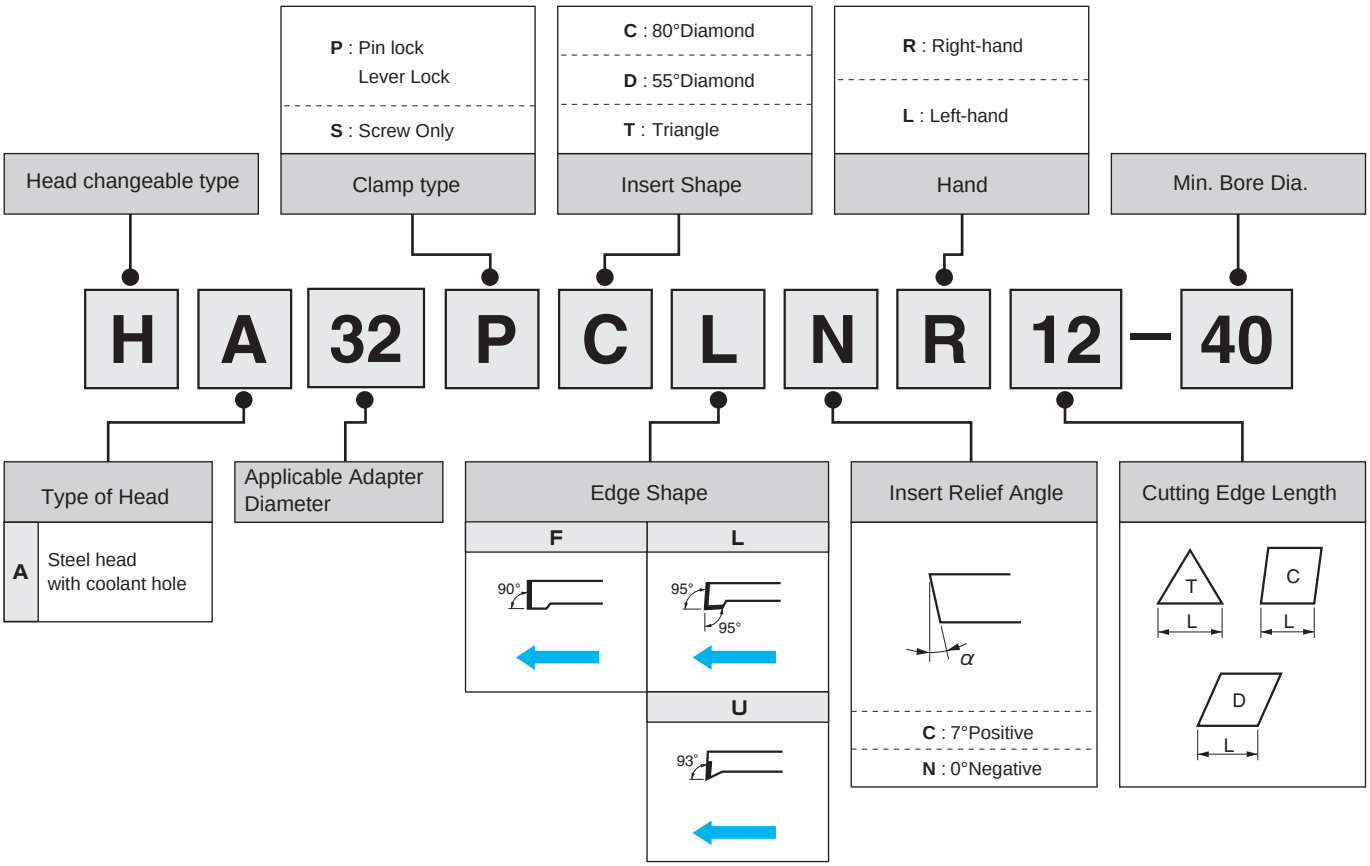
Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials	
Ref. Page	B70	B71	B70	B71	B70	B71	B70, B71	C22	C14	
Insert / Toolholder	CF	GP	R/L-DP	HQ	R/L-F	R/L-Y	Without Chipbreaker	PCD	CBN	
...-SWUBR/L06-...	WBGT0601..	-	WBMT0601..	-	WBGT0601..	-	WBGW0601..	WBMT0601..	WBGW0601..	
...-SWUBR/L08-...	-	-	WBMT0802..	-	WBGT0802..	-	WBGW0802..	WBMT0802..	WBGW0802..	
...-SWUPR/L11-...	-	WPMT1102..	-	WPMT1102..	-	WPGT1102..	WPGW1102..	WPMT1102..	-	
...-SWUPR/L16-...	-	WPMT1603..	-	WPMT1603..	-	WPGT1603..	WPGW1603..	-	-	

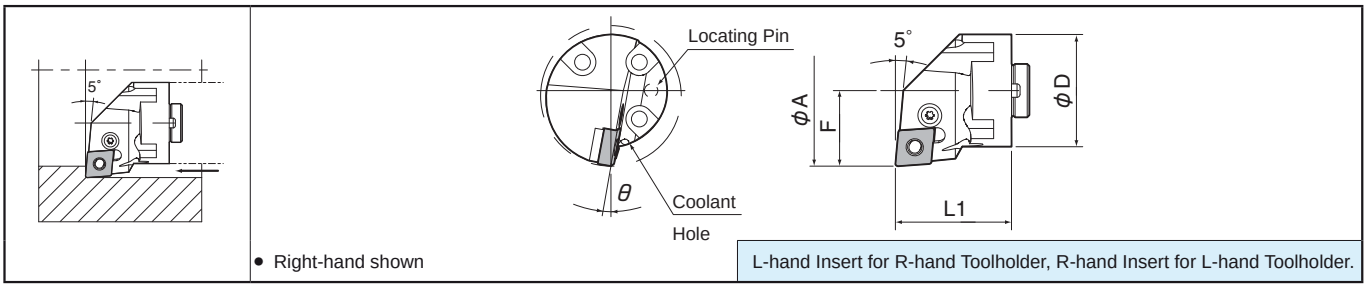
For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Identification System for Interchangeable Heads



HA…PCLN12 (Boring / Internal Facing: with Coolant Hole)



• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	Std.		Min. Bore Dia.	Dimension (mm)			θ	Standard Corner-R (rε)	Spare Parts						Applicable Boring Adapter ➡F45
									Lever	Lock Screw	Shim	Shim Pin	* Punch	Wrench	
	R	L	øA	øD	L1	F									
HA32PCLN$^{R}_{L}$12-40	●	●	40	32	41	22	10°	0.8	LL-2K	LS-2P	LC-4K	LSP-3K	*PC-2K	LTP-15	AD32U
HA40PCLN$^{R}_{L}$12-50	●	●	50	40		27									AD40V
HA50PCLN$^{R}_{L}$12-63	●	●	63	50		35									AD50W

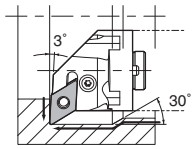
* Punch: Not included. Purchase separately.

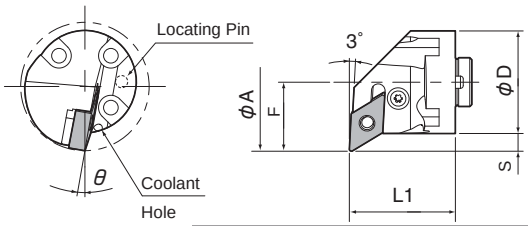
Applicable Inserts

Toolholder	Description		Ref. Page			
			Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PCLN$^{R}_{L}$12-40	CN○A	1204..	B14~B18	B81	C17	C5
HA40PCLN$^{R}_{L}$12-50	CN○G					
HA50PCLN$^{R}_{L}$12-63	CN○M					

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

HA…PDUN15 (Copying: with Coolant Hole)





• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

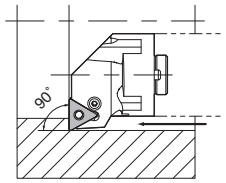
Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	L1	F	S	θ	Standard Corner-R (rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	* Punch	Wrench	Applicable Boring Adapter ➡F45
HA32PDUNR/L15-43	●	●	43	32	41	25	9	12°	0.8	LL-3K	LS-3P	LD-4K43 (LD-4K)	LSP-3K	*PC-2K	LTP-15	AD32U
HA40PDUNR/L15-50	●	●	50	40		27	7	10°								AD40V
HA50PDUNR/L15-63	●	●	63	50		35	10									AD50W

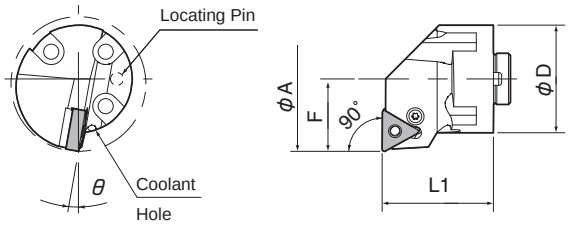
* Punch: Not included. Purchase separately.
* Shim: LD-4K43 is attached to Toolholder. When using DN □□ 1506 Insert, purchase LD-4K separately.

Applicable Inserts

Toolholder	Description: Shim: LD-4K43		Shim: LD-4K		Ref. Page: Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PDUNR/L15-43	DN○A	1504..	DN○A	1506..	B19~B23	B82	C17	C6
HA40PDUNR/L15-50	DN○G		DN○G					
HA50PDUNR/L15-63	DN○M		DN○M					

HA…PTFN16 (Internal: with Coolant Hole)





• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	L1	F	θ	Standard Corner-R (rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	* Punch	Wrench	Applicable Boring Adapter ➡F45
HA32PTFNR/L16-40	●	●	40	32	41	22	10°	0.8	LL-1K	LS-1P	LT-3K	LSP-2K	*PC-2K	LTP-10	AD32U
HA40PTFNR/L16-50	●	●	50	40		27									AD40V
HA50PTFNR/L16-63	●	●	63	50		35	8°								AD50W

* Punch: Not included. Purchase separately.

Applicable Inserts

Toolholder	Description		Ref. Page: Cermet / Coated Carbide / Carbide	Ceramic	PCD	CBN
HA32PTFNR/L16-40	TN○A	1604..	B28~B32	B86	C17	C7
HA40PTFNR/L16-50	TN○G					
HA50PTFNR/L16-63	TN○M					

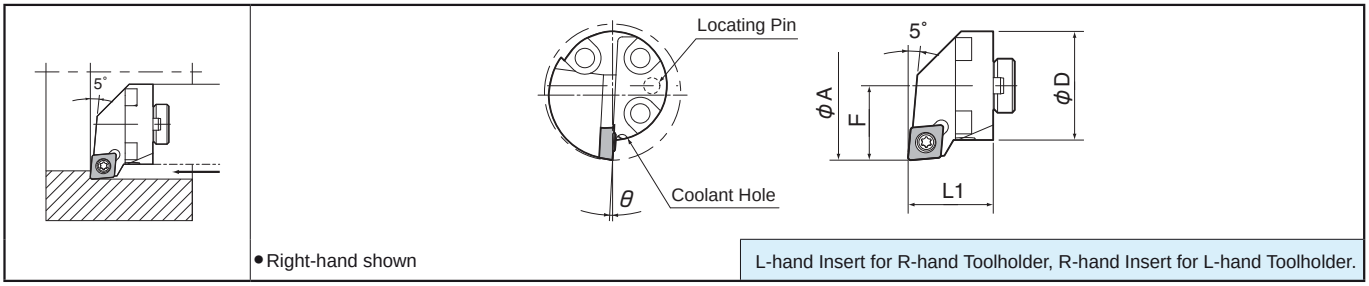
Reference

Wrenches (LTP-10, LTP-15) are Torx Plus.
The size of Torx Plus is engraved on the long shaft.

Wrench description	LTP-10	LTP-15
Engraved size	**10IP**	**15IP**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

HA…SCLC09 (Boring / Internal Facing: with Coolant Hole)



• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

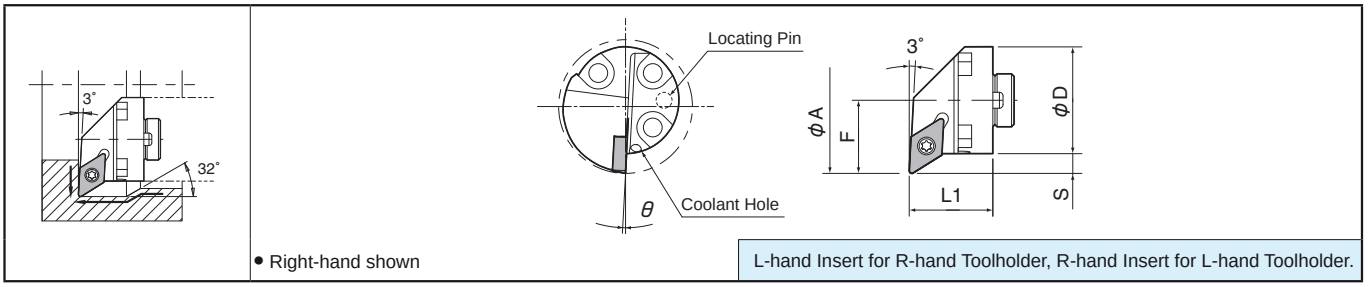
Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	L1	F	S	θ	Standard Corner-R (rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Boring Adapter	Applicable Inserts
HA32SCLCR/L09-40	●	●	40	32	25	22	-	3°	0.8	SB-3580TR	FTS-15	AD32U (➔F45)	CC..09T3..

Applicable Inserts

Description	Ref. Page: Cermet / Coated Carbide / Carbide	PCD	CBN
CC..09T3..	B45~B48	C18	C10

HA…SDUC11 (Copying: with Coolant Hole)



• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

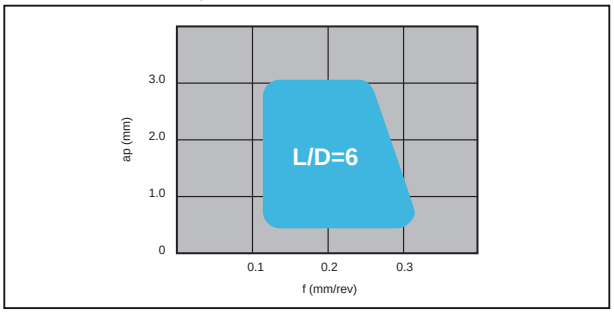
Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	L1	F	S	θ	Standard Corner-R (rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Boring Adapter	Applicable Inserts
HA32SDUCR/L11-40	●	●	40	32	25	22	6	3°	0.8	SB-3580TR	FTS-15	AD32U (➔F45)	DC..11T3..

Applicable Inserts

Description	Ref. Page: Cermet / Coated Carbide / Carbide	PCD	CBN
DC..11T3..	B50~B55	C19	C11

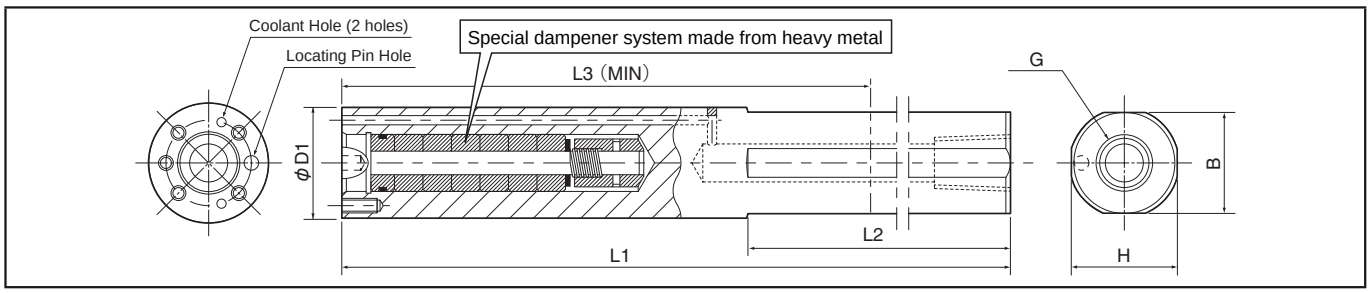
Possible machining Area (Guide-Line for Overhang Length of AD Bar)

(SCM435 Vc=150m/min ap=0.5~3mm f=0.1~0.3mm/rev TNMG160408)



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Adapter (with Coolant Hole / Anti-Vibration Dampener System)



● Dimensions

Description	Std.	Dimension (mm)							Spare Parts		
									Clamp Bolt		Wrench
		øD1	H	B	L1	L2	L3 (MIN)	G			
AD 32U	●	32	31	29	310	200	200	Rp3/8	HH5×20 (3 pcs)	HH5×30 (1 pc)	LW-4
AD 40V	●	40	39	37	360	248	228				
AD 50W	●	50	47	47	410	280	276		HH6×20 (3 pcs)	HH6×30 (1 pc)	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 at less than L3 (MIN) for use.

Combination of Boring Adapter and Interchangeable Head

Interchangeable Head Description		Boring Adapter			
		Base Description	Clamp Bolt		Wrench
HA32	**PCLN$^{R}_{L}$ 12-40**	AD32U	HH5×20	HH5×30	LW-4
	PDUN$^{R}_{L}$ 15-43				
	PTFN$^{R}_{L}$ 16-40				
	SCLC$^{R}_{L}$ 09-40		HH5×20		
	SDUC$^{R}_{L}$ 11-40				
HA40	**PCLN$^{R}_{L}$ 12-50**	AD40V	HH5×20	HH5×30	
	PDUN$^{R}_{L}$ 15-50				
	PTFN$^{R}_{L}$ 16-50				
HA50	**PCLN$^{R}_{L}$ 12-63**	AD50W	HH6×20	HH6×30	LW-5
	PDUN$^{R}_{L}$ 15-63				
	PTFN$^{R}_{L}$ 16-63				

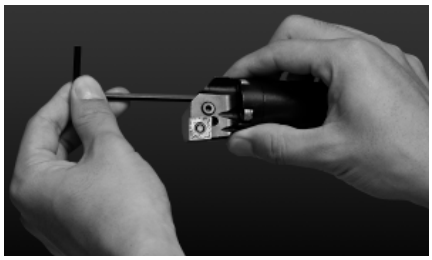
How to exchange heads



1. No head attached



2. Align hole positions

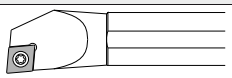
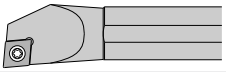
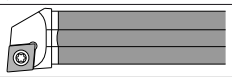
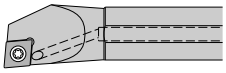
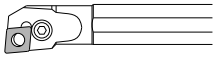
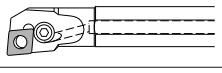
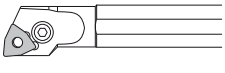
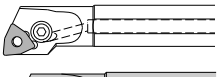
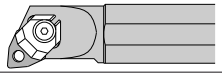
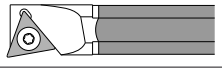
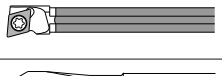
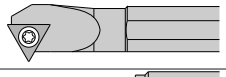
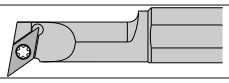
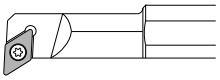
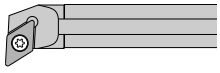
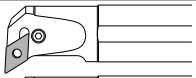
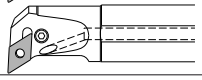
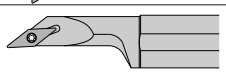
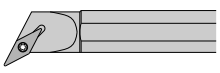
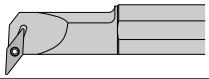


3. Tighten 3 bolts to attach the head

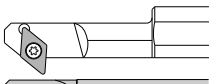
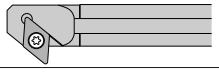
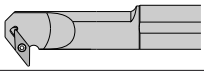
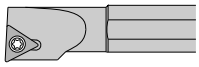
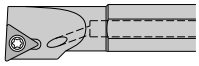
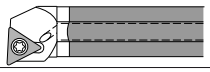
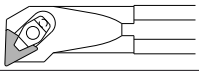
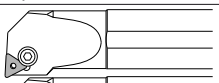
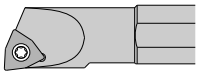
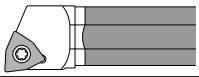
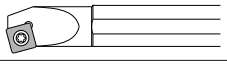
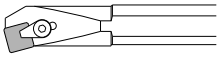
For lever lock type Interchangeable head, use 2 short bolts for upper side and 1 long bolt for lower side.
For HA32 SCLC$^{R}_{L}$09-40 and HA32 SDUC$^{R}_{L}$11-40,
use HH5 X 20 for all 3 bolts.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bars for General Purpose

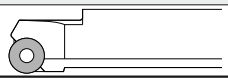
Application	Boring Bar Type	Shape	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Insert Type	Min. Bore Dia. øA 5	6	7	8	10	12	14	16	18	20	25	30	32	40	50	Ref. Page for Toolholder
Boring / Internal Facing	S···SCLP(C)		Steel L/D=~3		○	Positive					●	●	●	●	●	●	●	●				
	S···SCLP(C)-E		Excellent L/D=~5		○	Positive	●	●	●	●	●	●	●	●	●	●	●					F48
	C···SCLP(C)		Carbide L/D=~7		○	Positive	●	●	●	●	●	●		●		●	●					
	A···SCLP(C)-E		Excellent L/D=~5	●		Positive					●	●	●	●	●	●	●					F50
	E···SCLP(C)		Carbide L/D=~7	●		Positive					●	●		●		●	●					
	S···PCLN○○		Steel L/D=~3		○	Negative										●	● 27		●			F66
	A···PCLN09		Steel L/D=~3	●		Negative										●	● 27		●			
	S···PWLN○○		Steel L/D=~3		○	Negative										●	● 27		●			F69 F70
	A···PWLN06		Steel L/D=~3	●		Negative										●	● 27		●			F69
	S···WWLN08-E		Excellent L/D=~5		○	Negative											● 28		● 34	●		F70
	C···STXP(B)		Carbide L/D=~7		○	Positive			● 7.5	● 9	● 11											F58
	C···SJLC		Carbide L/D=~7		○	Positive	● 5.5															F53
Copying	S···STWP		Steel L/D=~3		○	Positive						●		●		●	●					F57
	S···STWP-E		Excellent L/D=~5		○	Positive						●		●		●	●		●			
	S···SYXP-E		Excellent L/D=~5		○	Positive						●		●								F59
	S···SDUC		Steel L/D=~3		○	Positive							●	●		●	●					F51
	S···SDUC-E		Excellent L/D=~5		○	Positive							●	●		●	●		●			
	C···SDUC		Carbide L/D=~7		○	Positive							●	●		●	●	●	●			
	S···PDUN11		Steel L/D=~3		○	Negative											● 27		●	●		F67
	A···PDUN11		Steel L/D=~3	●		Negative											● 27		●	●		
	S···SVJB(C)-E		Excellent L/D=~5		○	Positive								●		●	●	●		●	●	F62
	S···SVJP-E				○	Positive								●								
	S···SVPB(C)-E		Excellent L/D=~5		○	Positive								●		●	●		● 34	●		
	S···SVUB(C)-E		Excellent L/D=~5		○	Positive								●		●	●		● 34	●		
Back Copying	C···STZB		Carbide L/D=~7		○	Positive				● 8.5												F58
	C···SJZC		Carbide L/D=~7		○	Positive		● 6.5														F53

For Min.Bore Dia. øA, the figure under ● may be applied depending on the toolholder type.

Application	Boring Bar Type	Shape	Shank Type Max. Overhang Length (L/D)	Coolant Hole Yes	Coolant Hole No	Insert Type	Min. Bore Dia. øA 5	6	7	8	10	12	14	16	18	20	25	30	32	40	50	Ref. Page for Toolholder
Back Copying	S···SDZC		Steel L/D=~3		○	Positive							●	●		●	●					F52
	S···SDZC-E		Excellent L/D=~5		○	Positive							●	●		●	●		●			
	S···SVZB(C)-E		Excellent L/D=~5		○	Positive								●		●	●		● 34	●		F62
Boring	S···STUP(B)		Steel L/D=~3		○	Positive				●	●	●		●		●	●		●			F54
	S···STUP(B)-E		Excellent L/D=~5		○	Positive				●	●	●	●	●	●	●	●		●			
	C···STUP(B)		Carbide L/D=~7		○	Positive				●	●	●	●	●	●	●	●					
	A···STUP-E		Excellent L/D=~5	●		Positive					●	●	●	●	●	●	●		●			F56
	E···STUP		Carbide L/D=~7	●		Positive					●	●	●	●	●	●	●					
	S···CTUP		Steel L/D=~3		○	Positive								●		●	● 27		● 34	● 43	●	F61
	S···PTUN ○○		Steel L/D=~3		○	Negative										●	●	●	●	●	●	F68
	A···PTUN11		Steel L/D=~3	●		Negative										●	●		●			
	S···SWUB		Steel L/D=~3		○	Positive		●	●	●												F64
	S···SWUP(B)-E		Excellent L/D=~5		○	Positive					●	●	●	●	●	●	●					
	C···SWUP(B)		Carbide L/D=~7		○	Positive		●	●	●	●	●	●	●	●	●	●					
	S···SSKP		Steel L/D=~3		○	Positive										●	●		●	●		F60
	S···CSKP		Steel L/D=~3		○	Positive										●	● 27		● 34	● 43		

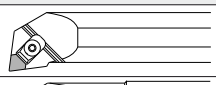
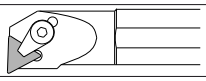
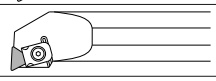
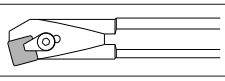
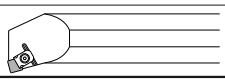
For Min.Bore Dia. øA, the figure under ● may be applied depending on the toolholder type.

Toolholders for Bearing Machining (Square Shank)

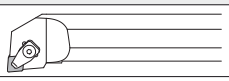
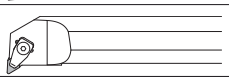
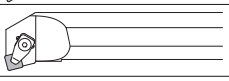
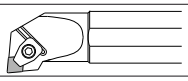
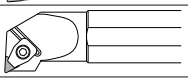
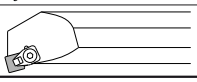
Application	Boring Bar Type	Shape	Min. Bore Dia. øA 20	25	30	32	40	50	Ref. Page for Toolholder
Boring	SRCP-B		●			●			F71

Application	Boring Bar Type	Shape	Min. Bore Dia. øA 20	25	30	32	40	50	Ref. Page for Toolholder
Round-Chamfering	CBSN-B		●						F71

Boring Bars for Ceramic / Solid CBN Tools (L/D=~3)

Application	Boring Bar Type	Shape	Min. Bore Dia. øA 16	18	20	25	30	32	40	50	Ref. Page for Toolholder
Boring / Internal Facing Machining	S···CELN									●	F72
Boring	S···CTUP		●		●	● 27		● 34	● 43	●	F61
	S···CTUC								●		F72
	S···CSKP				●	● 27		● 34	● 43		F60
	S···CSKN									●	F72

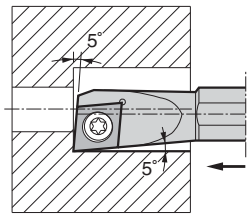
For Min.Bore Dia. ΦA, the figure under ● may be applied depending on the toolholder type.

Application	Boring Bar Type	Shape	Min. Bore Dia. øA 20	25	30	32	40	50	Ref. Page for Toolholder
Boring / Internal Facing Machining	S···CCLN-GX						●	●	F73
Boring / Copying Machining	S···CDUN-GX						●	●	F73
Boring Machining	S···CSKN-GX						●	●	F73
Boring / Internal Facing Machining	S···CCLN-A				●		●		F74
Boring	S···CTUN-A				●				F74
	S···CSKN-A				●		●		F74

Boring Bar [CC □□ , CP □□ Insert]

S…SCLP(C)-E Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5



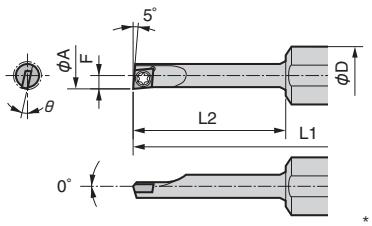
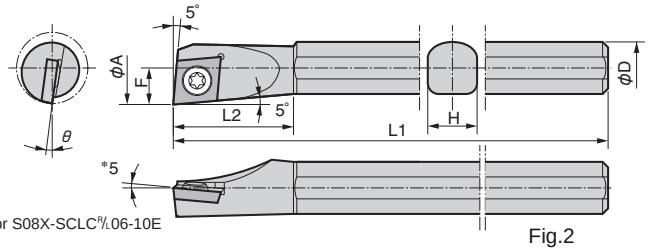


Fig.1



* 3° for S08X-SCLC□06-10E

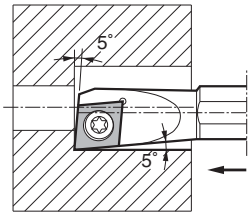
Fig.2

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S…SCLP(C) Steel Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~3



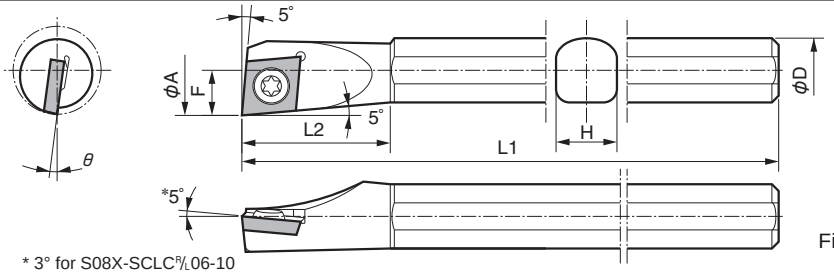


Fig.3

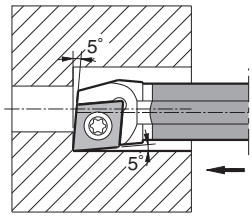
* 3° for S08X-SCLC□06-10

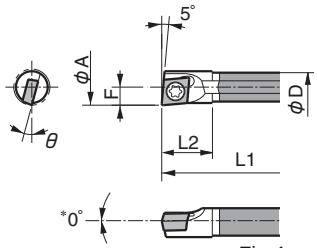
● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

C…SCLP(C) Carbide Shank Bar (Boring / Internal Facing)

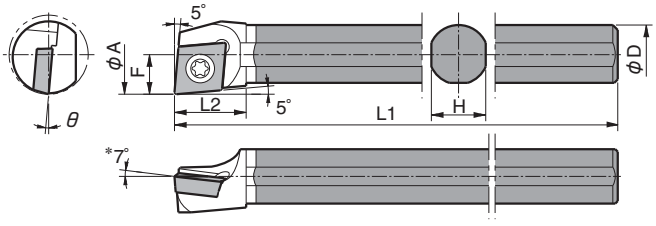
Max. Overhang Length L/D=~7





* 2° for C04G-SCLC□03-05

Fig.4



* 3° for C08L-SCLC□06-10

Fig.5

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	θ	Standard Corner-R (re)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10H-SCLC$^{R/L}$03-05E	SCLC$^{R/L}$ 0510B-03E	●	●	5	10	9	100	24	-	-	2.5	15°	0.2	Fig.1	SB-1635TR	FT-6
SCLC$^{R/L}$03-06E	0610B-03E	●	●	6				28			3.0	13°				
S10J-SCLC$^{R/L}$04-07E	0710B-04E	●	●	7	10	9	110	32	-	-	3.5	13°	0.2		SB-2040TR	
SCLC$^{R/L}$04-08E	0810B-04E	●	●	8				37			4.0	11°				
S08X-SCLC$^{R/L}$06-10E	SCLC$^{R/L}$ 1008B-06E	●	●	10	8	7	120	17	-	-	5	12°	0.2	Fig.2	SB-2545TR	FT-8
S10M-SCLP$^{R/L}$08-12E	SCLP$^{R/L}$ 1210B-08E	●	●	12	10	9	150	23	-	-	6	5°	0.4		SB-3STR	FT-10
S12M-SCLP$^{R/L}$08-14E	1412B-08E	●	●	14	12	11		25			7	4°				
S12M-SCLP$^{R/L}$09-16E	1612B-09E	●	●	16	12	11	150	29	-	-	8	4°	0.4		SB-4TR	FT-15
S16Q-SCLP$^{R/L}$09-18E	1816B-09E	●	●	18	16	15	180	31			9	3.5°				
S16R-SCLP$^{R/L}$09-20E	2016B-09E	●	●	20	16	15	200	34			10	3°				
S20X-SCLP$^{R/L}$09-25E	2520B-09E	●	●	25	20	19	220	37			12.5	0°				
S08X-SCLC$^{R/L}$06-10	SCLC$^{R/L}$ 1008B-06	●	●	10	8	7	120	17	-	-	5	12°	0.2	Fig.3	SB-2545TR	FT-8
S10M-SCLP$^{R/L}$08-12	SCLP$^{R/L}$ 1210B-08	●	●	12	10	9	150	23	-	-	6	5°	0.4		SB-3STR	FT-10
S12M-SCLP$^{R/L}$08-14	1412B-08	●	●	14	12	11		25			7	4°				
S12M-SCLP$^{R/L}$09-16	1612B-09	●	●	16	12	11	150	29	-	-	8	4°	0.4		SB-4TR	FT-15
S16N-SCLP$^{R/L}$09-18	1816B-09	●	●	18	16	15	160	31			9	3.5°				
S16Q-SCLP$^{R/L}$09-20	2016B-09	●	●	20	16	15	180	34			10	3°				
S20R-SCLP$^{R/L}$09-25	2520B-09	●	●	25	20	19	200	37			12.5	0°				
S25S-SCLP$^{R/L}$09-30	3025B-09	●	●	30	25	24	250	40			15	0°				
C04G-SCLC$^{R/L}$03-05	SCLC$^{R/L}$ 0504B-03W	●	●	5	4	3.8	90	7	-	-	2.5	15°	0.2	Fig.4	SB-1635TR	FT-6
C05H-SCLC$^{R/L}$03-06	0605B-03W	●	●	6	5	4.4	100	9			3.0	13°				
C06J-SCLC$^{R/L}$04-07	0706B-04W	●	●	7	6	5.4	110	10	-	-	3.5	13°	0.2		SB-2040TR	
C07K-SCLC$^{R/L}$04-08	0807B-04W	●	●	8	7	6.4	125	11			4.0	11°				
C08L-SCLC$^{R/L}$06-10	SCLC$^{R/L}$ 1008B-06W	●	●	10	8	7	140	10	-	-	5	10°	0.2	Fig.5	SB-2545TR	FT-8
C10N-SCLP$^{R/L}$08-12	SCLP$^{R/L}$ 1210B-08W	●	●	12	10	9	160	12	-	-	6	8°	0.4		SB-3STR	FT-10
SCLP$^{R/L}$08-12-1 / 2	1210B-08W-1 / 2	●					80									
SCLP$^{R/L}$08-12-2 / 3	1210B-08W-2 / 3	●					105									
C12Q-SCLP$^{R/L}$09-16	1612B-09W	●	●	16	12	11	180	14	-	-	8	5°	0.4		SB-4TR	FT-15
SCLP$^{R/L}$09-16-1 / 2	1612B-09W-1 / 2	●					90									
SCLP$^{R/L}$09-16-2 / 3	1612B-09W-2 / 3	●					120									
C16X-SCLP$^{R/L}$09-20	2016B-09W	●	●	20	16	15	220	16	-	-	10	3°				
SCLP$^{R/L}$09-20-1 / 2	2016B-09W-1 / 2	●					110									
SCLP$^{R/L}$09-20-2 / 3	2016B-09W-2 / 3	●					145									
C20S-SCLP$^{R/L}$09-25	2520B-09W	●	●	25	20	19	250	17	-	-	12.5	0°				
SCLP$^{R/L}$09-25-1 / 2	2520B-09W-1 / 2	●					125									
SCLP$^{R/L}$09-25-2 / 3	2520B-09W-2 / 3	●					165									

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing-Medium	Finishing	Finishing / Precision
Ref. Page	B45	B49	B45	B45	B45, B49	B46	B46, B49	B45	B47	B47
Insert / Toolholder	CF	GP	GF	GK	HQ	FN-Z	Standard	GQ	$^{R/L}$-F	$^{R/L}$-FSF
----SCLC$^{R/L}$03----	CCGT0301..	-	-	-	-	-	-	-	CCGT0301..	CCET0301..
----SCLC$^{R/L}$04----	CCGT0401..	-	-	-	-	-	-	-	CCGT0401..	CCET0401..
----SCLC$^{R/L}$06----	-	-	CCGT0602..	CCMT0602..	CCMT0602..	CCGT0602..	CCGT0602..	CCGT0602..	-	-
----SCLP$^{R/L}$08----	-	CPMT0802..	-	-	CPMH0802..	-	CPMH0802..	-	-	-
----SCLP$^{R/L}$09----	-	CPMT0903..	-	-	CPMH0903..	-	CPMH0903..	-	-	-

Applications	Finishing-Medium	Low Feed	Low Feed / Precision	Soft Steel Finishing	Soft Steel Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. Page	B49	B48	B48	B49	B49	B47, B49	C18	C10
Insert / Toolholder	$^{R/L}$-Y	(E / F) $^{R/L}$-U	F$^{R/L}$-USF	XP	XQ	Without Chipbreaker	PCD	CBN
----SCLC$^{R/L}$03----	-	-	-	-	-	-	-	CCMW0301..
----SCLC$^{R/L}$04----	-	-	-	-	-	-	CCGW0401..	CCMW0401..
----SCLC$^{R/L}$06----	-	CCGT0602..	CCET0602..	-	-	CCGW0602..	CCMT0602.. CCGW0602..	CCMW0602..
----SCLP$^{R/L}$08----	CPMH0802..	-	-	CPMT0802..	-	CPMB0802..	CPMH0802..	CPGB0802..
----SCLP$^{R/L}$09----	CPMH0903..	-	-	CPMT0903..	CPMT0903..	CPMB0903..	CPMH0903..	CPGB0903..

For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [CC □□ , CP □□ Insert]

A…SCLP(C)-E Excellent Twin-Hole Bar (Boring / Internal Facing: with Coolant Hole)

Max. Overhang Length L/D=~5

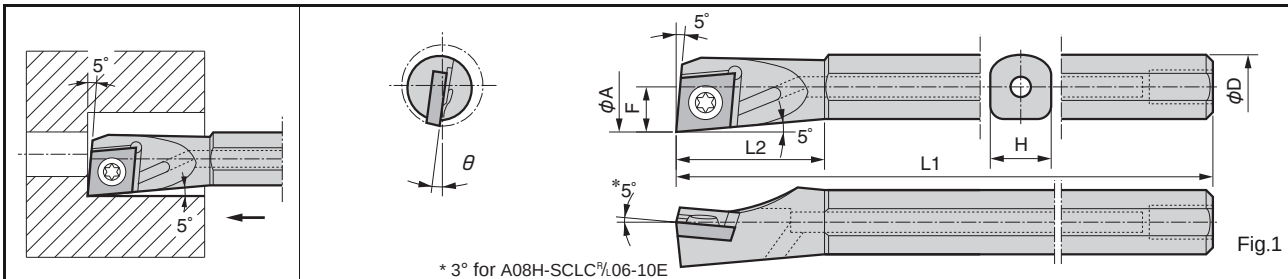


Fig.1

* 3° for A08H-SCLCR/L06-10E

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E…SCLP(C) Carbide Twin-Hole Bar (Boring / Internal Facing: with Coolant Hole)

Max. Overhang Length L/D=~7

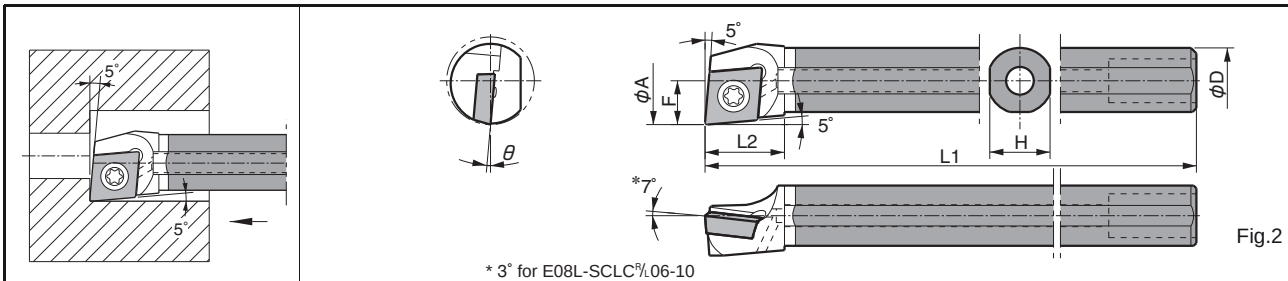


Fig.2

* 3° for E08L-SCLCR/L06-10

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions (For applicable sleeve / joint, refer to F76.)

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	θ	Standard Corner-R (rε)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
A08H -SCLCR/L06-10E	SCLCR/L 1008B-06EH	●	●	10	8	7	100	17	-	-	5	12°	0.2	Fig.1	SB-2545TR	FT-8
A10X -SCLPR/L08-12E	SCLPR/L 1210B-08EH	●	●	12	10	9	120	23	-	-	6	5°	0.4		SB-3STR	FT-10
A12X -SCLPR/L08-14E	1412B-08EH	●	●	14	12	11		25			7	4°				
A12X -SCLPR/L09-16E	1612B-09EH	●	●	16	12	11	120	29	-	-	8	4°	0.4		SB-4TR	FT-15
A16M -SCLPR/L09-18E	1816B-09EH	●	●	18	16	15	150	31			9	3.5°				
-SCLPR/L09-20E	2016B-09EH	●	●	20				34			10	3°				
A20Q -SCLPR/L09-25E	2520B-09EH	●	●	25	20	19	180	37			12.5	0°				
E08L -SCLCR/L06-10	SCLCR/L 1008B-06WH	●	●	10	8	7	140	11	-	-	5	10°	0.2	Fig.2	SB-2545TR	FT-8
E10N -SCLPR/L08-12	SCLPR/L 1210B-08WH	●	●	12	10	9	160	12			6	8°	0.4		SB-3STR	FT-10
E12Q -SCLPR/L09-16	1612B-09WH	●	●	16	12	11	180	15			8	5°				
E16X -SCLPR/L09-20	2016B-09WH	●	●	20	16	15	220	16			10	3°	0.4		SB-4TR	FT-15
E20S -SCLPR/L09-25	2520B-09WH	●	●	25	20	19	250	17			12.5	0°				

Applicable Inserts

Applications	Finishing	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium	Finishing-Medium	Finishing-Medium	Low Feed	Low Feed / Precision
Ref. Page	B49	B45	B45	B45, B49	B46	B46, B49	B45	B49	B48	B48
Insert / Toolholder	GP	GF	GK	HQ	FN-Z	Standard	GQ	R/L-Y	(E / F) R/L-U	FR/L-USF
----SCLCR/L06----	-	CCGT0602..	CCMT0602..	CCMT0602..	CCGT0602..	CCGT0602..	CCGT0602..	-	CCGT0602..	CCET0602..
----SCLPR/L08----	CPMT0802..	-	-	CPMH0802..	-	CPMH0802..	-	CPMH0802..	-	-
----SCLPR/L09----	CPMT0903..	-	-	CPMH0903..	-	CPMH0903..	-	CPMH0903..	-	-

Applications	Soft Steel Finishing	Soft Steel Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. Page	B49	B49	B47, B49	C18	C10
Insert / Toolholder	XP	XQ	Without Chipbreaker	PCD	CBN
----SCLCR/L06----	-	-	CCGW0602..	CCMT0602.. CCGW0602..	CCMW0602..
----SCLPR/L08----	CPMT0802..	-	CPMB0802..	CPMH0802..	CPGB0802..
----SCLPR/L09----	CPMT0903..	CPMT0903..	CPMB0903..	CPMH0903..	CPGB0903..

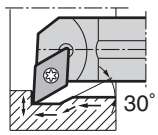
For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [DC □□ Insert]

S…SDUC-E Excellent Bar (Copying)

Max. Overhang Length L/D=~5



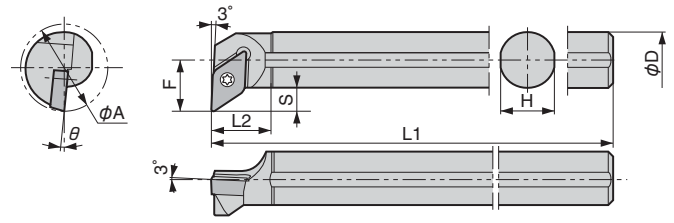


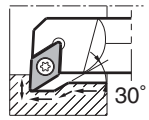
Fig.1

• Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S…SDUC Steel Bar (Copying)

Max. Overhang Length L/D=~3



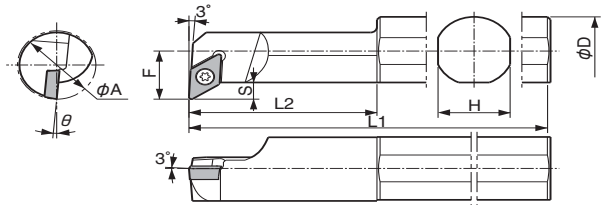


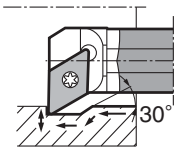
Fig.2

• Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

C…SDUC Carbide Shank Bar (Copying)

Max. Overhang Length L/D=~7



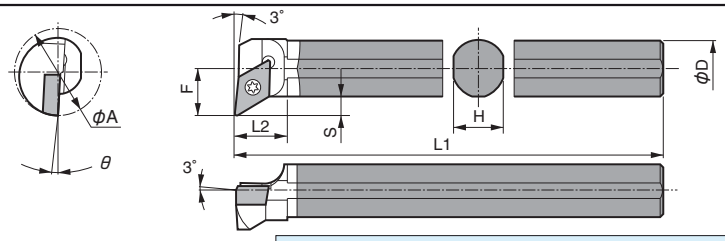


Fig.3

• Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (re)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10M-SDUCR/L07-14E	SDUCR/L 1410B-07E	●	●	14	10	9	150	18			8.3						
S12M-SDUCR/L07-16E	1612B-07E	●	●	16	12	11	150	20			9.3	3.3	5°	0.4		SB-2560TR	FT-8
S16Q-SDUCR/L07-20E	2016B-07E	●	●	20	16	15	180	20			11.3				Fig.1		
S16Q-SDUCR/L11-25E	2516B-11E	●	●	25	16	15	180	21			14.1	6.1	5°	0.8		SB-4085TR	FT-15
S20Q-SDUCR/L11-32E	3220B-11E	●	●	32	20	19		22			16.1						
S16Q-SDUCR/L07-14	SDUCR/L 1416B-07	●	●	14	16	14	180	30			10.4	4.4	5°	0.4		SB-2560TR	FT-8
S16Q-SDUCR/L07-16	1616B-07	●	●	16				35			11.4				Fig.2		
S20R-SDUCR/L11-20	2020B-11	●	●	20	20	18	200	50	-	-	15.1	6.1	5°	0.8		SB-4085TR	FT-15
S25X-SDUCR/L11-25	2525B-11	●	●	25	25	23	220	60			17.6						
C10N-SDUCR/L07-14	SDUCR/L 1410B-07W	●	●	14	10	9	160	11			8.2	3.3	5°	0.4		SB-2560TR	FT-8
C12Q-SDUCR/L07-16	1612B-07W	●	●	16	12	11	180	12			9.2				Fig.3		
C12Q-SDUCR/L11-20	2012B-11W	●	●	20	12	11	180	15			12.3	6.1	5°	0.8		SB-4085TR	FT-15
C16X-SDUCR/L11-25	2516B-11W	●	●	25	16	15	220	16			14.3						
C20S-SDUCR/L11-32	3220B-11W	●	●	32	20	19	250	17			16.3						

Applicable Inserts

Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium-Roughing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. Page	B50	B50	B51	B51	B52	B51	B53	B53	B54	B54
Insert / Toolholder	CF	GP	GK	HQ	FN-Z	Standard	R/L-F	R/L-FSF	(E / F) R/L-U	F R/L-USF
····SDUCR/L07····	DCGT0702..	DCMT0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
····SDUCR/L11····	DCGT11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCMT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

Applications	Low Feed	Low Feed / Precision	Soft Steel Finishing	Soft Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B55	B55	B52	B52	B52	B55	B55	B55	C19	C11
Insert / Toolholder	(E / F) R/L-J	FR/L-JSF	XP	XQ	MQ	Without Chipbreaker	AH	R/L-A3	PCD	CBN
...-SDUCR/L07-···	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
····SDUCR/L11-···	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

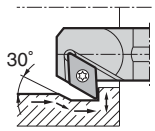
For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [DC □□ Insert]

S…SDZC-E Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5



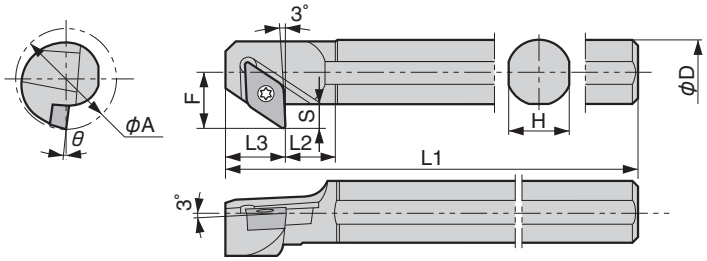


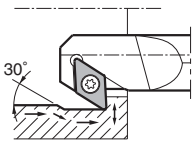
Fig.1

● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

S…SDZC Steel Bar (Back Boring)

Max. Overhang Length L/D=~3



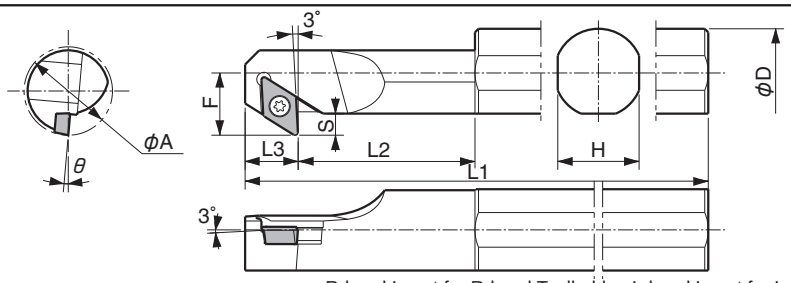


Fig.2

● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (re)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10M-SDZC[R/L]07-14E	SDZC[R/L]1410B-07E	●	●	14	10	9	150	14	9.5		8.3						
S12M-SDZC[R/L]07-16E	1612B-07E	●	●	16	12	11	150	16	10.5		9.3	3.3	5°	0.4		SB-2560TR	FT-8
S16Q-SDZC[R/L]07-20E	2016B-07E	●	●	20	16	15	180	16	10.5		11.3				Fig.1		
S16Q-SDZC[R/L]11-25E	2516B-11E	●	●	25	16	15	180	12	15	-	14.1	6.1	5°	0.8		SB-4085TR	FT-15
S20Q-SDZC[R/L]11-32E	3220B-11E	●	●	32	20	19					16.1						
S16Q-SDZC[R/L]07-14	SDZC[R/L]1416B-07	●	●	14	16	14	180	30	10		10.4	4.4	5°	0.4		SB-2560TR	FT-8
S16Q-SDZC[R/L]07-16	1616B-07	●	●	16				35	12.5		11.4				Fig.2		
S20R-SDZC[R/L]11-20	2020B-11	●	●	20	20	18	200	40	15		15.1	6.1	5°	0.8		SB-4085TR	FT-15
S25X-SDZC[R/L]11-25	2525B-11	●	●	25	25	23	220	50			17.6						

Applicable Inserts

Applications	Minute ap	Finishing	Finishing-Medium	Finishing-Medium	Medium	Medium-Roughing	Finishing	Finishing / Precision	Low Feed	Low Feed / Precision
Ref. Page	**B50**	**B50**	**B51**	**B51**	**B52**	**B51**	**B53**	**B53**	**B54**	**B54**
Insert / Toolholder	**CF**	**GP**	**GK**	**HQ**	**FN-Z**	**Standard**	**[R/L]-F**	**[R/L]-FSF**	**(E / F) [R/L]-U**	**F[R/L]-USF**
····SDZC[R/L]07-····	DCGT0702..	DCMT0702..	DCMT0702..	DCMT0702..	DCGT0702..	DCGT0702..	DCGT0702..	DCET0702..	DCGT0702..	DCET0702..
····SDZC[R/L]11····	DCGT11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGT11T3..	DCMT11T3.. DCGT11T3..	DCGT11T3..	DCET11T3..	DCGT11T3..	DCET11T3..

Applications	Low Feed	Low Feed / Precision	Soft Steel Finishing	Soft Steel Finishing-Medium	Stainless Steel	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	**B55**	**B55**	**B52**	**B52**	**B52**	**B55**	**B55**	**B55**	**C19**	**C11**
Insert / Toolholder	**(E / F) [R/L]-J**	**F[R/L]-JSF**	**XP**	**XQ**	**MQ**	Without Chipbreaker	**AH**	**[R/L]-A3**	**PCD**	**CBN**
····SDZC[R/L]07-····	-	-	DCMT0702..	-	DCMT0702..	DCGW0702..	-	-	DCMT0702..	DCMW0702..
····SDZC[R/L]11-····	DCGT11T3..	DCET11T3..	DCMT11T3..	DCMT11T3..	DCMT11T3..	DCGW11T3..	DCGT11T3..	DCGT11T3..	DCMT11T3..	DCMW11T3..

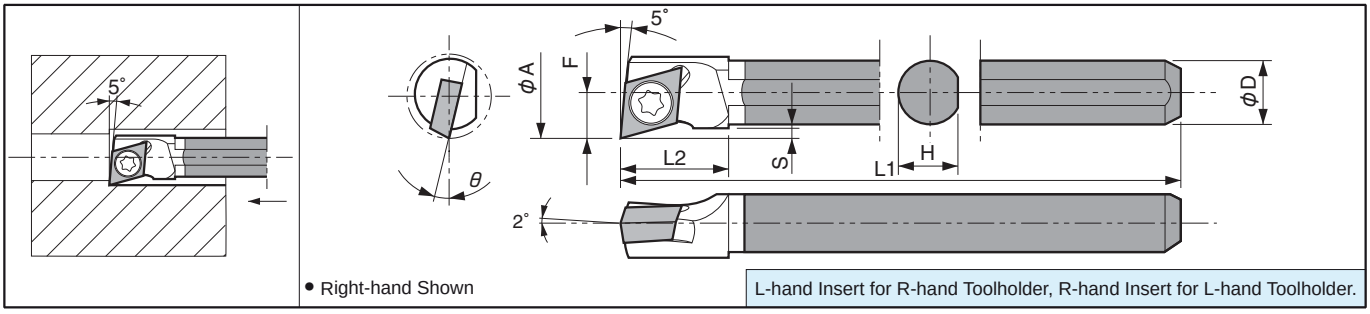
For recommended cutting conditions, see page **F77~F78**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [JC □□ Insert]

C…SJLC Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7

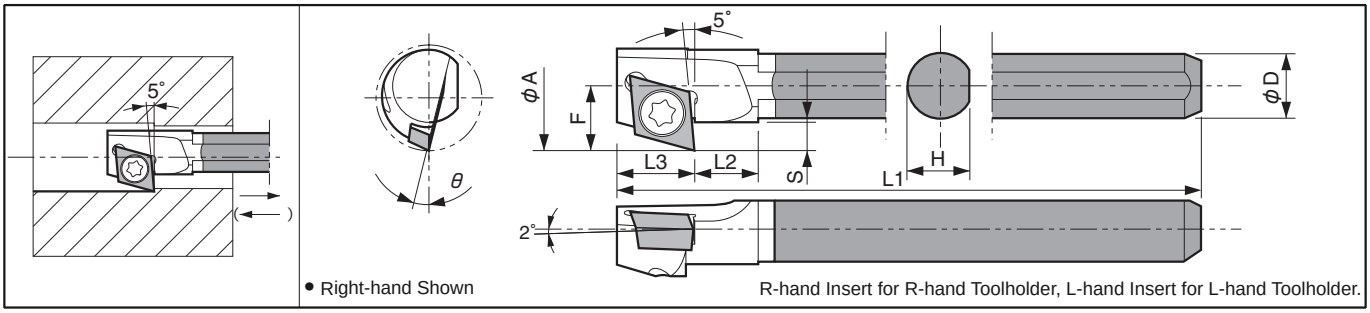


• Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

C…SJZC Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7



• Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

* When using R-hand Toolholder, use R-hand insert if machining from back to front in this direction (→).
Use L-hand insert if machining from front to back in this direction (←).

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	F	S	θ	Standard Corner-R (re)	Spare Parts: Clamp Screw	Spare Parts: Wrench
C04X-SJLC R/L 03-055	SJLC R/L 05504B-03W	●	●	5.5	4	3.8	91	7	-	2.95	0.65	15°	0.03	SB-1635TR	FT-6
C04X-SJZC R/L 03-065	SJZC R/L 06504B-03W	●	●	6.5			93	4	4.8	4.0	1.8				

Applicable Inserts

Applications	Finishing	Finishing / Precision
Ref. Page	B57	B57
Insert / Toolholder	R/L-F	R/L-FSF
····SJLC R/L 03····	JCGT0301..	JCET0301..
····SJZC R/L 03····	JCGT0301..	JCET0301..

For recommended cutting conditions, see page F77~F78

• Features of C…SJLC

1. Well balanced design of smaller edge and minimized bore dia. as much as possible.
2. As relief angle is introduced as 15°, flexibility of tool pass is high during necking.
3. Retaining front relief angle 5° and good surface roughness at internal facing.

• Features of C…SJZC

1. Back boring bars for workpiece which requires high concentric circle accuracy and unavailable of chuck change.
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 ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S…STUP(B)-E Excellent Bar (Boring)

Max. Overhang Length L/D=~5

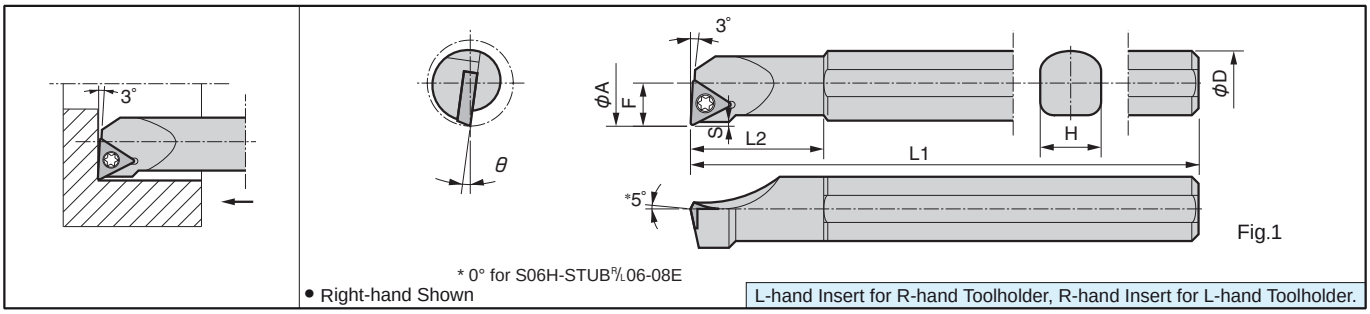


Fig.1

* 0° for S06H-STUB$^{R}_{L}$06-08E

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S…STUP(B) Steel Bar (Boring)

Max. Overhang Length L/D=~3

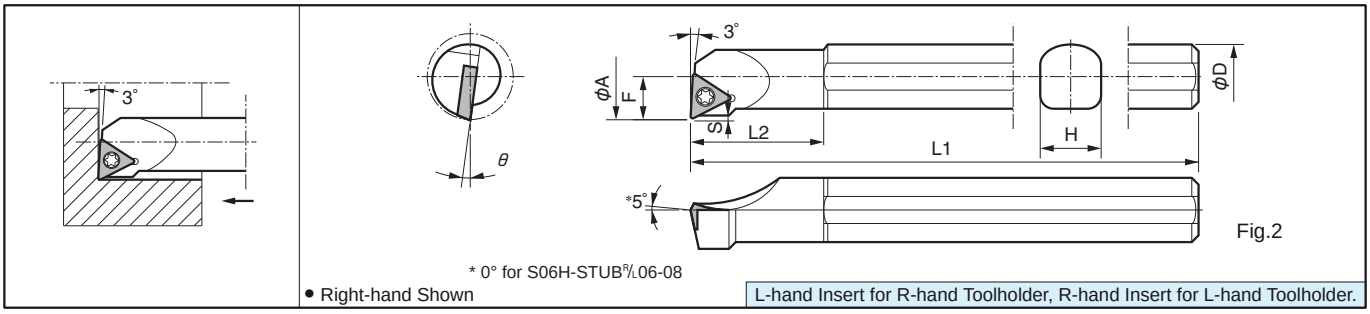


Fig.2

* 0° for S06H-STUB$^{R}_{L}$06-08

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

C…STUP(B) Carbide Shank Bar (Boring)

Max. Overhang Length L/D=~7

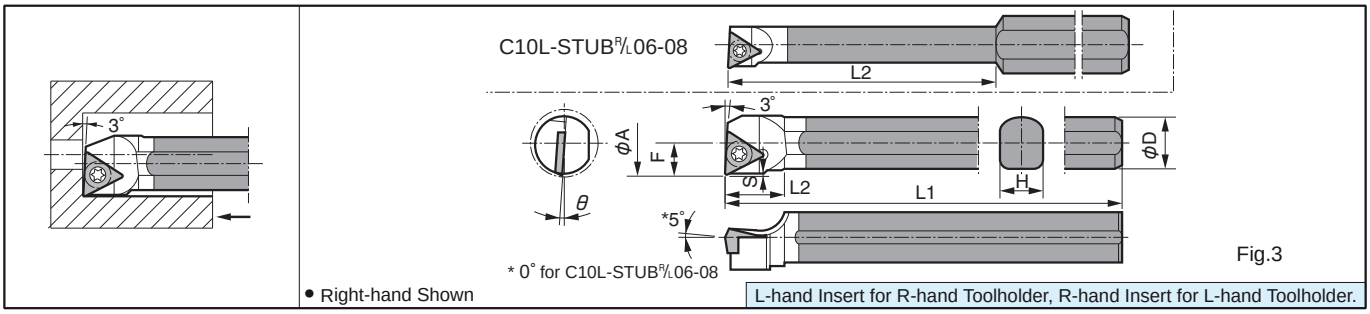


Fig.3

* 0° for C10L-STUB$^{R}_{L}$06-08

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

● Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
S06H-STUB$^{R}_{L}$06-08E	STUB$^{R}_{L}$ 0806B-06E	●	●	8	6	5.4	100	12	-	-	4	0.6	12°	0.2	Fig.1	SB-1STR	FT-6
S08K-STUP$^{R}_{L}$08-10E	STUP$^{R}_{L}$ 1008B-08E	●	●	10	8	7	125	17	-	-	5	0.4	10°	0.4		SB-1TR	
S10M-STUP$^{R}_{L}$09-12E	1210B-09E	●	●	12	10	9	150	20	-	-	6	0.5	8°	0.4		SB-2TR	FT-8
S12M-STUP$^{R}_{L}$09-16E	1612B-09E	●	●	16	12	11		25			8		5°				
S10M-STUP$^{R}_{L}$11-12E	1210B-11E	●	●	12	10	9	150	20	-	-	6	0.5	8°	0.4		SB-3TR	FT-10
S12M-STUP$^{R}_{L}$11-14E	1412B-11E	●	●	14	12	11	150	25			7	0.6	7°				
STUP$^{R}_{L}$11-16E	1612B-11E	●	●	16							8	0.5	5°				
S16R-STUP$^{R}_{L}$11-18E	1816B-11E	●	●	18	16	15	200	27			9	0.7	4°				
STUP$^{R}_{L}$11-20E	2016B-11E	●	●	20							10	0.9	3°				
S20X-STUP$^{R}_{L}$11-25E	2520B-11E	●	●	25	20	19	220	33			12.5	0.9	0°				
S20X-STUP$^{R}_{L}$16-25E	2520B-16E	●	●	25	20	19	220	33	-	-	12.5	0.9	0°	0.8		SB-4TR	FT-15
S25X-STUP$^{R}_{L}$16-32E	3225B-16E	●	●	32	25	23.4	270	42			16	0.6	0°				
S06H-STUB$^{R}_{L}$06-08	STUB$^{R}_{L}$ 0806B-06	●	●	8	6	5.4	100	12	-	-	4	0.6	12°	0.2	Fig.2	SB-1STR	FT-6
S08K-STUP$^{R}_{L}$08-10	STUP$^{R}_{L}$ 1008B-08	●	●	10	8	7	125	17	-	-	5	0.4	10°	0.4		SB-1TR	FT-6
S10M-STUP$^{R}_{L}$09-12	1210B-09	●	●	12	10	9	150	20	-	-	6	0.5	8°	0.4		SB-2TR	FT-8
S12M-STUP$^{R}_{L}$09-16	1612B-09	●	●	16	12	11		25			8		5°				
S16Q-STUP$^{R}_{L}$11-20	2016B-11	●	●	20	16	15	180	27	-	-	10	0.9	3°	0.4		SB-3TR	FT-10
S20R-STUP$^{R}_{L}$11-25	2520B-11	●	●	25	20	19	200	33			12.5		0°				
S25X-STUP$^{R}_{L}$16-32	3225B-16	●	●	32	25	23.4	220	42	-	-	16	0.6	0°	0.8		SB-4TR	FT-15

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (re)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
C10L -STUB$^{R}_{L}$06-08	STUB$^{R}_{L}$ 0810B-06W	●	●	8	10	9	140	50	-	-	4	0.5	12°	0.2	Fig.3	SB-1STR	FT-6
C08L -STUP$^{R}_{L}$08-10	STUP$^{R}_{L}$ 1008B-08W	●	●	10	8	7	140	10	-	-	5	0.5	10°	0.4		SB-1TR	
C10N -STUP$^{R}_{L}$09-12	1210B-09W	●	●	12	10	9	160	11	-	-	6	0.5	8°	0.4		SB-2TR	FT-8
STUP$^{R}_{L}$09-12-1 / 2	1210B-09W-1 / 2	●					80										
STUP$^{R}_{L}$09-12-2 / 3	1210B-09W-2 / 3	●					105										
C12Q -STUP$^{R}_{L}$09-16	1612B-09W	●	●	16	12	11	180	12	-	-	8	0.7	5°				
STUP$^{R}_{L}$09-16-1 / 2	1612B-09W-1 / 2	●					90										
STUP$^{R}_{L}$09-16-2 / 3	1612B-09W-2 / 3	●					120										
C10N -STUP$^{R}_{L}$11-12	1210B-11W	●	●	12	10	9	160	11	-	-	6	0.5	8°	0.4		SB-3TR	FT-10
STUP$^{R}_{L}$11-12-1 / 2	1210B-11W-1 / 2	●					80										
STUP$^{R}_{L}$11-12-2 / 3	1210B-11W-2 / 3	●					105										
C12Q -STUP$^{R}_{L}$11-14	1412B-11W	●	●	14	12	11	180	13	-	-	7	0.5	7°				
STUP$^{R}_{L}$11-14-1 / 2	1412B-11W-1 / 2	●					90										
STUP$^{R}_{L}$11-14-2 / 3	1412B-11W-2 / 3	●					120										
C12Q -STUP$^{R}_{L}$11-16	1612B-11W	●	●	16	12	11	180	13	-	-	8	0.3	5°				
STUP$^{R}_{L}$11-16-1 / 2	1612B-11W-1 / 2	●					90										
STUP$^{R}_{L}$11-16-2 / 3	1612B-11W-2 / 3	●					120										
C16X -STUP$^{R}_{L}$11-18	1816B-11W	●	●	18	16	15	220	14	-	-	9	0.3	4°				
STUP$^{R}_{L}$11-18-1 / 2	1816B-11W-1 / 2	●					110										
STUP$^{R}_{L}$11-18-2 / 3	1816B-11W-2 / 3	●					145										
C16X -STUP$^{R}_{L}$11-20	2016B-11W	●	●	20	16	15	220	14	-	-	10	0.8	3°				
STUP$^{R}_{L}$11-20-1 / 2	2016B-11W-1 / 2	●					110										
STUP$^{R}_{L}$11-20-2 / 3	2016B-11W-2 / 3	●					145										
C20S -STUP$^{R}_{L}$11-25	2520B-11W	●	●	25	20	19	250	16	-	-	12.5	0.7	0°				
STUP$^{R}_{L}$11-25-1 / 2	2520B-11W-1 / 2	●					125										
STUP$^{R}_{L}$11-25-2 / 3	2520B-11W-2 / 3	●					165										
C20S -STUP$^{R}_{L}$16-25	2520B-16W	●	●	25	20	19	250	18	-	-	12.5	0.3	0°	0.8		SB-4TR	FT-15
STUP$^{R}_{L}$16-25-1 / 2	2520B-16W-1 / 2	●					125										
STUP$^{R}_{L}$16-25-2 / 3	2520B-16W-2 / 3	●					165										

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Medium	Low Feed / Precision	Soft Steel Finishing	Soft Steel Finishing-Medium
Ref. Page	B59, B61	B61	B59	B61	B59, B62	B63	B62	B63	B61	B61
Insert / Toolholder	CF	GP	DP	HQ	$^{R}_{L}$	$^{R}_{L}$-FSF	$^{R}_{L}$-H	F$^{R}_{L}$-USF	XP	XQ
····STUB$^{R}_{L}$06-····	TBGT0601..	-	TBMT0601..	-	TBGT0601..	-	-	-	-	-
····STUP$^{R}_{L}$08-····	TPGT0802..	-	-	-	TPGH0802..	TPET0802..	-	TPET0802..	-	-
····STUP$^{R}_{L}$09-····	TPGT0902..	TPMT0902..	-	TPMT0902..	TPGH0902..	-	-	-	TPMT0902..	-
····STUP$^{R}_{L}$11-····	-	TPMT1103..	-	TPMT1103..	TPGH1103..	TPET1103..	TPGH1103..	TPET1103..	TPMT1103..	TPMT1103..
····STUP$^{R}_{L}$16-····	-	TPMT1603..	-	TPMT1603..	TPGH1603..	-	TPGH1603..	-	TPMT1603..	TPMT1603..

Applications	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. Page	B59, B63	C19~C21	C12
Insert / Toolholder	Without Chipbreaker	PCD	CBN
····STUB$^{R}_{L}$06-····	TBGW0601..	TBMT0601.. TBGW0601..	-
····STUP$^{R}_{L}$08-····	TPGB0802..	TPMH0802.. TPGB0802..	TPGB0802..
····STUP$^{R}_{L}$09-····	TPGB0902..	TPMH0902.. TPGB0902..	TPGB0902..
····STUP$^{R}_{L}$11-····	TPGB1103..	TPMH1103.. TPGB1103..	TPGB1103..
····STUP$^{R}_{L}$16-····	TPGB1603..	TPMH1603.. TPGB1603..	TPGB1603..

For recommended cutting conditions, see page ➡ F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [TP □□ Insert]

A…STUP-E Excellent Twin-Hole Bar (Boring: with Coolant Hole)

Max. Overhang Length L/D=~5

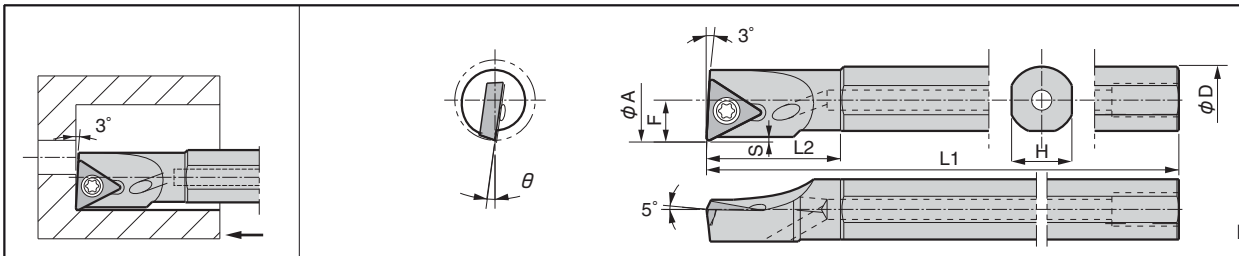


Fig.1

• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

E…STUP Carbide Twin-Hole Bar (Boring: with Coolant Hole)

Max. Overhang Length L/D=~7

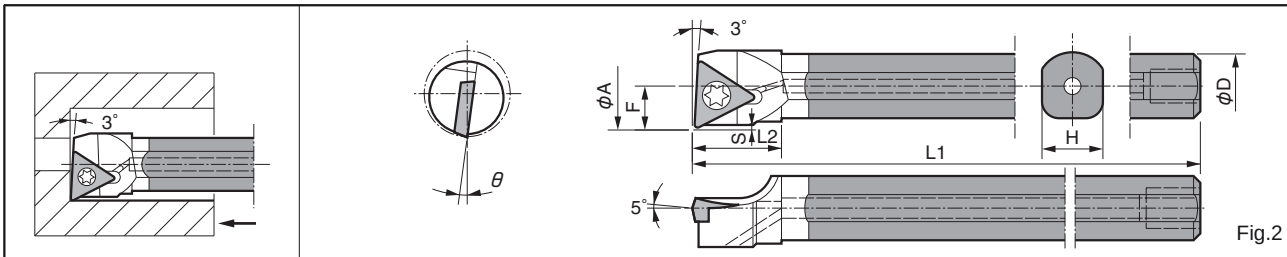


Fig.2

• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions (Applicable Inserts list → F55)

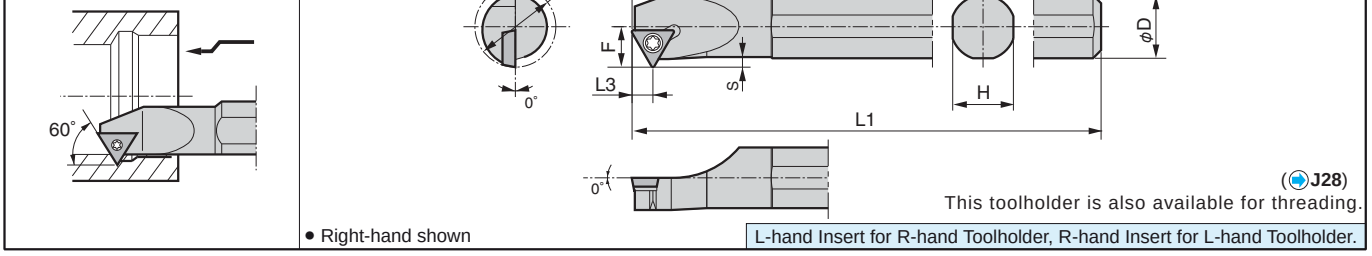
Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	L4	F	S	θ	Standard Corner-R (rε)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
A08H -STUP$^{R/L}$08-10E	STUP$^{R/L}$1008B-08EH	●	●	10	8	7	100	17			5	0.4	10°	0.4		SB-1TR	FT-6
A10X -STUP$^{R/L}$09-12E	1210B-09EH	●	●	12	10	9	120	20			6	0.5	8°	0.4		SB-2TR	FT-8
A12X -STUP$^{R/L}$09-16E	1612B-09EH	●		16	12	11		25			8		5°				
A10X -STUP$^{R/L}$11-12E	1210B-11EH	●	●	12	10	9	120	20			6	0.6	8°	0.4	Fig.1	SB-3TR	FT-10
A12X -STUP$^{R/L}$11-14E	1412B-11EH	●	●	14	12	11	120	25	-	-	7	0.6	7°				
STUP$^{R/L}$11-16E	1612B-11EH	●		16							8	0.5	5°				
A16M -STUP$^{R/L}$11-18E	1816B-11EH	●	●	18	16	15	150	27			9	0.7	4°				
STUP$^{R/L}$11-20E	2016B-11EH	●	●	20							10	0.9	3°				
A20Q -STUP$^{R/L}$11-25E	2520B-11EH	●	●	25	20	19	180	33			12.5	0.9	0°				
A20Q -STUP$^{R/L}$16-25E	2520B-16EH	●	●	25	20	19	180	33			12.5	0.9	0°	0.8		SB-4TR	FT-15
A25R -STUP$^{R/L}$16-32E	3225B-16EH	●	●	32	25	23.4	200	42			16	0.6					
E08L -STUP$^{R/L}$08-10	STUP$^{R/L}$1008B-08WH	●	●	10	8	7	140	10			5	0.4	10°	0.4		SB-1TR	FT-6
E10N -STUP$^{R/L}$09-12	1210B-09WH	●	●	12	10	9	160	11			6	0.5	8°	0.4		SB-2TR	FT-8
E12Q -STUP$^{R/L}$09-16	1612B-09WH	●	●	16	12	11	180	12			8		5°				
E10N -STUP$^{R/L}$11-12	1210B-11WH	●	●	12	10	9	160	11			6	0.6	8°	0.4	Fig.2	SB-3TR	FT-10
E12Q -STUP$^{R/L}$11-14	1412B-11WH	●	●	14	12	11	180	12	-	-	7	0.6	7°				
STUP$^{R/L}$11-16	1612B-11WH	●	●	16							8	0.5	5°				
E16X -STUP$^{R/L}$11-18	1816B-11WH	●	●	18	16	15	220	14			9	0.7	4°				
STUP$^{R/L}$11-20	2016B-11WH	●	●	20							10	0.9	3°				
E20S -STUP$^{R/L}$11-25	2520B-11WH	●		25	20	19	250	17			12.5	0.9	0°				
E20S -STUP$^{R/L}$16-25	2520B-16WH	●		25	20	19	250	17			12.5	0.9	0°	0.8		SB-4TR	FT-15

・Refer Page for details of the applicable Coolant Sleeve / Joint → F76

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S…STWP-E Excellent Bar (Copying)

Max. Overhang Length L/D=~5



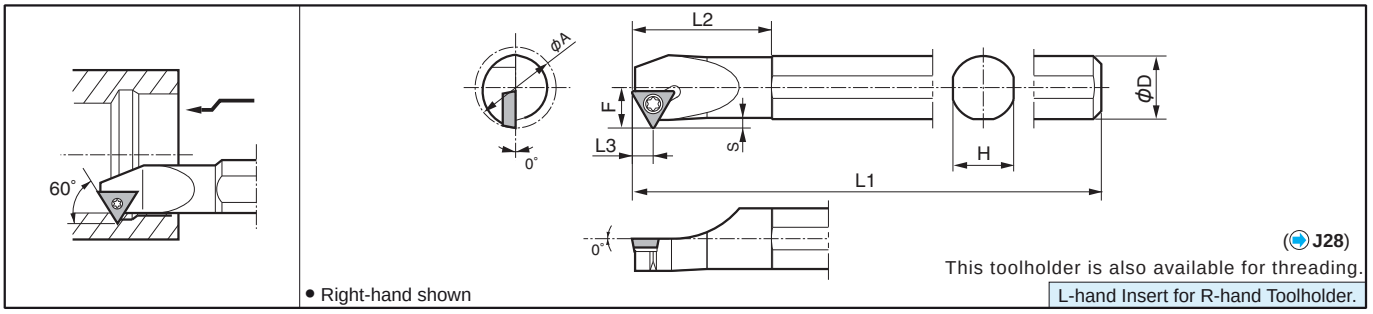
(J28)
This toolholder is also available for threading.

• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S…STWP Steel Bar (Copying)

Max. Overhang Length L/D=~3



(J28)
This toolholder is also available for threading.

• Right-hand shown

L-hand Insert for R-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	F	S		θ	Standard Corner-R (re)	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10M-STWP$^{R}_{L}$11 -12E	-	●	●	12	10	9.2	150	23	5.5	6	1.0		0°	0.1	SB-3STR	FT-10
S12M-STWP$^{R}_{L}$11 -16E		●	●	16	12	11	150	30		8	1.5					
S16R -STWP$^{R}_{L}$11 -20E		●	●	20	16	15	200	35		10	2.0				SB-3TR	
S20X -STWP$^{R}_{L}$11 -25E		●	●	25	20	19	220	40		12.5	2.5					
S20X -STWP$^{R}_{L}$16 -25E		●	●	25	20	19	220	40	7.7	14	4.0		0°	0.8	SB-4TR	FT-15
S25X -STWP$^{R}_{L}$16 -32E		●	●	32	25	23	270	42		16.5						
S10M-STWP$^{R}_{L}$11 -12	SIT$^{R}_{L}$ 1210-11	●		12	10	9.2	150	23	5.5	6	1.0		0°	0.1	SB-3STR	FT-10
S12M-STWP$^{R}_{L}$11 -16	SIT$^{R}_{L}$ 1612-11	●		16	12	11	150	30		8	1.5					
S16Q-STWP$^{R}_{L}$11 -20	2016-11	●		20	16	15	180	35		10	2.0				SB-3TR	
S20R -STWP$^{R}_{L}$11 -25	2520-11	●		25	20	19	200	40		12.5	2.5					

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Medium cutting	Low Feed / Precision	Soft Steel Finishing	Soft Steel Finishing-Medium	Cast Iron
Ref. Page	B61	B61	B62	B63	B62	B63	B61	B61	B63
Insert / Toolholder	GP	HQ	$^{R}_{L}$	$^{R}_{L}$-FSF	$^{R}_{L}$-H	F$^{R}_{L}$-USF	XP	XQ	Without Chipbreaker
S10M-STWP$^{R}_{L}$11-12(E)	-	-	TPGH1102..	-	-	-	-	-	TPGB1102..
····-STWP$^{R}_{L}$11-····	TPMT1103..	TPMT1103..	TPGH1103..	TPET1103..	TPGH1103..	TPET1103..	TPMT1103..	TPMT1103..	TPGB1103..
····-STWP$^{R}_{L}$16-····	TPMT1603..	TPMT1603..	TPGH1603..	-	TPGH1603..	-	TPMT1603..	TPMT1603..	TPGB1603..
Applications	Non-ferrous Metals	Hard Materials							
Ref. Page	C20, C21	C12							
Insert / Toolholder	PCD	CBN							
S10M-STWP$^{R}_{L}$11-12(E)	-	-							
····-STWP$^{R}_{L}$11-····	TPMH1103.. TPGB1103..	TPGB1103..							
····-STWP$^{R}_{L}$16-····	TPMH1603.. TPGB1603..	TPGB1603..							

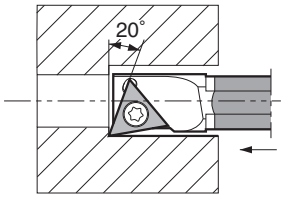
For recommended cutting conditions, see page F77~F78

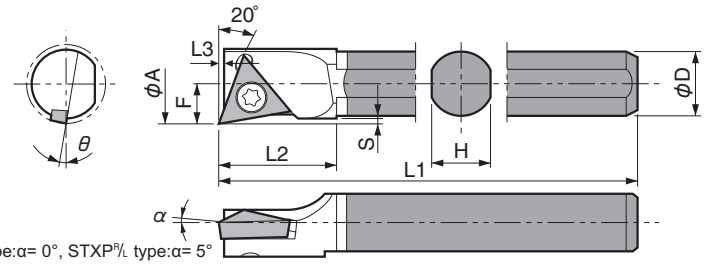
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [TB □□ / TP □□ Insert]

C…STXP(B) Carbide Shank Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~7





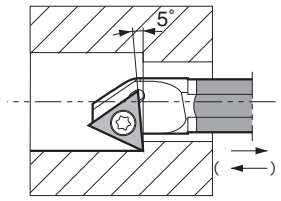
STXB$^{R/L}$ type:α= 0°, STXP$^{R/L}$ type:α= 5°

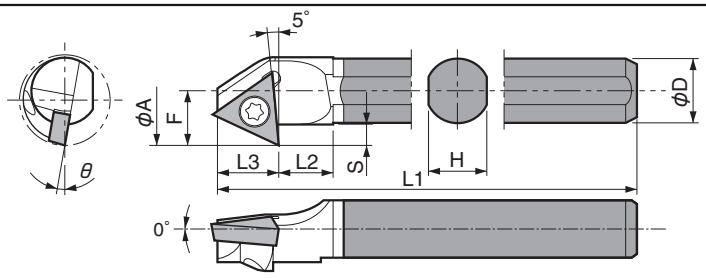
● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

C…STZB Carbide Shank Bar (Back Boring)

Max. Overhang Length L/D=~7





● Right-hand shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

* When using R-hand Toolholder, use R-hand insert if machining from back to front in this direction (→).
Use L-hand insert if machining from front to back in this direction (←).

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	F	S		θ	Standard Corner-R (rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
C06J-STXB$^{R/L}$06 -075	**STXB$^{R/L}$ 07506B-06W**	●	●	7.5	6	5.4	110	11	0.5	3.75	0.5		10°	0.03	SB-1STR	FT-6
C08X-STXP$^{R/L}$08 -09	**STXP$^{R/L}$ 09008B-08W**	●	●	9.0	8	7.0	143	14	0.6	4.6					SB-1TR	
C10X-STXP$^{R/L}$09 -11	**11010B-09W**	●	●	11.0	10	9.0	164	17		5.6					SB-2TR	FT-8
C06J-STZB$^{R/L}$06 -085	**STZB$^{R/L}$ 08506B-06W**	●	●	8.5	6	5.4	110	5	5.7	5.1	2.0				SB-1STR	FT-6

Applicable Inserts

Applications	Minute ap	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Low Feed / Precision	Soft Steel Finishing	Cast Iron	Non-ferrous Metals
Ref. Page	**B59, B61**	**B61**	**B59**	**B61**	**B59, B62**	**B63**	**B63**	**B61**	**B59, B63**	**C19, C21**
Insert / Toolholder	**CF**	**GP**	**DP**	**HQ**	**$^{R/L}$**	**$^{R/L}$-FSF**	**F$^{R/L}$-USF**	**XP**	Without Chipbreaker	**PCD**
····-STXB$^{R/L}$06-····	TBGT0601..	-	TBMT0601..	-	TBGT0601..	-	-	-	TBGW0601..	TBMT0601..
····-STXP$^{R/L}$08-····	TPGT0802	-	-	-	TPGH0802..	TPET0802..	TPET0802..	-	TPGB0802..	TPMH0802..
····-STXP$^{R/L}$09-····	TPGT0902..	TPMT0902..	-	TPMT0902..	TPGH0902..	-	-	TPMT0902..	TPGB0902..	TPMH0902..
····-STZB$^{R/L}$06-...	TBGT0601..	-	TBMT0601..	-	TBGT0601..	-	-	-	TBGW0601..	TBMT0601..

Applications	Hard Materials
Ref. Page	**C12**
Insert / Toolholder	**CBN**
····-STXB$^{R/L}$06-····	-
····-STXP$^{R/L}$08-····	TPGB0802..
····-STXP$^{R/L}$09-····	TPGB0902..
····-STZB$^{R/L}$06-····	-

For recommended cutting conditions, see page **F77~F78**

C···STXP(B) Type Boring Bar Cutting Conditions

Toolholder	Insert Description (Grade)	Vc (m/min)	ap (mm)	f (mm/rev)	Coolant
C06J-STXB$^{R/L}$06-075	**TBGT0601003 $^{L/R}$ (PR930)**	30~100	0.02~0.1	0.02~0.04	Yes
C08X-STXP$^{R/L}$08-09	**TPGH080201 $^{L/R}$ (PR930)**	30~100	0.05~0.15	0.03~0.08	Yes
C10X-STXP$^{R/L}$09-11	**TPGH090201 $^{R/L}$ (PR930)**	30~100	0.05~0.15	0.03~0.08	Yes

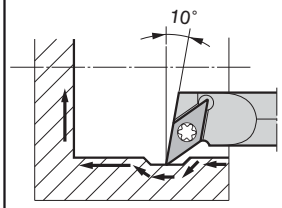
(Workpiece Material: Alloy Steel)

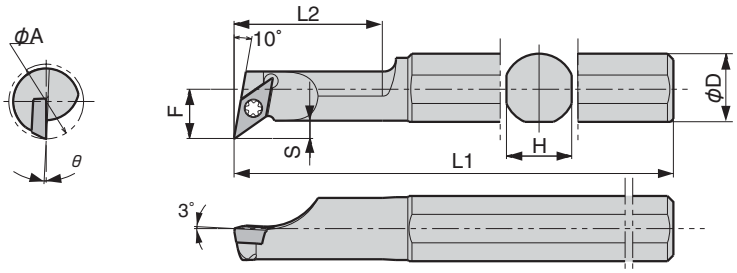
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [YP □□ Insert]

S…SYXP-E Excellent Bar (Boring / Internal Facing / Copying)

Max. Overhang Length L/D=~5





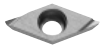
● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	S			θ	Standard Corner-R (rε)	Spare Parts Clamp Screw	Spare Parts Wrench
S12M -SYXP$^{R}_{L}$06 -12E	-	●	●	12	12	11	150	25	8.3	3			3°	0.2	SB-2040TR	FT-6
S16Q -SYXP$^{R}_{L}$06 -16E		●	●	16	16	15	180	30	10						SB-2045TR	

Applicable Inserts

Applications	Finishing	Low Feed
Ref. Page	**B78**	**B78**
Insert / Toolholder	$^{R}_{L}$**-F** 	**F**$^{R}_{L}$**-U** 
----SYXP$^{R}_{L}$06----	YPGT0602..	YPGT0602..

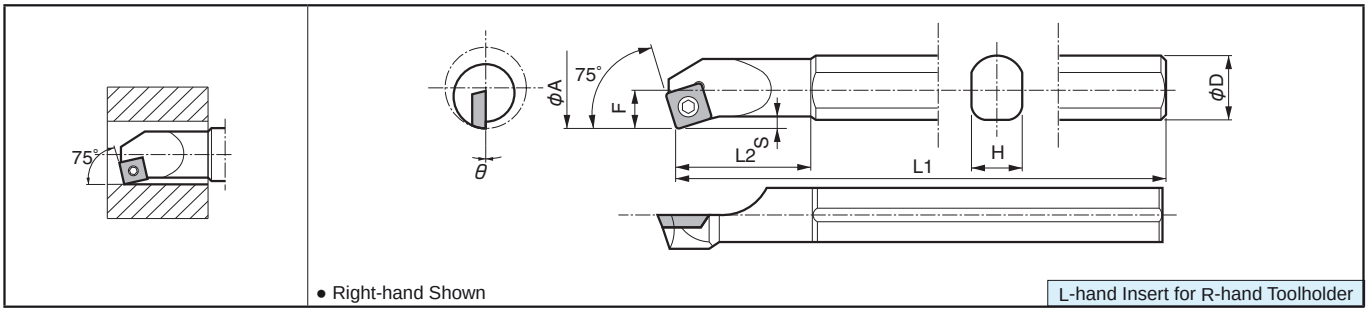
For recommended cutting conditions, see page **F77~F78**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [SP □□ Insert]

S...SSKP (Boring)

Max. Overhang Length L/D=~3



● Right-hand Shown

L-hand Insert for R-hand Toolholder

Toolholder Dimensions

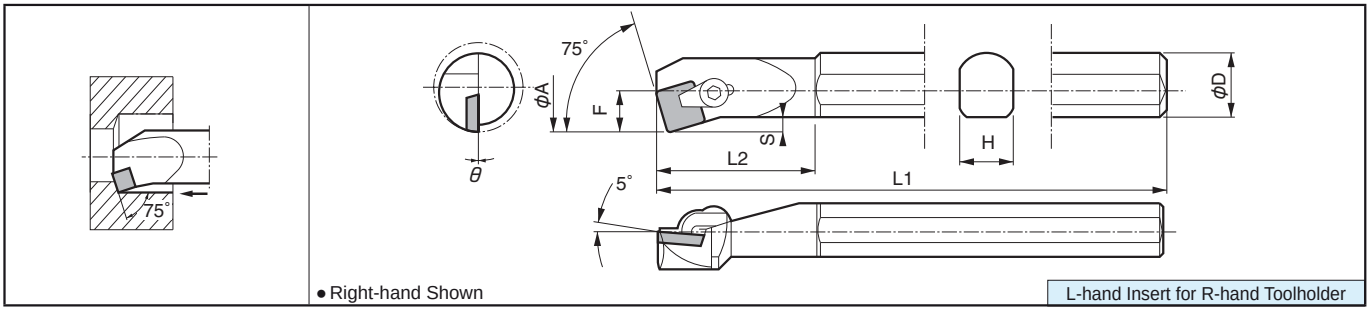
Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	S	θ	Standard Corner-R (rε)	Spare Parts: Clamp Screw	Spare Parts: Wrench
S16Q-SSKPR/L09-20	SSKPR/L 2016B-09	●		20	16	14	180	30	10	2.0	-3°	0.8	SB-4TR	FT-15
S20R-SSKPR/L09-25	2520B-09	●		25	20	18	200	35	12.5	2.5	0°			
S25X-SSKPR/L12-32	3225B-12	●		32	25	23	220	45	16	3.5	0°	0.8	GS-50S	LW-3
S32S-SSKPR/L12-40	4032B-12	●		40	32	30	250	60	20	4.0			GS-50	

Applicable Inserts

Applications	Finishing
Ref. Page	B58
Insert / Toolholder	R/L
····-SSKPR/L09···	SPGH0903..
····-SSKPR/L12···	SPGH1203..

S...CSKP (Boring)

Max. Overhang Length L/D=~3



● Right-hand Shown

L-hand Insert for R-hand Toolholder

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) D	H	L1	L2	F	S	θ	Standard Corner-R (rε)	Spare Parts: Clamp Set	Spare Parts: Wrench	Spare Parts: Shim	Spare Parts: Shim Screw
S16N -CSKPR/L09-20	CSKPR/L 2016B-09	●		20	16	14	160	40	10	2.0	0°	0.8	CPS-2	FH-2.5	-	-	-
S20Q -CSKPR/L09-27	2720B-09	●		27	20	18	180	45	13.5	3.5							
S25X -CSKPR/L12-34	3425B-12	●		34	25	23	220	60	17	4.5	0°	0.8	CPS-3	-	LW-3	-	-
S32S -CSKPR/L12-43	4332B-12	●		43	32	30	250	75	21.5	5.5						KPS-42	SP3X10

Applicable Inserts

Applications	Medium	Medium	Finishing-Medium	Cast Iron	Cast Iron	Non-ferrous Metals	Hard Materials
Ref. Page	B58	B58	B58	B58	B88	C23	C15
Insert / Toolholder	G	Standard	R/L	Without Chipbreaker	Ceramic	PCD	CBN
····-CSKPR/L09···	SPMR0903..	SPMR0903..	SPGR0903..	SPMN0903.. SPGN0903..	SPGN0903..	-	SPGN0903..
····-CSKPR/L12···	SPMR1203..	SPMR1203..	SPGR1203..	SPMN1203.. SPGN1203..	SPGN1203..	SPGN1203..	SPGN1203..

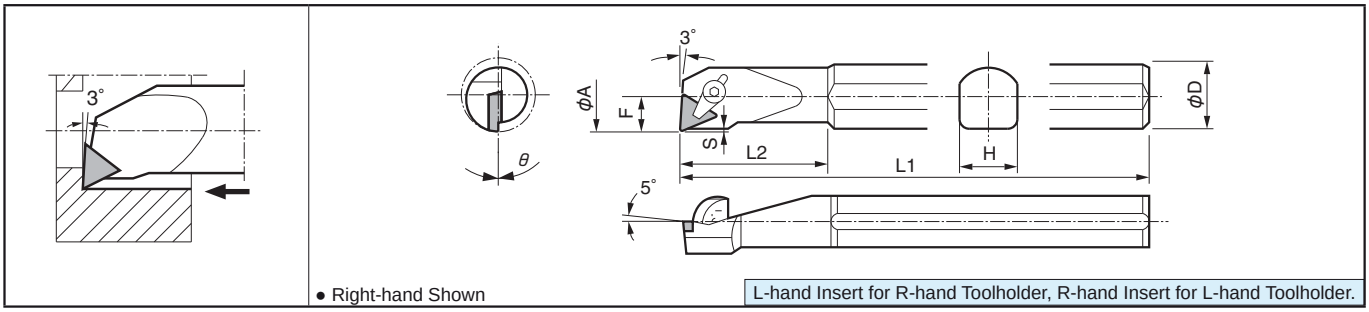
For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [TP □□ Insert]

S…CTUP (Boring)

Max. Overhang Length L/D=~3



● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	S	θ	Standard Corner-R (ε)	Spare Parts: Clamp Set		Wrench		Shim	Shim Screw
S12L-CTUP$^{R}_{L}$09-16	**CTUP$^{R}_{L}$1612B-09**	●	●	16	12	11	140	32	8	0.5	0°	0.4	CPS-1	-	FH-2	-	-	-
S16N-CTUP$^{R}_{L}$11-20	**2016B-11**	●	●	20	16	14	160	30	10	0.5	0°	0.4	-	CPS-2	FH-2.5	-	-	-
S20Q-CTUP$^{R}_{L}$11-27	**2720B-11**	●	●	27	20	18	180	40	13.5	1.3								
S25X-CTUP$^{R}_{L}$16-34	**3425B-16**	●	●	34	25	23	220	60	17	1.0	0°	0.8	-	CPS-3	-	LW-3	-	-
S32S-CTUP$^{R}_{L}$16-43	**4332B-16**	●	●	43	32	30	250	70	21.5								KPT-32	SP3X10
S40X-CTUP$^{R}_{L}$16-50	**5040B-16**	●	●	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
Ref. Page	**B64**	**B64**	**B64**	**B64**	**B64**	**B64**	**B65**	**B88**	**C23**	**C15**
Insert / Toolholder	**GP**	**HQ**	**G**	**Standard**	**$^{R}_{L}$-F**	**$^{R}_{L}$-□**	Without Chipbreaker	**Ceramic**	**PCD**	**CBN**
····CTUP$^{R}_{L}$09····	-	-	TPMR0902..	-	TPGR0902..	-	TPGN0902..	-	TPGN0902..	-
····CTUP$^{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..

For recommended cutting conditions, see page **F77~F78**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S...SVJB(C)-E / S...SVJP-E Excellent Bar (Internal Spherical Machining / Internal Facing)

Max. Overhang Length L/D=~5

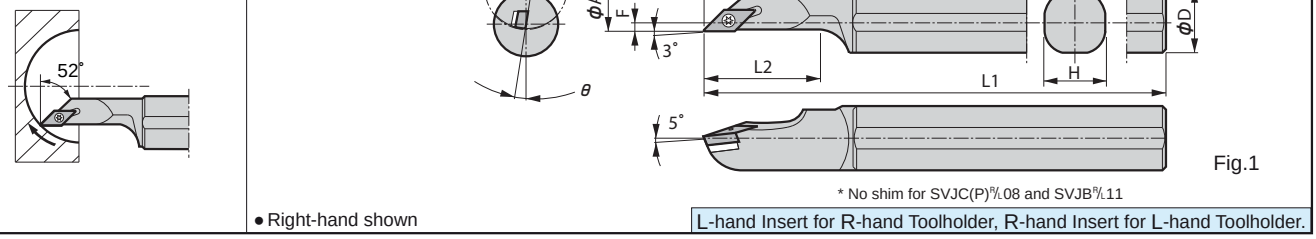


Fig.1

* No shim for SVJC(P)R/L08 and SVJBR/L11

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S...SVPB(C)-E Excellent Bar (Copying / Undercutting)

Max. Overhang Length L/D=~5

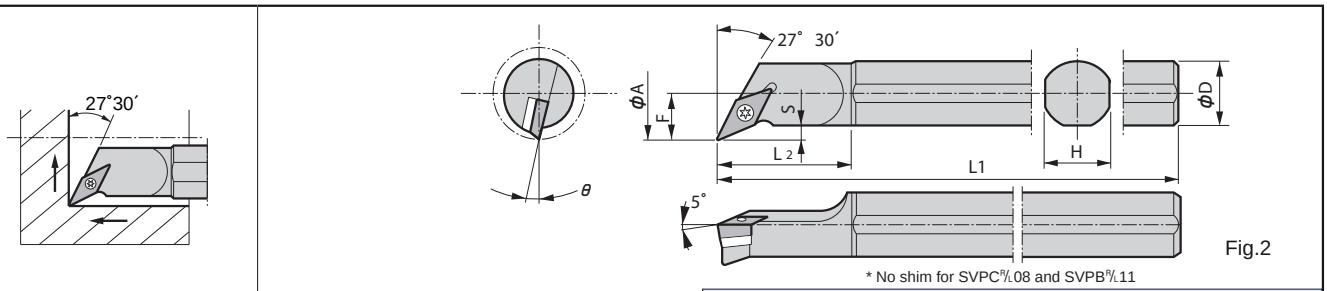


Fig.2

* No shim for SVPCR/L08 and SVPBR/L11

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S...SVUB(C)-E Excellent Bar (Copying)

Max. Overhang Length L/D=~5

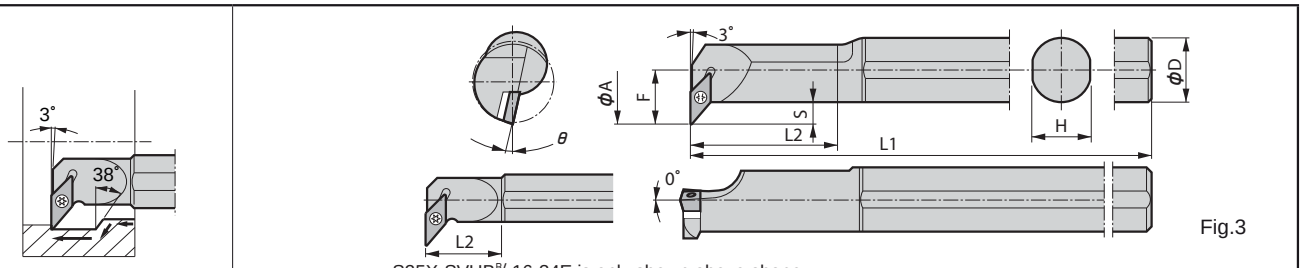


Fig.3

S25X-SVUBR/L16-34E is only shown above shape.

* No shim for SVUCR/L08 and SVUBR/L11

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S...SVZB(C)-E Excellent Bar (Back Boring)

Max. Overhang Length L/D=~5

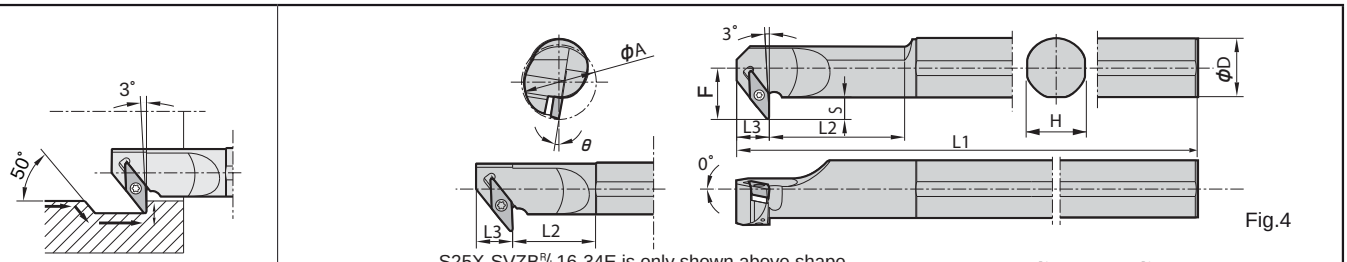


Fig.4

S25X-SVZBR/L16-34E is only shown above shape.

* No shim for SVJC(P)R/L08 and SVJBR/L11

● Right-hand shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

● Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	F	S		θ	Standard Corner-R (re)	Drawing
S12M-SVJPR/L08-16E	SVJPR/L 1612B-08E	●	●	16	12	11	150	26	-	2	-		5°	0.2	Fig.1
S12M-SVJCR/L08-16E	SVJCR/L 1612B-08E	●	●	16	12	11	150	26	-	2	-		5°	0.4	
S16Q-SVJCR/L08-20E	2016B-08E	●	●	20	16	15	180	36							
S20R-SVJBR/L11-25E	SVJBR/L 2520B-11E	●	●	25	20	19	200	37.5	-	2	-		5°	0.4	
S25S-SVJBR/L11-30E	3025B-11E	●	●	30	25	24	250	45		3.5					
S32S-SVJBR/L16-40EN	-	●	●	40	32	31	250	60	-	3.5	-		8°	0.8	
S40T-SVJBR/L16-50EN		●	●	50	40	39	300	75		4.5			7°		
S10M-SVPCR/L08-16E	SVQCR/L 1610B-08E	●	●	16	10	9	150	25	-	8	3		8°	0.4	Fig.2
S12M-SVPBR/L11-20E	SVQBR/L 2012B-11E	●	●	20	12	10.6	150	28	-	10	4.5		8°	0.4	
S16Q-SVPBR/L11-25E	2516B-11E	●	●	25	16	14.6	180			12.5	5		5°		
S25X-SVPBR/L16-34EN	-	●	●	34	25	23.6	220	50	-	17	5		13°	0.8	
S32S-SVPBR/L16-40EN		●	●	40	32	30.6	250	55		22	6.5		9°		

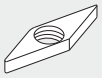
* For applications of S·· SVJ○ type, see **F35**.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	F	S		θ	Standard Corner-R (re)	Drawing
S12M-SVUC$^{R/L}$08-16E	**SVUC$^{R/L}$ 1612B-08E**	●	●	16	12	11	150	25.5	-	11	5.5		8°	0.4	
S16Q-SVUB$^{R/L}$11-20E	**SVUB$^{R/L}$ 2016B-11E**	●	●	20	16	14.6	180	32.5	-	15.5	8		8°	0.4	
S20R-SVUB$^{R/L}$11-25E	**2520B-11E**	●	●	25	20	18.6	200	40.5		17.5	8		7°		Fig.3
S25X-SVUB$^{R/L}$16-34EN	-	●	●	34	25	23.6	220	40	-	20.5	8.5		13°	0.8	
S32S-SVUB$^{R/L}$16-40EN		●	●	40	32	30.6	250	84		27.5	12		9°		
S12M-SVZC$^{R/L}$08-16E	-	●	●	16	12	11	150	25.5	7.5	11	5.5		8°	0.4	
S16Q-SVZB$^{R/L}$11-20E		●	●	20	16	15	180	32.5	10	15.5	8		8°	0.4	
S20R-SVZB$^{R/L}$11-25E		●	●	25	20	19	200	40.5		17.5			7°		Fig.4
S25X-SVZB$^{R/L}$16-34EN	-	●	●	34	25	24	220	40	17.5	20.5	8.5		13°	0.8	
S32S-SVZB$^{R/L}$16-40EN		●	●	40	32	31	250	72.5		27.5	12		9°		

Spare Parts

Description	Spare Parts: Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)
					
S12M -SVJP$^{R/L}$08 -16E	SB-2050TR	FT-6	-	-	-
S12M -SVJC$^{R/L}$08 -16E **S16Q -SVJC$^{R/L}$08 -20E**					
S20R -SVJB$^{R/L}$11 -25E **S25S -SVJB$^{R/L}$11 -30E**	SB-2570TR	FT-8			
S32S -SVJB$^{R/L}$16 -40EN **S40T -SVJB$^{R/L}$16 -50EN**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S10M -SVPC$^{R/L}$08 -16E	SB-2050TR	FT-6	-	-	-
S12M -SVPB$^{R/L}$11 -20E **S16Q -SVPB$^{R/L}$11 -25E**	SB-2570TR	FT-8			
S25X -SVPB$^{R/L}$16 -34EN **S32S -SVPB$^{R/L}$16 -40EN**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S12M -SVUC$^{R/L}$08 -16E	SB-2050TR	FT-6	-	-	-
S16Q -SVUB$^{R/L}$11 -20E **S20R -SVUB$^{R/L}$11 -25E**	SB-2570TR	FT-8			
S25X -SVUB$^{R/L}$16 -34EN **S32S -SVUB$^{R/L}$16 -40EN**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4
S12M -SVZC$^{R/L}$08 -16E	SB-2050TR	FT-6	-	-	-
S16Q -SVZB$^{R/L}$11 -20E **S20R -SVZB$^{R/L}$11 -25E**	SB-2570TR	FT-8			
S25X -SVZB$^{R/L}$16 -34EN **S32S -SVZB$^{R/L}$16 -40EN**	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4

Applicable Inserts

Applications	Finishing	Finishing	Finishing	Finishing-Medium	Finishing	Finishing / Precision	Finishing-Medium	Medium	Low Feed / Precision	Non-ferrous Metals
Ref. Page	**B68**	**B66, B67**	**B66**	**B66, B67**	**B66**	**B66, B69**	**B67**	**B66, B67**	**B69**	**B67**
Insert / Toolholder	**CK**	**VF**	**GP**	**HQ**	**$^{R/L}$-F**	**$^{R/L}$-FSF**	**$^{R/L}$-Y**	**FN-Z**	**F$^{R/L}$-USF**	Without Indication
...-SV○P$^{R/L}$08-...	VPGT0802..	-	-	-	-	VPET0802..	-	-	VPET0802..	-
...-SV○C$^{R/L}$08-...	-	VCMT0802..	-	VCMT0802..	-	-	-	-	-	-
...-SV○B$^{R/L}$11-...	-	VBMT1103..	VBMT1103..	VBMT1103..	VBGT1103..	VBET1103..	VBGT1103..	VBGT1103..	-	-
...-SV○B$^{R/L}$16-...	-	VBMT1604..	VBMT1604..	VBMT1604..	-	-	VBGT1604..	VCGT1604..	-	VCGT1604..

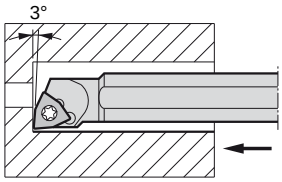
Applications	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	**B67**	**B67**	**C22**	**C13, C14**
Insert / Toolholder	**AH**	**$^{R/L}$-A3**	**PCD**	**CBN**
...-SV○P$^{R/L}$08-...	-	-	-	-
...-SV○C$^{R/L}$08-...	-	-	VCMT0802..	VCGW0802..
...-SV○B$^{R/L}$11-...	-	-	VBMT1103..	VBGW1103..
...-SV○B$^{R/L}$16-...	VCGT1604..	VCGT1604..	VBMT1604..	VBGW1604..

For recommended cutting conditions, see page **F77~F78**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S…SWUP(B)-E Excellent Bar (Boring)

Max. Overhang Length L/D=~5



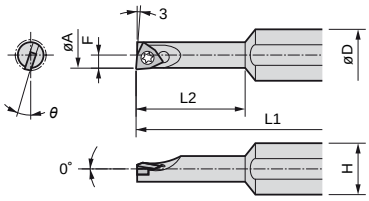
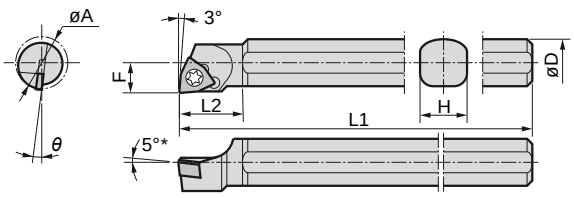


Fig.1



* 0° for S08K-SWUB□08-10E, S10M-SWUB□08-12E

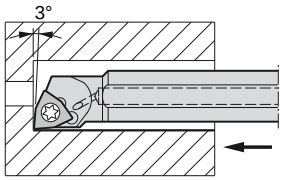
Fig.2

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

A…SWUP-E Excellent Twin-Hole Bar (Boring)

Max. Overhang Length L/D=~5



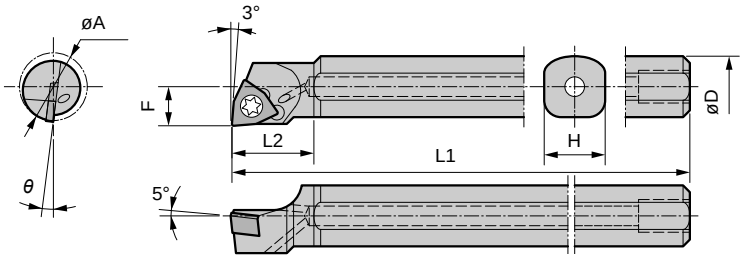


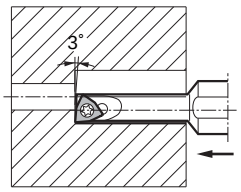
Fig.3

● Right-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S…SWUB Steel Bar (Boring)

Max. Overhang Length L/D=~3



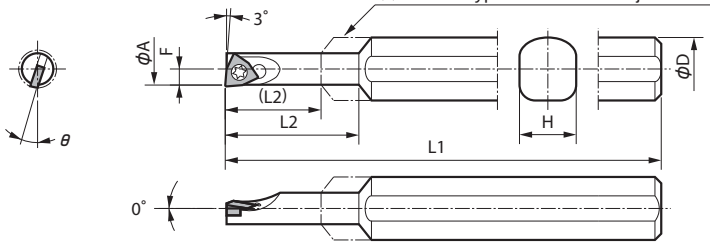


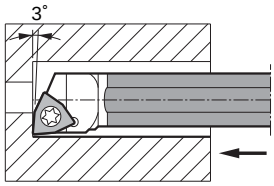
Fig.4

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

C…SWUP (B) Carbide Shank Bar (Boring)

Max. Overhang Length L/D=~7



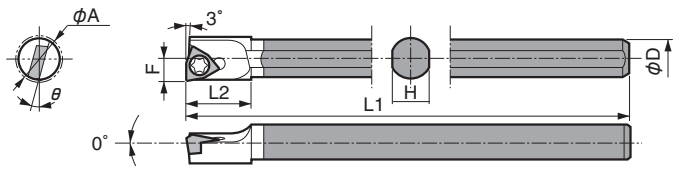


Fig.5

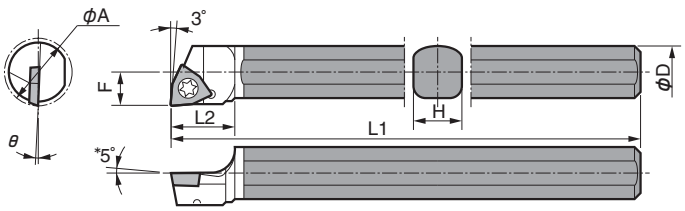


Fig.6

* 0° for C08L-SWUB□08-10, C10N-SWUB□08-12

● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F			θ	Standard Corner-R (rε)	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10H -SWUB$^{R/L}$06 -06E	-	●	●	6	10	9	100	28	3			15°	0.2	Fig.1	SB-2040TR	FT-6
SWUB$^{R/L}$06 -07E		●	●	7				32	3.5			13°				
S10J -SWUB$^{R/L}$08 -08E		●	●	8	10	9	110	37	4			15°			SB-2050TR	
S08K -SWUB$^{R/L}$08 -10E	SWUB$^{R/L}$ 1008B-08E	●	●	10	8	7	125	17	5			13°	0.2		SB-2050TR	
S10M -SWUB$^{R/L}$08 -12E	1210B-08E	●	●	12	10	9	150	23	6			10°				
S12M -SWUP$^{R/L}$11 -14E	SWUP$^{R/L}$ 1412B-11E	●	●	14	12	11	150	26	7			4°	0.4	Fig.2	SB-2545TR	FT-8
SWUP$^{R/L}$11 -16E	1612B-11E	●	●	16				29	8			2°			SB-2560TR	
S16N -SWUP$^{R/L}$11 -18E	1816B-11E	●	●	18	16	15	160	32	9			1°				
S16Q -SWUP$^{R/L}$16 -20E	2016B-16E	●	●	20	16	15	180	34	10			3°	0.8		SB-4065TR	FT-15
S20R -SWUP$^{R/L}$16 -25E	2520B-16E	●	●	25	20	19	200	37	12.5			2°				
S10H -SWUB$^{R/L}$06 -06	SWUB$^{R/L}$ 0610B-06	●	●	6	10	9	100	21	3			15°	0.2	Fig.4	SB-2040TR	FT-6
SWUB$^{R/L}$06 -06-15	☆ 0610B-06-15	●	●					(15)								
S10H -SWUB$^{R/L}$06 -07	0710B-06	●	●	7	10	9	100	24.5	3.5			13°				
S10J -SWUB$^{R/L}$08 -08	0810B-08	●	●	8	10	9	110	28	4			15°	0.2		SB-2050TR	
SWUB$^{R/L}$08 -08-20	☆ 0810B-08-20	●	●					(20)								
C05H -SWUB$^{R/L}$06 -06	SWUB$^{R/L}$ 0605B-06W	●	●	6	5	4.4	100	8	3			15°	0.2	Fig.5	SB-2040TR	FT-6
C06J -SWUB$^{R/L}$06 -07	0706B-06W	●	●	7	6	5.4	110	9	3.5			13°				
C07K -SWUB$^{R/L}$08 -08	0807B-08W	●	●	8	7	6.4	125	11	4			15°			SB-2050TR	
C08L -SWUB$^{R/L}$08 -10	1008B-08W	●	●	10	8	7	140	10	5			13°				
C10N -SWUB$^{R/L}$08 -12	1210B-08W	●	●	12	10	9	160	12	6			10°		Fig.6		
SWUB$^{R/L}$08 -12-1 / 2	1210B-08W-1 / 2	●					80									
SWUB$^{R/L}$08 -12-2 / 3	1210B-08W-2 / 3	●					105									
C12Q -SWUP$^{R/L}$11 -14	SWUP$^{R/L}$ 1412B-11W	●	●	14	12	11	180	14	7			4°	0.4	Fig.6	SB-2545TR	FT-8
SWUP$^{R/L}$11 -14-1 / 2	1412B-11W-1 / 2	●					90									
SWUP$^{R/L}$11 -14-2 / 3	1412B-11W-2 / 3	●					120									
C12Q -SWUP$^{R/L}$11 -16	1612B-11W	●	●	16	12	11	180	14	8			2°			SB-2560TR	
SWUP$^{R/L}$11 -16-1 / 2	1612B-11W-1 / 2	●					90									
SWUP$^{R/L}$11 -16-2 / 3	1612B-11W-2 / 3	●					120									
C16X -SWUP$^{R/L}$11 -18	1816B-11W	●	●	18	16	15	220	14	9			1°				
SWUP$^{R/L}$11 -18-1 / 2	1816B-11W-1 / 2	●					110									
SWUP$^{R/L}$11 -18-2 / 3	1816B-11W-2 / 3	●					145									
C16X -SWUP$^{R/L}$16 -20	2016B-16W	●	●	20	16	15	220	17	10			3°	0.8		SB-4065TR	FT-15
SWUP$^{R/L}$16 -20-1 / 2	2016B-16W-1 / 2	●					110									
SWUP$^{R/L}$16 -20-2 / 3	2016B-16W-2 / 3	●					145									
C20S -SWUP$^{R/L}$16 -25	2520B-16W	●	●	25	20	19	250	19	12.5			2°				
SWUP$^{R/L}$16 -25-1 / 2	2520B-16W-1 / 2	●					125									
SWUP$^{R/L}$16 -25-2 / 3	2520B-16W-2 / 3	●					165									

Applicable Inserts

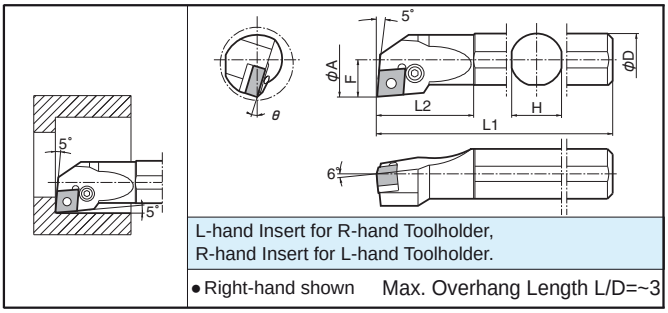
Applications	Finishing	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Cast Iron	Non-ferrous Metals	Hard Materials		
Ref. Page	B71	B70	B71	B70	B71	B70, B71	C22	C14		
Insert / Toolholder	GP	$^{R/L}$-DP	HQ	$^{R/L}$-F	$^{R/L}$-Y	Without Chipbreaker	PCD	CBN		
····SWUB$^{R/L}$06····	-	WBMT0601..	-	WBGT0601..	-	WBGW0601..	WBMT0601..	WBGW0601..		
····SWUB$^{R/L}$08····	-	WBMT0802..	-	WBGT0802..	-	WBGW0802..	WBMT0802..	WBGW0802..		
····SWUP$^{R/L}$11····	WPMT1102..	-	WPMT1102..	-	WPGT1102..	WPGW1102..	WPMT1102..	-		
····SWUP$^{R/L}$16····	WPMT1603..	-	WPMT1603..	-	WPGT1603..	WPGW1603..	-	-		

For recommended cutting conditions, see page F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [CN □□ Negative Insert]

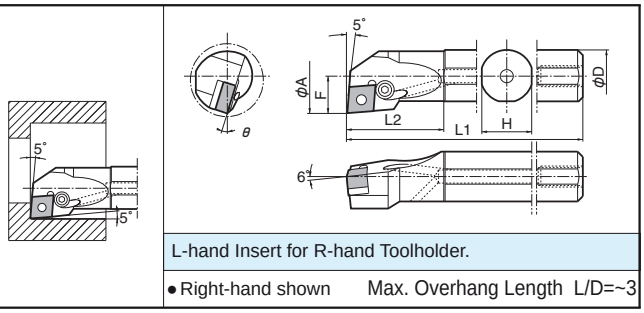
S…PCLN ○○ (Boring / Internal Facing)



L-hand Insert for R-hand Toolholder,
R-hand Insert for L-hand Toolholder.

• Right-hand shown Max. Overhang Length L/D=~3

A…PCLN09 Twin-Hole Bar (Boring / Internal Facing: with Coolant Hole)



L-hand Insert for R-hand Toolholder.

• Right-hand shown Max. Overhang Length L/D=~3

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S16M-PCLN$^{R}_{L}$09-20	PCLN$^{R}_{L}$2016B-09	●	●	20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q-PCLN$^{R}_{L}$09-27 S25R-PCLN$^{R}_{L}$09-32	PCLN$^{R}_{L}$2720B-09 3225B-09	● ●	● ●	27 32	20 25	19 24	180 200	37 42	14.2 15.7	17° 15°	0.8	LL-1N	LS-1SN	LC-32N	LSP-1	PC-1	FH-2.5
S32S -PCLN$^{R}_{L}$12-40 S40T -PCLN$^{R}_{L}$12-50	PCLN$^{R}_{L}$4032B-12 5040B-12	● ●	● ●	40 50	32 40	30 37	250 300	50 60	21 25	10°	0.8	LL-2N	LS-2N	LC-42N$^{R}_{L}$	LSP-2	PC-2	LW-3
A16M-PCLN$^{R}_{L}$09-20	PCLN$^{R}_{L}$2016B-09H	●	●	20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
A20Q-PCLN$^{R}_{L}$09-27 A25R-PCLN$^{R}_{L}$09-32	PCLN$^{R}_{L}$2720B-09H 3225B-09H	● ●	● 	27 32	20 25	19 24	180 200	37 42	14.2 15.7	17° 15°	0.8	LL-1N	LS-1SN	LC-32N	LSP-1	PC-1	FH-2.5

Spare Parts: Lever / Lock Screw / Shim / Shim Pin (LSP, P) / Punch / Wrench (FH)

• Shim: LC-42NR for R-hand Toolholder, LC-42NL for L-hand Toolholder.

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing
Ref. Page	B14	B14	B14	B14	B14	B14	B14	B15	B15	B15
Insert / Toolholder	WP (Wiper)	WQ (Wiper)	GP	HQ	CQ	CJ	TK	GS	PS	HS / CS
...-PCLN$^{R}_{L}$09-...	-	-	CNMG0904..	CNMG0904..	-	-	-	CNMG0904..	-	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMP1204..	CNMG1204..	CNMG1204..	CNMG1204..

Applications	Medium-Roughing	Medium-Roughing High Feed Rate	Roughing	One side / Roughing• High Feed Rate	Finishing	Medium cutting	Medium-Roughing / Low Cutting Resistance type	Soft Steel Finishing	Soft Steel / Medium cutting	Soft Steel / Roughing
Ref. Page	B15	B15	B16	B16	B18	B18	B18	B16	B16	B16
Insert / Toolholder	PT	GT	Standard	PX	$^{R}_{L}$-S	$^{R}_{L}$	$^{R}_{L}$-25R	XP (-T)	XQ	XS
...-PCLN$^{R}_{L}$09-...	-	-	-	-	CNGG0904..	CNGG0904..	-	-	-	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMM1204..	—	CNGG1204..	CNGG1204..	CNMG1204..	CNMG1204..	CNMG1204..

Applications	Stainless Finishing	Stainless Medium-Roughing	Stainless Medium to Roughing	Stainless Medium to Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals
Ref. Page	B17	B17	B17	B17	B17	B17	B17	B17	B81	B18
Insert / Toolholder	MQ	MS	MU	TK	C	ZS	GC	Without Chipbreaker	Ceramic	AH
...-PCLN$^{R}_{L}$09-...	-	-	-	-	-	-	-	-	-	-
...-PCLN$^{R}_{L}$12-...	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMG1204..	CNMA1204.. CNGA1204..	CNMA1204.. CNGA1204..	CN_G1204..

Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B18	C17	C5
Insert / Toolholder	$^{R}_{L}$-A3	PCD	CBN
...-PCLN$^{R}_{L}$09-...	-	-	-
...-PCLN$^{R}_{L}$12-...	CNGG1204..	CNMM1204..	CNGA1204..

For recommended cutting conditions, see page ➡ F77~F78

Applicable Coolant Sleeve / Joint

Toolholder	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	

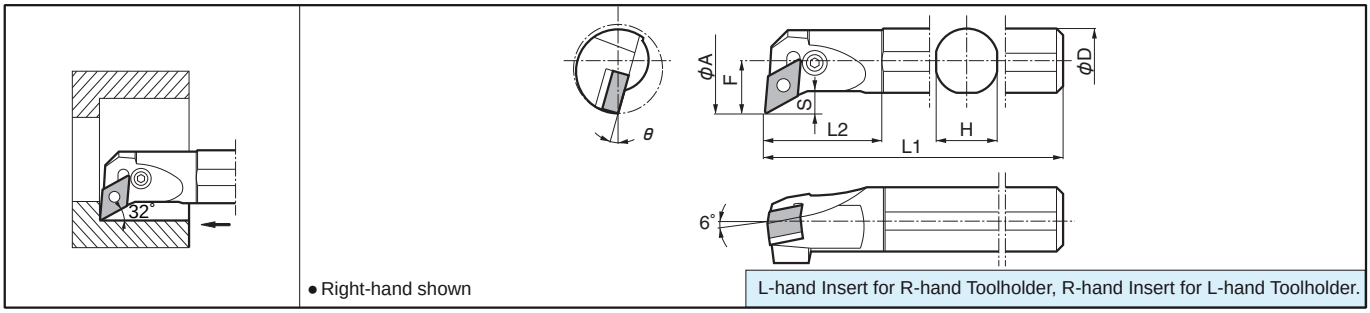
• For Coolant Sleeve, Coolant Joint, see ➡ F76.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [DN □□ Small Negative Insert]

S…PDUN11 (Copying)

Max. Overhang Length L/D=~3

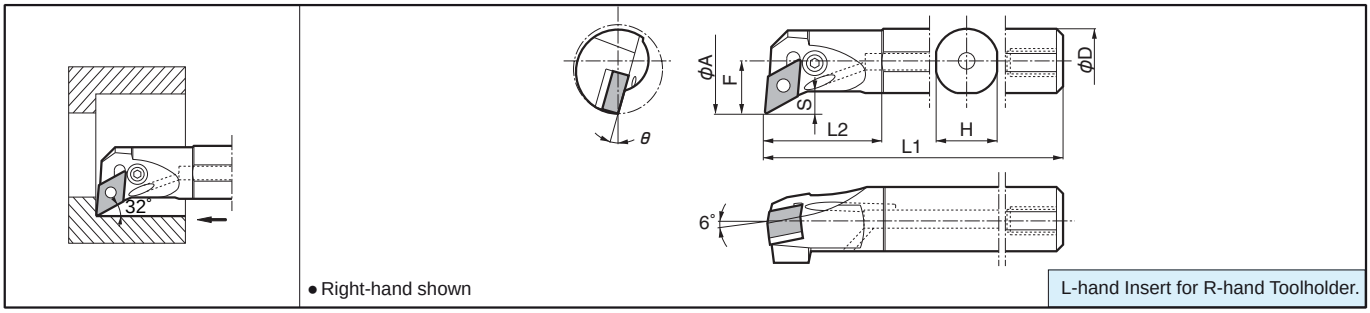


• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

A…PDUN11 Twin-Hole Bar (Copying: with Coolant Hole)

Max. Overhang Length L/D=~3



• Right-hand shown

L-hand Insert for R-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	S	θ	Standard Corner-R (rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S20Q -PDUNR/L11-27	**PDUNR/L 2720B-11**	●	●	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 -PDUNR/L11-32	**3225B-11**	●	●	32	25	24	200	40	17	7.6	15°							
S32S -PDUNR/L11-40	**4032B-11**	●	●	40	32	31	250	45	22	8.5	12°							
A20Q -PDUNR/L11-27	**PDUNR/L 2720B-11H**	●		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 -PDUNR/L11-32	**3225B-11H**	●		32	25	24	200	40	17	7.6	15°							
A32S -PDUNR/L11-40	**4032B-11H**	●		40	32	31	250	45	22	8.5	12°							

Applicable Inserts

Applications	Finishing	Finishing-Medium	Medium-Roughing	Finishing	Medium
Ref. Page	**B19**	**B19**	**B20**	**B23**	**B23**
Insert / Toolholder	**GP**	**HQ**	**GS**	**R/L-S**	**R/L**
····PDUNR/L11-····	DNMG1104..	DNMG1104..	DNMG1104..	DNGG1104..	DNGG1104..

For recommended cutting conditions, see page **F77~F78**

Applicable Coolant Sleeve / Joint

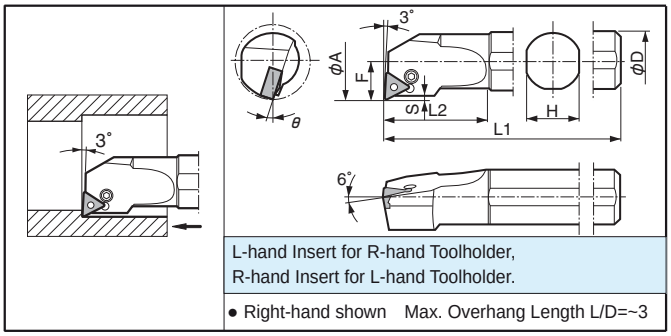
Toolholder	Applicable Coolant Sleeve	Applicable Coolant Joint
A20Q -PDUNR/L11-27	SHC2040-70, SHC2050-95	SJS-8
A25R -PDUNR/L11-32	SHC2540-70, SHC2550-95	
A32S -PDUNR/L11-40	-	

• For Coolant Sleeve, Coolant Joint, see **F76**.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [TN □□ Negative Insert]

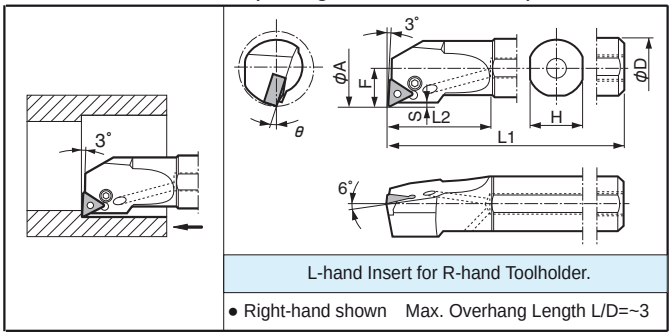
S…PTUN ○○ (Boring)



L-hand Insert for R-hand Toolholder,
R-hand Insert for L-hand Toolholder.

● Right-hand shown Max. Overhang Length L/D=~3

A…PTUN11 Twin-Hole Bar (Boring: with Coolant Hole)



L-hand Insert for R-hand Toolholder.

● Right-hand shown Max. Overhang Length L/D=~3

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	S	θ	Standard Corner-R (re)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S16M-PTUN$^{R}_{L}$11-20	PTUN$^{R}_{L}$2016B-11	●	●	20	16	15	150	34	11	0.3	18°	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
S20Q-PTUN$^{R}_{L}$11-25	2520B-11	●	●	25	20	19	180	37	13.2	0.2	17°							
S25R-PTUN$^{R}_{L}$11-32	3225B-11	●	●	32	25	24	200	42	15.7	0.3	16°							
S25R-PTUN$^{R}_{L}$16-30	-	●	●	30	25	24	200	42	15.5	1.5	13°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S32S-PTUN$^{R}_{L}$16-40		●	●	40	32	30	250	50	22	2.0	13°		LL-1N	LS-1N	LT-32N *LT-32N-20	LSP-1	PC-1	FH-2.5
S40T-PTUN$^{R}_{L}$16-50		●	●	50	40	37	300	60	27	1.8	11°							
A16M-PTUN$^{R}_{L}$11-20	PTUN$^{R}_{L}$2016B-11H	●		20	16	15	150	34	11	0.3	18°	0.8	LL-03TN	LS-03SN	-	P-03S	-	FH-2.5
A20Q-PTUN$^{R}_{L}$11-25	2520B-11H	●		25	20	19	180	37	13.2	0.2	17°							
A25R-PTUN$^{R}_{L}$11-32	3225B-11H	●		32	25	24	200	42	15.7	0.3	16°							

• When using insert with corner R = 1.6mm or longer, purchase and use shim with * mark separately to prevent interference between workpiece and shim.

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Medium-Roughing / High Feed Rate	Roughing
Ref. Page	B28	B28	B28	B28	B28	B28	B28, B29	B29	B29	B29
Insert / Toolholder	GP	HQ	CQ	TK	GS	PS	HS / CS	PT	GT	Standard
----PTUN$^{R}_{L}$11----	TNMG1104..	TNMG1104..	-	-	TNMG1104..	-	-	-	-	-
----PTUN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNMG1604..	TNMP1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
Applications	One side / Roughing High Feed Rate	Finishing	Medium-Roughing	Medium-Roughing / Low Cutting Resistance type	Soft Steel Finishing	Soft Steel / Medium cutting	Soft Steel / Roughing	Stainless Finishing	Stainless Medium to Roughing	Stainless Medium to Roughing
Ref. Page	B29	B32	B32	B32	B29	B30	B30	B30	B30	B30
Insert / Toolholder	PX	$^{R}_{L}$-S	$^{R}_{L}$- □	$^{R}_{L}$-25R	XP (-T)	XQ	XS	MQ	MS	TK
----PTUN$^{R}_{L}$11----	-	TNGG1104..	TNGG1104..	-	-	-	-	-	-	-
----PTUN$^{R}_{L}$16----	TNMM1604..	TNGG1604..	TNGG1604..	TNGG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..
Applications	Stainless Medium to Roughing	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Cast Iron	Non-ferrous Metals	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B30	B31	B31	B31	B31	B86	B31	B31	C17	C7
Insert / Toolholder	$^{R}_{L}$-ST	C	ZS	GC	Without Chipbreaker	Ceramic	AH	$^{R}_{L}$-A3	PCD	CBN
----PTUN$^{R}_{L}$11----	-	-	-	-	-	-	-	-	-	-
----PTUN$^{R}_{L}$16----	TNMG1604..	TNMG1604..	TNMG1604..	TNMG1604..	TNMA1604.. TNGA1604..	TNGA1604..	TN_G1604..	TNGG1604..	TNMM1604..	TNGA1604..

For recommended cutting conditions, see page ➡ F77~F78

Applicable Coolant Sleeve / Joint

Toolholder	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	

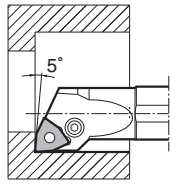
• For Coolant Sleeve, Coolant Joint, see ➡ F76.

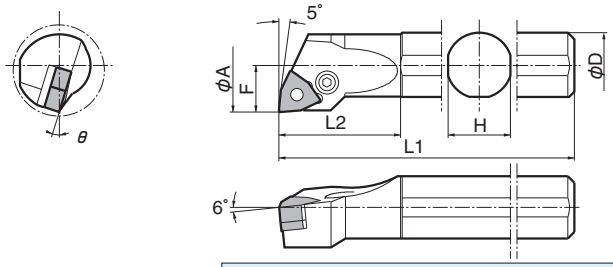
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [WN□□ Small Negative Insert]

S…PWLN06 (Boring / Internal Facing)

Max. Overhang Length L/D=~3



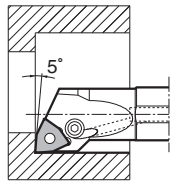


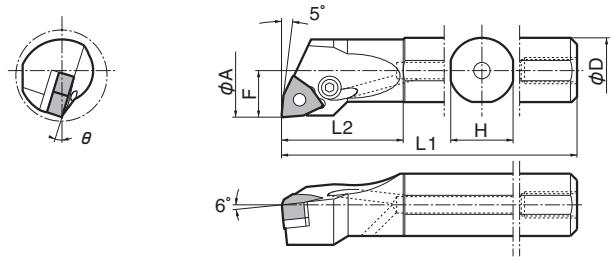
● Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

A…PWLN06 Twin-Hole Bar (Boring / Internal Facing: with Coolant Hole)

Max. Overhang Length L/D=~3





● Right-hand shown

L-hand Insert for R-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
S16M-PWLN[R/L]06-20	PWLN[R/L]2016B-06	●	●	20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
S20Q-PWLN[R/L]06-27	PWLN[R/L]2720B-06	●	●	27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LW-32N	LSP-1	PC-1	
S25R-PWLN[R/L]06-32	3225B-06	●	●	32	25	24	200	42	15.7	15°							
A16M-PWLN[R/L]06-20	PWLN[R/L]2016B-06H	●		20	16	15	150	34	11	16°	0.8	LL-03SN	LS-03SN	-	P-03S	-	FH-2.5
A20Q-PWLN[R/L]06-27	PWLN[R/L]2720B-06H	●		27	20	19	180	37	14.2	17°		LL-1N	LS-1SN	LW-32N	LSP-1	PC-1	
A25R-PWLN[R/L]06-32	3225B-06H	●		32	25	24	200	42	15.7	15°							

Applicable Inserts

Applications	Finishing	Finishing-Medium	Medium-Roughing	Finishing	Medium
Ref. Page	B35	B35	B35	B37	B37
Insert / Toolholder	GP	HQ	GS	[R/L]-S	[R/L]
····PWLN[R/L]06-····	WNMG0604..	WNMG0604..	WNMG0604..	WNGG0604..	WNGG0604..

For recommended cutting conditions, see page ➔ F77~F78

Applicable Coolant Sleeve / Joint

Toolholder	Applicable Coolant Sleeve	Applicable Coolant Joint
A16M-PWLN[R/L]06-20	SHC1640-70, SHC1650-95	SJS-8
A20M-PWLN[R/L]06-27	SHC2040-70, SHC2050-95	
A25R-PWLN[R/L]06-32	SHC2540-70, SHC2550-95	

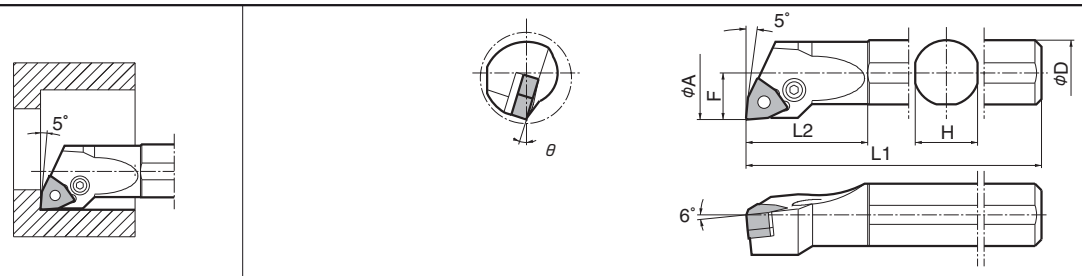
● For Coolant Sleeve, Coolant Joint, see ➔ F76.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Boring Bar [WN □□ Negative Insert]

S…PWLN08 (Boring / Internal Facing)

Max. Overhang Length L/D=~3

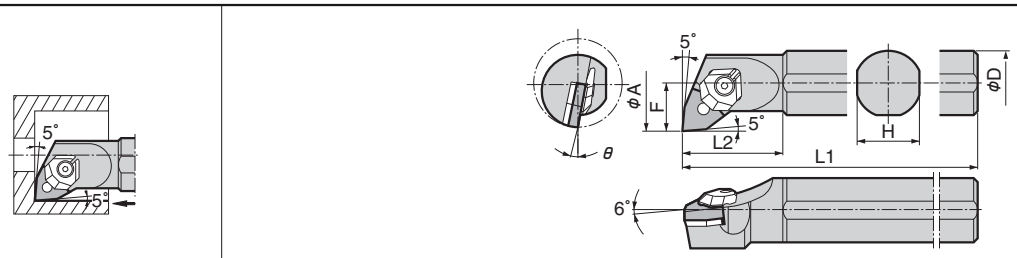


• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

S…WWLN08-E Excellent Bar (Boring / Internal Facing)

Max. Overhang Length L/D=~5



• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (re)	Spare Parts: Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench
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								

Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (re)	Spare Parts: Clamp Set	Wrench	Shim	Shim Pin	Wrench
S25S-WWLN$^{R}_{L}$08-28E	WWLN$^{R}_{L}$ 2825B-08E	●	●	28	25	24		36	14	13°						
S25S-WWLN$^{R}_{L}$08-34E	3425B-08E	●	●	34	25	24	250	40	17	11°	1.2	WCS-8	LW-3	WWP-42 *WWP-42-16	WP5X11	LW-2
S32S-WWLN$^{R}_{L}$08-40E	4032B-08E	●	●	40	32	30		50	20	10°						

• When using insert with corner R = 1.6mm or longer, purchase and use shim with * mark separately to prevent interference between workpiece and shim.

Applicable Inserts

Applications	Finishing	Finishing-Medium	Finishing	Finishing-Medium	Finishing-Medium	Finishing-Medium	Medium-Roughing	Medium-Roughing	Medium-Roughing	Medium-Roughing / High Feed Rate	Medium-Roughing / High Feed Rate
Ref. Page	B35	B35	B35	B35	B35	B35	B35	B35	B36	B36	B36
Insert / Toolholder	WP (Wiper)	WQ (Wiper)	GP	HQ	CQ	CJ	TK	GS	PS	PT	GT
...-PWLN$^{R}_{L}$08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMP0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..
...-WWLN$^{R}_{L}$08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMP0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..

Applications	Roughing	Soft Steel Finishing	Soft Steel / Medium cutting	Soft Steel / Roughing	Stainless Steel Finishing	Stainless Finishing	Stainless Medium to Roughing	Stainless Medium to Roughing	Stainless Medium to Roughing	Cast Iron	Cast Iron
Ref. Page	B36	B36	B36	B36	B36	B37	B37	B37	B37	B37	B37
Insert / Toolholder	Standard	XP	XQ	XS	GU	MQ	MS	MU	TK	C(GC)	ZS
...-PWLN$^{R}_{L}$08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMA0804..
...-WWLN$^{R}_{L}$08-...	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMG0804..	WNMA0804..

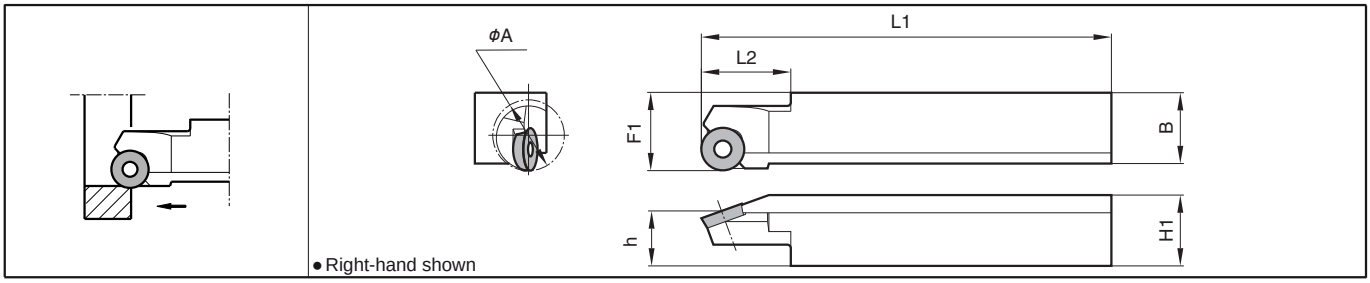
Applications	Non-ferrous Metals	Non-ferrous Metals	Hard Materials
Ref. Page	B37	C17	C8
Insert / Toolholder	AH	PCD	CBN
...-PWLN$^{R}_{L}$08-...	WNGG0804..	WNMM0804..	WNGA0804..
...-WWLN$^{R}_{L}$08-...	WNGG0804..	WNMM0804..	WNGA0804..

• In wedge lock, use of ceramic insert other than TN30 / PV30 and silicon nitride insert is not recommended due to strong restraint force.

For recommended cutting conditions, see page ➡ F77~F78

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SRCP-B (Boring)

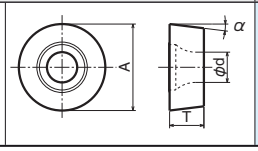


• Right-hand shown

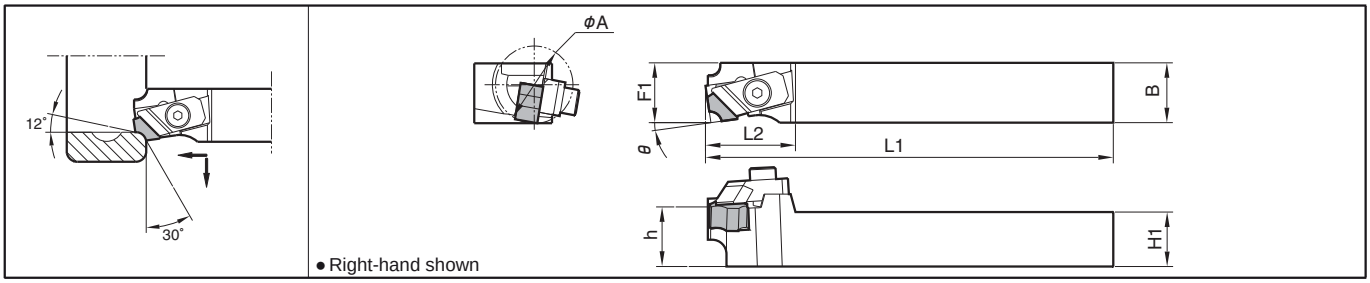
Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) H1	h	B	L1	L2	F1	Spare Parts: Clamp Screw	Spare Parts: Wrench		Applicable Inserts ⇒ B73
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) A	T	ød	Angle (°) α
		RPMT 1203M0-BB 1604M0-BB	12.0 16.0	3.18 4.76	4.4 5.5	11°

CBSN-B (Internal Round Chamfering)



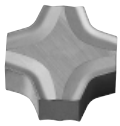
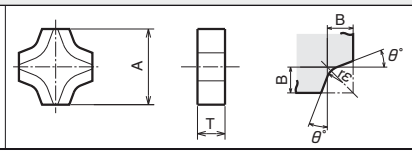
• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) H1	h	B	L1	L2	F1	θ	Spare Parts: Clamp Set	Spare Parts: Wrench		Applicable Inserts ⇒ B73
CBSN R/L	2020B-12-A20	●	●	20	20	21	20	125	32	20	9°	CP-RC R/L	LW-5		SNMF1204 ○○ -21
	2525B-12-A20	●	●		25	26	25	150		25					

• Clamp Set: RP-RCR for R-hand Toolholder, and CP-RCL for L-hand Toolholder.

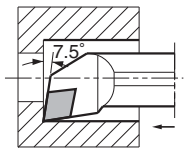
Applicable Inserts

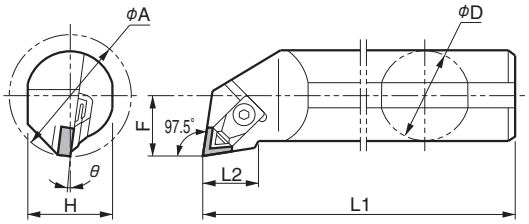
Insert		Description	Dimension (mm) A	T	B	rε	Angle (°) θ
		SNMF 120406-21 120410-21 120416-21 120421-21 120426-21	12.70	4.76	1.5 3.0 3.1 3.2 3.3	0.6 1.0 1.6 2.1 2.6	21°

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S…CELN (Boring / Internal Facing)

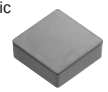
Max. Overhang Length L/D=~3





● Right-hand shown

Applicable Inserts

Cast Iron / Hard Materials
➡ B83
Ceramic

ENGN1307..

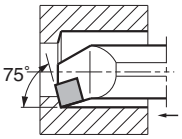
Toolholder Dimensions

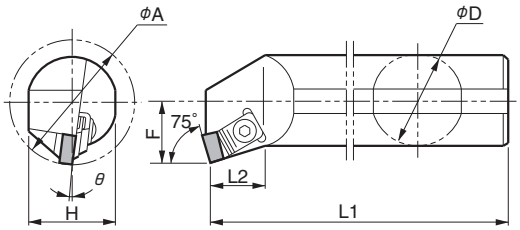
Recommended Cutting Conditions ➡ F77~F78

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
																
S40T-CELN$^{R}_{L}$13-50	**CELN$^{R}_{L}$ 5040B-13**	●		50	40	37	300	32	27	12°	0.8	CB-16	CE-010	LW-4	SP-341P	M3X8

S…CSKN (Boring)

Max. Overhang Length L/D=~3





● Right-hand shown

Applicable Inserts

Cast Iron / Hard Materials	Cast Iron	Cast Iron / Hard Materials
➡ B84, B85	➡ B27	➡ C9
Ceramic	Coated / Carbide	CBN(KBN900)
		
SNGN1207..(1204..) SNMN1207..	(SNMN1204..)	(SNMN1204..)

Toolholder Dimensions

Recommended Cutting Conditions ➡ F77~F78

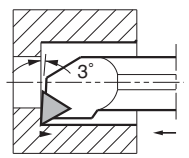
Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
																
S40T-CSKN$^{R}_{L}$12-50	**CSKN$^{R}_{L}$ 5040B-12**	●	●	50	40	37	300	26	27	10.5°	0.8	CB-13 / 12	CE-320	LW-4	SP-141P (SP-143P)	M3X8 (M3X12)

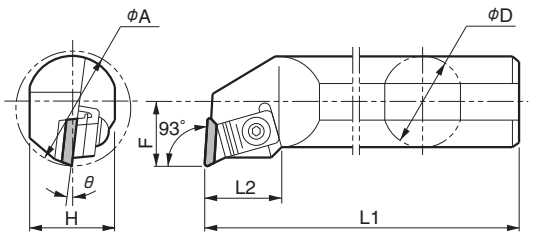
• Chipbreaker: CB-13 for R-hand Toolholder, CB-12 for L-hand Toolholder.

• Shim & Shim Screw: When using SN □□ 1204 type Insert, purchase spare parts in ( ) separately.

S…CTUC (Boring)

Max. Overhang Length L/D=~3





● Right-hand shown

Applicable Inserts

Cast Iron
➡ B88
Ceramic

TCGN1604..

Toolholder Dimensions

Recommended Cutting Conditions ➡ F77~F78

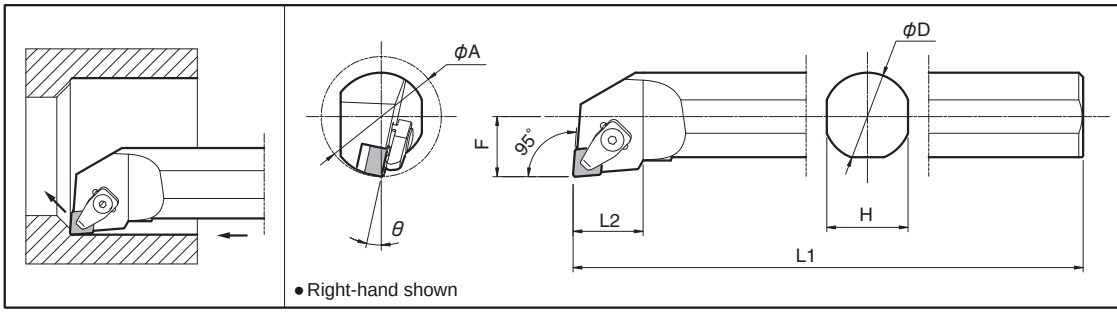
Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Chipbreaker	Clamp Set	Wrench	Shim	Shim Screw
																
S32S-CTUC$^{R}_{L}$16-40	**CTUC$^{R}_{L}$ 4032B-16**	●		40	32	30	250	27	22	6.5°	0.8	CB-13 / 12	CE-320	LW-4	SP-230P	SP3X10

• Chipbreaker: CB-13 for R-hand Toolholder, CB-12 for L-hand Toolholder.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S…CCLN-GX (Boring / Internal Facing)

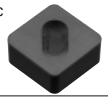
Max. Overhang Length L/D=~3



● Right-hand shown

● Applicable Inserts

Cast Iron
B81
Ceramic



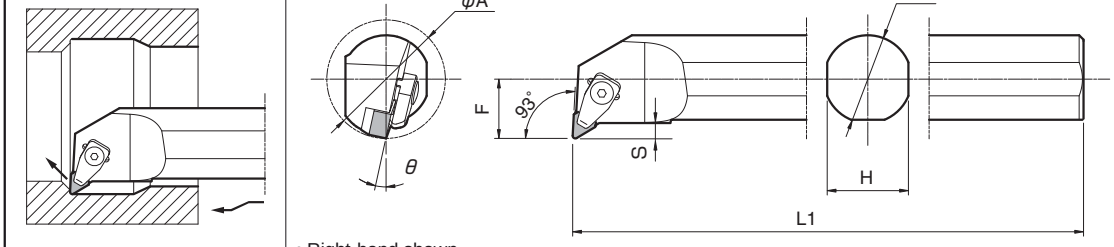
CNGX1207..

● Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (re)	Spare Parts Clamp Set	Wrench	Shim	Shim Screw	Recommended Cutting Conditions
S32S- CCLN[R/L] 12-40GX	●	●	40	32	30	250	32	22	14°	1.2	CE-410	LW-4	-	-	F77~F78
S40T- CCLN[R/L] 12-50GX	●	●	50	40	37	300	32	27	12°	1.2	CE-410	LW-4	SP-441P	M3X8	

S…CDUN-GX (Boring / Copying)

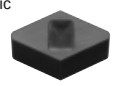
Max. Overhang Length L/D=~3



● Right-hand shown

● Applicable Inserts

Cast Iron
B82
Ceramic



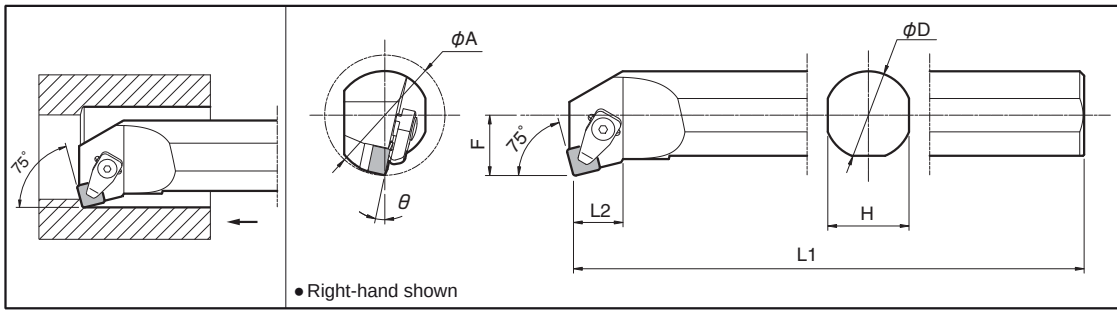
DNGX1207..

● Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	S	F	θ	Standard Corner-R (re)	Spare Parts Clamp Set	Wrench	Shim	Shim Screw	Recommended Cutting Conditions
S32S- CDUN[R/L] 12-40GX	●	●	40	32	30	250	7.5	22	14°	1.2	CE-410	LW-4	-	-	F77~F78
S40T- CDUN[R/L] 12-50GX	●	●	50	40	37	300	7.5	27	12°	1.2	CE-410	LW-4	SP-521P	M3X8	

S…CSKN-GX (Boring)

Max. Overhang Length L/D=~3



● Right-hand shown

● Applicable Inserts

Cast Iron
B85
Ceramic



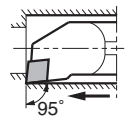
SNGX1207..

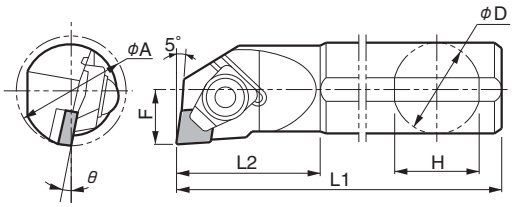
● Toolholder Dimensions

Description	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (re)	Spare Parts Clamp Set	Wrench	Shim	Shim Screw	Recommended Cutting Conditions
S32S- CSKN[R/L] 12-40GX	●	●	40	32	30	250	22.5	22	14°	1.2	CE-410	LW-4	-	-	F77~F78
S40T- CSKN[R/L] 12-50GX	●	●	50	40	37	300	22.5	27	12°	1.2	CE-410	LW-4	SP-141P	M3X8	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

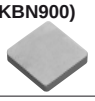
S…CCLN-A (Boring / Internal Facing)





● Right-hand shown

● Applicable Inserts

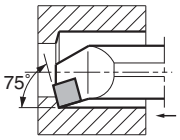
Cast Iron / Hard Materials
➡C9
CBN(KBN900)

CNMN0903..

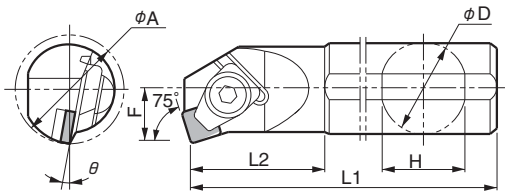
For recommended cutting conditions, see page ➡F77~F78

● Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
S25X-CCLN$^{R/L}$09-30A	CCLN$^{R/L}$ 3025B-09A	●	●	30	25	24	220	40	15	10°	0.8	CE-360S	LW-4	SP-420A	BH3X6
S32S-CCLN$^{R/L}$09-40A	4032B-09A	●	●	40	32	30	250	50	22	8°					

S…CSKN-A (Boring)





● Right-hand shown

● Applicable Inserts

Cast Iron / Hard Materials
➡C9
CBN(KBN900)

SNMN0903..

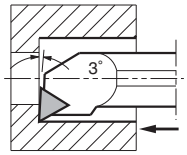
For recommended cutting conditions, see page ➡F77~F78

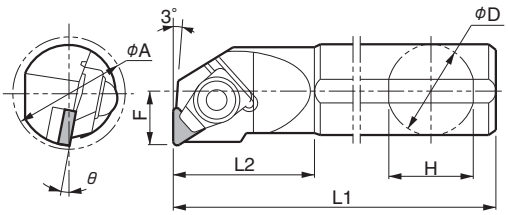
● Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
S25X-CSKN$^{R/L}$09-30A	CSKN$^{R/L}$ 3025B-09A	●		30	25	24	220	40	15	10°	1.2	CE-360S	LW-4	SP-130A	BH3X12
S32S-CSKN$^{R/L}$09-40A	4032B-09A	●		40	32	30	250	50	22	8°					

* Toolholders for SNMN1204 Type Insert are described in **F72**.

S…CTUN-A (Boring)





● Right-hand shown

● Applicable Inserts

Cast Iron / Hard Materials	Cast Iron / Hard Materials
➡C9	➡B86
CBN(KBN900)	Ceramic
	
TNMN1103..	TNGN1103..

For recommended cutting conditions, see page ➡F77~F78

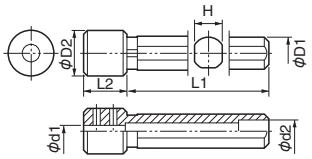
● Toolholder Dimensions

Description	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	θ	Standard Corner-R (rε)	Spare Parts: Clamp Set	Wrench	Shim	Shim Screw
S25X-CTUN$^{R/L}$11-30A	CTUN$^{R/L}$ 3025B-11A	●		30	25	24	220	40	15	10°	0.8	CE-360S	LW-4	SP-210A	BH3X6

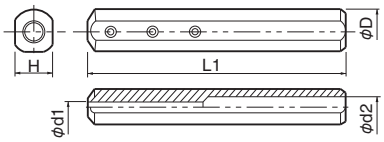
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Sleeves for Boring Bars

Sleeves for Tip-Bar

Shape	Description	(Previous Description)	Std.	Dimension (mm) øD1	øD2	ød1	ød2	H	L1	L2	Spare Parts Screw	Wrench
 (Tip-Bar installation side)	PH 0212-60	PH -0212	●	12	19	1.8	6	11	60	20	HS3X4	LW-1.5
	0312-60	-0312	●			2.8						
	0412-60	-0412	●			3.8					HS4X4	LW-2
	0512-60	-0512	●			4.8						
	0612-60	-0612	●			5.8	8					
	0712-60	-0712	●			6.8						
	PH 0216-80	PH -0216	●	16	22	1.8	Rp1/4 (PS1/4)	15	80	20	HS3X4	LW-1.5
	0316-80	-0316	●			2.8						
	0416-80	-0416	●			3.8					HS4X4	LW-2
	0516-80	-0516	●			4.8						
	0616-80	-0616	●			5.8						
	0716-80	-0716	●			6.8						

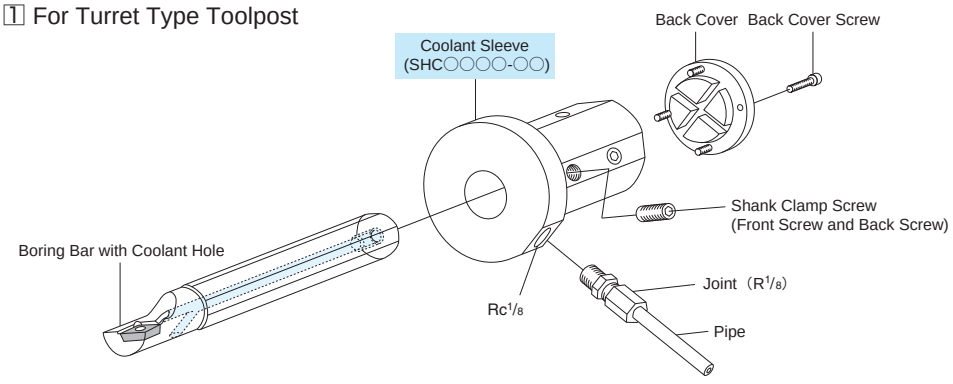
Sleeves for Boring Bars

Shape	Description	(Previous Description)	Std.	Dimension (mm) øD	ød1	ød2	H	L1	Spare Parts Screw	Wrench
 (Holder installation side)	SH 0416-100	SH -0516	●	16	4	5	14	100	HS4X4	LW-2
	0516-100	-0616	●		5	6				
	0616-100	-0716	●		6	7				
	0716-100	-0816	●		7	8				
	SH 0820-120	SH -1020	●	20	8	9	18	120	HS4X4	LW-2
	1020-120	-1220	●		10	11				
	1225-150	-1625	●	25	12	13	23	150	HS5X5	LW-2.5
	1632-180	-2032	●	32	16	18	30	180		
	2032-180	-2532	●		20	22				

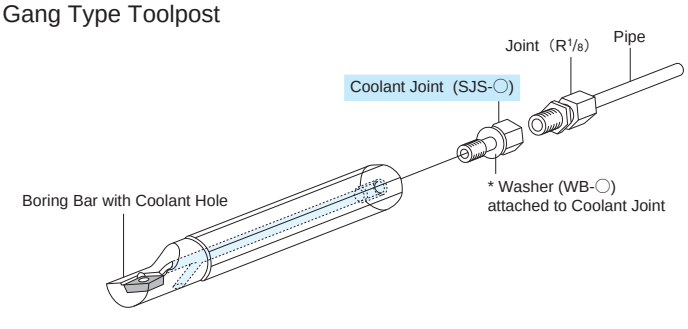
Coolant Sleeves for Boring Bar with Coolant Hole

● How to install

1 For Turret Type Toolpost



2 For Gang Type Toolpost



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Sleeves for Boring Bars

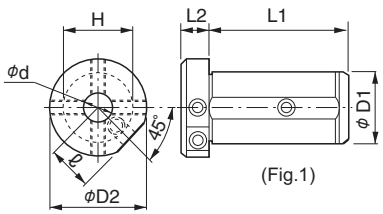
List of toolholders and applicable sleeves and joints

Toolholder	Applicable Coolant Sleeve	Applicable Coolant Joint
A08-	SHC0840-70 / SHC0850-95	SJS-5
A10-	SHC1040-70 / SHC1050-95	
A12-	SHC1240-70 / SHC1250-95	SJS-6
A16-	SHC1640-70 / SHC1650-95	SJS-8
A20-	SHC2040-70 / SHC2050-95	
A25-	SHC2540-70 / SHC2550-95	
E08-	SHC0840-70 / SHC0850-95	SJS-5
E10-	SHC1040-70 / SHC1050-95	
E12-	SHC1240-70 / SHC1250-95	SJS-6
E16-	SHC1640-70 / SHC1650-95	SJS-8
E20-	SHC2040-70 / SHC2050-95	

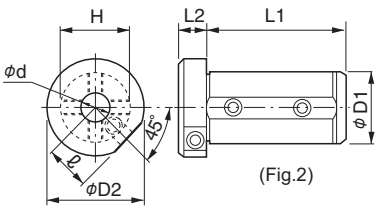
Toolholder	Applicable Coolant Sleeve	Applicable Coolant Joint
K10- -H	SHC1040-70 / SHC1050-95	-
K12- -H	SHC1240-70 / SHC1250-95	-
K16- -H	SHC1640-70 / SHC1650-95	-
K20- -H	SHC2040-70 / SHC2050-95	-
K25- -H	SHC2540-70 / SHC2550-95	-

• For installation of Coolant Sleeve and Coolant Joint, refer to ⇒ **F75**.

Coolant Sleeve Dimension



(Fig.1)



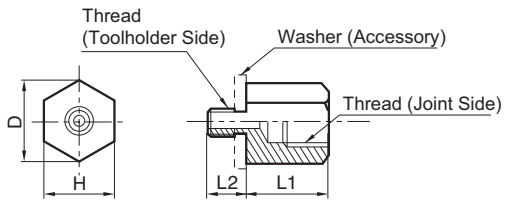
(Fig.2)

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	(Previous Description)	Std.	Dimension (mm) øD1	øD2	ød	L1	L2	H	A	Drawing	Spare Parts: Front Screw	Wrench	Back Screw	Wrench	Back Cover	Back Cover Screw	Wrench
SHC 0840-70	**SHC -084070**	●	40	56	8	70	16	38	27	Fig.1	HS6X22	LW-3	HS6X14	LW-3	SHL-4	HH3X6	LW-2.5
1040-70	**-104070**	●			10												
1240-70	**-124070**	●			12					Fig.2	HS10X10	LW-5	HS10X10	LW-5			
1640-70	**-164070**	●			16												
2040-70	**-204070**	●			20					Fig.1	HS10X10	LW-5	HS6X6	LW-3			
2540-70	**-254070**	●			25												
SHC 0850-95	**SHC -085095**	●	50	65	8	95	16	47	30.5	Fig.1	HS6X22	LW-3	HS6X14	LW-3	SHL-5	HH3X12	LW-2.5
1050-95	**-105095**	●			10												
1250-95	**-125095**	●			12					Fig.2	HS10X10	LW-5	HS10X10	LW-5			
1650-95	**-165095**	●			16												
2050-95	**-205095**	●			20												
2550-95	**-255095**	●			25												

Coolant Joint Dimension



Description	Std.	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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

Recommended Cutting Conditions - Boring (Positive Insert: Cutting Dia under 10mm) [ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Corner R (rε)	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	(VNB)	PR930	0.03 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	Continuous Interruption	F , FSF	PR1025	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	GQ	PR1025	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
	Medium-carbon Steel Medium-carbon Alloy	HB ≦ 300	Finishing (Solid Type)	Continuous Interruption	(VNB)	PR930	0.03 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	Continuous Interruption	F , FSF	PR1025	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 cutting	Continuous Interruption	GQ	PR1025	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
	High-carbon Alloy	HB ≦ 280	Finishing (Solid Type)	Continuous Interruption	(VNB)	PR930	0.03 0.2	30 - 60 - 100 30 - 50 - 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 , FSF	PR1025	0.1 0.2	30 - 60 - 100 30 - 50 - 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	GQ	PR1025	0.2 0.4	30 - 60 - 100 30 - 50 - 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
M	Stainless Steel	HB ≦ 220	Finishing (Solid Type)	Continuous Interruption	(VNB)	PR930	0.03 0.2	30 - 60 - 100 30 - 50 - 70	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 , FSF	PR1025	0.1 0.2	30 - 60 - 100 30 - 50 - 70	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	GQ	PR1025	0.2 0.4	30 - 60 - 100 30 - 50 - 70	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	0.03 - 0.05 - 0.07 0.03 - 0.07 - 0.1
	Stainless Steel	HB ≦ 300	Finishing (Solid Type)	Continuous Interruption	(VNB)	PR930	0.03 0.2	30 - 60 - 80 20 - 40 - 60	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 , FSF	PR1025	0.1 0.2	30 - 60 - 80 20 - 40 - 60	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	GQ	PR1025	0.2 0.4	30 - 60 - 80 20 - 40 - 60	0.1 - 0.2 - 0.3 0.1 - 0.2 - 0.3	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	HQ	CA4010	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	Standard	CA4120	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	HB ≦ 100	High Speed Cutting (Rainbow Surface Gross)	Continuous	Without Chipbreaker	KPD001	0.05	150 - 200 - 300	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			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 Alloy	HB ≦ 400	Precision Cutting (Rainbow Surface Gross)	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	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	SE SET	KBN25M	0.2 0.4	60 - 100 - 120 60 - 80 - 100	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 PR1005 set to Vc=150m/min or below, for machining of free-cutting steel such as small size 11SMn (SUM). For ap and feed, see low carbon steel.

Recommended Cutting Conditions - Boring (Positive Insert: Cutting Dia over 10mm) [ap indicates radius]

ISO Classification	Workpiece Material	Hardness	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Corner R (rε)	Lower Limit - Recommendation - Upper Limit		
								Vc(m/min)	ap(mm)	f(mm/rev)
*P	Low-carbon Steel Low-carbon Alloy	HB ≦ 300	Precision Cutting	Continuous	FSF, USF	TN6020	0.1	250 - 300 - 350	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15
				Interruption		PR1025	0.2	100 - 150 - 200	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15
			Finishing	Continuous	XP	PV7010	0.4	200 - 250 - 300	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		CA5525	0.4	150 - 200 - 250	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous	XQ	PV7010	0.4	150 - 200 - 250	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.25
				Interruption		CA5525	0.4	100 - 150 - 200	0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.2
			Medium cutting	Continuous	Standard	PV7020	0.8	100 - 150 - 200	1.0 - 1.5 - 2.5	0.1 - 0.15 - 0.3
				Interruption		CA5525	0.8	80 - 120 - 150	1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.2
	Medium-carbon Steel Medium-carbon Alloy	HB ≦ 300	Precision Cutting	Continuous	FSF, USF	TN6020	0.2	150 - 200 - 250	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15
				Interruption		PR1025	0.4	100 - 120 - 150	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15
			Finishing	Continuous	GP	PV7010	0.4	150 - 200 - 250	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		CA5525	0.4	120 - 180 - 200	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous	HQ	PV7010	0.4	120 - 180 - 220	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.25
				Interruption		CA5525	0.4	100 - 150 - 200	0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.2
			Medium cutting	Continuous	Standard	PV7020	0.8	100 - 150 - 200	1.0 - 1.5 - 2.5	0.1 - 0.15 - 0.3
				Interruption		CA5525	0.8	80 - 120 - 150	1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.2
	High-carbon Alloy	HB ≦ 280	Precision Cutting	Continuous	FSF, USF	TN6020	0.2	120 - 150 - 180	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15
				Interruption		PR1025	0.4	100 - 120 - 150	0.05 - 0.3 - 0.5	0.03 - 0.1 - 0.15
			Finishing	Continuous	GP	PV7010	0.4	120 - 150 - 180	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		CA5525	0.4	100 - 120 - 150	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing-Medium	Continuous	HQ	PV7010	0.4	120 - 150 - 180	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.25
				Interruption		CA5525	0.4	100 - 120 - 150	0.5 - 1.0 - 1.5	0.1 - 0.15 - 0.2
			Medium cutting	Continuous	Standard	CA5515	0.8	100 - 120 - 150	1.0 - 1.5 - 2.5	0.1 - 0.15 - 0.3
				Interruption		CA5525	0.8	80 - 100 - 120	1.0 - 1.5 - 2.0	0.1 - 0.15 - 0.2
M	Stainless Steel	HB ≦ 220	Finishing	Continuous	MQ	CA6525	0.4	120 - 150 - 180	0.2 - 0.5 - 0.8	0.05 - 0.08 - 0.1
				Interruption			0.8	100 - 120 - 150	0.2 - 0.5 - 0.8	0.05 - 0.08 - 0.1
			Medium cutting	Continuous	Standard	CA6525	0.4	120 - 150 - 180	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2
				Interruption			0.8	100 - 120 - 150	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2
	Stainless Steel	HB ≦ 300	Finishing	Continuous	MQ	CA6525	0.4	80 - 100 - 120	0.2 - 0.7 - 1.0	0.05 - 0.1 - 0.15
				Interruption			0.8	60 - 80 - 100	0.2 - 0.7 - 1.0	0.05 - 0.1 - 0.15
			Medium cutting	Continuous	Standard	CA6525	0.4	80 - 100 - 120	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2
				Interruption			0.8	60 - 80 - 100	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.2
K	Gray Cast Iron	HB ≦ 250	High Speed Cutting	Continuous	Without Chipbreaker	KBN60M	0.4	400 - 500 - 600	0.05 - 0.2 - 0.5	0.05 - 0.1 - 0.15
				Interruption		PT600M	0.8	200 - 250 - 350	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Finishing (Gloss Oriented)	Continuous	Standard	PV7005	0.8	200 - 250 - 300	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		TN6020	0.8	100 - 150 - 200	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing	Continuous	Standard	CA4010	0.4	150 - 180 - 200	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption			0.8	100 - 150 - 180	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Medium cutting	Continuous	Conventional Without Chipbreaker	CA4010	0.8	100 - 150 - 200	0.5 - 1.0 - 2.0	0.1 - 0.15 - 0.2
				Interruption			0.8	80 - 120 - 150	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.15
	Nodular Cast Iron	HB ≦ 270	High Speed Cutting	Continuous	Without Chipbreaker	KBN60M	0.4	200 - 300 - 400	0.05 - 0.2 - 0.5	0.03 - 0.05 - 0.1
				Interruption		PT600M	0.8	150 - 200 - 250	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			Finishing (Gloss Oriented)	Continuous	Standard	PV7005	0.8	150 - 200 - 250	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		TN6020	0.8	100 - 120 - 150	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Finishing	Continuous	Standard	CA4115	0.4	120 - 150 - 180	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
				Interruption		CA4120	0.8	100 - 120 - 150	0.2 - 0.5 - 1.0	0.05 - 0.1 - 0.2
			Medium cutting	Continuous	Standard	CA4115	0.8	100 - 120 - 150	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.2
				Interruption		CA4120	0.8	80 - 100 - 120	0.5 - 1.0 - 2.0	0.05 - 0.1 - 0.15
N	Non-ferrous Metals	HB ≦ 100	High Speed Cutting (Rainbow Surface Gross)	Continuous	Without Chipbreaker	KPD001	0.2	200 - 400-1000	0.05 - 0.1 - 0.3	0.05 - 0.1 - 0.15
			Finishing	Continuous	FSF, USF	KW10	0.4	100 - 200 - 400	0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2
				Interruption			0.4	100 - 200 - 400	0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2
S	Titanium Alloy	HB ≦ 400	Precision Cutting (Rainbow Surface Gross)	Continuous	Without Chipbreaker	KPD001	0.2	100 - 120 - 150	0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1
				Interruption			0.4	70 - 100 - 120	0.05 - 0.1 - 0.3	0.03 - 0.07 - 0.1
			Finishing	Continuous	F , U	KW10	0.2	30 - 50 - 70	0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2
				Interruption			0.4	30 - 50 - 70	0.05 - 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	0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2
				Interruption			0.4	10 - 30 - 50	0.05 - 0.5 - 1.0	0.03 - 0.1 - 0.2
			Finishing	Continuous	MQ	CA6525	0.4	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
				Interruption			0.8	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
H	Hard Materials	40 ~ 50 HRC	Finishing	Continuous	HQ Without Chipbreaker	CA5515	0.8	60 - 80 - 100	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1
				Interruption			0.8	30 - 50 - 70	0.05 - 0.3 - 0.5	0.05 - 0.08 - 0.1
		45 ~ 68 HRC	Finishing	Continuous	Without Chipbreaker	KBN10M	0.4	80 - 120 - 150	0.1 - 0.2 - 0.3	0.02 - 0.07 - 0.1
				Interruption	SET, MET	KBN25M	0.8	60 - 100 - 120	0.1 - 0.2 - 0.3	0.02 - 0.07 - 0.1
			Medium cutting	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 11SMn (SUM), please use PR1005 for Vc=200m/min or under and use PV7020 / CA5515, etc. for Vc=200m/min or over.

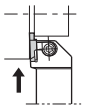
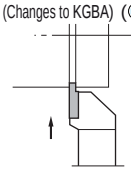
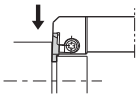
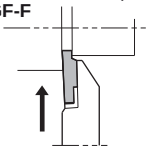
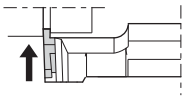
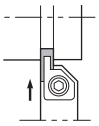
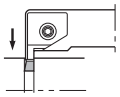
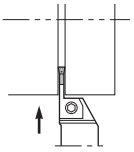
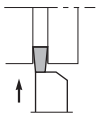
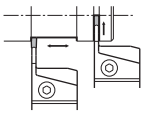
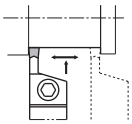
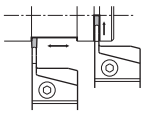
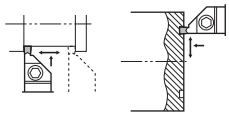
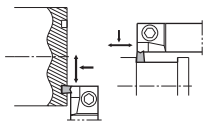
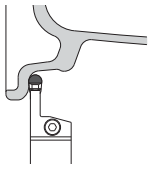
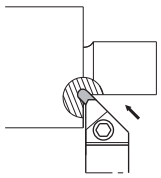
Grooving

G1~G80

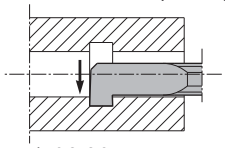
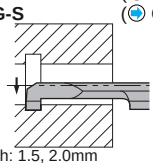
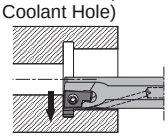
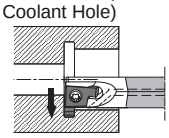
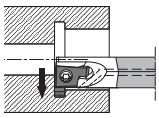
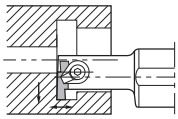
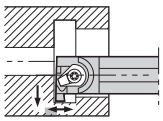
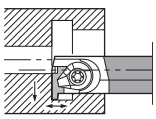
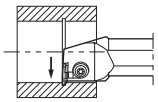
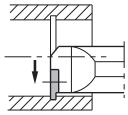
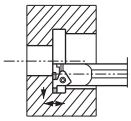
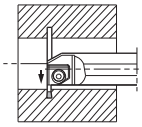
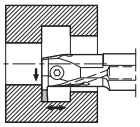
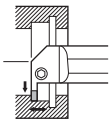
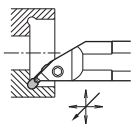
Product Lineup		**G2~G3**
External Grooving		**G4~G27**
KGBA / KGBAS		G9
KGB / KGBS changes to KGBA / KGBAS.		G11
KTGF-F / KTGF		G12
S…KTGF	Sleeve Holder	G13
KTG changes to KGBA.		G15
KGH / KGHS		G16
KGA		G17
KGM (Automatic Lathe / Long Shank)		G22
KGM / KGM-T		G23
KGMM / KGMS		G24
KGMU		G25
KN91		G26
KGMW (For Aluminum Wheel)		G27
Internal Grooving		**G28~G48**
HPG	2-Edge Tip-Bar	G30
PSG-S changes to HPG.	Tip-Bar	G32
VNG	System Tip-Bar	G33
SIGE-EH / SIGE-WH / SIGE-WH-90		G34
GIV / GIV-E / GIV-W		G40
KIGBA		G43
KITG changes to KIGBA.		G44
KIGH		G45
KIGM-V		G46
KIGM-8 / KIGMU-8		G47
KGIA		G48
Face Grooving		**G49~G71**
HPFG	2-Edge Tip-Bar	G53
TWFG / TWFGT	Twin Bar	G54
VNFG	System Tip-Bar	G56
PSFG-S changes to HPFG.	Tip-Bar	G57
GFVS-AA / GFVT-AA		G58
GFV		G60
GFVS / GFVT		G62
KFMS		G66
KFMS-8		G68
KFTB-S		G69
GIFV (Boring Bar Type)		G70
Technical Information		**G72~G79**
Recommended Cutting Conditions		G72
Guide for Machining		G78



External Grooving (G4-G26)

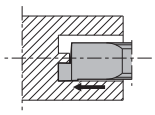
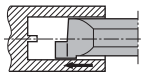
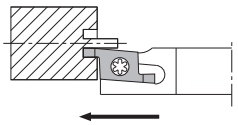
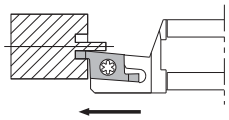
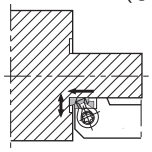
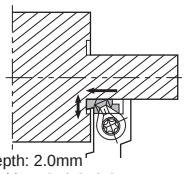
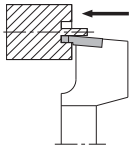
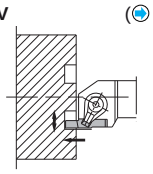
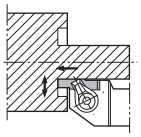
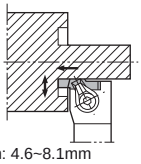
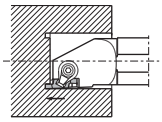
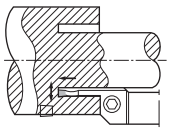
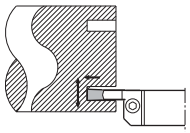
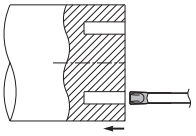
Shallow Grooving (3-Edge)	**KGBA** (G9) KGB (Changes to KGBA) (G11)  Depth: 1.0~5.0mm Width: 0.5~4.8mm	KTG (Changes to KGBA) (G15)  Depth: 2.0~5.0mm Width: 0.75~4.5mm	**KGBAS** (G9) KGBS (Changes to KGBAS) (G11)  Depth: 1.0~5.0mm Width: 0.5~4.8mm	**KTGF** (G12) **KTGF-F**  Depth: 0.8~2.5mm Width: 0.33~2.5mm	**S-KTGF** (G13)  Depth: 0.8~2.5mm Width: 0.33~2.5mm
Deep Grooving (1-Edge) (2-Edge)	**KGH** (G16)  Depth: 13, 17mm Width: 4.0~12.0mm	**KGHS** (G16)  Depth: 13mm Width: 4.0~8.0mm	**KGA** (G17)  Depth: 16, 20, 25mm Width: 3.0, 4.0, 5.0mm	**KN91** (G26)  Depth: 15, 17mm Width: 4.0~8.0mm	
Grooving / Plunge&Turn (Grooving / Multi-Function)	**KGM** (G22)  Depth: 5.0~16.0mm Width: 1.5~4.0mm	**KGM** (G23)  Depth: 8.0~25.0mm Width: 3.0~8.0mm	**KGM-T** (G23)  Depth: 17.0~30.0mm Width: 2.0~6.0mm	**KGMM** (G24)  Depth: 4.8mm Width: 3.0, 4.0, 5.0mm	**KGMS** (G24)  Depth: 4.8mm Width: 3.0, 4.0, 5.0mm
				KGMW (G27) For Aluminum Wheel  Depth: 25mm Width: 6.0, 8.0mm	**KGMU** (G25)  Depth: 3.5~4.5mm Width: 3.0, 4.0, 5.0mm

Internal Grooving (G27-G48)

Internal Grooving (Small Dia.) (Solid) Min. Bore Dia. ø4-ø8	**VNG** (G33)  Depth: 0.8~2.0mm Width: 1.0, 2.0mm	**HPG** (G30) **PSG-S** (G32)  Depth: 1.5, 2.0mm Width: 1.0, 2.0mm			
Internal Grooving (Small Dia.) (2-Edge) Min. Bore Dia. ø8~ø40	**SIGE-EH** (G36) (With Coolant Hole)  Depth: 1.5~6.5mm Width: 1.0~5.0mm	**SIGE-WH** (G37) (With Coolant Hole)  Depth: 1.5~2.5mm Width: 1.0~3.5mm	**SIGE-WH-90** (G38) (For Automatic Lathe / With Coolant Hole)  Depth: 1.5~2.5mm Width: 1.0~3.5mm		
Internal Grooving (Small Dia.) (1-Edge) (2-Edge) Min. Bore Dia. ø35, ø40, ø45	**GIV** (G40)  Depth: 2.2~6.3mm Width: 1.0~5.0mm	**GIV-E** (G40)  Depth: 1.7~6.3mm Width: 1.0~5.0mm	**GIV-W** (G40)  Depth: 2.2~6.3mm Width: 1.0~5.0mm		
Internal Shallow Grooving (3-Edge) Min. Bore Dia. ø35, ø40, ø45	**KIGBA** (G43)  Depth: 1.0~2.8mm Width: 0.5~4.8mm	**KITG** (G44)  Depth: 2.0, 2.5mm Width: 0.75~4.5mm	Internal Deep Grooving (Large Dia.) (2-Edge) Min. Cutting Dia. ø32~ø66	**KGIA** (G48)  Depth: 10, 15mm Width: 3.0, 4.0, 5.0mm	**KIGH** (G45)  Depth: 12.0mm Width: 4.0~8.0mm
CERACUT / Plunge&Turn (Grooving / Multi-Function) Min. Bore Dia. ø20~ø40, ø65	**KIGM-V** (G46)  Depth: 5.5~11.0mm Width: 3.0, 4.0, 5.0mm	**KIGM-8** (G47)  Depth: 20.0mm Width: 8.0mm	**KIGMU-8** (G47)  Depth: 2.2mm Width: 8.0mm		

Face Grooving (G49-G71)

For Face Grooving Diameter Table ➡ See Page **G52**

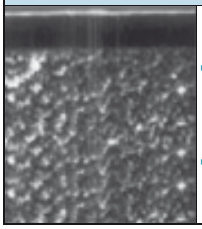
Face Grooving (Small Dia.) (Solid) Face Grooving Dia. ø8~	**VNFG** (➡ G56)  Depth: 2.0, 3.0mm Width: 1.0, 2.0, 3.0mm	**HPFG** (➡ G53) **PSFG-S** (➡ G57)  Depth: 2.0, 3.0mm (HPFG) Width: 1.0, 2.0, 3.0mm		Micro Face Grooving Face Grooving Dia. ø6 -	**STW** (➡ G55)  Depth: 1.0~3.0mm Width: 0.5~2.0mm	**S..-STW** (➡ G55)  Depth: 1.0~3.0mm Width: 0.5~2.0mm
Face Grooving (Small Dia.) (2-Edge) Face Grooving Dia. ø8~	**GFVS-AA** (➡ G58)  Depth: 2.2mm Width: 1.0, 2.0, 3.0mm	**GFVT-AA** (➡ G58)  Depth: 2.0mm Width: 1.0, 2.0, 3.0mm			**STWS** (➡ G55)  Depth: 1.0~3.0mm Width: 0.5~2.0mm	
Face Grooving (General purpose) (2-Edge) For face grooving dia. see each page.	**GFV** (➡ G60)  Depth: 2.2~8.1mm Width: 2.0~6.0mm	**GFVS** (➡ G62)  Depth: 4.6~8.1mm Width: 2.5~6.0mm	**GFVT** (➡ G62)  Depth: 4.6~8.1mm Width: 2.5~6.0mm		**GIFV** (➡ G70)  Depth: 2.2~8.1mm Width: 2.0~6.0mm	
Grooving / Plunge&Turn (Grooving / Multi-Function) For face grooving dia. see each page.	**KFMS** (➡ G66)  Depth: 13.0~32.0mm Width: 3.0~6.0mm	**KFMS-8** (➡ G68)  Depth: 25.0mm Width: 8.0mm			**KFTB-S** (➡ G69)  Depth: 25.0~38.0mm Width: 4.0, 5.0mm	

PR1115 : PVD Coated Carbide for Steel

1. **Micro-grain carbide improves its bending strength better than conventional carbide!**
2. **New Fine Surface PVD Coating improves wear and chipping resistance!**
3. **Supports wide range for continuous / interrupted cutting with middle~high speed**

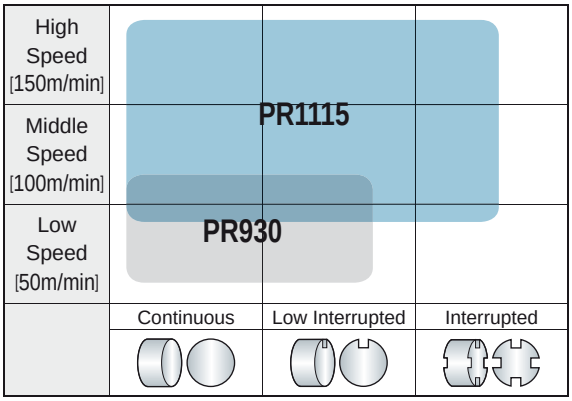


● Coating layer of PR1115

Sectional Structure	Performance
 ➡NEW FS(Fine Surface) Coat (TiAlN) Suitable for high speed machining, and excellent in wear resistance ➡Micro-grain carbide substrate	• High hardness (30GPa) • High Adhesive Strength • Precise, fine texture • High oxidation resistance (800°C)

NEW FS (Fine Surface) coating (TiAlN)

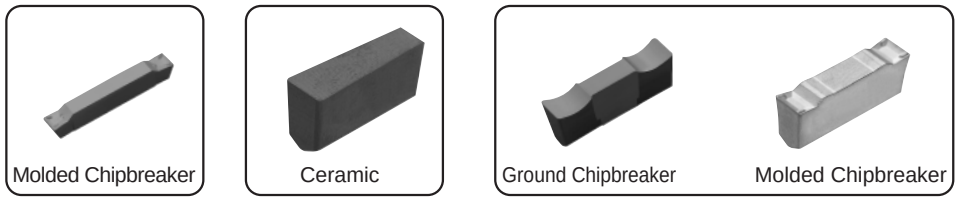
Newly developed TiAlN PVD coat brings stability and smooth machining. coating layer hardness / adhesive strength better than conventional FS coating



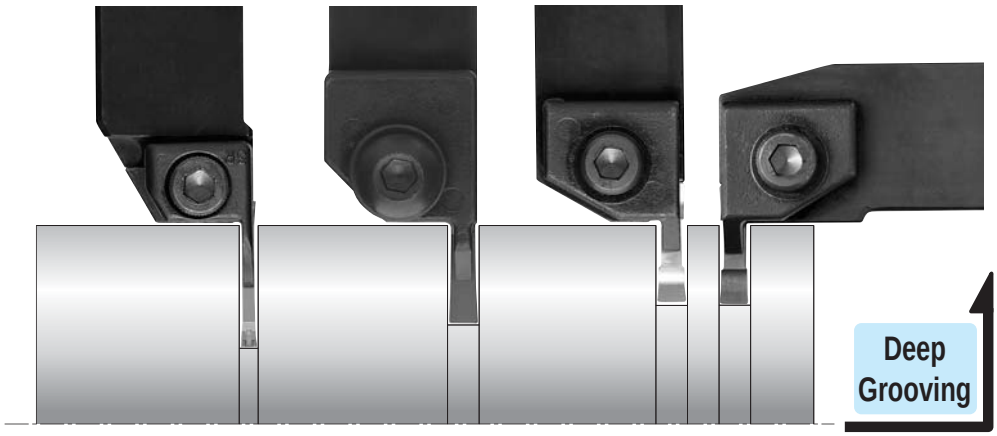
PR905: PVD Coated Carbide for Cast Iron

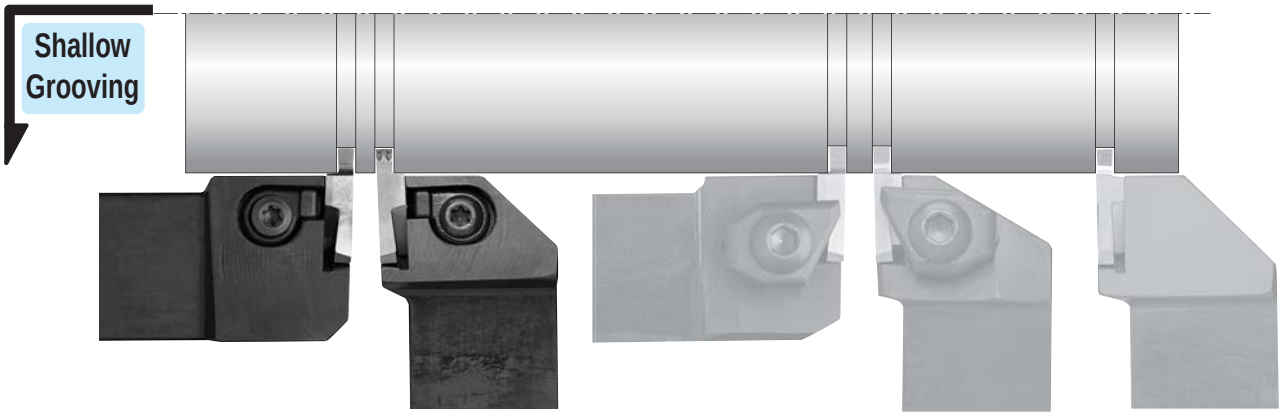
1. **High efficiency and stability made possible during machining of gray cast iron / nodular cast iron**
2. **Long life is made possible with TiAlN coating, bringing smooth insert surface, wear resistance, and, high temperature stability**
3. **Special carbide substrate made of hard material with excellent plastic deformation performance reduces edge wear**

External Grooving

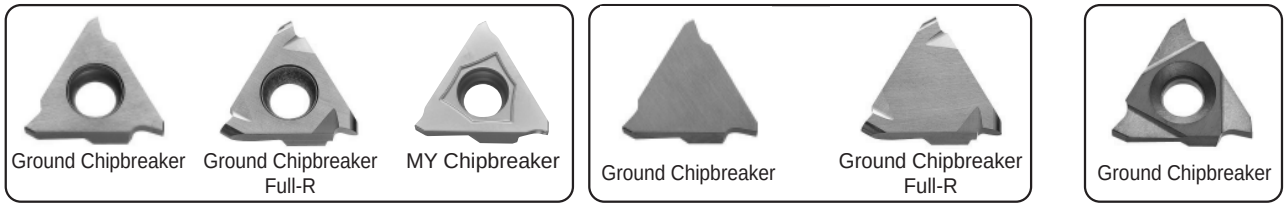


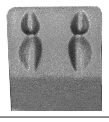
KGA	KN91	KGH	KGHS
Width: 3.0~5.0 Depth: 16~25	Width: 4.0~8.0 Depth: 15~17	Width: 4.0~12.0 Depth: 13~17	Width: 4.0~8.0 Depth: 13
➡G17	➡G26	➡G16	➡G16





KGBAS	KGBA	KGBS	KGB	KTG
Width: 0.5~4.8 Depth: 1.0~5.0	Width: 0.5~4.8 Depth: 1.0~5.0	Width: 0.5~4.8 Depth: 1.0~5.0	Width: 0.5~4.8 Depth: 1.0~5.0	Width: 0.75~4.5 Depth: 2.0~5.0
➡G9	➡G9	➡G11	➡G11	➡G15



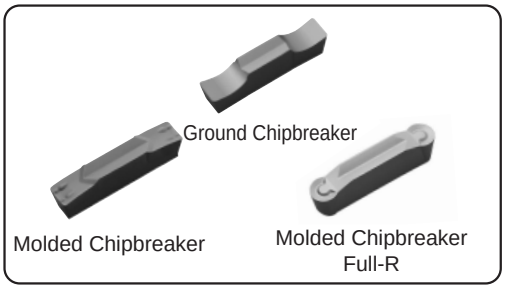
Edge Shape	General (Square)	Full-R (Round)	MY Chipbreaker
			

* These shallow groove types of the previous system will be switched to the system on the left.

KGBS Type ⟶ KGBSA Type
KGB Type, KTG Type ⟶ KGBA Type

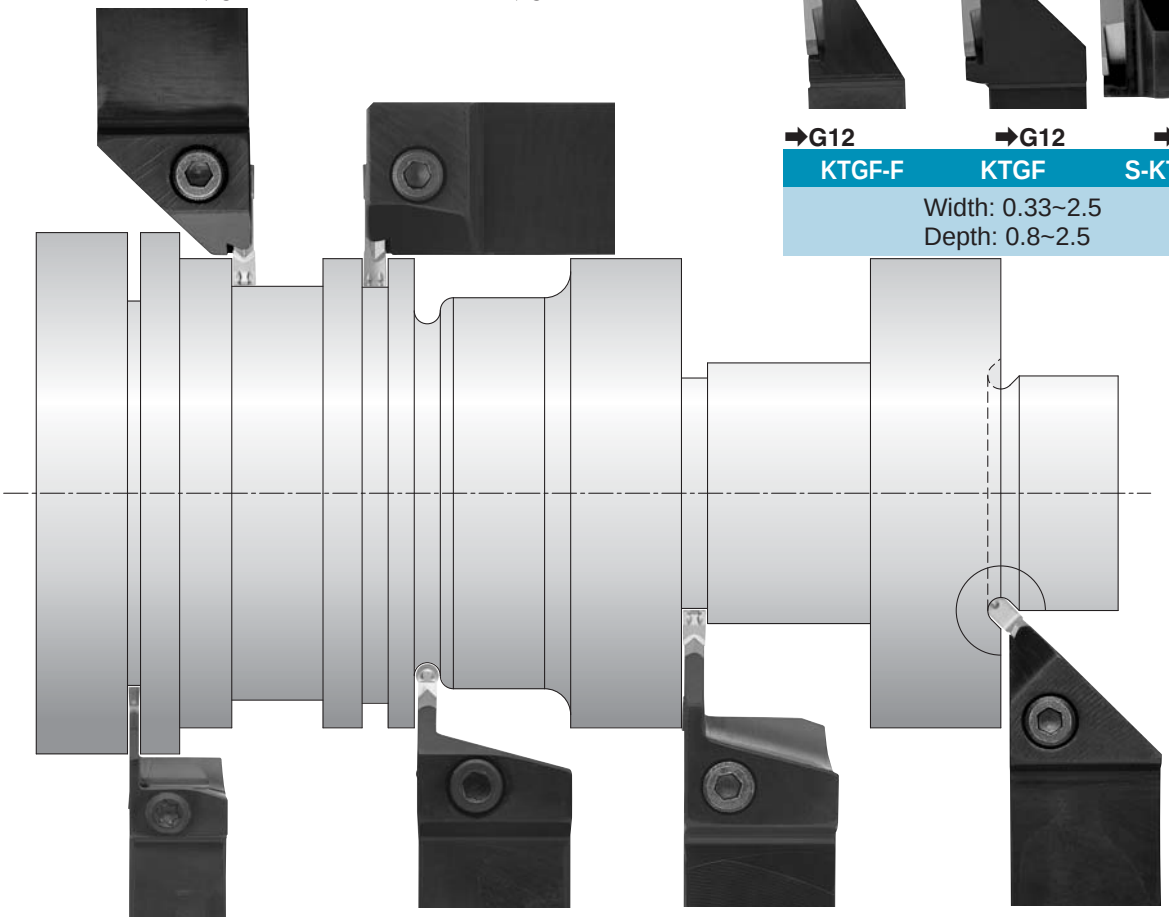
External Grooving & Traversing

Multi-function CERACUT Plunge & Turn



Width: 3.0~5.0
Depth: 4.8
KGMM
➡G24

Width: 3.0~5.0
Depth: 4.8
KGMS
➡G24

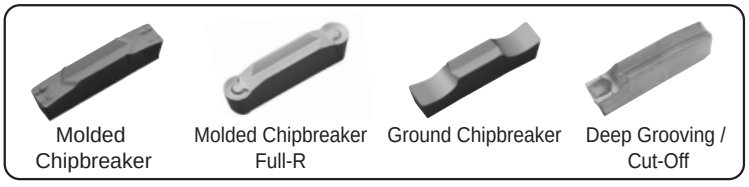


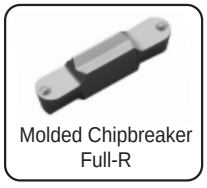
➡G22
KGM
Width: 1.5~4.0
Depth: 5~16

➡G23
KGM
Width: 3.0~8.0
Depth: 9~25

➡G23
KGM-T
Width: 2.0~6.0
Depth: 17~30

➡G25
KGMU
Width: 3.0~5.0
Depth: 4.8

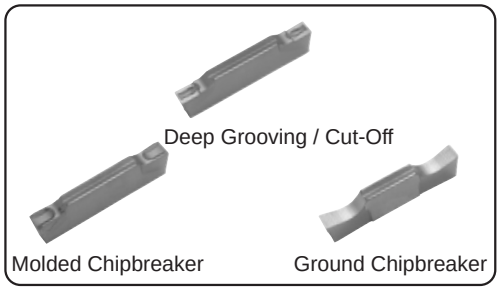


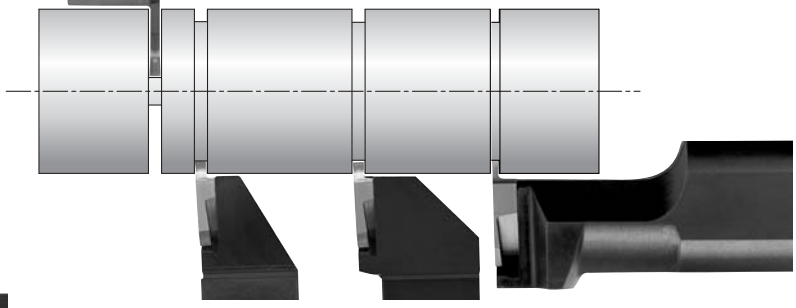


External Grooving of Precision Parts

Small Shank

Width: 1.5~4.0
Depth: 5~16
KGM
➡G16





➡G12 **KTGF-F**
➡G12 **KTGF**
➡G13 **S-KTGF**
Width: 0.33~2.5
Depth: 0.8~2.5

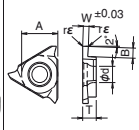


Applicable Inserts

(mm)

Description	A	T	ød
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

P	Carbon Steel / Alloy Steel					◌	●			Classification of usage ●: 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 Alloy								●	
H	Hard materials (under 40HRC)					○	●			
	Hard materials (over 40HRC)									

Insert (R-hand shown)	Description	(Previous Description)	Dimension (mm) W	B	rε	Cermet TC40	TN6020	TN90	PVD Coated Carbide PR630	PR930	PR1115	PR905	Carbide KW10	Applicable Toolholder	Reference Page for Toolholder
 	GBA32R/L 033-005	-	0.33	0.8	0.05						●	●		KGBAR/L...16 KGBASR/L...16	G9 G11 G43
	050-005 *	GBA32R/L 050 *	0.50	1.0				●	○	●			●		
	050-005 *	-	0.50	1.2							●	●			
	075-005	GBA32R/L 075	0.75	2.0				●	○	●	●	●	●		
	095-005	095	0.95					●	○	●	●	●	●		
	100-005	100	1.00					●	○	●	●	●	●		
	110-005	110	1.10								●	●			
	120-005	120	1.20								●	●			
	125-020	125	1.25		0.2			●	○	●	●	●	●		
	130-020	130	1.30								●	●			
	140-020	140	1.40								●	●			
	145-020	145	1.45					●	○	●			●		
	145-020	-	1.45	2.5							●	●			
	150-020	GBA32R/L 150	1.50	2.0				●	○	●			●		
	150-020	-	1.50	2.5							●	●			
	160-020	GBA32R/L 160	1.60	2.0							●	●			
	170-020	170	1.70								●	●			
	175-020	GBA32R/L 175	1.75					●	○	●			●		
	175-020	-	1.75	2.5							●	●			
	200-020	GBA32R/L 200	2.00					●	○	●	●	●	●		
	225-020	225	2.25								●	●			
	250-020	250	2.50					●	○	●	●	●	●		
	300-020	300	3.00								●	●			
	GBA43R/L 125-010	-	1.25	2.0	0.1						●				
	125-020	GBA43R/L 125	1.25		0.2	●		●	○	●	●	●	●		
	140-020	140	1.40								●	●			
	145-020	145	1.45			●		●	○	●			●		
	145-020	-	1.45	3.5	0.2						●	●			
	150-010	-	1.50		0.1						●				
	150-020	GBA43R/L 150	1.50		0.2	●		●	○	●	●	●	●	KGBAR/L...22-15 KGBASR/L...22-15	
	170-020	170	1.70								●	●			
	175-020	175	1.75			●		●	○	●	●	●	●		
	185-020	185	1.85			●		●	○	●	●	●	●		
	195-020	195	1.95								●	●			
	200-010	-	2.00		0.1						●				
	200-020	GBA43R/L 200	2.00		0.2	●		●	○	●	●	●	●		
	225-020	225	2.25								●	●			
	230-020	230	2.30			●		●	○	●	●	●	●		
	250-010	-	2.50	5.0	0.1						●			KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	250-030	GBA43R/L 250	2.50	4.0	0.3	●		●	○	●			●	KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	250-030	-	2.50	5.0							●	●		KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	265-030	GBA43R/L 265	2.65	4.0		●		●	○	●			●	KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	265-030	-	2.65	5.0							●	●		KGBAR/L...22-25T5 KGBASR/L...22-25T5	

• Dimension B: shows available grooving depth.

* The edge width tolerance of GBA32R/L050 (with * mark) is different ($0.50^{+0.05}_{-0}$)

• For KIGBA Internal Grooving Toolholder, See page **G43**

For recommended cutting conditions, see page G72

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

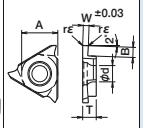
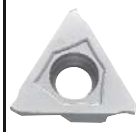
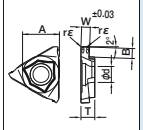
Inserts are sold in 10 piece boxes.

Applicable Inserts

(mm)

Description	A	T	ød
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

P	Carbon Steel / Alloy Steel					◯	●			Classification of usage ●: 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 Alloy								●	
H	Hard materials (under 40HRC)					◯	●			
	Hard materials (over 40HRC)									

Insert (R-hand shown)	Description	(Previous Description)	Dimension (mm) W	B	rε	Cermet TC40	TN6020	TN90	PVD Coated Carbide PR630	PR930	PR1115	PR905	Carbide KW10	Applicable Toolholder	Reference Page for Toolholder
 	GBA43R/L 280-030	GBA43R/L 280	2.80	4.0	0.3	●		●	○	●			●	KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	G9 G11 G43
	280-030	-	2.80	5.0							●	●		KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	300-010	-	3.00	5.0	0.1						●				
	300-030	GBA43R/L 300	3.00	4.0		●		●	○	●			●	KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	300-030	-	3.00	5.0	0.3						●	●		KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	325-030	GBA43R/L 325	3.25	4.0							R	R		KGBAR/L...22-25 KGBASR/L...22-25	
	330-030	330	3.30			●		●	○	●			●	KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	330-030	-	3.30	5.0							●	●		KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	350-010	-	3.50	5.0	0.1						●				
	350-030	GBA43R/L 350	3.50	5.0	0.3	●		●	○	●	●	●	●		
	400-010	-	4.00		0.1						●				
	400-040	GBA43R/L 400	4.00		0.4	●		●	○	●	●	●	●	KGBAR/L...22-35 KGBASR/L...22-35	
	430-040	430	4.30			●		●	○	●	●	●	●		
	450-040	450	4.50			●		●	○	●	●	●	●		
	480-040	480	4.80			●		●	○	●	●	●	●		
With Molded Chipbreaker  MY Chipbreaker  	GBA43R/L 175-020MY	GBA43R/L 175MY	1.75	3.5	0.2		●			●	●			KGBAR/L...22-15 KGBASR/L...22-15	G9 G11 G43
	185-020MY	185MY	1.85				●			●	●				
	200-020MY	200MY	2.00				●			●	●				
	230-020MY	230MY	2.30				●			●	●				
	250-030MY	GBA43R/L 250MY	2.50	4.0	0.3		●			●				KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	250-030MY	-	2.50	5.0							●			KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	265-030MY	GBA43R/L 265MY	2.65	4.0			●			●				KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	265-030MY	-	2.65	5.0							●			KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	300-030MY	GBA43R/L 300MY	3.00	4.0			●			●				KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	300-030MY	-	3.00	5.0							●			KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	330-030MY	GBA43R/L 330MY	3.30	4.0			R			R				KGBAR...22-25 KGBASL...22-25 KGBAR...22-25T5 KGBASL...22-25T5	
	330-030MY	-	3.30	5.0							●			KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	350-030MY	GBA43R/L 350MY	3.50	5.0			●			●	●			KGBAR/L...22-35 KGBASR/L...22-35	
	400-040MY	400MY	4.00		0.4		●			●	●				

• Dimension B: shows available grooving depth.

• For KIGBA type Internal Grooving Toolholder, See page **G43**

For recommended cutting conditions, see page G72

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

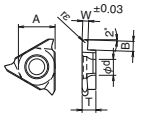
Applicable Inserts

(mm)

Description	A	T	ød
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

P	Carbon Steel / Alloy Steel	◯ ●
M	Stainless Steel	◯ ●
K	Cast Iron	● ●
N	Non-ferrous Metals	●
S	Titanium Alloy	●
H	Hard materials (under 40HRC)	◯ ●
	Hard materials (over 40HRC)	

Classification of usage
●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
◯: Continuous / 2nd Choice

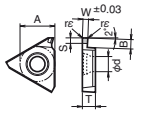
Insert (R-hand shown)	Description	(Previous Description)	W	B	rε	TC40	TN6020	TN90	PR630	PR930	PR1115	PR905	KW10	Applicable Toolholder	Reference Page for Toolholder
 Full-R  	GBA32R/L 200-100R	-	2.00	2.5	1.00						R			KGBAR...16 KGBASL...16	G9 G11 G43
	300-150R		3.00		1.50						R				
	GBA43R/L 100-050R	GBA43R/L 050R	1.00	2.0	0.50			●	◯	●	●	●	●	KGBAR/L...22-15 KGBASR/L...22-15	
	150-075R	075R	1.50	3.5	0.75			●	◯	●	●	●	●		
	200-100R	100R	2.00		1.00			●	◯	●	●	●	●		
	250-125R	125R	2.50	4.0	1.25			●	◯	●	●	●	●	KGBAR/L...22-25 KGBASR/L...22-25	
	300-150R	150R	3.00		1.50			●	◯	●	●	●	●	KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	400-200R	200R	4.00	5.0	2.00			●	◯	●	●	●	●	KGBAR/L...22-35 KGBASR/L...22-35	

(mm)

Description	A	T	ød
GBA32_	9.525	3.18	4.4
GBA43_	12.70	4.76	5.5
GBA43R/L480	12.70	5.00	5.5

P	Carbon Steel / Alloy Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metals	●
S	Titanium Alloy	●
H	Hard materials (under 40HRC)	
	Hard materials (over 40HRC)	◯ ●

Classification of usage
●: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
●: Continuous / 2nd Choice

Insert (R-hand shown)	Description	(Previous Description)	W	B	rε	KBN10B	KBN510	KBN525	KPD001	KPD010	Applicable Toolholder	Reference Page for Toolholder
 1-Edge  GBA32 S=1.7 GBA43 S=1.9	GBA32R/L 125-010	GBA32R/L 125	1.25	2.0	0.1					R	KGBAR...16 KGBASL...16	G9 G11 G43
	150-010	150	1.50						R	R		
	GBA43R/L 125-010	GBA43R/L 125	1.25	2.0	0.1					●		
	125-020	125			0.2	●	●	●				
	150-010	150	1.50	3.5	0.1				●	●	KGBAR/L...22-15 KGBASR/L...22-15	
	150-020	150			0.2	●	●	●				
	200-010	200	2.00		0.1				●	●		
	200-020	200			0.2	●	●	●				
	250-010	250	2.50	4.0	0.1				●	●	KGBAR/L...22-25 KGBASR/L...22-25 KGBAR/L...22-25T5 KGBASR/L...22-25T5	
	250-020	250			0.2	●	●	●				
	300-010	300	3.00		0.1				●	●		
	300-020	300			0.2	●	●	●				

• Dimension B: shows available grooving depth.
• For KIGBA Internal Grooving Toolholder, See page **G43**

For recommended cutting conditions, see page ➡ **G72**

GBA applicable for KGBA / KGBAS toolholders are also usable for KGB / KGBS toolholders.

The following is a table for application compatibility.

KGBA	(KGB)
KGBAR/L ...22-15	KGBR/L ...22-15
KGBAR/L ...22-25	KGBR/L ...22-25
KGBAR/L ...22-35	KGBR/L ...22-35
KGBAR/L ...22-25T5	KGBR/L ...22-25 (Available grooving depth has a limit)

KGBAS	(KGBS)
KGBASR/L ...22-15	KGBSR/L ...22-15
KGBASR/L ...22-25	KGBSR/L ...22-25
KGBASR/L ...22-35	KGBSR/L ...22-35
KGBASR/L ...22-25T5	KGBSR/L ...22-25 (Available grooving depth has a limit)

• Short shank type is not available for KGB / KGBS.

External Grooving Toolholders KGBA Short Shank types are available

For NC lathe and HSK tooling, KGBAR2020K22-◯◯ (Overall length 125mm)
short shank type KGBAR2020H22-◯◯ (Overall length 100mm) is available.
No longer required for the users to cut the shank portion.

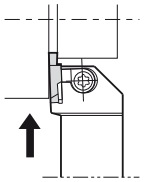
Inserts are sold in 10 piece boxes.

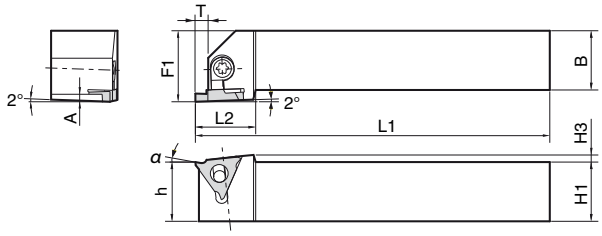
CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item ◯ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Shallow Grooving Toolholders

KGBA

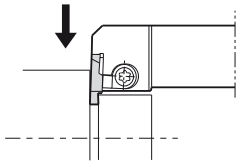


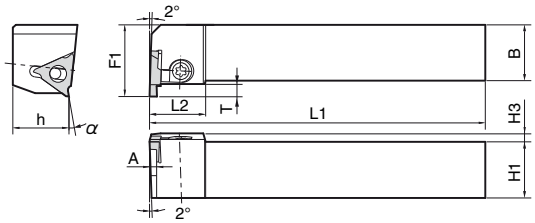


• Right-hand shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

KGBAS





• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	A	T	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts
KGBA R/L	1616H-16	●	●	16	4.0	16	100	24	20	-	2.5	LGBA-16 R/LS	FT-15	GBA32 R/L type
	2020K-16	●	●	20	4.0	20	125	24	25	-	2.5			
	2525M-16	●	●	25		25	150		30					
	2020K22-15	●	●	20	4.0	20	125	25.5	25	1.0	4.0	LGBA-22 R/LS		GBA43 R/L type
	2525M22-15	●	●	25		25	150		30					
	2020K22-25	●	●	20	4.0	20	125	25.5	25	2.0	4.5			
	2525M22-25	●	●	25		25	150		30					
	2020K22-25T5	●	●	20	4.0	20	125	25.5	25	2.0	5.5			
	2525M22-25T5	●	●	25		25	150		30					
	2020K22-35	●	●	20	4.0	20	125	25.5	25	3.0				
	2525M22-35	●	●	25		25	150		30					
	2020H22-15*	●		20	4.0	20	100	25.5	25	1.0	4.0			
	2020H22-25*	●								2.0	4.5			
	2020H22-35*	●								3.0	5.5			
KGBAS R/L	2020K-16	●	●	20	4.0	20	125	25	25	-	2.5	LGBA-16 L/RS	FT-15	GBA32 L/R type
	2525M-16	●	●	25	4.5	25	150		30					
	2020K22-15	●	●	20	4.5	20	125	25	27	1.0	4.0	LGBA-22 L/RS		GBA43 L/R type
	2525M22-15	●	●	25	5.0	25	150		32					
	2020K22-25	●	●	20	4.5	20	125	25	27	2.0	4.5			
	2525M22-25	●	●	25	5.0	25	150		32					
	2020K22-25T5	●	●	20	4.5	20	125	25	27	2.0	5.5			
	2525M22-25T5	●	●	25	5.0	25	150		32					
	2020K22-35	●	●	20	4.5	20	125	25	27	3.0				
	2525M22-35	●	●	25	5.0	25	150		32					

• Dimension T shows the distance from the Toolholder to the cutting edge. Dimension B shows available grooving depth.

∗ 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.

Rake Angle (α) after Installment of GBA

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°	TN90 PR630 PR930 PR1115 PR905 KPD001, KPD010	0°	KBN510, KBN525	10°	TN90 PR630 PR930 PR1115 PR905	050R~150R
		10°	TC40, TN90 PR630 PR930 PR1115 PR905 KPD001, KPD010	14°	TN90 PR630 PR930 PR1115 PR905	200R
20°	KW10	20°	KW10		KW10	050R~200R

Rake Angle (α) after Installment of GBA-MY

α	Description
15°	GBA43 R/L175MY ⟆ GBA43 R/L350MY
14°	GBA43 R/L400MY

α indicates the rake angle at the center of the edge width, after installing insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Grooving Inserts

[GB insert changes to GBA (G6-G8).]

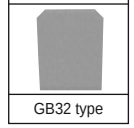
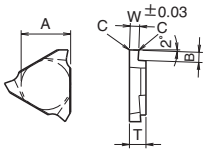
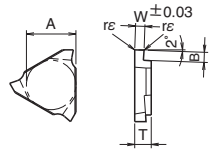
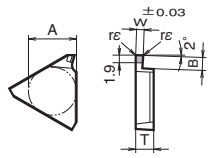
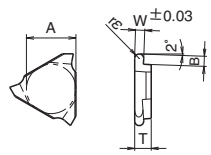
Applicable Inserts

(mm)

Description	A	T
GB32_	9.525	3.18
GB43_	12.70	4.76
GB43R/L480	12.70	5.00

P	Carbon Steel / Alloy Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metals	
S	Titanium Alloy	
H	Hard materials (under 40HRC)	
	Hard materials (over 40HRC)	

Classification of usage
◕: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

Insert (Right-hand Shown)	Description	Dimension (mm) W	B	C or rε	Cermet TC40	Cermet TC60	PVD Coated Carbide PR630	PVD Coated Carbide PR930	Carbide KW10	Diamond KPD001	Diamond KPD010	Applicable Toolholder	Ref. Page for Toolholder
General (Square) (Corner is C shape) GB32 type  (Corner is C shape) 	GB32R/L 050 *	0.50	1.0	C0.05		○	R					KGBR/L ···16 KGBSR/L ···16	G11
	GB32R/L 075	0.75	2.0	C0.10		○	R						
	GB32R/L 095	0.95				○	R						
	GB32R/L 100	1.00				○	○						
	GB32R/L 125	1.25				○	R						
	GB32R/L 145	1.45				○	R						
	GB32R/L 150	1.50				○	R						
	GB32R/L 200	2.00	2.5			○	R						
	GB32R/L 250	2.50				○	R						
General (Square) (Corner is R shape) GB43 type   GB type insert changes to GBA type in order. When replacing with GBA Insert, be careful for the Corner-R(rε) specification.	GB43R/L 125	1.25	2.0	0.1	○	○	○	○				KGBR/L ···22-15 KGBSR/L ···22-15	
	GB43R/L 125			0.2									
	GB43R/L 145	1.45	2.0	0.2	○	○	R						
	GB43R/L 150	1.50	3.5	0.1				○					
	GB43R/L 150			0.2	○	○	○						
	GB43R/L 175	1.75		0.2	○	○	R						
	GB43R/L 185	1.85		0.2	○	○	R						
	GB43R/L 200	2.00		0.1				○					
	GB43R/L 200			0.2	○	○	○						
	GB43R/L 230	2.30		0.2	○	○	R						
	GB43R/L 250	2.50	4.0	0.1				○				KGBR/L ···22-25 KGBSR/L ···22-25	
	GB43R/L 250			0.3	○	○	○						
	GB43R/L 265	2.65		0.3	○	○	R						
	GB43R/L 280	2.80		0.3	○	○	R						
	GB43R/L 300	3.00		0.1				○					
	GB43R/L 300			0.3	○	○	○						
	GB43R/L 330	3.30		0.3	○	○	R						
	GB43R/L 350	3.50	5.0	0.1				○				KGBR/L ···22-35 KGBSR/L ···22-35	
	GB43R/L 350			0.3	○	○	○						
	GB43R/L 400	4.00		0.1				○					
	GB43R/L 400			0.4	○	○	○						
	GB43R/L 430	4.30		0.4	○	○	R						
	GB43R/L 450	4.50		0.4	○	○	○						
	GB43R/L 480	4.80		0.4	○	○	○						
1-Edge  	GB43R/L 125	1.25	2.0	0.1							◔	KGBR/L ···22-15 KGBSR/L ···22-15	
	GB43R/L 150	1.50	3.5								◔		
	GB43R/L 200	2.00									◔		
	GB43R/L 250	2.50	4.0								◔	KGBR/L ···22-25 KGBSR/L ···22-25	
	GB43R/L 300	3.00									◔		
Full-R  	GB43R/L 050R	1.00	2.0	0.50		○	○					KGBR/L ···22-15 KGBSR/L ···22-15	
	GB43R/L 075R	1.50	3.5	0.75		○	○						
	GB43R/L 100R	2.00		1.00		○	○						
	GB43R/L 125R	2.50	4.0	1.25		○	○					KGBR/L ···22-25 KGBSR/L ···22-25	
	GB43R/L 150R	3.00		1.50		○	○						
	GB43R/L 200R	4.00	5.0	2.00		○	○					KGBR/L ···22-35 KGBSR/L ···22-35	

• Dimension B shows available grooving depth.

The edge width tolerance of GB32R/L050 is different.$0.50^{+0.05}_{-0}$ (*)

For recommended cutting conditions, see page ➡ G72

* Material selection standard when changing to GBA.

GB Insert ➡	GBA Insert
TC40	TC40
TC60	TN90
PR630	PR1115 (PR630)
PR930	PR1115 (PR930)
KPD010	KPD001 (KPD010)

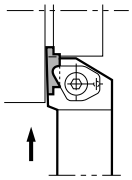
* Check the cornner-R(rε) of the insert when changing.

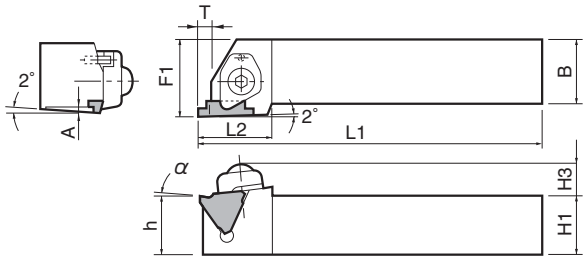
Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KGB (Changes to KGBA ➡ G9)

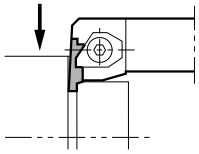


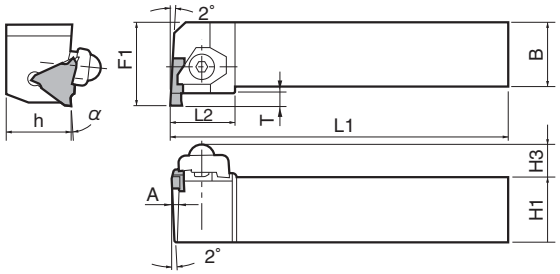


● Right-hand shown

R-hand insert for R-hand toolholder, L-hand insert for L-hand toolholder.

KGBS (Changes to KGBAS ➡ G9)





● Right-hand shown

L-hand insert for R-hand toolholder, R-hand insert for L-hand toolholder.

Toolholder Dimensions

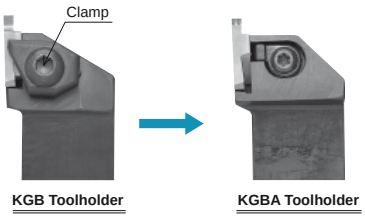
Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	A	T	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench	Applicable Inserts ➡ G6~G8 ➡ G10
KGB$^{R}_{L}$	2020K-16	●	●	20	11	20	125	24	25	-	2.5	CGB$^{R}_{L}$	BH6X25	SP-6	LW-4	GB32$^{R}_{L}$ GBA32$^{R}_{L}$
	2525M-16	●	●	25		25	150		30							
	2020K22-15	●	●	20	11.5	20	125	25.5	25	1.0	4.0					GB43$^{R}_{L}$ GBA43$^{R}_{L}$
	2525M22-15	●	●	25		25	150		30							
	2020K22-25	●	●	20	11.5	20	125	25.5	25	2.0	4.5					
	2525M22-25	●	●	25		25	150		30							
	2020K22-35	●	●	20	11.5	20	125	25.5	25	3.0	5.5					
	2525M22-35	●	●	25		25	150		30							
KGBS$^{R}_{L}$	2020K-16	●	●	20	11	20	125	25	25	-	2.5	CGB$^{L}_{R}$	BH6X25	SP-6	LW-4	GB32$^{L}_{R}$ GBA32$^{L}_{R}$
	2525M-16	●	●	25		25	150		30							
	2020K22-15	●	●	20	11.5	20	125	25	27	1.0	4.0					GB43$^{L}_{R}$ GBA43$^{L}_{R}$
	2525M22-15	●	●	25		25	150		32							
	2020K22-25	●	●	20	11.5	20	125	25	27	2.0	4.5					
	2525M22-25	●	●	25		25	150		32							
	2020K22-35	●	●	20	11.5	20	125	25	27	3.0	5.5					
	2525M22-35	●	●	25		25	150		32							

• Dimension T shows the distance from the Toolholder to the cutting edge. Dimension B shows available grooving depth.

Clamp: KGB$^{R}_{L}$ ... CGBR for Right-hand Toolholder, and CGBL for Left-hand Toolholder.
KGBS$^{R}_{L}$ ... CGBR for Right-hand Toolholder, and CGBL for Left-hand Toolholder.

Rake Angle (α) after Installment of GBA

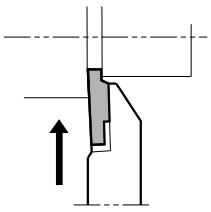
GB32$^{R}_{L}$ ○○○		GB43$^{R}_{L}$ ○○○		GBA43$^{R}_{L}$ ○○○ R (Full-R)	
α	Insert Grades	α	Insert Grades	α	Insert Grades
5°	TC60 PR630	5°	TC40 TC60 PR630 PR930	5°	TC60 PR630 } 050R~150R
20°	KW10	10°	KPD010	14°	TC60 PR630 } 200R KW10…050R~200R
		20°	KW10		

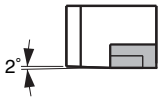


* KGB / KGBS toolholder changes to KGBA / KGBAS. Better Chip flow.
* For applicable insert, GB insert changes to GBA. GBA insert has various types of material available for user's cutting condition requirements.

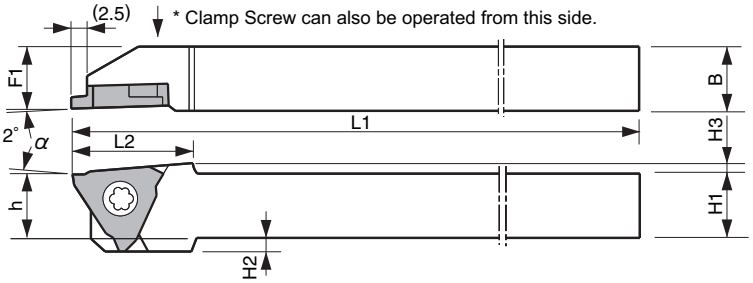
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KTGF-F (Without Offset)





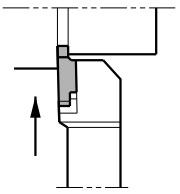
α	Insert Grades
20°	TN90, TC60 PR1115, PR930, KW10
11°	KPD010, KPD001
6°	TC40

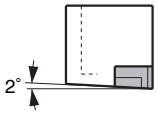


● Right-hand shown

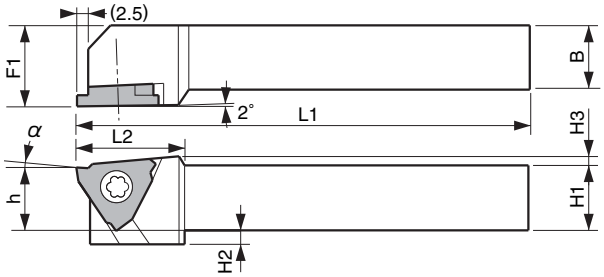
R-hand insert for R-hand toolholder, L-hand insert for L-hand toolholder.

KTGF (With Offset)





α	Insert Grades
20°	TN90, TC60 PR1115, PR930, KW10
11°	KPD010, KPD001
6°	TC40



● Right-hand shown

R-hand insert for R-hand toolholder, L-hand insert for L-hand toolholder.

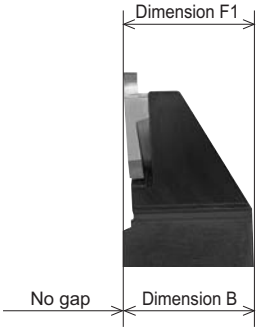
Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	Spare Parts: Clamp Screw	Spare Parts: Wrench
KTGF R/L	1010K-16F	●	●	10	2	2.5	10	125	18.5	10	SB-4070TRW	FT-8
	1212F-16F	●		12	-		12	85		12		
	1212M-16F	●	●					150				
	1616M-16F	●	●	16			16	150		16		
KTGF R/L	1010F-16	●	●	10	4	2.5	10	80	18.5	12	SB-4070TRS	FT-10
	1212H-16	●	●	12	2		12	100		16		
	1616H-16	●	●	16	-		16	100		20		
	2,020K-16	●	●	20			20	125	20	25		
	2525M-16	●	●	25			25	150		32		

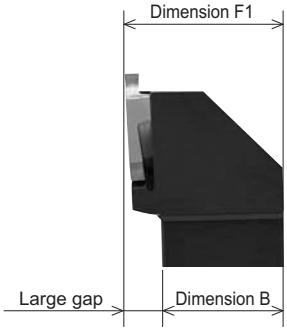
Usage difference between KTGF-F and KTGF toolholders

Q: What is the difference between “Without Offset” and “With Offset” of KTGF toolholders for external grooving?

A: When operating the automatic lathe, the toolholder come 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 F1 dimensions as shown below.
It is necessary to use “Without Offset” in such cases.



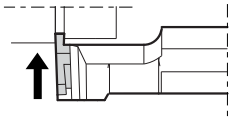
Without Offset Type (KTGF-F)

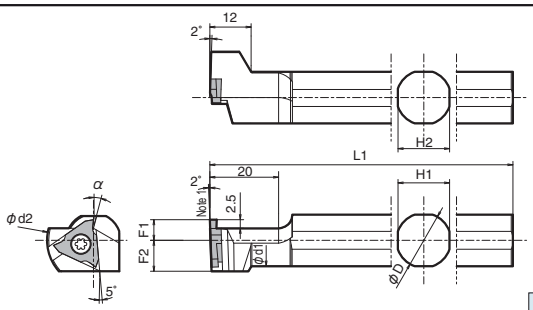


With Offset Type (KTGF)

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

S-KTGF (Sleeve Holder)





α	Insert Grades
20°	TN90, TC60 PR1115, PR930, KW10
11°	KPD010, KPD001
6°	TC40

● Left-hand shown

R-hand Insert for L-hand Toolholder.

Note 1. Dimension B shows available grooving depth.

Toolholder Dimensions

Description	Std.	Dimension (mm)							Spare Parts	
									Clamp Screw	Wrench
		øD	L1	F1	F2	ød1	ød2	H1=H2		
S12F-KTGFL16	●	12.0	80	6	9.0	11.0	27	11	SB-4070TRS	FT-10
S14H-KTGFL16	●	14.0	100			13.0		13		
S15F-KTGFL16	●	15.875	85			14.6		15		
S16F-KTGFL16	●	16.0								
S19G-KTGFL16	●	19.05	90		10.5	17.6		17		
S19K-KTGFL16	●		120							
S20G-KTGFL16	●	20.0	90		11.0	18.6		18		
S20K-KTGFL16	●		120							
S25.0H-KTGFL16	●	25.0	100	10	14.0	23.6	32	23		
S25K-KTGFL16	●	25.4	120							

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

(mm)

Description	A	T	ød
TGF32_	9.525	3.18	4.5
TGF32R/L325	9.525	3.40	4.5
TGF32R/L315-SRC	9.525	3.40	4.5

P	Carbon Steel / Alloy Steel						◔	●				
M	Stainless Steel						◔	●				
K	Cast Iron								●			
N	Non-ferrous Metals								●	●		
S	Titanium Alloy								●	●		
H	Hard materials (under 40HRC)						○	●				
	Hard materials (over 40HRC)											

Classification of usage
- ● : Continuous-Light Interruption / 1st Choice
- ◔ : Continuous-Light Interruption / 2nd Choice
- ● : Continuous / 1st Choice
- ○ : Continuous / 2nd Choice

Insert (R-hand shown)		Description	Dimension (mm) W	B	C or rε	Cermet TN60	TN90	TC40	TC60	PVD Coated Carbide PR630	PR930	PR1115	Carbide KW10	PCD KPD001	KPD010	Applicable Toolholder	Ref. Page for Toolholder
General (Square) (Corner is C shape) TGF32R/L ○○○	TGF32R/L○○○-S type Edge Width Tolerance W+0.12 +0.06	TGF32R/L033	0.33	0.8	C0.05						R		●			KTGFR/L…16F KTGFR/L…16 S…KTGFL16	G12 G13
		050	0.50	1.2		●	R				●		●				
		060	0.60			●											
		075	0.75	2.0	C0.1		●				●		●				
		080	0.80			●											
		090	0.90			●											
		095	0.95				R				●		●				
		100	1.00			●	●				●		●				
		120	1.20			●					●						
		125	1.25				●				●		●				
		130	1.30			●											
		140	1.40			●					●						
		145	1.45				R				●		●				
		150	1.50			●	R				●		●				
		170	1.70			●											
		175	1.75				R				●		●				
		185	1.85	2.5							●						
		190	1.90			●											
		200	2.00			●	R				●		●				
		225	2.25			●											
		250	2.50			●	R				●		●				
		275	2.75	3.0	0.2	●					●						
		300	3.00			●					●						
		325	3.25			●					●						
General (Square) (Corner is R shape) TGF32R/L ○○○ - ○○○		TGF32R/L033-005	0.33	0.8	0.05			R			R	R	R				
		050-005	0.50	1.2				R			●	●	R				
		075-010	0.75	2.0	0.1			R			●	●	R				
		095-010	0.95					R			●	●	R				
		100-010	1.00					R			●	●	R				
		125-010	1.25					R			●	●	R				
		145-010	1.45					R			●	●	R				
		150-010	1.50					R			●	●	R				
		175-010	1.75					R			●	●	R				
		200-010	2.00	2.5				R			●	●	R				
		250-010	2.50					R			●	●	R				
	TGF32R/L○○○-SRG type Edge Width Tolerance W+0 -0.05 For Circlip Grooves (DIN 471 / 472)	TGF32R/LS090-S	0.90	2.0	C0.05	●											
		110-S	1.10			●											
		130-S	1.30			●											
		160-S	1.60			●											
		185-S	1.85	2.5		●											
		TGF32R/LS080-SRG	0.87	2.0	rε max 0.03	●											
		090-SRG	0.97			●											
		100-SRG	1.07			●											
		110-SRG	1.24			●											
		130-SRG	1.44			●											
		160-SRG	1.74			●											
		185-SRG	1.99	2.5		●											
		215-SRG	2.29			●											
		265-SRG	2.79	3.0		●											
		315-SRG	3.29			●											
1-Edge	125~150 S=1.7 200 S=1.9	TGF32R/L125	1.25	2.0	C0.1									R	R		
		150	1.50											R	R		
		200	2.00	2.5										R	R		
		TGF32R/L125-010	1.25	2.0	0.1									R			
		150-010	1.50											R			
		200-010	2.00	2.5										R			

• Dimension B shows available grooving depth.

For recommended cutting conditions, see page G73

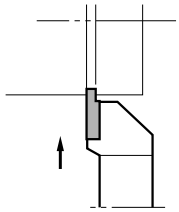
Inserts are sold in 10 piece boxes.

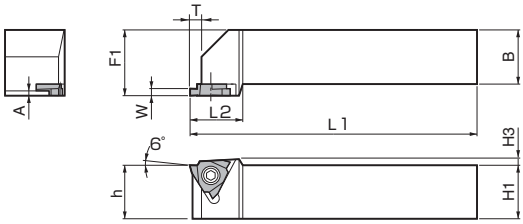
CBN & PCD Inserts are sold in 1 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Shallow Grooving Toolholders [TG Insert]

KTG (Changes to KGBA ➡ G9)





• Right-hand shown

R-hand insert for R-hand toolholder, L-hand insert for L-hand toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	A	T	Spare Parts: Clamp Screw	Clamp Screw	Wrench	Wrench
KTG$^{R}_{L}$	2020K-16	●	●	20	3.0	20	125	20	25	-	2.5	SB-4TR	-	FT-15	-
	2525M-16	●	●	25		25	150		30						
	2020K22-15	●	●	20	3.0	20	125	25	25	1.0	4.0	-	GS-50	-	LW-3
	2525M22-15	●	●	25		25	150		30						
	2020K22-25	●	●	20	3.0	20	125	25	25	2.0	4.5				
	2525M22-25	●	●	25		25	150		30						
	2020K22-35	●	●	20	3.0	20	125	25	25	3.0	5.5				
	2525M22-35	●	●	25		25	150		30						

• Dimension T shows the distance from the Toolholder to the cutting edge. Dimension B shows available grooving depth.

* GBA Insert cannot be installed to this toolholder.

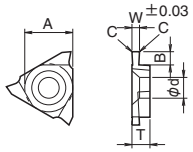
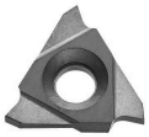
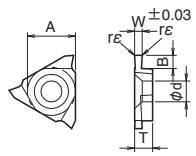
Applicable Inserts

(TG insert changes to GBA ➡ G6~➡ G8)

(mm)

Description	A	T	ød
TG32_	9.525	3.18	4.5
TG43_	12.75	4.76	5.5

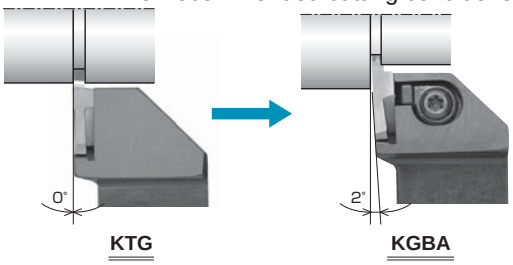
P	Carbon Steel / Alloy Steel	Classification of usage
M	Stainless Steel	
K	Cast Iron	◕: Continuous-Light Interruption / 1st Choice
N	Non-ferrous Metals	◔: Continuous-Light Interruption / 2nd Choice
S	Titanium Alloy	●: Continuous / 1st Choice
H	Hard materials (under 40HRC)	○: Continuous / 2nd Choice
	Hard materials (over 40HRC)	

Insert (R-hand shown)		Description		Dimension (mm) W	B	C or rε	Cermet TN60	TN90	TC40	TC60	Applicable Toolholder	Ref. Page for Toolholder
General (Square) (Corner is C shape) TG32 type	 (Corner is C shape)	TG32$^{R}_{L}$	075	0.75	2.0	C0.1	●				KTG$^{R}_{L}$...16	G15
			095	0.95			●					
			125	1.25			●					
			145	1.45			●					
			150	1.50			●					
			175	1.75			●					
			200	2.00			●					
 General (Square) (Corner is R shape) TG43 type		TG43$^{R}_{L}$	150	1.50	3.5	0.2	●				KTG$^{R}_{L}$...22-15	G15
			175	1.75			●					
			200	2.00			●					
			230	2.30			●					
			250	2.50	4.0	0.3	●				KTG$^{R}_{L}$...22-25	
			265	2.65			●					
			280	2.80			●					
			300	3.00			●					
			330	3.30			●					
			350	3.50	5.0		●				KTG$^{R}_{L}$...22-35	
			400	4.00		0.4	●					
			430	4.30			●					
			450	4.50			●					

• Dimension B shows available grooving depth.

For recommended cutting conditions, see page ➡ G73

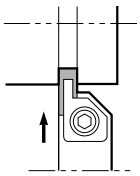
* KTG will be switched to KGBA.
  Machining against the wall is available.
* For applicable insert, TG insert changes to GBA.
  Change Insert Grade TN60 for TN90.
  GBA insert has various types of material available for user's cutting condition requirements.
* Check the cornner-R(rε) of the insert when changing.

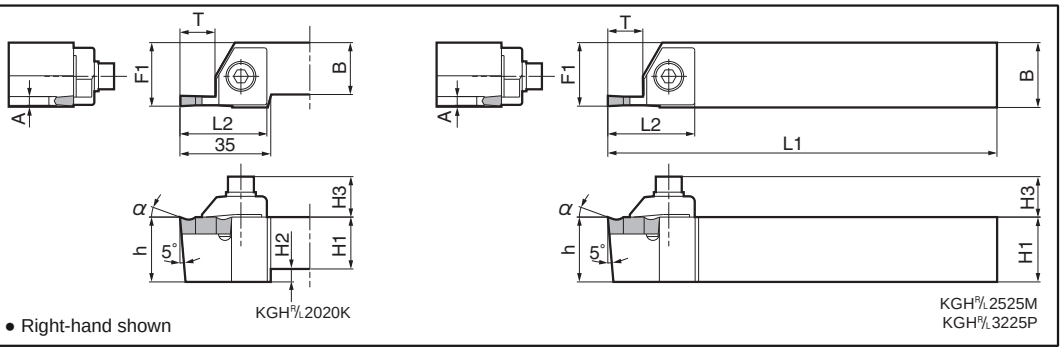


● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

KGH

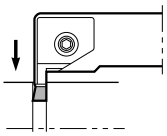


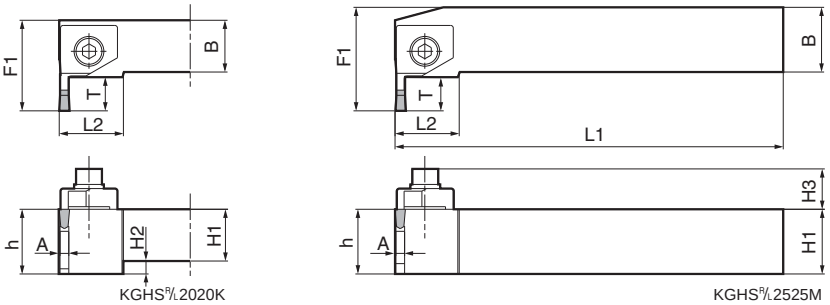


KGH R/L 2020K
KGH R/L 2525M
KGH R/L 3225P

● Right-hand shown

KGHS

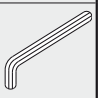




KGHS R/L 2020K
KGHS R/L 2525M

● Right-hand shown

● Toolholder Dimensions

Description		Std.		Dimension (mm)									Spare Parts				
													Clamp	Clamp Bolt	Washer	Spring	Wrench
		R	L	H1=h	H2	H3	B	L1	L2	F1	A	T					
KGH R/L	**2020K-4**	●	●	20	5	15.6	20	125	33.5	24.5-24.8	3.4	13	CGH-1 R/L	HH6X25	W-6	SP-6	LW-5
	2525M-4	●	●	25	-		25	150		24.5-24.8							
	2020K-5	●	●	20	5	15.6	20	125	33.5	25.0-25.8	4.2	13	CGH-1 R/L				
	2525M-5	●	●	25	-		25	150		25.0-25.8							
	3225P-5	●	●	32	-		25	170		25.0-25.8							
	2020K-7	●	●	20	5	15.6	20	125	33.5	24.5-25.0	5.8	13	CGH-2 R/L				
	2525M-7	●	●	25	-		25	150		24.5-25.0							
	2525M-10	●	●	25	-	16.1	25	150	41	25.5-26.5	9.0	17	CGH-3 R/L				
	3225P-10	●		32	-		25	170		25.5-26.5							
KGHS R/L	**2020K-4**	●	●	20	5	15.6	20	125	25	35	3.4	13	CGH-1 L/R	HH6X25	W-6	SP-6	LW-5
	2525M-4	●	●	25	-		25	150		40							
	2020K-5	●	●	20	5	15.6	20	125	25	35	4.2	13	CGH-1 L/R				
	2525M-5	●	●	25	-		25	150		40							
	2525M-7	●	●	25	-	15.6	25	150	25	40	5.8	13	CGH-2 L/R				

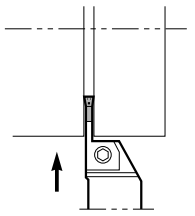
• Dimension T shows available grooving depth.
• Dimension F1 of KGH R/L Toolholder depends on the insert's edge width.
• Clamp: KGH R/L ... CGH- ○ R for Right-hand Toolholder, and CGH- ○ L for Left-hand Toolholder.
KGHS R/L ... CGH- ○ L for Right-hand Toolholder, and CGH- ○ R for Left-hand Toolholder.

● Rake Angle (α) after Installment of GH / GHU insert

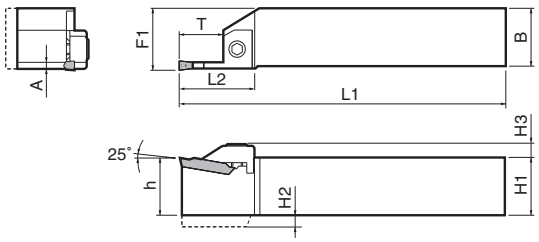
GH ○○○○ - ○○		GHU ○○○○	
α	Insert Grades	α	Insert Grades
0°	A65, A66N	10°	TN60 CR9025
10°	TC40		
20°	TN90, TC60 PR630, PR930 KW10		

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KGA



• Right-hand shown



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench
KGA R/L	2020K-3	●	●	20	5	6	20	125	37	21.5	2.3	20	CGA-3 R/L	HH6X20	SP-6	LW-5
	2525M-3	●	●	25	-		25	150		26.5						
	2020K-4	●		20	5	6	20	125	37	21.5	3.3	20	CGA-4 R/L			
	2525M-4	●	●	25	-		25	150		26.5						
	2020K-5	●		20	5	6	20	125	42	21.5	4.3	25	CGA-5 R/L			
	2525M-5	●	●	25	-		25	150		26.5						
KGA R/L	2020K-3S	●		20	5	6	20	125	34	21.5	2.3	16	CGA-3 R/L	HH6X20	SP-6	LW-5
	2525M-3S	●	●	25	-		25	150		26.5						
	2020K-4S	●		20	5	6	20	125	34	21.5	3.3	16	CGA-3 R/L			
	2525M-4S	●	●	25	-		25	150		26.5						

• Dimension T shows available grooving depth.
• Clamp: CGA-○ R for Right-hand Toolholder, and CGA-○ L for Left-hand Toolholder.

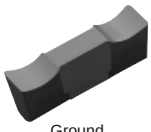
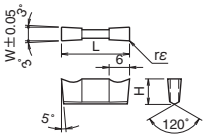
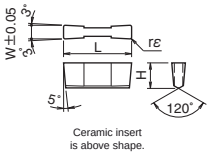
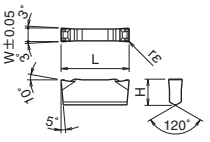
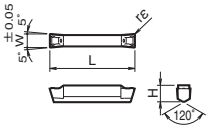
Applicable Inserts

(mm)

Description	L	H
GH4020-○○ ~GH8020-○○	20	7.5
GH10025-05~GH12025-05	25	
GHU ○○○○	20	
GA30, GA40	25	5.0
GA50	30	

P	Carbon Steel / Alloy Steel	◕
M	Stainless Steel	◕
K	Cast Iron	◕ ○ ●
N	Non-ferrous Metals	◕
S	Titanium Alloy	◕
H	Hard materials (under 40HRC)	●
	Hard materials (over 40HRC)	○ ●

Classification of usage
◕: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

Insert		Description		Dimension (mm) W	rε	Cermet TN60	Cermet TN90	Cermet TC40	Cermet TC60	CVD Coated Carbide CR9025	PVD Coated Carbide PR630	PVD Coated Carbide PR930	Carbide KW10	Ceramic A65	Ceramic A66N	Ceramic PT600M	Applicable Toolholder	Ref. Page for Toolholder
 Ground Chipbreaker		GH	4020-02	4.0	0.2		●	●				●	●				KGH R/L...4	G16
			4020-05		0.5		●	●				●	●	●	●	●		
			4520-02	4.5	0.2			●									KGHS R/L...4	
			4520-05		0.5			●										
			5020-02	5.0	0.2		●	●				●	●					
			5020-05		0.5		●	●				●	●	●	●	●		
			5520-02	5.5	0.2			●										
			5520-05		0.5			●									KGH R/L...5	
			6020-02	6.0	0.2		●	●				●	●				KGHS R/L...5	
			6020-05		0.5		●	●				●	●	●		●		
			6520-02	6.5	0.2			●										
			6520-05		0.5			●										
 Ceramic	 Ceramic insert is above shape.		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	4020	4.0	0.25	●				●							KGH R/L...4 KGHS R/L...4	G16
			5020	5.0	0.30	●				●							KGH R/L...5 KGHS R/L...5	
			6020	6.0	0.30	●				●								
		GA	30	3.0	0.20	●				●							KGA R/L...3	G17
			40	4.0	0.25	●				●							KGA R/L...4	
			50	5.0	0.30	●				●							KGA R/L...5	

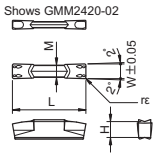
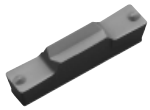
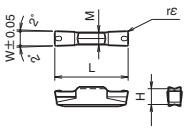
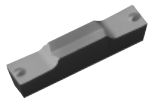
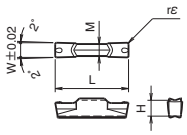
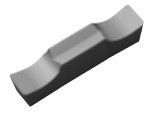
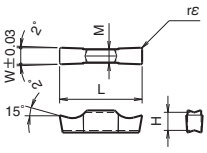
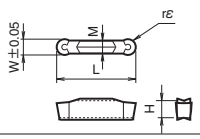
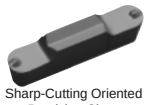
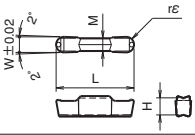
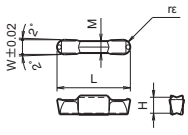
For recommended cutting conditions, see page G73~G74

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

GMM / GMG

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 Alloy						◕	
	H	Hard materials (under 40HRC)			○	●			
		Hard materials (over 40HRC)							

Insert (R-hand shown)		Description	(Previous Description)	W	rε	M	L	H	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	PVD Coated Carbide PR905	Carbide KW10	Ref. Page for Toolholder
 Chip Control Oriented M Class		GMM 2420-020MW	GMM 2420-02	2.4	0.2	1.9	20	4.3	●	●	●	●	●	●	G22 G23 G24
		3020-020MW	3020-02	3.0	0.2	2.3			●	●	●	●	●	●	
		3020-040MW	3020-04		0.4				●	●	●	●	●	●	
		4020-020MW	4020-02	4.0	0.2	3.3			●	●	●	●	●	●	
		4020-040MW	4020-04		0.4				●	●	●	●	●	●	
		4020-080MW	4020-08		0.8				●	●	●	●	●	●	
		5020-040MW	5020-04	5.0	0.4	4.2			●	●	●	●	●	●	
		5020-080MW	5020-08		0.8				●	●	●	●	●	●	G22 G23
		6020-040MW	6020-04	6.0	0.4	5.2			●	●	●	●	●	●	
		6020-080MW	6020-08		0.8				●	●	●	●	●	●	
		8030-080MW	8030-08	8.0	0.8	6.0	30	5.5		●	●	●	●	●	G23
 Sharp-Cutting Oriented M Class		GMM 3020-020MS	GMM 3020-02MS	3.0	0.2	2.3	20	4.3	●	●	●	●		●	G22 G23 G24
		3020-040MS	3020-04MS		0.4				●	●	●	●		●	
		4020-040MS	4020-04MS	4.0	0.4	3.3			●	●	●	●		●	
		5020-040MS	5020-04MS	5.0		4.2			●	●	●	●		●	
		6020-040MS	6020-04MS	6.0		5.2				●		●		●	G22, G23
 Sharp-Cutting Oriented Precision Class		GMG 3020-000MS	GMG 3020-00	3.0	0.0	2.3	20	4.3		●	●	●		●	G22 G23 G24
		3020-020MS	3020-02		0.2				●	●	●	●		●	
		3020-040MS	3020-04		0.4				●	●	●	●		●	
		4020-020MS	4020-02	4.0	0.2	3.3			●	●	●	●		●	
		4020-040MS	4020-04		0.4				●	●	●	●		●	
		4020-080MS	4020-08		0.8				●	●	●	●		●	
		5020-040MS	5020-04	5.0	0.4	4.2			●	●	●	●		●	
		5020-080MS	5020-08		0.8				●	●	●	●		●	
		6020-040MS	6020-04	6.0	0.4	5.2	20	4.3		●		●		●	G22
		6020-080MS	6020-08		0.8					●		●		●	G23
 Sharp-Cutting Oriented Precision Class Ground Chipbreaker		GMG 2520-030MG	GMG 2520-03MG	2.5	0.3	2.0	20	4.3	●	●	●	●	●	●	G22 G23 G24
		3020-030MG	3020-03MG	3.0		2.3			●	●	●	●	●	●	
		3520-030MG	3520-03MG	3.5		2.8			●	●	●	●	●	●	
		4020-040MG	4020-04MG	4.0	0.4	3.3			●	●	●	●	●	●	
		5020-040MG	5020-04MG	5.0		4.2			●	●	●	●	●	●	
		6020-040MG	6020-04MG	6.0		5.2			●	●		●	●	●	G22,G23
		8030-050MG	8030-05MG	8.0	0.5	6.0	30	5.5	●	●		●	●	●	G23
 Chip Control Oriented M Class Full-R / Copying		GMM 3020-150R	GMM 3020-15R	3.0	1.5	2.3	20	4.3	●	●	●	●	●	●	G22 G23 G24
		4020-200R	4020-20R	4.0	2.0	3.3			●	●	●	●	●	●	
		5020-250R	5020-25R	5.0	2.5	4.2			●	●	●	●	●	●	
		6020-300R	6020-30R	6.0	3.0	5.2			●	●	●	●	●	●	G22,G23
 Sharp-Cutting Oriented Precision Class Full-R / Copying		GMG 3020-150R	GMG 3020-15R	3.0	1.5	2.3	20	4.3	●	●		●		●	G22 G23 G24
		4020-200R	4020-20R	4.0	2.0	3.3			●	●		●		●	
		5020-250R	5020-25R	5.0	2.5	4.2				●		●		●	
		6020-300R	6020-30R	6.0	3.0	5.2				●		●		●	G22,G23
 Undercutting Chip Control Oriented		GMG 3020-150RU	GMG 3020-15RU	3.0	1.5	2.3	20	4.3		●		●		●	G24 G25
		4020-200RU	4020-20RU	4.0	2.0	3.3				●		●		●	
		5020-250RU	5020-25RU	5.0	2.5	4.2				●		●		●	

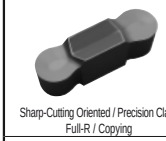
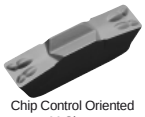
For recommended cutting conditions, see page ➔ G76~G77

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

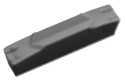
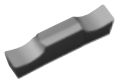
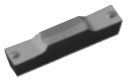
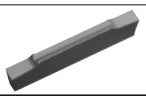
GMM / GMGA / FGG

Classification of usage							Ref. Page for Toolholder
◕: 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 Alloy					◕	
	H	Hard materials (under 40HRC)			○	●		
		Hard materials (over 40HRC)						

Insert (R-hand shown)	Description	(Previous Description)	Dimension (mm) W	rε	M	L	H	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	Carbide KW10	Ref. Page for Toolholder
 Sharp-Cutting Oriented / Precision Class Full-R / Copying	**GMGA 6020-300R**	**GMGA 6020-30R**	6.0	3.0	4.3	20	4.3					●	**G23**
 Sharp-Cutting Oriented / Precision Class Full-R / Copying	**GMGA 8030-400R**	**GMGA 8030-40R**	8.0	4.0	6.0	30	5.5					●	
 Chip Control Oriented M Class	**GMM 3014-04**	-	3.0	0.4	2.3	14	4.3	●	●	●	●	●	
 Chip Control Oriented / M Class Full-R / Copying	**GMM 3014-15R**	-	3.0	1.5	2.3	14	4.3	●	●		●	●	**G24**
 Undercutting Chip Control Oriented	**GMM 3014-15RU**	-	3.0	1.5	2.3	14	4.3		●		●	●	
 Face Grooving Chip Control Oriented Precision Class	**FGG R/L 3020-02** **4020-04** **5020-04**	-	3.0 4.0 5.0	0.2 0.4 0.4	2.3 3.3 4.2	20	4.3	● ● ●	● ● ●		● ● ●	● ● ●	**G24**

For recommended cutting conditions, see page ➡ **G76~G77**

Multi-Function Tool CERACUT Plunge & Turn Chipbreakers

Series	Shape	Features
GMM-MW		Excellent chip evacuation at Grooving, Traversing, Cut-Off.
GMG-MG		Low cutting force with ground chipbreaker.
GMG-MS GMM-MS		Grooving / Traversing / Cut-Off operations are minimum cutting force at Positive Edge.
GMM-MT		Small corner-R(rε) and minimize the core which remains in the center of the face.
GMM-TK		Large corner-R(rε) and stable performance at cut off.
GMM-NB		Flat rake face and non-chipbreaker. It works well for brass.

◆ Edge Preparation

Edge Preparation		
	Chamfer + R-honed Corner-R(rε) = 0.05	Chamfer + R-honed Sharp Corner
		
MT Chipbreaker.	**CR9025 / PR915**	**PR930 / KW10**
Edge Preparation	Chamfer + R-honed Corner-R(rε) = 0.2-0.3	Sharp Edge Corner-R(rε) = 0.2-0.3
		
TK Chipbreaker	**CR9025 / PR915**	**PR930 / KW10**
Edge Preparation	R Honing Corner-R(rε) = 0.05	Sharp Edge Sharp Corner
		
Without Chipbreaker (-NB)	**CR9025**	**PR930 / KW10**

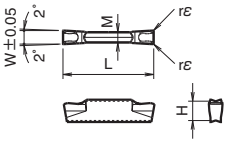
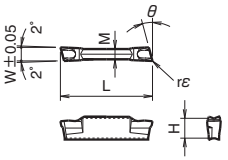
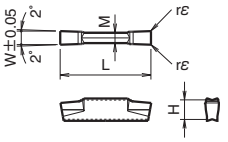
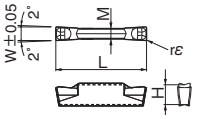
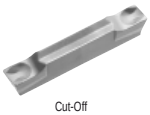
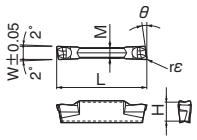
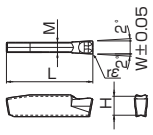
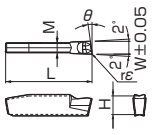
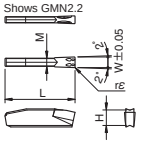
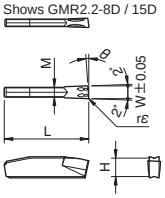
• Sharp Edge Spec. can reduce cutting resistance 40% less than that of chamfer edge.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

GMM / GMN

Classification of usage								
● : Continuous-Light Interruption / 1st Choice (●) : Continuous-Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Steel			(●)	●		G22 G23 G24
	M	Stainless Steel			●	(●)		
	K	Cast Iron					●	
	N	Non-ferrous Metals					●	
	S	Titanium Alloy					●	
	H	Hard materials (under 40HRC)			○	●		
		Hard materials (over 40HRC)						

Insert (R-hand shown)		Description	Dimension (mm) W	rε	M	L	H	Angle (°) θ	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	Carbide KW10
 Deep Grooving / Cut-Off Sharp-Cutting Oriented		GMM 1520-MT	1.5	0.0 0.05	1.2	20	4.3	-				●	●
		GMM 2020-MT	2.0	0.0 0.05	1.5	20	4.3	-			●	●	●
		GMM 2520-MT	2.5	0.0 0.05	1.9	20	4.3	-		●	●		
		GMM 3020-MT	3.0	0.0 0.05	2.3	20	4.3	-		●	●	●	●
 Cut-Off Sharp-Cutting Oriented / With lead angle		GMM 1520R/L-MT-15D	1.5	0.0 0.05	1.2	20	4.3	15°			R	●	●
		GMM 2020R/L-MT-15D	2.0	0.0 0.05	1.5	20	4.3	15°		●	R	●	●
		GMM 2520R/L-MT-15D	2.5	0.0 0.05	1.9	20	4.3	15°		●	R	●	●
		GMM 3020R/L-MT-15D	3.0	0.0 0.05	2.3	20	4.3	15°		●	R	●	●
 Deep Grooving / Cut-Off Sharp-Cutting Oriented Without Chipbreaker		GMM 1520-NB	1.5	0.0 0.05	1.2	20	4.3	-				●	●
		GMM 2020-NB	2.0	0.0 0.05	1.5	20	4.3	-		●		●	●
		GMM 2520-NB	2.5	0.0 0.05	1.9	20	4.3	-		●		●	●
		GMM 3020-NB	3.0	0.0 0.05	2.3	20	4.3	-		●		●	●
 Deep Grooving / Cut-Off Stability-Oriented		GMM 2020-TK 2520-TK 3020-TK	2.0 2.5 3.0	0.20 0.20 0.25	1.5 1.9 2.3	20	4.3	-		● ● ●	● ● ●	● ● ●	● ● ●
 Cut-Off Stability-Oriented / With lead angle		GMM 2020R/L-TK-8D 2520R/L-TK-8D 3020R/L-TK-8D	2.0 2.5 3.0	0.20 0.20 0.25	1.5 1.9 2.3	20	4.3	8°		R R	R R R	R R R	R R R
 Cut-Off / Stability-oriented 1-Edge		GMN 2-TK 3-TK 4-TK	2.0 3.0 4.0	0.20 0.25 0.30	1.8 2.3 3.3	20	4.3	-		● ●	● ● ●	● ● ●	● ● ●
 Cut-Off / Stability-oriented 1-Edge / With lead angle		GMR/L 2-TK-8D 3-TK-8D 4-TK-8D	2.0 3.0 4.0	0.20 0.25 0.30	1.8 2.3 3.3	20	4.3	8°		R R	R R R	R R R	R R R
 Deep Grooving / Cut-Off 1-Edge	 Shows GMN2.2	GMN 2.2 3 4 5 6	2.2 3.0 4.0 5.0 6.0	0.17 0.20 0.25 0.8 0.8	1.8 2.3 3.3 4.2 5.2	20	4.3	-	● ● ● ● ●	● ● ● ● ●		● ● ● ● ●	● ● ● ● ●
 Cut-Off / Sharp-Cutting 1-Edge / With lead angle	 Shows GMR2.2-8D / 15D	GMR/L 2.2-8D 2.2-15D 3-4D 3-15D 4-4D	2.2 2.2 3.0 3.0 4.0	0.17 0.00 0.20 0.20 0.25	1.8 1.8 2.3 2.3 3.3	20	4.3	8° 15° 4° 15° 4°	R R R	● ● ● ●		● ● ● R	● ● ●

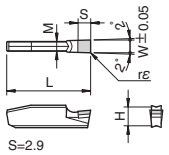
For recommended cutting conditions, see page ● G76

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

GMN

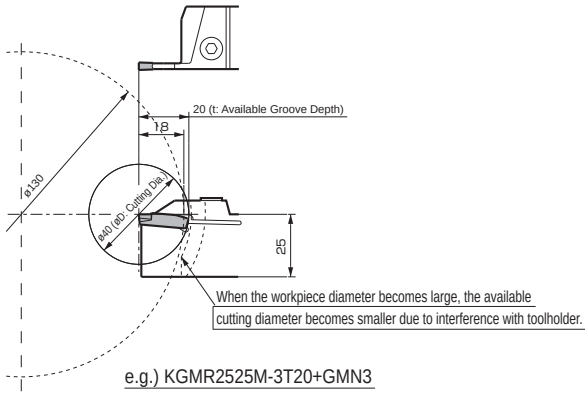
Classification of usage								
● : Continuous-Light Interruption / 1st Choice ◔ : Continuous-Light Interruption / 2nd Choice ● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel						
	M	Stainless Steel						
	K	Cast Iron						
	N	Non-ferrous Metals				●		
	S	Titanium Alloy				●		
	H	Hard materials (under 40HRC)						
		Hard materials (over 40HRC)		○	●			

Insert	Description	Dimension (mm)					Angle (°)	CBN			PCD		Ref. Page for Toolholder
		W	rε	M	L	H	θ	KBN10B	KBN510	KBN525	KPD001	KPD010	
 Deep Grooving 1-Edge	GMN 2	2.0	0.2	1.8	20	4.3	-	●	●	●	●	●	G22 G23 G24
			0.4										
 S=2.9	3	3.0	0.2	2.3							●	●	
			0.4					●	●	●			
	4	4.0	0.2	3.3							●	●	
			0.4					●	●	●			
	5	5.0	0.2	4.2							●	●	
			0.4					●	●	●			
	6	6.0	0.2	5.2								●	
			0.4					●	●	●			

For recommended cutting conditions, see page ➡ G74

Available cutting diameter of KGM (For automatic lathe) / KGM-T type

・There is a limit to available grooving depth depending on the workpiece diameter.



e.g.) KGMR2525M-3T20+GMN3

◆ KGM Available Cutting Diameter Table

Toolholder		øD (Cutting Dia.)																
KGM R/L	0810K-1.5-125	-	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	∞
	1010K-1.5-125	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212F-1.5-85 1212M-1.5-150	-	-	-	-	25	26	28	32	36	40	60	100					
	0810K-2-125	-	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	
	1010K-2-125	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212F-2-85 1212M-2-150	-	-	-	-	25	26	28	50	∞	∞	∞	∞					
	1616M-2-150	32	40	50	60	80	100	∞	∞									
	1010K-2.5-125	-	-	-	-	-	-	-	20	25	32	40	60					
	1212F-2.5-85 1212M-2.5-150	-	-	-	-	25	26	28	32	36	40	60	100					
	1616M-2.5-150	32	40	50	60	80	100	∞	∞	∞	∞	∞	∞					
	1616M-3-150	32	40	50	60	80	100											
Available Grooving Depth t (mm)		16	15	14	13	12.5	12	11	10	9	8	7	6	5	4	3	2	1

◆ KGM-T Available Cutting Diameter Table (GMN, GM R/L When using 1-edge insert)

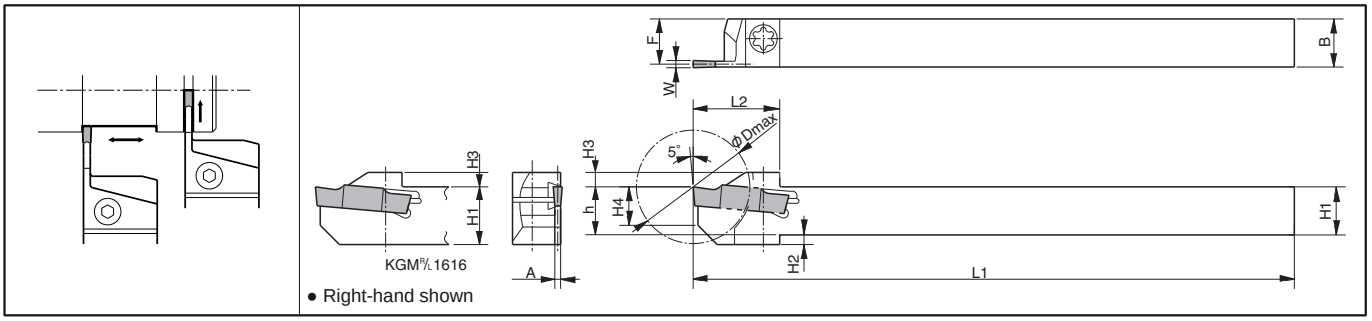
Toolholder		øD (Cutting Dia.)												
KGM R/L	2012K-2T17 2020K-2T17 2525M-2T17	-	-	-	-	-	-	-	-	66	80	130	260	∞
	1616H-3T20	-	-	-	-	-	40	54	70	100	180	∞	∞	
	2012K-3T20 2020K-3T20 2525M-3T20 2020K-4T20 2525M-4T20	-	-	-	-	-	40	90	130	240	∞			
	2525M-4T25 2525M-5T25	-	-	50	140	240	∞	∞	∞	∞				
	3232P-5T25	-	-	50	280	600								
	2525M-6T30	100	300	∞	∞	∞								
Available Grooving Depth t (mm)		30	27	25	23	22	20	19	18	17	16	15	14	Under 13

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Inserts are sold in 1 piece boxes.

KGM (For automatic lathe)

Width: 1.5~4.0mm



Toolholder Dimensions

Description		Std. R	Std. L	Cutting Dia. øDmax	Dimension (mm) H1=h	H2	H3	H4	B	L1	L2	F	A	Width W (mm) MIN.	MAX.	Spare Parts Screw	Spare Parts Wrench
KGMR/L	0810K-1.5-125	●	●	10	8	4	3	8	10	125	18	9.4	1.2	1.5	2.0	SE-40120TR	LTW-15S
	1010K-1.5-125	●	●	20	10	2											
	1212F-1.5-85	●		25	12		4	10	12	85	19	11.4					
	1212M-1.5-150	●	●							150							
	0810K-2-125	●	●	10	8	4	3	8	10	125	18	9.2	1.6	2.0	3.0	SE-40120TR	LTW-15S
	1010K-2-125	●	●	20	10	2						9.15	1.7				
	1212F-2-85	●		25	12		4	10	12	85	19	11.15	1.7				
	1212M-2-150	●	●							150							
	1616M-2-150	●	●	32	16	-	4	9	16	150	24.5	15.15				SE-50125TR	LTW-20
	1010K-2.5-125	●	●	20	10	2	3	8	10	125	18	9	2.0	2.4	3.0	SE-40120TR	LTW-15S
	1212F-2.5-85	●		25	12	2	4	10	12	85	19	11					
	1212M-2.5-150	●	●							150							
	1616M-2.5-150	●	●	32	16	-		9	16	150	25.5	15				SE-50125TR	LTW-20
	1616M-3-150	●	●	32	16	-	4	9	16	150	25.5	14.8	2.4	3.0	4.0	SE-50125TR	LTW-20

Applicable Inserts

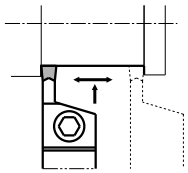
Applications	Grooving / Traversing	Grooving / Traversing	Grooving	Full-R / Copying	Full-R / Copying	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving / Cut-off	Deep Grooving
Ref. Page	G18	G18	G18	G18	G19	G20	G20	G20	G20	G20	G21
Insert / Toolholder	MW	MS	MG			MT	NB	TK	TK		CBN PCD
KGMR/L...1.5	-	-	-	-	-	GMM1520..MT GMM2020..MT GMM1520R/L..MT GMM2020R/L..MT	GMM1520..NB GMM2020..NB	GMM2020..TK GMM2020R/L..TK	GMN2..TK GMR/L2..TK	-	-
KGMR/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 GMM2020R/L..MT GMM2520R/L..MT GMM3020R/L..MT	GMM2020..NB GMM2520..NB GMM3020..NB	GMM2020..TK GMM2520..TK GMM3020..TK GMM2020R/L..TK GMM2520R/L..TK GMM3020R/L..TK	GMN2..TK GMN3..TK GMR/L2..TK GMR/L3..TK	GMN2 GMN2.2 GMN3 GMR/L2.2 GMR/L3	GMN2 GMN3
KGMR/L...2.5	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2520..MT GMM3020..MT GMM2520R/L..MT GMM3020R/L..MT	GMM2520..NB GMM3020..NB	GMM2520..TK GMM3020..TK GMM2520R/L..TK GMM3020R/L..TK	GMN3..TK GMR/L3..TK	GMN3 GMR/L3	GMN3
KGMR/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 GMM3020R/L..MT	GMM3020..NB	GMM3020..TK GMM3020R/L..TK	GMN3..TK GMN4..TK GMR/L3..TK GMR/L4..TK	GMN3 GMN4 GMR/L3 GMR/L4	GMN3 GMN4
KGMR/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 GMR/L4..TK	GMN4 GMN5 GMR/L4	GMN4 GMN5
KGMR/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
KGMR/L...6T	GMM6020..MW	GMG6020..MS GMM6020..MS	GMG6020..MG	GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN6	GMN6
KGMR/L...8	GMM8030..MW	-	GMG8030..MG	-	GMGA8030..R	-	-	-	-	-	-

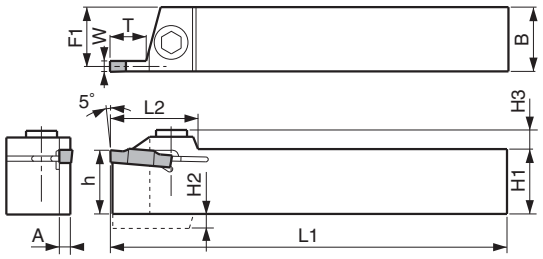
For recommended cutting conditions, see page G76
For recommended cutting conditions of CBN / PCD, see page G74

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KGM

Width: 3.0~8.0mm





• Right-hand shown

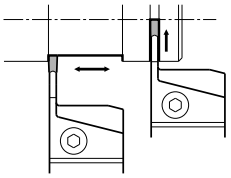
Toolholder Dimensions

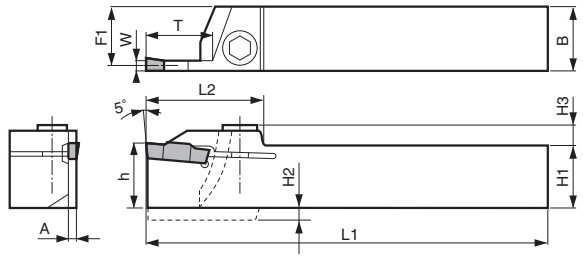
Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T	Width W (mm) MIN.	Width W (mm) MAX.	Spare Parts: Screw	Spare Parts: Screw	Spare Parts: Wrench	Spare Parts: Wrench
KGM R/L	1212H-3	●	●	12	4	6	12	100	27	10.8	2.4	9	3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16		7	16			14.8						HH5X16		
	2020K-3	●	●	20	-	7	20	125		18.8			3.0	4.0	-		-	LW-4
	2525M-3	●	●	25			25	150		23.8						HH5X25		
	2020K-4	●	●	20	-	7	20	125	27	18.3	3.4	10	4.0	5.0	-	HH5X16	-	LW-4
	2525M-4	●	●	25			25	150		23.3						HH5X25		
	2020K-5	●	●	20	-	7	20	125	27	17.8	4.4	10	5.0	6.0	-	HH5X16	-	LW-4
	2525M-5	●	●	25			25	150		22.8						HH5X25		
	3232P-5	●	●	32			32	170		29.8								
	2525M-8	●	●	25	7.5	10.5	25	150	40	22.0	6.0	25	8.0	8.0	-	HH6X25	-	LW-5
	3232P-8	●	●	32	-		32	170		29.0								

• Dimension T shows available grooving depth.
• 4.0mm width Insert can be installed in KGM R/L 1212H-3, but is not recommended due to the toolholder's rigidity.

KGM-T (Deep Grooving Type)

Width: 2.0~6.0mm





• Right-hand shown

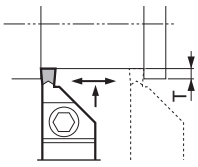
Toolholder Dimensions

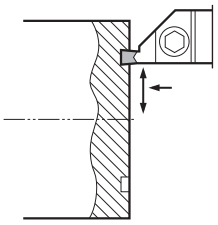
Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T	Width W (mm) MIN.	Width W (mm) MAX.	Spare Parts: Screw	Spare Parts: Screw	Spare Parts: Wrench	Spare Parts: Wrench
KGM R/L	2012K-2T17	●	●	20			12	125		11.15					SB-5TR	-	LTW-20	-
	2020K-2T17	●	●	20	-	7	20	125	33	19.15	1.7	17	2.0	3.0	-	HH5X16	-	LW-4
	2525M-2T17	●	●	25			25	150		24.15						HH5X25		
	1616H-3T20	●	●	16	4		16	100		14.8					-	HH5X16	-	LW-4
	2012K-3T20	●	●	20	-	7	12	125	36	10.8	2.4	20	3.0	4.0	SB-5TR	-	LTW-20	-
	2020K-3T20	●	●	20	-		20	125		18.8					-	HH5X16	-	LW-4
	2525M-3T20	●	●	25	-		25	150		23.8						HH5X25		
	2020K-4T20	●	●	20	-	7.5	20	125	36	18.3	3.4	20	4.0	5.0	-	HH5X16	-	LW-4
	2525M-4T20	●	●	25			25	150	36	23.3		20				HH5X25		
	2525M-4T25	●	●	25			25	150	41	23.3		25						
	2525M-5T25	●	●	25	-	8.5	25	150	42	22.8	4.4	25	5.0	6.0	-	HH5X25	-	LW-4
	3232P-5T25	●	●	32			32	170		29.8								
	2525M-6T30	●	●	25	-	9.5	25	150	45	22.4	5.2	30	6.0	6.0	-	HH5X25	-	LW-4

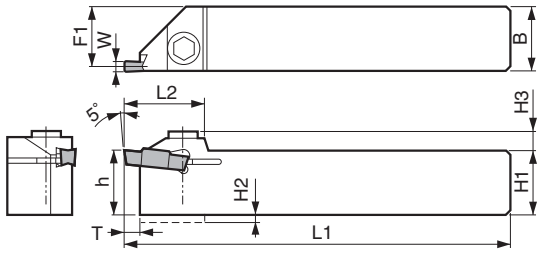
• Dimension T shows the distance from the Toolholder to the cutting edge. Refer to the Table (**G21**) for the relationship between the available Grooving Depth and the Cutting Dia.
• When using GMG / GMM type (2-Edge) insert, set the groove depth under 15mm.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KGMM

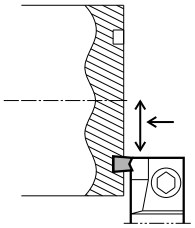


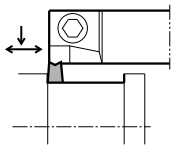


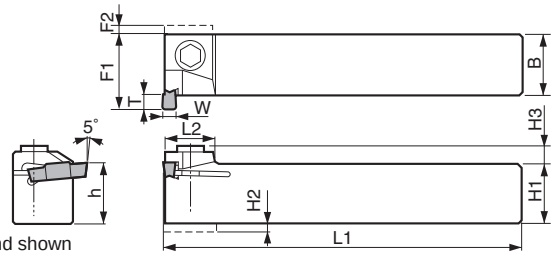


● Right-hand shown

KGMS







● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	F2	T		Width W (mm) MIN	MAX	Spare Parts: Screw	Screw	Wrench	Wrench
KGMM R/L	1212H-3	●	●	12	4	5	12	100	25	10.8	-	4.8		3.0	5.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16	-		16			14.8						-	HH5X16	-	LW-4
	2020K-3	●	●	20		6	20	125		18.8						-		-	
	2525M-3	●	●	25			25	150		23.8						-	HH5X25	-	
KGMS R/L	1212H-3	●	●	12	4	5	12	100	17	17	1.5	4.8		3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16	-		16			21.5				3.0	5.0	GS-50	-	-	LW-3
	2020K-3	●	●	20		6	20	125		25	-					-	HH5X16	-	LW-4
	2525M-3	●	●	25			25	150		30						-	HH5X25	-	

• Dimension T shows available grooving depth. (See the table **G52** for Face Grooving)

Applicable Inserts [External Grooving]

Applications	Grooving / Traversing	Grooving / Traversing	Grooving	Full-R / Copying	Grooving	Grooving	Grooving	Grooving	Grooving	Grooving
Ref. Page	G18	G18	G18	G18	G20	G20	G20	G20	G20	G21
Insert / Toolholder	MW	MS	MG		MT	NB	TK	TK		CBN PCD
KGMS R/L1212H-3	GMM3014..	-	-	GMM3014..R	-	-	-	-	-	-
KGMM R/L...3 KGMS R/L...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 / Traversing	Grooving / Traversing	Grooving / Traversing	Grooving / Traversing	Grooving	Full-R / Copying	Grooving	Grooving	Grooving	Grooving
Ref. Page	G19	G18.19	G18	G18	G18	G18	G20	G20	G20	G20, G21
Insert / Toolholder			MW	MS	MG		MT	NB	TK	
KGMS R/L1212H-3	-	GMM3014..RU	-	-	-	-	-	-	-	-
KGMM R/L...3 KGMS R/L...3	FGG R/L3020.. FGG R/L4020.. FGG R/L5020..	GMG3020..RU GMG4020..RU GMG5020..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

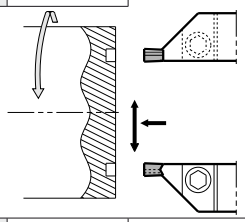
For recommended cutting conditions, see page **G76**
For recommended cutting conditions of CBN / PCD, see page **G74**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

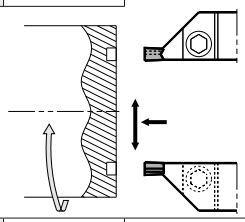
◆ Selection of Insert & Toolholder (Face Grooving)

● Case of KGMM

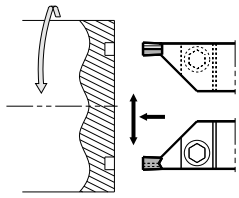
Toolholder	L-hand
Insert	L-hand



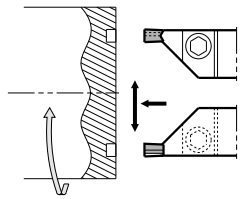
Toolholder	R-hand
Insert	R-hand



Toolholder	R-hand
Insert	L-hand

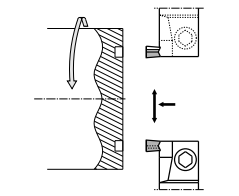


Toolholder	L-hand
Insert	R-hand

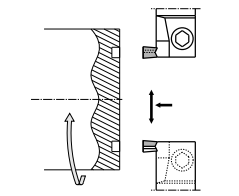


● Case of KGMS

Toolholder	R-hand
Insert	L-hand

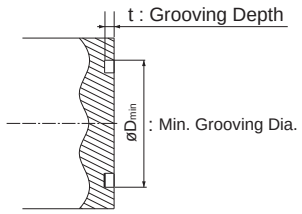


Toolholder	L-hand
Insert	R-hand



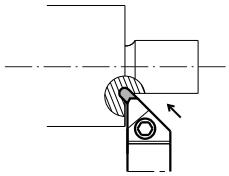
◆ Min. Cutting Dia. (Face Grooving)

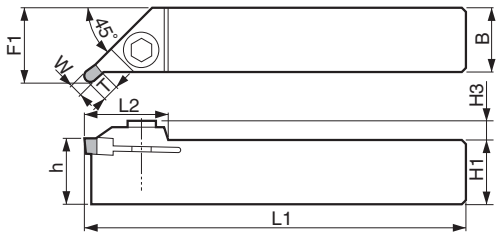
● KGMM / KGMS (Common)



Description	øDmin	t
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
GMG5020-250RU	ø30	

■ KGMU (External Undercutting Toolholder)





● Right-hand shown

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	T				Edge Width W (mm) MIN.	MAX.	Spare Parts Screw		Spare Parts Wrench	
KGMUR/L	2020K	●	●	20	6	20	125	28.5	23.6	4.8				3.0	5.0	HH5X16		LW-4	
	2525M	●	●	25		25	150		28.6						(6.0)	HH5X25			

• Dimension T shows the distance from the Toolholder to the cutting edge. See the table below for the available Grooving Depth.

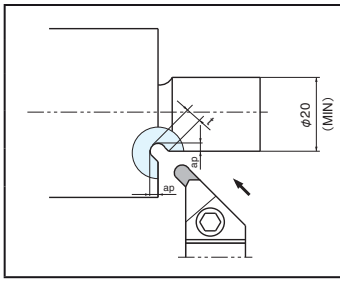
Dimension F1 shows at GMM5020-RU. ( ) indicates external grooving inserts when installed.

● Applicable Insert

Applications	Undercutting		
Ref. Page	G18		
Shape / Toolholder			
KGMUR/L 2020K 2525M	GMG3020..RU GMG4020..RU GMG5020..RU		

• External grooving inserts (grooving width 3mm~6mm) will be attached.
(In case of using GMG○○20-○○, GMM○○20-○○○○, GMN○ insert)

◆ Undercut Depth t



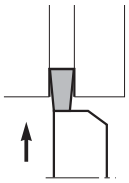
Description	Undercut Depth t (mm)	Distance from the face of the workpiece. ap (mm)
GMG3020-15RU	3.5	1.8
GMG4020-20RU	4.0	1.9
GMG5020-25RU	4.5	2.1

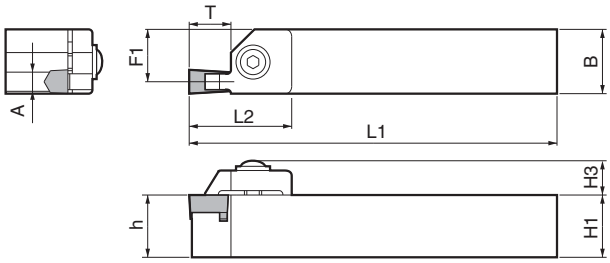
* In case of undercutting for the diameter over 100mm, external grooving inserts
GMG ○○ 20- ○○ , GMM ○○ 20- ○○□□ ,
GMN ○ are also available.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

External Shallow Grooving Toolholders [Ceramic TG Insert]

KN91





• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F1	A	T			Spare Parts Clamp	Clamp Bolt	Washer	Spring	Wrench
KN91R/L	44-4	●	●	25	16	25	150	40	22.5	3.4	15			CE-111 / 121	BH8X30	W-8	SP-8	LW-5
	44-5	●	●					42	22.5	4.4	17							
	44-7	●						42	21	6.4	17			CE-131 / 141				

• Dimension T shows available grooving depth.

Clamp: KN91R/L 44-4 / 5 ... CE-111 for Right-hand Toolholder, and CE-121 for Left-hand Toolholder.
KN91R/L 44-7 ... CE-131 for Right-hand Toolholder, and CE-141 for Left-hand Toolholder.

Applicable Inserts

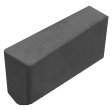
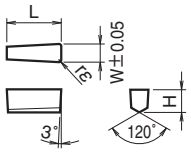
(mm)

Description	L	H
GS91-4	12	5.0
GS91-5~GS91-8	15	7.5

		Ceramic	PVD Ceramic
P	Carbon Steel / Alloy Steel		
M	Stainless Steel		
K	Cast Iron	●	
N	Non-ferrous Metals		
S	Titanium Alloy		
H	Hard materials (under 40HRC)		
	Hard materials (over 40HRC)	○	

Classification of usage

◕: Continuous-Light Interruption / 1st Choice
◔: Continuous-Light Interruption / 2nd Choice
●: Continuous / 1st Choice
○: Continuous / 2nd Choice

Insert		Description		Dimension (mm) W	rε	Ceramic A65	PVD Ceramic A66N	Applicable Toolholder	Ref. Page for Toolholder
		GS	91-4	4.0	0.5			KN91R/L...4	G26
			91-5	5.0		●		KN91R/L...5	
			91-6	6.0	0.8				
			91-7	7.0				KN91R/L...7	
			91-8	8.0		●			

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed m/min) Ceramic A65	f (mm/rev) GS91-4 GS91-5 GS91-6	GS91-7 GS91-8
Cast Iron (FC / FCD, etc.)	★ 150~300	0.03~0.07	0.04~0.08
Hard Materials	★ 40~80	0.02~0.05	0.04~0.07

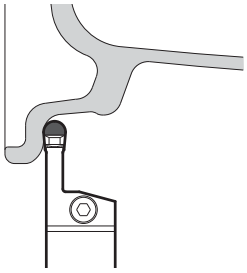
★ : 1st Recommendation

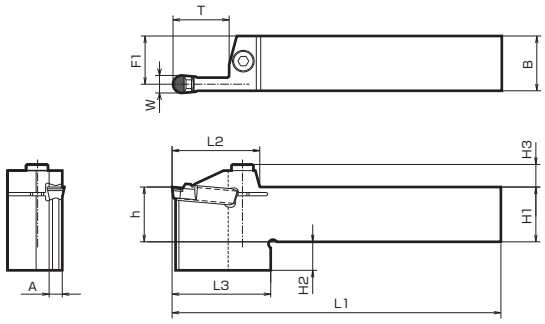
Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

For Aliminum Wheel External Grooving

KGMW (External / Facing / Copying)



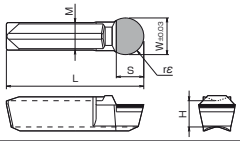
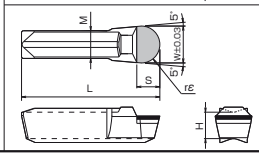


• Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	L3	F1	A	T	Spare Parts Screw	Spare Parts Wrench	Applicable Inserts
KGMW R/L	2525M-6	●	●	25	13	10.3	25	150	40	55	22.8	4.4	25	HH6X25	LW-5	GMGW6030-30R
	2525M-8	●	●								22	6				GMGW8030-40R GMGW8030-40R-HR

Applicable Inserts

Shape		Description		Dimension (mm) W	rε	L	H	M	S	No. of Edge	PCD KPD001
		GMGW	6030-30R	6	3	30	5.5	5	4.5	1	●
			8030-40R	8	4			6	6	1	●
		GMGW	8030-40R-HR	8	4	30	5.5	6	5	1	●

• GMGW insert is exclusively used for KGMW type / KIGMW type toolholder. It cannot be used for other toolholder because of its different installation angle.

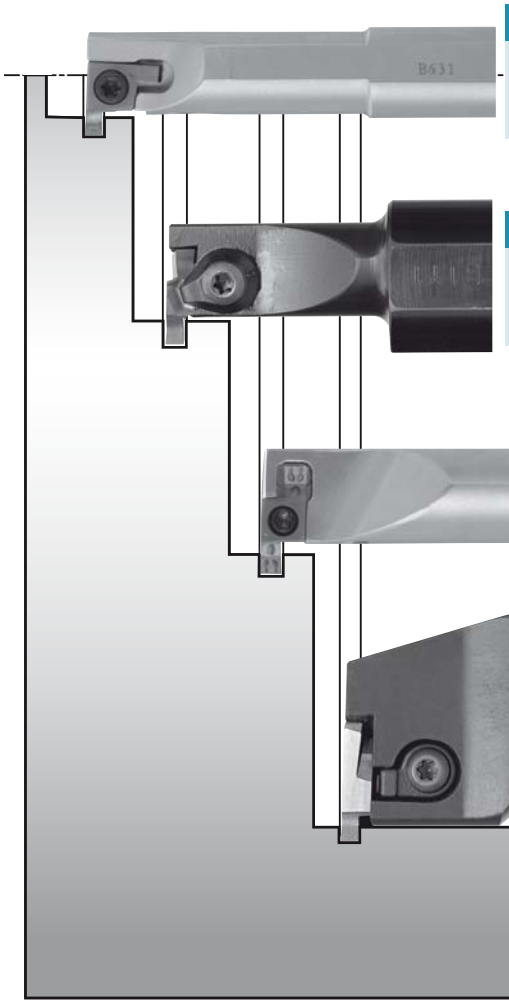
Recommended Cutting Conditions

Workpiece Material	Insert Grade (Vc: m/min) PCD KPD001	① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ ap at Traversing (mm)
Aluminum	★ 150~2700	① 0.05~0.3 mm/rev ② 0.2~0.8 mm/rev ③ MAX.3 mm

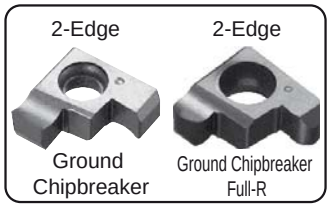
★ : 1st Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

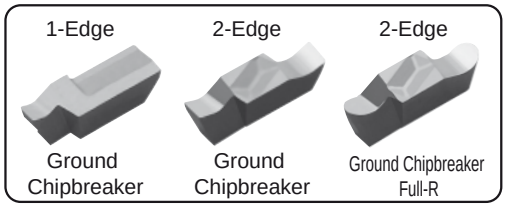
Internal Grooving ø8~



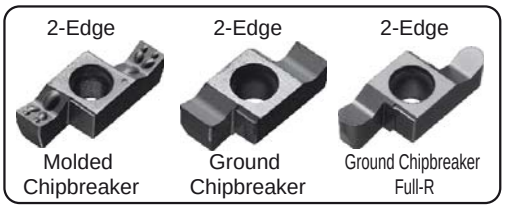
SIGE
Min.Cutting Dia.: ø8~12
Width: 1.0~3.0
Depth: 1.5~2.2
➡G36



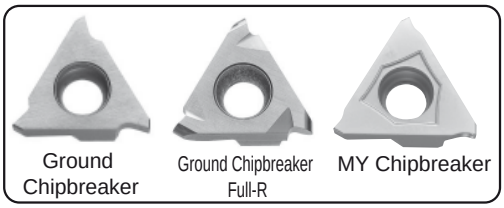
GIV
Min.Cutting Dia.: ø12~40
Width: 1.0~5.0
Depth: 1.7~5.5
➡G40



SIGE
Min.Cutting Dia.: ø14~40
Width: 1.0~5.0
Depth: 2.5~6.5
➡G36



KIGBA
Min.Cutting Dia.: ø35~40
Width: 0.5~4.8
Depth: 1.0~2.8
➡G43



Shallow Grooving

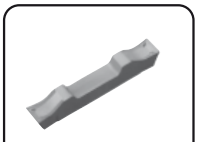
KITG
Min.Cutting Dia.: ø35~40
Width: 0.75~4.5
Depth: 2.0~2.5
➡G44



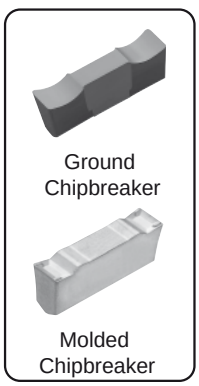
* KITG type will be switched to KIGBA type.

Deep Grooving

KGIA
Min.Cutting Dia.: ø32~66
Width: 3.0~5.0
Depth: 12~15
➡G48

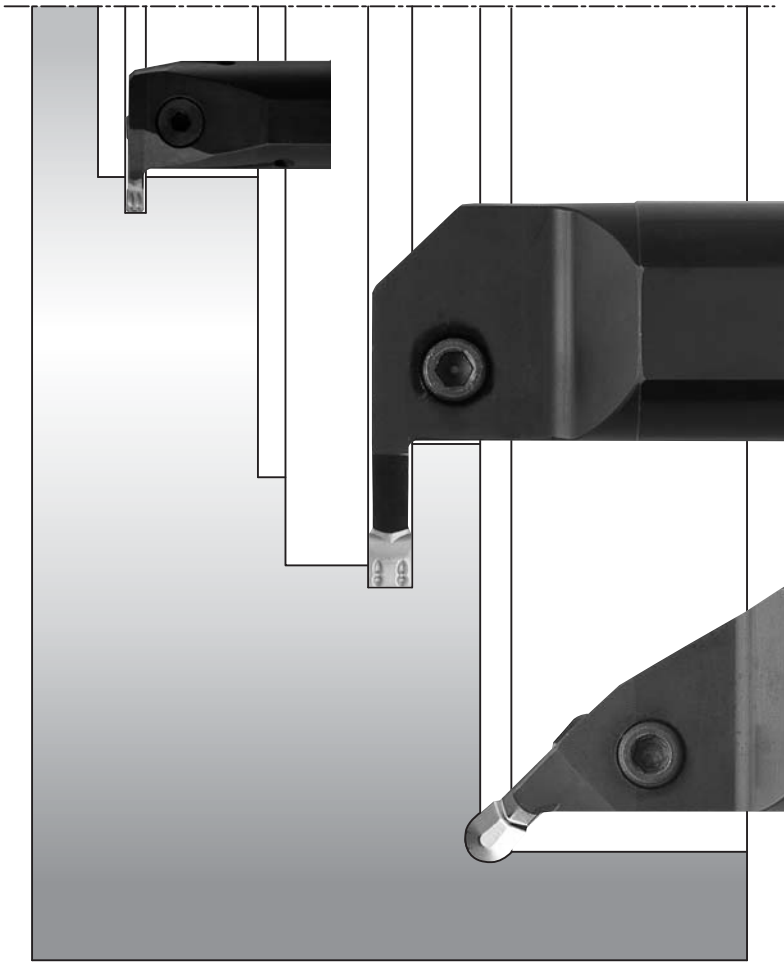


KIGH
Min.Cutting Dia.: ø45~65
Width: 4.0~8.0
Depth: 12
➡G45



Internal Grooving & Traversing ø20~

CERACUT Plunge & Turn



➡G46

KIGM-V

Min.Cutting Dia.: ø20~40
Width: 3.0~5.0
Depth: 5.5~11.0



Molded Chipbreaker | Molded Chipberaker Full-R

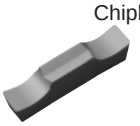
➡G47

KIGM-8

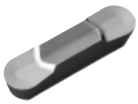
Min.Cutting Dia.: ø65
Width: 8.0
Depth: 20



Molded Chipbreaker



Ground Chipbreaker



Ground Chipbreaker Full-R

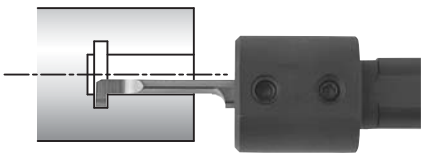
KIGMU-8

Min.Cutting Dia.: ø65
Width: 8.0
Depth: 2.2

➡G47

Small Dia. Internal Grooving ø4~

2-Edge Tip-Bar & System Tip-Bar



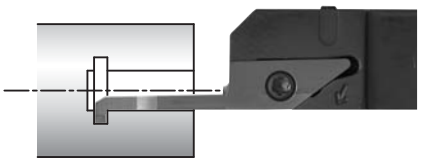
HPG

Min.Cutting Dia.: ø4~7
Width: 1.0~2.0
Depth: 1.5~2.0

➡G30



2-Edge Tip-Bar



VNG

Min.Cutting Dia.: ø4~7
Width: 1.0~2.0
Depth: 0.8~2.0

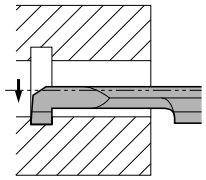
➡G33

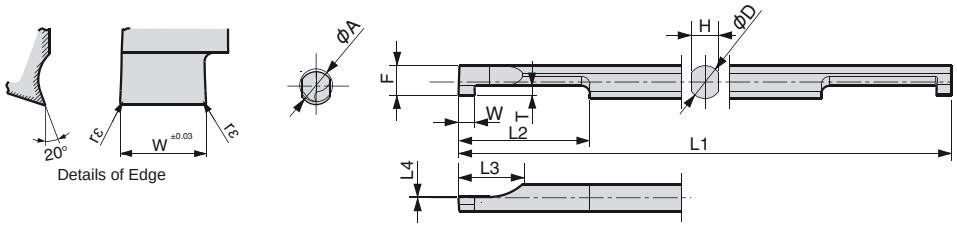


System Tip-Bar

2-Edge Tip-Bar for Micro Internal Grooving HPG type

HPG (Micro Internal Grooving)





● Right-hand shown

Tip-Bar Dimensions

Description		Min. Cutting Dia.	Dimension (mm)										Insert Grade			
													PVD Coated Carbide		Carbide	
		øA	W±0.03	rε	øD	H	L1	L2	L3	L4	F	T	PR930		KW10	
													R	L	R	L
HPGR/L	0404-10	4	1	+0 -0.02 0.05	4	3.35	60	15	8	0	3.65	1	●	●	●	
	0404-20		2										●	●	●	
	0505-10	5	1		5	4.3	70	20			4.55	1.5	●	●	●	
	0505-20		2										●	●	●	
	0606-10	6	1		6	5.2			10		5.5	2	●	●	●	
	0606-20		2										●	●	●	
	0707-10	7	1		7	6.2	80	25			6.45		●	●	●	
	0707-20		2										●	●	●	

• Dimension T: shows available grooving depth.

Description Table for Tip-Bars and Applicable Sleeves

Tip-Bar		Applicable Sleeve ➡G31
HPGR/L	0404-···	PSH 04···-···
	0505-···	05···-···
	0606-···	06···-···
	0707-···	07···-···

Recommended Cutting Conditions

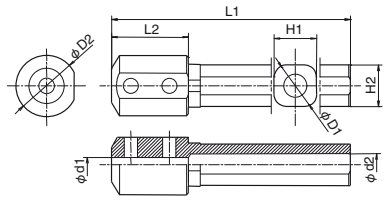
Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)		HPGR/L04 HPGR/L05	HPGR/L06 HPGR/L07	Remarks
	PVD Coated Carbide	Carbide			
	PR930	KW10	f (mm/rev)		
Carbon Steel / Alloy Steel	★ 30～100	-	~0.03	~0.05	Coolant
Stainless Steel	★ 30～80	-	~0.02	~0.03	
Non-ferrous Metals	-	★ ～300	~0.05	~0.08	

★: 1st Recommendation ☆: 2nd Recommendation

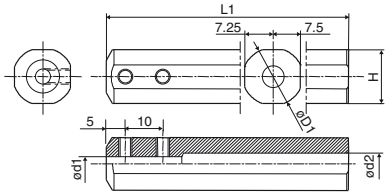
Tip-Bars are sold in 1 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

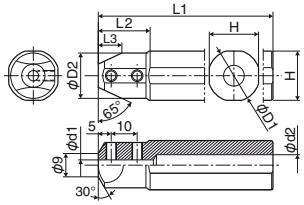
Applicable Sleeve



(Tip-Bar installation side) Fig.1



(Tip-Bar installation side) Fig.2



(Tip-Bar installation side) Fig.3

Description	Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Machine Manufactuer	Ref. Page for 2-Edge Tip-Bar (Ref. Page for other 2-Edge Tip-Bar)
		*ød1	øD1	øD2	ød2	H	L1	L2	L3		Screw	Wrench		
PSH 0412-80	●	4	12	16	6	11	80	20	-	Fig.1	HS4×4P	LW-2	(General use)	Grooving (HPG) ⇒ **G30**
0512-80	●	5			8									
0612-80	●	6												
0712-80	●	7												
PSH 0416-100	●	4	16	-	6	15	100	-	-	Fig.2	HS4×4P	LW-2		
0516-100	●	5			8									
0616-100	●	6												
0716-100	●	7												
PSH 0420-120	●	4	20	17.5	6	19	120	20	9	Fig.3	HS4×4P	LW-2	Amada Wasino Eguro Citizen machinery Precision Tsugami Miyano (General use)	
0520-120	●	5			8				7.5					
0620-120	●	6												
0720-120	●	7												
PSH 0425.0-135	●	4	25	18	6	24	135	23	9.5	Fig.3	HS4×4P	LW-2	Amada Wasino Eguro Precision Tsugami Miyano (General use)	Boring (HPB) ⇒ **F18**
0525.0-135	●	5			8				8					
0625.0-135	●	6												
0725.0-135	●	7												
PSH 0419-120	●	4	19.05 (0.75")	17.5	6	18	120	20	9	Fig.3	HS4×4P	LW-2	Citizen Machinery	Back Boring (HPBT) ⇒ **F18**
0519-120	●	5			8				7.5					
0619-120	●	6												Face Grooving (HPFG) ⇒ **G53**
0719-120	●	7												
PSH 0425-120	●	4	25.4 (1")	18	6	24.4	120	23	9.5	Fig.3	HS4×4P	LW-2		Threading (HPT) ⇒ **J24**
0525-120	●	5			8				8					
0625-120	●	6												
0725-120	●	7												
PSH 0422-135	●	4	22	18	6	21	135	22	9.5	Fig.3	HS4×4P	LW-2	Star Micronics Nomura VTC	
0522-135	●	5			8				8					
0622-135	●	6												
0722-135	●	7												
PSH 0423-120	●	4	23	18	6	22	120	22	9.5	Fig.3	HS4×4P	LW-2	Nomura VTC	
0523-120	●	5			8				8					
0623-120	●	6												
0723-120	●	7												

*: Length of ød1...20mm (PSH04)
...25mm (PSH05, PSH06, PSH07)

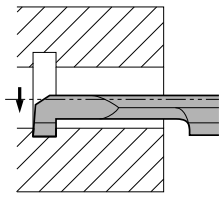
- Choose sleeves (ød1) to meet with øD dimension of Tip-Bar.
- Names of machine builders are listed in the order of the Japanese syllabary with omitted titles of respect.

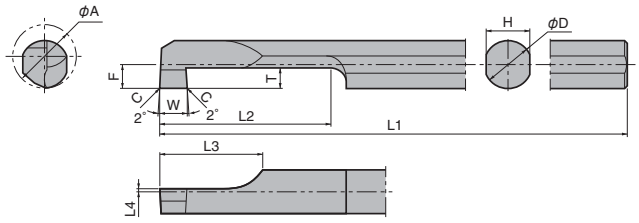
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Tip-Bar for Micro Internal Grooving

PSG-S (Tip-Bar)

This insert will be switched to **HPG** type (2-Edge See Page ➡ **G30**).





● Right-hand shown

Classification of usage									
● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel				●			
	M	Stainless Steel				●			
	K	Cast Iron					●		
	N	Non-ferrous Metals					●		
	S	Titanium Alloy					●		
	H	Hard materials (under 40HRC)				●			
		Hard materials (over 40HRC)							

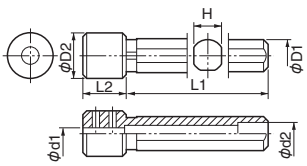
● Tip-Bar

Description		Min. Cutting Dia.	Dimension (mm)										Cermet	PVD Coated Carbide			Carbide			Ref. Page for Sleeve
		øA	W±0.03	C	øD	H	L1	L2	L3	L4	F	T	TC60		PR915	PR930	KW10			
PSG R/L	0510-60S	5	1.0	0.05	3.8	3.6	60	15	8	0.1	1.86	1.5					●			G32
	0520-60S		2.0	0.1													●			
	0610-70S	6	1.0	0.05	4.8	4.4	70	20			2.36		●			●	●			
	0620-70S		2.0	0.1									●			●	●			
	0710-70S	7	1.0	0.05	5.8	5.2	70	20	10	0.3	2.86	2.0	●			●	●			
	0720-70S		2.0	0.1									●			●	●			
	0810-80S	8	1.0	0.05	6.8	6.2	80	25			3.38		●			●	●			
	0820-80S		2.0	0.1									●			●	●			

• Dimension T shows available grooving depth.
• Dimension L4 indicates the cutting edge is above the Tool's Center Position.

● Applicable Sleeve

This sleeve is for 1-Edge Tip-Bar. For 2-Edge Tip-Bar, See Page ➡ **G31**.

Shape	Description	(Previous Description)	Std.	Dimension (mm)							Spare Parts		Applicable Tip-Bar
				øD1	øD2	ød1	ød2	H	L1	L2	Screw	Wrench	
	PH 0412-60	PH -0412	○	12	19	3.8	6	11	60	20	HS4X4	LW-2	PSG R/L 05 ○○ - ○○ S
	0512-60	-0512	○			4.8							PSG R/L 06 ○○ - ○○ S
	0612-60	-0612	○			5.8	8						PSG R/L 07 ○○ - ○○ S
	0712-60	-0712	○			6.8							*PSG R/L 08 ○○ - ○○ S
	PH 0416-80	PH -0416	○	16	22	3.8	Rp¼ (PS¼)	15	80	20	HS4X4	LW-2	PSG R/L 05 ○○ - ○○ S
	0516-80	-0516	○			4.8							PSG R/L 06 ○○ - ○○ S
	0616-80	-0616	○			5.8							PSG R/L 07 ○○ - ○○ S
	0716-80	-0716	○			6.8							*PSG R/L 08 ○○ - ○○ S

(Tip-Bar installation side)

• Besides the above Sleeves, Collet Chucks are also available in the market .

* PSFG R/L 08 ○○ _20S is available.

◆ Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)				PSG05	PSG06 PSG07 PSG08	Remarks
	Cermet	PVD Coated Carbide		Carbide			
	TC60		PR930	KW10	Feed Rate (mm/rev)		
Steel	☆ 60～120		★ 30～100		～0.03	～0.05	Coolant
Stainless Steel	☆ 50～100		★ 30～80		～0.02	～0.03	
Non-ferrous Metals				★ ～300	～0.05	～0.08	

★ : 1st Recommendation ☆ : 2nd Recommendation

Remarks on PSG-S type Tool

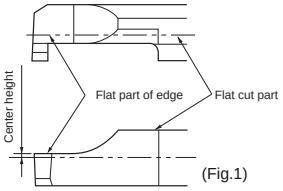
How to install

PSG-S should be installed accurately because errors from the cutting edge's height and angle affect the machining precision in the micro grooving application. When installing, set the cutting edge above the center position as shown in the Table 1. All PSG-S type tools are produced to have the cutting edge above the center position.
(See dimension L4)

① In case of using the exclusive sleeve (PH ○○ 12-60, PH ○○ 16-80), the cutting edge of PSG-S tool comes to the suitable position automatically.
② In case of using the collet chuck in the market, adjust the center height according to the Table 1.
It is easy to adjust the center height using the edge's flat part. (Fig.1)

(Table1)

Grooving Tip-bar	Center height (mm)
PSG05 type	0.1
PSG06 type	0.3
PSG07 type	
PSG08 type	



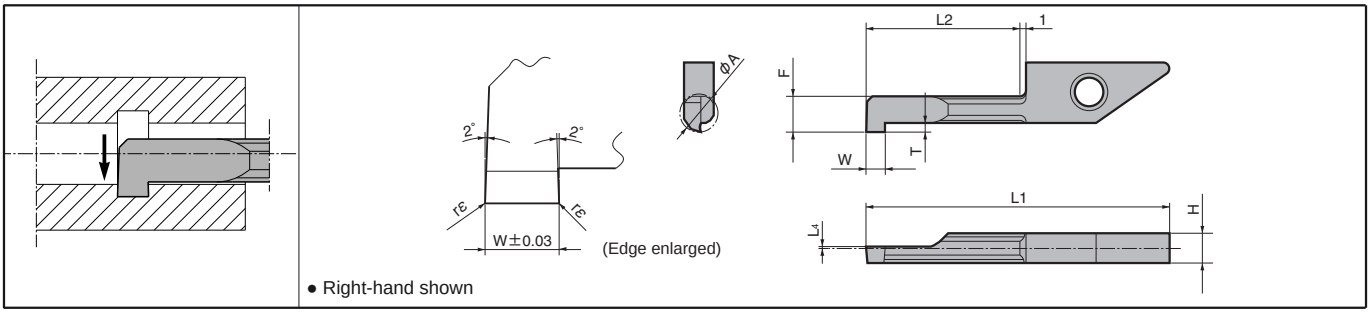
(Fig.1)

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Tip-Bars are sold in 1 piece boxes.

System Tip-Bar for Micro Internal Grooving

VNG



• Right-hand shown

Classification of usage			Cermet	PVD Coated Carbide			Carbide	PCD		Ref. Page for Toolholder
● : Continuous / 1st Choice ○ : Continuous / 2nd Choice			TC60	PR630	PR915	PR930	KW10	KPD001	KPD010	
	P	Carbon Steel / Alloy Steel				●				
	M	Stainless Steel				○				
	K	Cast Iron					●			
	N	Non-ferrous Metals								
	S	Titanium Alloy								
	H	Hard materials (under 40HRC)				●				
		Hard materials (over 40HRC)								

Insert Dimensions

Description		Min. Cutting Dia.	Dimension (mm)										Cermet	PVD Coated Carbide			Carbide	PCD		Ref. Page for Toolholder
		øA	W	rε	øD	H	L1	L2	L3	L4	F	T	TC60	PR630	PR915	PR930	KW10	KPD001	KPD010	
VNGR	0410-11	4	1.0	0.05	-	3.9	30.8	11	-	0.1	3.5	0.8				●	●			F12 F13 F14
	0420-11		2.0	0.10												●	●			
	0510-11	5	1.0	0.05							4.4	1.0	●	●		●	●			
	0520-11		2.0	0.10									●	●		●	●			
	0610-20	6	1.0	0.05			39.8	20		0.3	5.2	1.8	●	●		●	●			
	0620-20		2.0	0.10									●	●		●	●			
	0710-20	7	1.0	0.05							6.2	2.0	●	●		●	●			
	0720-20		2.0	0.10									●	●		●	●			
VNGR	0410-11NB	4	1.0	0.05	-	3.9	30.8	11	-	0.1	3.5	0.8						○	○	
	0420-11NB		2.0	0.10														○	○	
	0510-11NB	5	1.0	0.05							4.4	1.0						○	○	
	0520-11NB		2.0	0.10														○	○	
	0610-20NB	6	1.0	0.05			39.8	20		0.3	5.2	1.8						○	○	
	0620-20NB		2.0	0.10														○	○	
	0710-20NB	7	1.0	0.05							6.2	2.0						○	○	
	0720-20NB		2.0	0.10														○	○	

• Dimension T shows available grooving depth.
• Dimension L4 indicates the cutting edge is above the Tool's Center Position.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)				VNG04 VNG05	VNG06 VNG07	Remarks
	Cermet	PVD Coated Carbide		Carbide	f (mm/rev)		
	TC60	PR630	PR930	KW10			
Carbon Steel / Alloy Steel	☆ 60～120	☆ 30～100	★ 30～100		～0.03	～0.05	Coolant
Stainless Steel	☆ 50～100	☆ 30～80	★ 30～80		～0.02	～0.03	
Non-ferrous Metals				★ ～300	～0.05	～0.08	

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

System Tip-Bars (VNG) are sold in 5 piece boxes.
CBN & PCD Inserts are sold in 1 piece boxes.

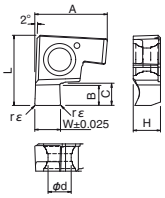
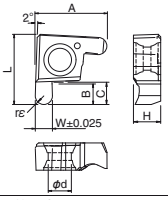
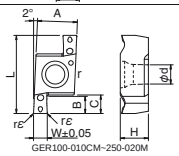
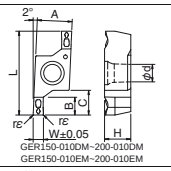
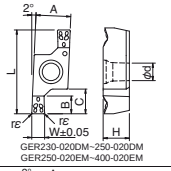
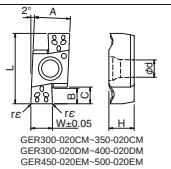
Applicable Inserts

(mm)

Description	A	L	H	ød
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 Alloy				●
H	Hard materials (under 40HRC)		●		
	Hard materials (over 40HRC)				

Classification of usage
● : Light Interruption / 1st Choice
◔ : Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Insert (R-hand shown)		Description		Dimension (mm) W	B	C	rε	Cermet TN6020 R	TN6020 L	PVD Coated Carbide PR1025 R	PR1025 L	Carbide GW15 R	GW15 L	KW10 R	KW10 L	Applicable Toolholder	Ref. Page for Toolholder
 2-Edge		GE$^{R/L}$	100-005A	1.00	1.5	1.8	0.05	●	●	●	●			●	●	SIGE$^{R/L}$...A-EH SIGE$^{R/L}$...A-WH	G36 G37 G38
			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	2.6	0.05	●	●	●	●			●	●	SIGE$^{R/L}$...B-EH SIGE$^{R/L}$...B-WH	
			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				●	●	●	●			●	●		
 Full-R		GER	100-050AR	1.00	1.5	1.8	0.5			●				●		SIGER...A-EH SIGER...A-WH	
			200-100AR	2.00			1.0			●				●			
		GER	100-050BR	1.00	2.2	2.6	0.5			●				●		SIGER...B-EH SIGER...B-WH	
			200-100BR	2.00			1.0			●				●			
	 GER100-010CM~250-020M	GER	150-010CM	1.50	2.5	2.7	0.1			●						SIGER...C-EH SIGER...C-WH	
			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	4.8	0.1			●						SIGER...D-EH	G36 G37
			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	6.8	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						●							

• Dimension B: shows available grooving depth.

Comparison of Chip evacuation (Molded Chipbreaker)

Description \ f (mm/rev)	15CrMo4 (SCM415 (Minimum Bore Dia. ø16)) 0.05	0.07	0.1	Evaluation
SIGER1612C-EH GER300-020CM(PR1025)				Good Chip Control
Competitor A Width: 3mm			Insert cracks	Unstable chip control and biting
Competitor B Width: 3mm				Unstable chip control and biting

[Vc =100m/min, ap=2.0mm, Wet] (Internal evaluation)

Comparison of Chip evacuation (Min. Bore Dia.: ø8)

Description \ f (mm/rev)	15CrMo4 (JIS:SCM415) 0.02	Evaluation
SIGER0808A-EH GER200-010A (PR1025)		◎
Competitor C Width: 2mm		✕ Chipping

[Vc=50m/min, ap=1.25mm, Wet] (Internal evaluation)

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

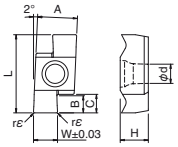
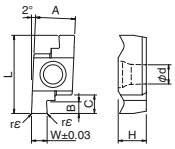
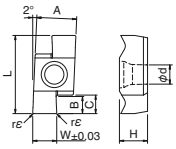
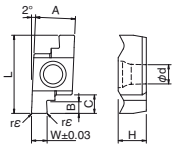
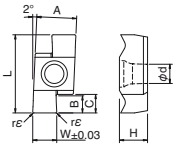
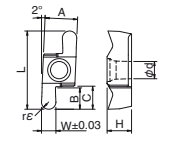
Applicable Inserts

(mm)

Description	A	L	H	ød
GE$^{R}/_{L}$...-C	5.8	11.48	4.05	2.8
GER...-CR				
GE$^{R}/_{L}$...-D	6.8	16.44	5.05	3.4
GER...-DR				
GE$^{R}/_{L}$...-E	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 Alloy			●		
H	Hard materials (under 40HRC)		●			
	Hard materials (over 40HRC)					

Classification of usage
● : Light Interruption / 1st Choice
◔ : Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

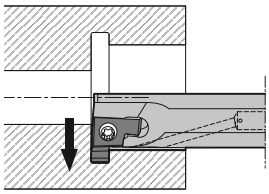
Insert (R-hand shown)		Description		Dimension (mm) W	B	C	rε	Cermet TN6020 R	TN6020 L	PVD Coated Carbide PR1025 R	PR1025 L	Carbide GW15 R	GW15 L	KW10 R	KW10 L	Applicable Toolholder	Ref. Page for Toolholder
 2-Edge		GE$^{R}/_{L}$	100-005C	1.00	2.5	2.7	0.05	●	●	●	●	●	●			SIGE$^{R}/_{L}$...C-EH SIGE$^{R}/_{L}$...C-WH	G36 G37 G38
			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				●	●	●	●	●	●				
	 GER100-005D~280-020D  GER300-020D~400-020D	GE$^{R}/_{L}$	100-005D	1.00	2.5	4.8	0.05	●	●	●	●	●	●			SIGE$^{R}/_{L}$...D-EH	
			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				●	●	●	●	●	●				
			275-020D	2.75				●		●	●	●					
			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	6.8	0.05	●	●	●	●	●	●			SIGE$^{R}/_{L}$...E-EH	G36 G37
			150-010E	1.50	3.0			●	●	●	●	●	●				
			170-010E	1.70			0.1	●		●	●	●					
			185-010E	1.85				●		●	●	●					
			195-010E	1.95				●		●	●	●					
			200-010E	2.00	3.2			●	●	●	●	●	●				
			225-010E	2.25				●		●	●	●					
			230-020E	2.30	4.5		0.2	●	●	●	●	●	●				
			250-020E	2.50				●	●	●	●	●	●				
			275-020E	2.75				●		●	●	●					
			280-020E	2.80				●		●	●	●					
			300-020E	3.00				●	●	●	●	●	●				
			330-020E	3.30				●		●	●	●					
			350-020E	3.50	5.5			●	●	●	●	●	●				
			400-020E	4.00				●	●	●	●	●	●				
			430-020E	4.30				●		●	●	●					
			450-020E	4.50	6.5			●	●	●	●	●	●				
			460-020E	4.60				●		●	●	●					
			500-020E	5.00				●	●	●	●	●	●				
 Full-R		GER	200-100CR	2.00	2.5	2.7	1.0			●		●				SIGER...C-EH SIGER...C-WH	G36 G37 G38
			250-125CR	2.50			1.25			●		●					
			300-150CR	3.00			1.5			●		●					
		GER	200-100DR	2.00	3.2	4.8	1.0			●		●				SIGER...D-EH	G36 G37
			300-150DR	3.00	4.5		1.5			●		●					

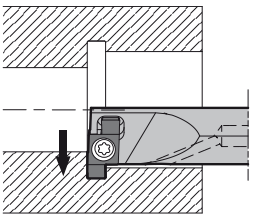
• Dimension B: shows available grooving depth.

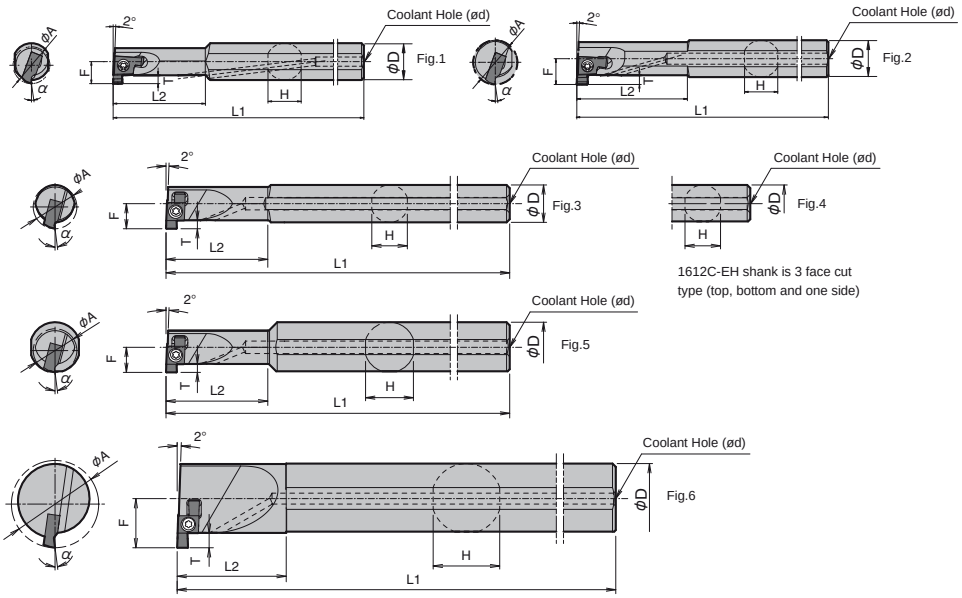
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

SIGE-EH Excellent Bar (with Coolant Hole)







● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	T	ød	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench FT	Spare Parts: Wrench DT	Applicable Inserts
SIGE$^{R/L}$	0808A-EH	●	●	8	8	7.2	100	20	4.8	1.5	3	Fig.1	SB-2045TRN	FT-6	-	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR
	1010B-EH	●	●	10	10	9	125	25	6.2	2.2	3	Fig.1	SB-2255TR	-	DT-7	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR
	1210B-EH	●	●	12				30	7			Fig.2				
	1412C-EH	●	●	14	12	11.4	150	33	8	2.5	4	Fig.3	SB-2570TR	FT-8	-	GE$^{R/L}$100-005C~GE$^{R/L}$350-020C GER150-010CM~GER350-020CM GER200-100CR~GER300-150CR
	1612C-EH	●	●	16				20	8.5			Fig.4				
	1616C-EH	●	●		16	15	160	36	9		5	Fig.5				
	2020D-EH	●	●	20	20	19	180	40	12.1	4.5	5		SB-3080TR	FT-10	-	GE$^{R/L}$100-005D~GE$^{R/L}$400-020D GER150-010DM~GER400-020DM GER200-100DR~GER300-150DR
	2525E-EH	●	●	25	25	24	200	45	15.6	6.5	5		SB-4085TR	FT-15	-	GE$^{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				

• Dimension T: shows available grooving depth.

Features

● Large chip pocket screw clamp toolholder design provides excellent chip evacuation.



● Cost effective chip control from a molded chipbreaker



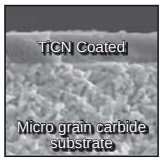
● Cutting edge is free from contact face.



● An 8mm minimum cutting diameter with a 2-Edge design

● New Grade PR1025 improves stable machining

New Grade PR1025
(Micro Grain Carbide + PVD Coated Carbide)
Long tool life and stable machining for internal grooving



● SIGE toolholder and Sleeve for Automatic Lathes

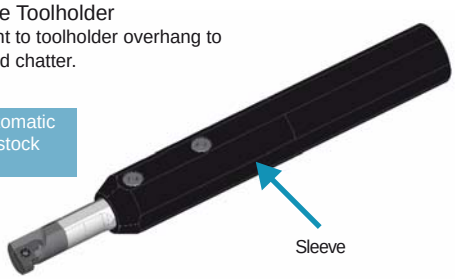
• SIGE toolholder
The locating surface for the sleeve lock screw reaches nearly to the insert pocket.
This provides a maximum range of overhang adjustment to reduce chatter.



To retain the groove depth, the edge is single straight core shape thinner than the shank.

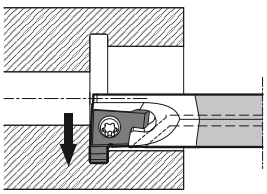
• Applicable Sleeve Toolholder
Provides adjustment to toolholder overhang to reduce vibration and chatter.

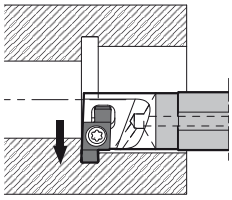
Shank diameters for other automatic lathe manufactures added to stock items.

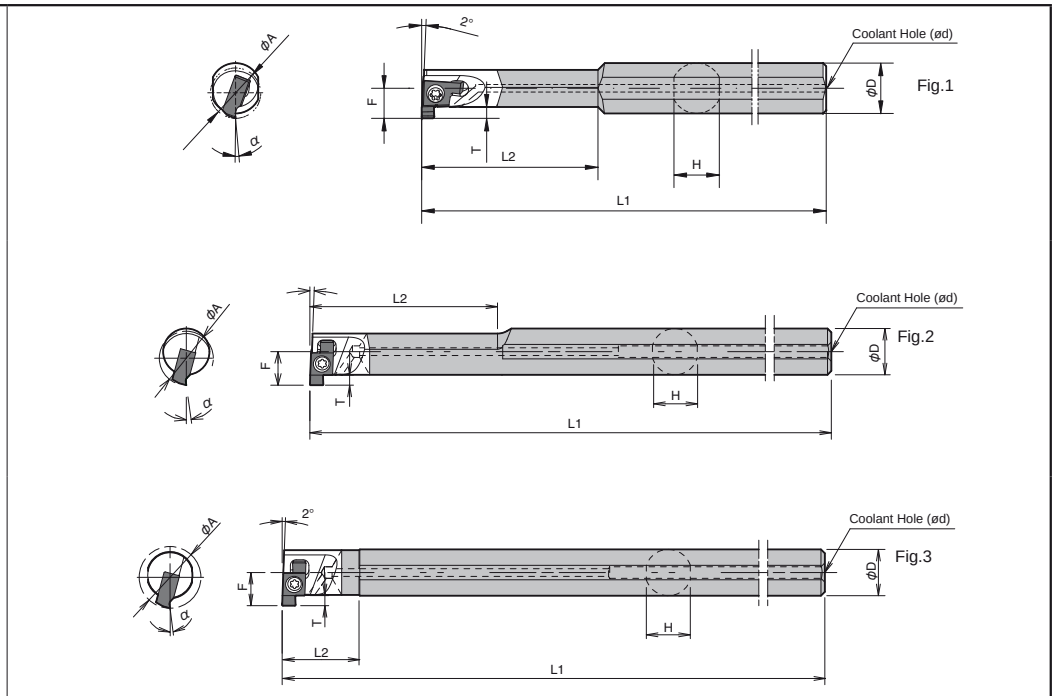


● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SIGE-WH Carbide Shank Bar (with Coolant Hole)







● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std.		Min. Cutting Dia.	Dimension (mm)							Drawing	Spare Parts			Applicable Inserts
													Clamp Screw	Wrench		
		R	L	øA	øD	H	L1	L2	F	T	ød			FT	DT	
SIGE$^{R/L}$	0808A-WH	●	●	8	8	7.2	125	28	4.8	1.5	3	Fig.1	SB-2045TRN	FT-6	-	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR
	1010B-WH	●	●	10	10	9	125	35	6.2	2.2	3		SB-2255TR	-	DT-7	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR
	1210B-WH	●	●	12			140	45	7							
	1412C-WH	●	●	14	12	11.4	150	50	8.7	2.5	4	Fig.2	SB-2570TR	FT-8	-	GE$^{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				

• Dimension T: shows available grooving depth.

Applicable Insert & Rake Angle (α) after Installment of Insert

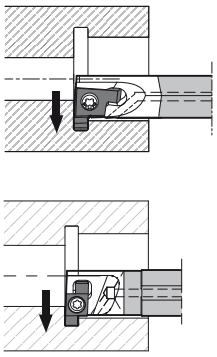
Description		Applicable Insert & Rake Angle (α) after Installment of Insert			
		Ground Chipbreaker	α (°)	Molded Chipbreaker	α (°)
SIGE$^{R/L}$	0808A-EH	GE$^{R/L}$100-005A~GE$^{R/L}$200-010A GER100-050AR~GER200-100AR	5°	-	-
	1010B-EH	GE$^{R/L}$100-005B~GE$^{R/L}$300-020B GER100-050BR~GER200-100BR	5°	-	-
	1210B-EH				
	1412C-EH	GE$^{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 ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Internal Grooving SIGE

SIGE-WH Carbide Shank Bar (with Coolant Hole)



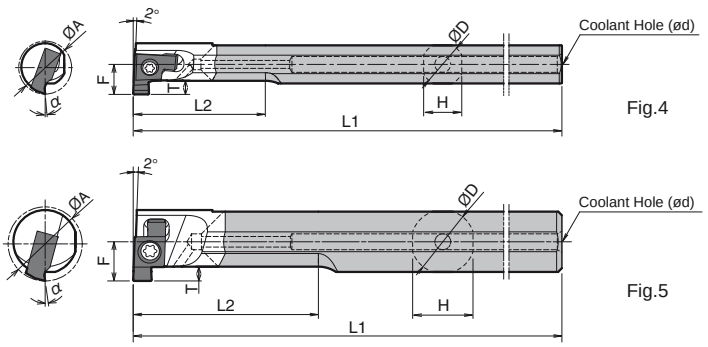


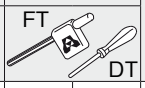
Fig.4

Fig.5

• Right-hand shown

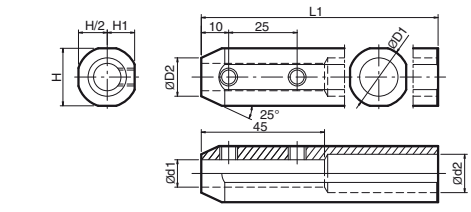
R-hand Insert for R-hand Toolholder.

Toolholder Dimensions

Description		Std.	Min. Cutting Dia.	Dimension (mm)							Drawing	Spare Parts			Applicable Inserts
												Clamp Screw	Wrench		
			øA	øD	H	L1	L2	F	T	ød			 FT DT		
SIGER	1008B-WH-90	●	10	8	7.2	90	25	5.6	2.2	3	Fig.4	SB-2255TR	-	DT-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	7.4	2.5	3	Fig.5	SB-2570TR	FT-8	-	GER100-005C~GER350-020C GER150-010CM~GER350-020CM GER200-100CR~GER300-150CR

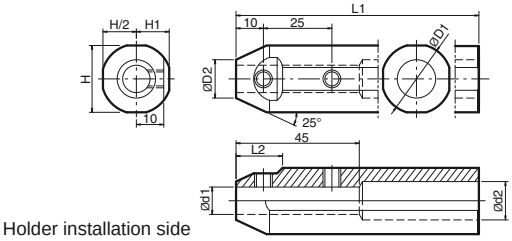
• See page G37 for applicable Insert & Rake Angle (α) after Installment of Insert.

Applicable Sleeve



Holder installation side

Fig.1



Holder installation side

Fig.2

Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Machine Manufactuer
												Screw	Wrench	
			ød1	øD1	øD2	ød2	H	H1	L1	L2				
SHA	0820-120	●	8	20	14	12	19	9.25	120	-	Fig.1	HS6x4P	LW-3	Amada Wasino Eguro Precision Tsugami Miyano
	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 VTC
	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 VTC
	1023-120	●	10											
	1223-120	●	12		16									

* Length of ød1...45mm (SHA all types)

• Select a sleeve dimension ød1 by adjusting for toolholder dimension øD.

• Names of machine builders are listed in the order of the Japanese syllabary with omitted titles of respect.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions (Ground Chipbreaker: GE^{R}/$_{L}$•••A(R), GE^{R}/$_{L}$••B(R))

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			① f at Grooving ② f at Traversing ③ ap at Traversing			Remarks
	Cermet	PVD Coated Carbide	Carbide				
	TN6020	**PR1025**	**KW10**	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	-	①0.01~0.03 ②0.01~0.03 ③Max. 0.05	①0.02~0.04 ②0.02~0.04 ③Max. 0.05	①0.02~0.04 ②0.02~0.04 ③Max. 0.1	Coolant
Alloy Steel	☆ 50~80	★ 50~80	-	①0.01~0.03 ②0.01~0.03 ③Max. 0.05	①0.02~0.04 ②0.02~0.04 ③Max. 0.05	①0.02~0.04 ②0.02~0.04 ③Max. 0.1	
Stainless Steel	-	★ 50~80	-	①0.01~0.03 ②0.01~0.03 ③Max. 0.05	①0.01~0.03 ②0.01~0.03 ③Max. 0.05	①0.01~0.03 ②0.01~0.03 ③Max. 0.1	
Cast Iron	-	-	★ 50~80	①0.01~0.03 ②0.01~0.03 ③Max. 0.05	①0.02~0.04 ②0.02~0.04 ③Max. 0.05	①0.02~0.04 ②0.02~0.04 ③Max. 0.1	
Non-ferrous Metals	-	-	★ 50~100	①0.01~0.03 ②0.01~0.03 ③Max. 0.1	①0.02~0.04 ②0.02~0.04 ③Max. 0.1	①0.02~0.04 ②0.02~0.04 ③Max. 0.2	
Brass	-	-	★ 50~100	①0.01~0.03 ②0.01~0.03 ③Max. 0.1	①0.02~0.04 ②0.02~0.04 ③Max. 0.1	①0.02~0.04 ②0.02~0.04 ③Max. 0.2	

* Use PVD coated grade or carbie for traversing with edge width 1mm. (GE^{R}/$_{L}$100-005A / 100-005B)

★: 1st Recommendation ☆: 2nd Recommendation

Recommended Cutting Conditions (Ground Chipbreaker: GE^{R}/$_{L}$•••C(R), GE^{R}/$_{L}$•••D(R), GE^{R}/$_{L}$•••E)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			① f at Grooving ② f at Traversing ③ ap at Traversing							Remarks
	Cermet	PVD Coated Carbide	Carbide	GE^{R}/$_{L}$ 100~200-010C 200-100CR	GE^{R}/$_{L}$ 250~350-020C 250~300-150CR						
	TN6020	**PR1025**	**GW15**	GE^{R}/$_{L}$ 100~145-010D GE^{R}/$_{L}$ 100-010E	GE^{R}/$_{L}$ 150~195-010D GE^{R}/$_{L}$ 150~195-010E	GE^{R}/$_{L}$ 200~280-020D 200-100DR GE^{R}/$_{L}$ 200~225-010E 230-020E	GE^{R}/$_{L}$ 250~330-020E	GE^{R}/$_{L}$ 300~400-020D 300-150DR	GE^{R}/$_{L}$ 350~430-020E	GE^{R}/$_{L}$ 450~500-020E	
Carbon Steel	☆ 120~180	★ 60~140	-	①0.03~0.08 ②0.03~0.08 ③Max. 0.3	①0.03~0.08 ②0.03~0.08 ③Max. 0.3	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	Coolant
Alloy Steel	☆ 100~160	★ 60~120	-	① 0.03~0.07 ② 0.03~0.1 ③Max. 0.3	① 0.03~0.07 ② 0.03~0.1 ③Max. 0.3	① 0.04~0.08 ② 0.04~0.08 ③Max. 0.3	① 0.04~0.08 ② 0.04~0.08 ③Max. 0.3	① 0.05~0.1 ② 0.05~0.1 ③Max. 0.5	① 0.05~0.1 ② 0.05~0.1 ③Max. 0.5	① 0.05~0.1 ② 0.05~0.1 ③Max. 0.5	
Stainless Steel	☆ 70~130	★ 60~110	-	① 0.03~0.07 ② 0.03~0.1 ③Max. 0.3	① 0.03~0.07 ② 0.03~0.1 ③Max. 0.3	① 0.04~0.08 ② 0.04~0.08 ③Max. 0.3	① 0.04~0.08 ② 0.04~0.08 ③Max. 0.3	① 0.05~0.1 ② 0.05~0.1 ③Max. 0.5	① 0.05~0.1 ② 0.05~0.1 ③Max. 0.5	① 0.05~0.1 ② 0.05~0.1 ③Max. 0.5	
Cast Iron	-	-	★ 60~100	① 0.03~0.08 ② 0.03~0.08 ③Max. 0.3	① 0.03~0.08 ② 0.03~0.08 ③Max. 0.3	① 0.04~0.09 ② 0.04~0.09 ③Max. 0.3	① 0.04~0.09 ② 0.04~0.09 ③Max. 0.3	① 0.05~0.12 ② 0.05~0.1 ③Max. 0.5	① 0.05~0.12 ② 0.05~0.1 ③Max. 0.5	① 0.05~0.12 ② 0.05~0.1 ③Max. 0.5	
Non-ferrous Metals	-	-	★ 150~300	① 0.05~0.12 ② 0.05~0.12 ③Max. 0.5	① 0.05~0.12 ② 0.05~0.12 ③Max. 0.5	① 0.05~0.15 ② 0.05~0.15 ③Max. 0.5	① 0.05~0.15 ② 0.05~0.15 ③Max. 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	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 ③Max. 0.5	① 0.05~0.12 ② 0.05~0.12 ③Max. 0.5	① 0.05~0.15 ② 0.05~0.15 ③Max. 0.5	① 0.05~0.15 ② 0.05~0.15 ③Max. 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	① 0.08~0.15 ② 0.08~0.15 ③ Max. 0.8	

* Use PVD coated grade or carbie for traversing with edge width 1mm. (GE^{R}/$_{L}$100-010C / 100-010D / 100-010E)

★: 1st Recommendation ☆: 2nd Recommendation

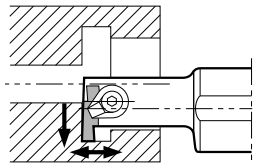
Recommended Cutting Conditions (Molded Chipbreaker: GER•••CM, GER•••DM, GER•••EM)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			① f at Grooving ② f at Traversing ③ ap at Traversing						Remarks
	Cermet	PVD Coated Carbide	Carbide							
	TN6020	**PR1025**	**GW15**	GER 150~200-010CM GER 150~200-010DM GER 150~200-010EM	GER 250~350-020CM	GER 230~250-020DM	GER 300~400-020DM GER 250~300-020EM	GER 350~400-020EM	GER 450~500-020EM	
Carbon Steel	-	★ 60~160	-	① 0.03~0.1 ② 0.03~0.1 ③ Max. 1.0	① 0.03~0.12 ② 0.03~0.1 ③ Max. 1.5	① 0.04~0.12 ② 0.04~0.1 ③ Max. 1.5	① 0.05~0.12 ② 0.05~0.1 ③ Max. 1.5	① 0.05~0.12 ② 0.05~0.1 ③ Max. 1.5	① 0.05~0.12 ② 0.05~0.1 ③ Max. 1.5	Coolant
Alloy Steel	-	★ 60~140	-	① 0.03~0.1 ② 0.03~0.1 ③ Max. 1.0	① 0.03~0.1 ② 0.03~0.1 ③ Max. 1.5	① 0.04~0.12 ② 0.04~0.1 ③ Max. 1.5	① 0.05~0.12 ② 0.05~0.1 ③ Max. 1.5	① 0.05~0.12 ② 0.05~0.1 ③ Max. 1.5	① 0.05~0.12 ② 0.05~0.1 ③ Max. 1.5	
Stainless Steel	-	★ 60~110	-	① 0.03~0.08 ② 0.03~0.1 ③ Max. 1.0	① 0.03~0.08 ② 0.03~0.1 ③ Max. 1.5	① 0.04~0.08 ② 0.04~0.1 ③ Max. 1.5	① 0.05~0.1 ② 0.05~0.1 ③ Max. 1.5	① 0.05~0.1 ② 0.05~0.1 ③ Max. 1.5	① 0.05~0.1 ② 0.05~0.1 ③ Max. 1.5	

★: 1st Recommendation ☆: 2nd Recommendation

Internal Small Diameter Grooving Toolholders [GV Insert]

GIV



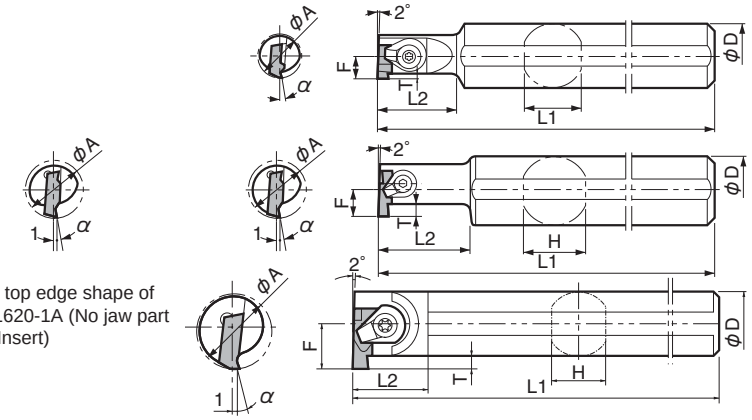


Fig.1

Fig.2

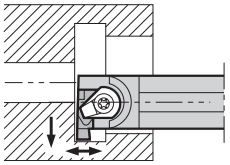
Fig.3

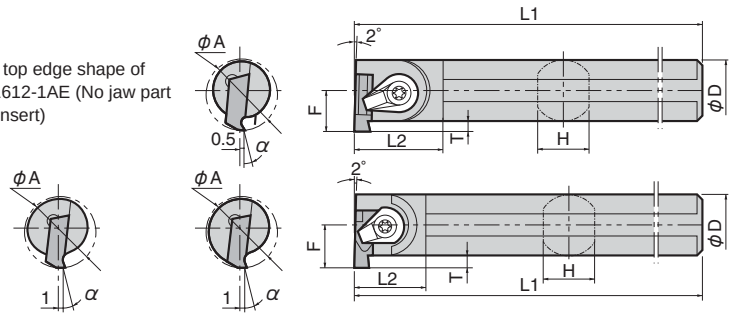
Shows top edge shape of GIV$^{R/L}$1620-1A (No jaw part under Insert)

● Right-hand shown

R-hand insert for R-hand toolholder, L-hand insert for L-hand toolholder.

GIV-E Excellent Bar





Shows top edge shape of GIV$^{R/L}$1612-1AE (No jaw part under Insert)

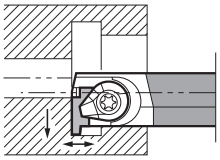
Fig.1

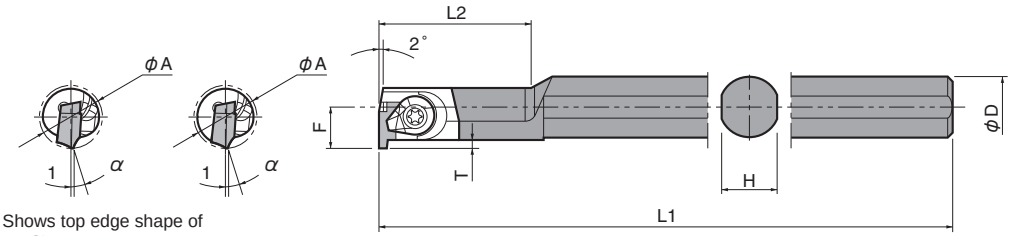
Fig.2

● Right-hand shown

R-hand insert for R-hand toolholder, L-hand insert for L-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

R-hand insert for R-hand toolholder, L-hand insert for L-hand toolholder.

● Applicable Insert & Rake Angle (α) after Installment of Insert

Toolholder	Description ➡G42		Rake Angle (α)	
	General Grooving (Square)	Full-R Grooving (Round)	TC40	TN90, TC60 PR630, PR930 KW10
GIV$^{R/L}$...1SS	GV$^{R/L}$100SS~300SS	-	10°	15°
GIV$^{R/L}$...1S	GV$^{R/L}$100S~340S	-	10°	15°
GIV$^{R/L}$...1SE	GV$^{R/L}$100S~340S	-	3°	8°
GIV$^{R/L}$...1A(□)	GV$^{R/L}$100A~340A	GV$^{R/L}$100AR~150AR	3°	8°
GIV$^{R/L}$...1B(□)	GV$^{R/L}$145B~250B	GV$^{R/L}$100BR	4°	9°
GIV$^{R/L}$...2B(□)	GV$^{R/L}$280B~400B	GV$^{R/L}$150BR		
GIV$^{R/L}$...1C(□)	GV$^{R/L}$280C~340C	-	5°	10°
GIV$^{R/L}$...2C(□)	GV$^{R/L}$400C~500C	-		

Toolholder Dimensions

Description		Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	T		Drawing	Spare Parts: Clamp Set		Wrench	Wrench
GIV$^{R}_{L}$	1216-1SS	●	●	12	16	15	150	20	6.0	2.2		Fig.1	CPS-4V	-	FT-10	-
	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	Note2) 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.1	CPS-5F	-	FT-15	-
	1612-1AE	●	●	16	12	11.4	150	19	8.2	2.2		Fig.2	CPS-5V	-	FT-15	-
	2016-1BE	●	●	20	16	15.2	180	20	11.2	Note1) 2.8		Fig.2	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.2	-	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		-	CPS-5V	-	FT-15	-
	2020-1BW	●	●	20	20	19	220	60	14.6	Note1) 2.8		-	CPS-5V	-	FT-15	-
	2020-2BW	●	●							Note2) 3.2						
	2525-1CW	●	●	25	25	24	260	70	19.1	Note3) 4.5		-	-	CPS-6V	-	LW-3
	2525-2CW	●	●							Note4) 5.5						

•Dimension T shows available grooving depth.

Note 1: GV$^{R}_{L}$200B~250B Insert is available up to a Groove Depth 3.2mm.
Note 2: GV$^{R}_{L}$300B~400B Insert is available up to a Groove Depth 4.2mm.
Note 3: GV$^{R}_{L}$340C Insert is available up to a Groove Depth 5.5mm
Note 4: GV$^{R}_{L}$430C~500C Insert is available up to a Groove Depth 6.3mm
Note 5: GV$^{R}_{L}$300B~400B Insert is available up to a Groove Depth 3.8mm.（When using GIV$^{R}_{L}$2016-2BE）
Note 6: GV$^{R}_{L}$340C Insert is available up to a Groove Depth 4.7mm.（When using GIV$^{R}_{L}$2520-1CE）
Note 7: GV$^{R}_{L}$340C Insert is available up to a Groove Depth 5.3mm.（When using GIV$^{R}_{L}$3225-1CE, GIV$^{R}_{L}$4032-1CE）

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

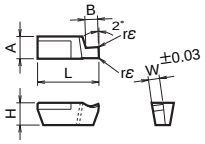
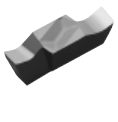
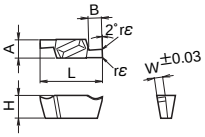
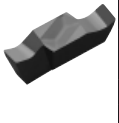
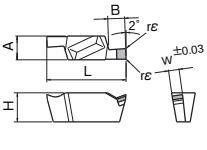
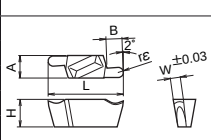
Insert for Small Internal Grooving

Applicable Inserts (GIV / GIV-E / GIV-W)

(mm)

Description	A	L	H
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
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 Alloy	
H	Hard materials (under 40HRC)	
	Hard materials (over 40HRC)	

Insert (R-hand shown)	Description	(Previous Description)	Dimensions (mm) W	B	rε	Cermet TN90	TC40	TC60	PVD Coated Carbide PR630	PR930	Carbide KW10	PCD KPD001	KPD010	Applicable Toolholder	Ref. Page for Toolholder
  1-Edge	GV$^{R/L}$ 100-020SS	GV$^{R/L}$ 100SS	1.00	2.3	0.2			●	●	R	●			GIV$^{R/L}$···1SS	G40
	GV$^{R/L}$ 125-020SS	125SS	1.25					●	●	R	●				
	GV$^{R/L}$ 145-020SS	145SS	1.45					●	●	●	●				
	GV$^{R/L}$ 200-020SS	200SS	2.00					●	●	R	●				
	GV$^{R/L}$ 250-020SS	250SS	2.50					●	●	R	●				
	GV$^{R/L}$ 300-020SS	300SS	3.00					●	●	●	●				
	GV$^{R/L}$ 100-020S	GV$^{R/L}$ 100S	1.00	2.3	0.2			●	●	●	●			GIV$^{R/L}$···1S GIV$^{R/L}$···1SE	
	GV$^{R/L}$ 125-020S	125S	1.25					●	●	R	●				
	GV$^{R/L}$ 145-020S	145S	1.45					●	●	R	●				
	GV$^{R/L}$ 185-020S	185S	1.85					●	●	R	●				
	GV$^{R/L}$ 200-020S	200S	2.00					●	●	●	●				
	GV$^{R/L}$ 250-020S	250S	2.50					●	●	R	●				
	GV$^{R/L}$ 340-020S	340S	3.40					●	●	R	●				
  2-Edge	GV$^{R/L}$ 100-020A	GV$^{R/L}$ 100A	1.00	2.3	0.2			●	●	●	●			GIV$^{R/L}$···1A GIV$^{R/L}$···1AE GIV$^{R/L}$···1AW	
	GV$^{R/L}$ 120-020A	120A	1.20					●							
	GV$^{R/L}$ 125-020A	125A	1.25					●	●	R	●				
	GV$^{R/L}$ 140-020A	140A	1.40					●							
	GV$^{R/L}$ 145-020A	145A	1.45					●	●	R	●				
	GV$^{R/L}$ 170-020A	170A	1.70					●							
	GV$^{R/L}$ 185-020A	185A	1.85					●	●	R	●				
	GV$^{R/L}$ 195-020A	195A	1.95					●							
	GV$^{R/L}$ 200-020A	200A	2.00					●	●	●	●				
	GV$^{R/L}$ 225-020A	225A	2.25					●							
	GV$^{R/L}$ 250-020A	250A	2.50					●	●	R	●				
	GV$^{R/L}$ 275-020A	275A	2.75					●							
	GV$^{R/L}$ 300-020A	300A	3.00					●	●	R	●				
	GV$^{R/L}$ 340-020A	340A	3.40					●	●	R	●				
	GV$^{R/L}$ 145-020B	GV$^{R/L}$ 145B	1.45	2.8	0.2			●	●	●	●			GIV$^{R/L}$···1B GIV$^{R/L}$···1BE GIV$^{R/L}$···1BW	
	GV$^{R/L}$ 185-020B	185B	1.85					●	●	R	●				
	GV$^{R/L}$ 200-020B	200B	2.00	3.2				●	●	●	●				
	GV$^{R/L}$ 225-020B	225B	2.25					●							
	GV$^{R/L}$ 230-020B	230B	2.30					●	R	●	R				
	GV$^{R/L}$ 250-020B	250B	2.50					●	●	●	●				
	GV$^{R/L}$ 275-020B	275B	2.75					●							
	GV$^{R/L}$ 280-020B	280B	2.80					●	R	R	R			GIV$^{R/L}$···2B GIV$^{R/L}$···2BE GIV$^{R/L}$···2BW	
	GV$^{R/L}$ 300-020B	300B	3.00	4.2				●	●	●	●				
	GV$^{R/L}$ 325-020B	325B	3.25					●							
	GV$^{R/L}$ 340-020B	340B	3.40					●	R	R	R				
	GV$^{R/L}$ 400-020B	400B	4.00					●	●	R	●				
	GV$^{R/L}$ 280-020C	GV$^{R/L}$ 280C	2.80	4.5	0.2			●	●	R	●			GIV$^{R/L}$···1C GIV$^{R/L}$···1CE GIV$^{R/L}$···1CW	
	GV$^{R/L}$ 300-020C	300C	3.00					●	●	●	●				
	GV$^{R/L}$ 325-020C	325C	3.25					●							
	GV$^{R/L}$ 340-020C	340C	3.40	5.5				●	●	●	●				
	GV$^{R/L}$ 400-020C	400C	4.00					●	●	●	●			GIV$^{R/L}$···2C GIV$^{R/L}$···2CE GIV$^{R/L}$···2CW	
	GV$^{R/L}$ 425-020C	425C	4.25					●							
	GV$^{R/L}$ 430-020C	430C	4.30	6.3				●	●	R	●				
	GV$^{R/L}$ 460-020C	460C	4.60					●	●	R	●				
	GV$^{R/L}$ 500-020C	500C	5.00					●	●	●	●				
  2-Edge	GV$^{R/L}$ 145-020A	GV$^{R/L}$ 145A	1.45	2.3	0.2								R	GIV$^{R/L}$···1A	
	GV$^{R/L}$ 200-020A	200A	2.00										R	GIV$^{R/L}$···1AE	
	GV$^{R/L}$ 300-020A	300A	3.00										○	GIV$^{R/L}$···1AW	
	GV$^{R/L}$ 200-020B	GV$^{R/L}$ 200B	2.00	3.2	0.2								R	GIV$^{R/L}$···1B	
	250-020B	250B	2.50										R	GIV$^{R/L}$···1BE GIV$^{R/L}$···1BW	
	300-020B	300B	3.00	4.2									○	GIV$^{R/L}$···2B ○	
	GV$^{R/L}$ 300-020C	GV$^{R/L}$ 300C	3.00	4.5	0.2								○	GIV$^{R/L}$···1C ○	
	GV$^{R/L}$ 400-020C	400C	4.00	5.5									○	GIV$^{R/L}$···2C ○	
  2-Edge Full-R	GV$^{R/L}$ 200-100AR	GV$^{R/L}$ 100AR	2.00	2.3	1.00			●	R	●	R			GIV$^{R/L}$···1A	
	250-125AR	125AR	2.50		1.25			R	R	R	R			GIV$^{R/L}$···1AE	
	300-150AR	150AR	3.00		1.50			R	R	R	R			GIV$^{R/L}$···1AW	
	GV$^{R/L}$ 200-100BR	GV$^{R/L}$ 100BR	2.00	3.2	1.00			●	R	R	R			GIV$^{R/L}$···1B ○	
	300-150BR	150BR	3.00	4.2	1.50			R	R	R	R			GIV$^{R/L}$···2B ○	

• Dimension B shows available grooving depth.

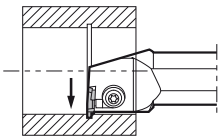
For recommended cutting conditions, see page ➔ G75

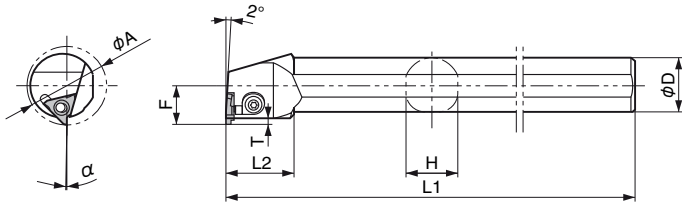
● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

KIGBA





● Right-hand shown

L-hand insert for R-hand toolholder, R-hand insert for L-hand toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	T	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts ➡G6~G8
KIGBA$^{R}_{L}$	3525-16	●	●	35	25	23	220	30	17.5	3.0	LGBA-16$^{L}_{R}$S	FT-15	GBA32$^{L}_{R}$ type
	4032-22	●	●	40	32	30	250	30	23.0	3.0	LGBA-22$^{L}_{R}$S	FT-15	GBA43$^{L}_{R}$ type

・Dimension T shows the distance from the Toolholder to the cutting edge.
Available Groove Depth : KIGBA$^{R}_{L}$3525-16 … "B" Dimension of the Applicable Insert
2.0mm for KIGBA$^{R}_{L}$4032-22…GBA43$^{R}_{L}$125-020,145-020,100-050R
2.8mm for the Inserts except the above.

・Clamp Set : LGBA-○LS for Right-hand Toolholder, and LGBA-○RS for Left-hand Toolholder.

Rake Angle (α) after Installment of GBA type

GBA32$^{R}_{L}$○○○-○○○		GBA43$^{R}_{L}$○○○-○○○		GBA43$^{R}_{L}$○○○-○○○R (Full-R)		
α	Insert Grades	α	Insert Grades	α	Insert Grades	Full-R Description
+1°	TN90 PR630 PR930 PR1115 PR905 KPD001, KPD010	-9°	KBN510, KBN525	+1°	TN90 PR630 PR930 PR1115 PR905	050R~150R
		+1°	TC40, TN90 PR630 PR930 PR1115 PR905 KPD001, KPD010	+5°	TN90 PR630 PR930 PR1115 PR905	200R
+11°	KW10	+11°	KW10		KW10	050R~200R

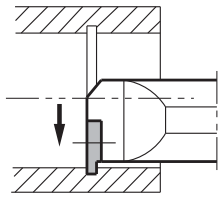
Rake Angle (α) after Installment of GBA-MY type

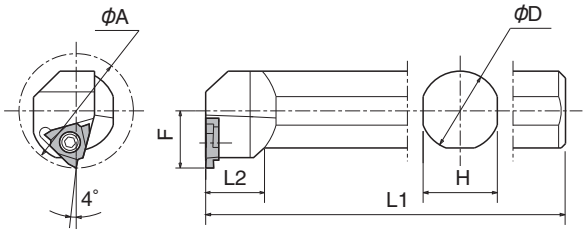
α	Insert
+6°	GBA43$^{R}_{L}$175MY ⟩ GBA43$^{R}_{L}$350MY
+5°	GBA43$^{R}_{L}$400MY

α indicates the rake angle at the center of the edge width, after installing insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KITG (Changes to KIGBA, See Page G43)





• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	Spare Parts: Clamp Screw		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

・Available Grooving Depth：KITG R/L3525T-16=2.0mm, KITG R/L4532T-22=2.5mm

* KITG will be switched to KIGBA as an Internal Large Diameter Shallow Grooving Toolholder; however, it will continue to be sold as Internal Threading Toolholder (J23).
・GBA Insert cannot be installed to this toolholder.

Applicable Inserts

(TG type insert changes to GBA type See page G6 ~ G8)

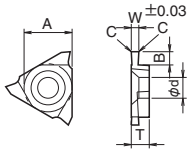
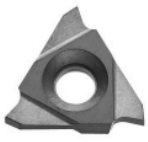
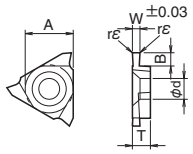
(mm)

Description	A	T	ød
TG32_	9.525	3.18	4.5
TG43_	12.70	4.76	5.5

P	Carbon Steel / Alloy Steel	●			
M	Stainless Steel				
K	Cast Iron				
N	Non-ferrous Metals				
S	Titanium Alloy				
H	Hard materials (under 40HRC)				
	Hard materials (over 40HRC)				

Classification of usage

◕ : Continuous-Light Interruption / 1st Choice
◔ : Continuous-Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Insert (R-hand shown)	Description		Dimension (mm) W	B	C or rε	Cermet TN60	TN90	TC40	TC60	Applicable Toolholder	Ref. Page for Toolholder
General (Square) TG32 type	 (Corner is C shape)	TG32 R/L	075	0.75	2.0	C0.1	●				KITG R/L ···16	G44
			095	0.95			●					
			125	1.25			●					
			145	1.45			●					
			150	1.50			●					
			175	1.75			●					
			200	2.00			●					
 General (Square) (Corner is R shape) TG43 type		TG43 R/L	150	1.50	3.5	0.2	●				KITG R/L ···22	G44
			175	1.75			●					
			200	2.00			●					
			230	2.30			●					
			250	2.50	4.0	0.3	●					
			265	2.65			●					
			280	2.80			●					
			300	3.00			●					
			330	3.30			●					
			350	3.50	5.0	0.4	●					
			400	4.00			●					
			430	4.30			●					
			450	4.50			●					

・Dimension B: shows available grooving depth.

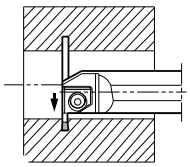
For recommended cutting conditions, see page G73

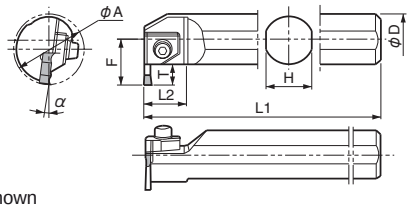
* KITG will be switched to KIGBA.
* For applicable insert, TG insert changes to GBA.
Change Insert Grade TN60 for TN90.
GBA insert has various types of material available for user's cutting condition requirements.
* Check the cornner-R(rε) of the insert when changing.

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KIGH





● Right-hand shown

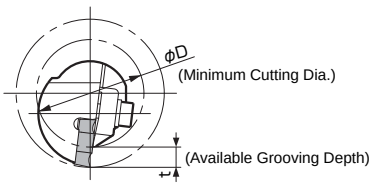


Fig.A

Toolholder Dimensions

Description		Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	T	Spare Parts: Clamp	Clamp Bolt	Washer	Spring	Wrench
KIGH R/L	4532B-4	●		45	32	30	200	27	28.2	12	CGH-1L	HH6X25	W-6	SP-6	LW-5
	5540B-4	●		55	40	38	250		32.2						
	6550B-4	●		65	50	48	300		37.2						
	4532B-5	●		45	32	30	200	27	28.2	12					
	5540B-5	●		55	40	38	250		32.2						
	6550B-5	●		65	50	48	300		37.2						
	5540B-7	●		55	40	38	250	27	32.2	12	CGH-2L				
	6550B-7	●		65	50	48	300		37.2						

・Dimension T shows the distance from the Toolholder to the cutting edge. For the available Grooving Depth (t) see "List of Minimum Available Cutting Diameter and Groove Depth".
・Dimension L2 depends on the width of the installed Insert.

Rake Angle (α) after Installment of GH / GHU

When using GH ○○○○ - ○○		When using GHU ○○○○	
α	Insert Grades	α	Insert Grades
-5°	A65, A66N	+5°	TN60 CR9025
+5°	TC40		
+15°	TN90, TC60 PR630, PR930 KW10		

List of the Minimum Cutting Diameter and Grooving Depth (Refer Fig.A)

Toolholder		øD (Minimum Cutting Dia.)					
KIGH R/L	4532B- ○	ø110	ø70	ø65	ø60	ø55	ø45
	5540B- ○	ø70	ø60	ø55			
	6550B- ○	ø65					
Available Grooving Depth t (mm)		12	11.5	11	10	9	under 8

Applicable Inserts

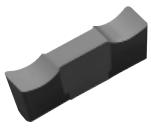
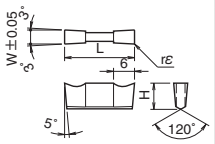
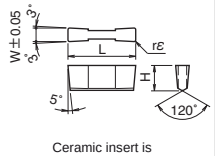
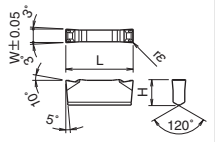
(mm)

Description	L	H
GH4020- ○○ ~GH8020- ○○	20	7.5
GHU ○○○○	20	

P	Carbon Steel / Alloy Steel							●				
M	Stainless Steel							●				
K	Cast Iron								●	○		●
N	Non-ferrous Metals								●			
S	Titanium Alloy								●			
H	Hard materials (under 40HRC)							●				
	Hard materials (over 40HRC)										○	●

Classification of usage

● : Continuous-Light Interruption / 1st Choice
◔ : Continuous-Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Insert		Description		Dimension (mm) W	rε	Cermet TN60	TN90	TC40	CVD Coated Carbide TC60	CR9025	PVD Coated Carbide PR630	PR930	Carbide KW10	Ceramic A65	A66N	PT600M	Applicable Toolholder
 Ground Chipbreaker		GH	4020-02	4.0	0.2		●	●				●	●				KIGH R/L 4532B-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		●	●				●	●				KIGH R/L 4532B-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	 Ceramic insert is above shape.		7020-02	7.0	0.2		●	●				●	●				KIGH R/L 5540B-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		●	●				●	●				
 Molded Chipbreaker		GHU	4020	4.0	0.25	●				●							KIGH R/L ···○○○ B-4
			5020	5.0	0.30	●				●							KIGH R/L ···○○○ B-5
			6020	6.0	0.30	●				●							

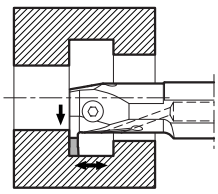
For recommended cutting conditions, see page ➡ G73

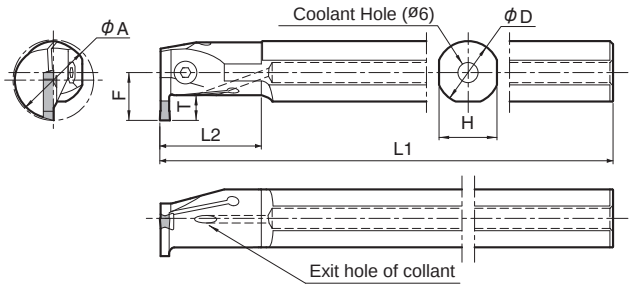
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Internal Grooving Toolholders

KIGM-V





● Right-hand shown

Toolholder Dimensions

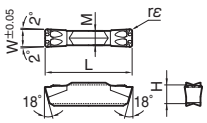
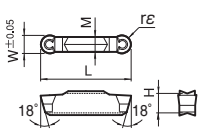
Description		Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	T				Width (mm) MIN.	Width (mm) MAX.	Spare Parts: Screw		Spare Parts: Wrench	
KIGM R/L	2016B-3V	●	●	20	16	15	150	25	11.5	5.5				3.0	3.0	GS-50	-	LW-3	-
	2520B-3V	●	●	25	20	18	180	32	14.5	6.0									
	3225B-3V	●	●	32	25	23	200	40	19	8.0						-	SB-5TR	-	LTW-20
	3225B-4V	●	●	32	25	23	200	40	19	8.5				4.0	5.0	-	SB-5TR	-	LTW-20
	4032B-4V	●	●	40	32	29	220	50	23.5	11.0									

・Dimension T shows available grooving depth.

Applicable Inserts (mm)

Description	L	H
GMM3015...V ○	15.5	4.3
GMM4020...V ○	20	
GMM5020...V ○		

		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 Alloy	
H	Hard materials (under 40HRC)	
	Hard materials (over 40HRC)	

Insert	Description	(Previous Description)	Dimension (mm) W	rε	M	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	PVD Coated Carbide PR905	Carbide KW10	Applicable Toolholder
 Chip Control Oriented M Class	 GMM 3015-040V	GMM 3015-04V	3.0	0.4	2.3	●	●	●	●	●	●	KIGM R/L 2016B-3V 2520B-3V 3225B-3V
	4020-040V	4020-04V	4.0	0.4	3.3	●	●	●	●	●	●	KIGM R/L 3225B-4V 4032B-4V
	5020-080V	5020-08V	5.0	0.8	4.2	●	●	●	●	●	●	
 Chip Control Oriented M Class Full-R / Copying	 GMM 3015-150VR	GMM 3015-15VR	3.0	1.5	2.3	●	●		●	●	●	KIGM R/L 2016B-3V 2520B-3V 3225B-3V
	4020-200VR	4020-20VR	4.0	2.0	3.3		●		●	●	●	KIGM R/L 3225B-4V 4032B-4V
	5020-250VR	5020-25VR	5.0	2.5	4.2		●		●	●	●	

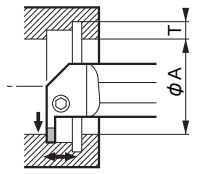
・It is not recommended to use this for KIGM-V Internal Grooving Toolholders against GMM…V / GMM…VR whose front relief angle is 18°, because the relief angle of the insert used for GMM4020-04 toolholder is 10°.

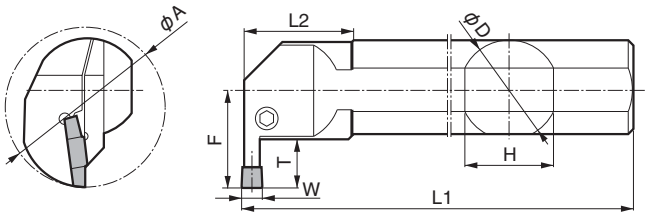
For recommended cutting conditions, see page G76

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

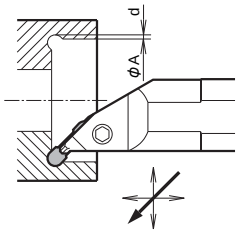
KIGM-8 (8mm-Width Insert / Large Internal Diameter Deep Grooving)

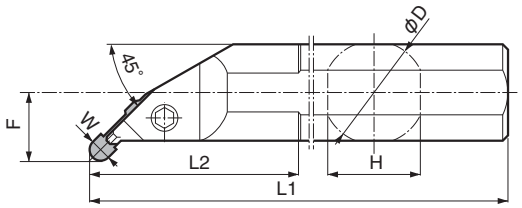




● Right-hand shown

KIGMU-8 (8mm-Width Insert / Large Internal Diameter Undercut Grooving)





● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	T	d			Width (mm) MIN.	Width (mm) MAX.	Spare Parts Screw	Spare Parts Wrench
KIGM R/L	6540B-8	●	●	65	40	36	300	41	41	20	-			8.0	8.0	HH6X20	LW-5
KIGMU R/L	6540B-8	●		65	40	36	300	83	26	-	2.2			8.0	8.0	HH6X20	LW-5

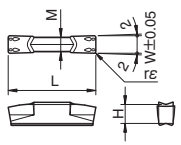
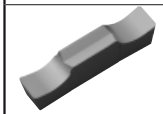
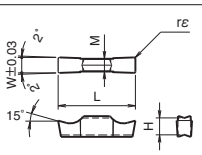
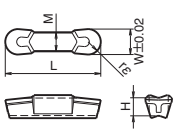
・Dimension T shows available grooving depth.
・Dimension d shows the distance from the Internal face of the workpiece.

Applicable Inserts (mm)

Description	L	H
GMM8030-080MW	30	5.5
GMG8030-050MG		
GMGA8030-400R		

		Classification of usage
P	Carbon Steel / Alloy Steel	◔ ●
M	Stainless Steel	● ◔
K	Cast Iron	● ◔
N	Non-ferrous Metals	●
S	Titanium Alloy	●
H	Hard materials (under 40HRC)	○ ●
	Hard materials (over 40HRC)	

● : Continuous-Light Interruption / 1st Choice
◔ : Continuous-Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

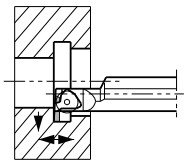
Insert		Description	(Previous Description)	Dimension (mm) W	rε	M	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	PVD Coated Carbide PR905	Carbide KW10	Applicable Toolholder	Ref. Page for Toolholder
 Chip Control Oriented / M Class		GMM 8030-080MW	GMM 8030-08	8.0	0.8	6.0		●	●	●	●	●	KIGM R/L ···8 KIGMU R/L ···8	G47
 Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG 8030-050MG	GMG 8030-05MG	8.0	0.5	6.0	●	●		●	●	●		
 Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMGA 8030-400R	GMGA 8030-40R	8.0	4.0	6.0						●		

For recommended cutting conditions, see page ➡ G77

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

KGIA



Integral Type

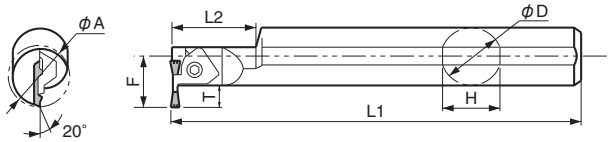
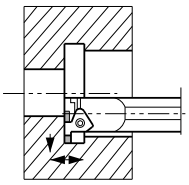


Fig.1



Separate Type

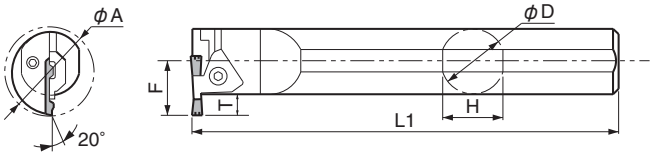


Fig.2

• Right-hand shown

Toolholder Dimensions

Description		Std.	Min. Cutting Dia. øA	Dimension (mm) øD	H	L1	L2	F	T			Drawing	Spare Parts: Clamp	Clamp Bolt	Spring	Wrench
KGIAR	3232B-3	●	32	32	30	200	45	26.3				Fig.1				
	4332B-3	●	43	32	30	200	-	26.3	10			Fig.2	CGIA-3R			
	5140B-3	●	51	40	38	250	-	30.3								
	3232B-4	●	32	32	30	200	45	26.3				Fig.1				
	4332B-4	●	43	32	30	200	-	26.3	10			Fig.2	CGIA-4R	HH5X15	SP-5	LW-4
	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								

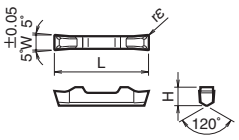
· Dimension T shows available grooving depth.

Composition

Type	Spare Parts / Toolholder		Toolholder	Blade	Screw	Wrench
Integral	KGIAR	3232B-3	-	-	-	-
Separate		4332B-3	KGIAR32H	BGIAR43-3	SB-40140TR	FT-15
		5140B-3	KGIAR40H	BGIAR51-3		
Integral		3232B-4	-	-	-	-
Separate		4332B-4	KGIAR32H	BGIAR43-4	SB-40140TR	FT-15
		5140B-4	KGIAR40H	BGIAR51-4		
Separate		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 Alloy			
H	Hard materials (under 40HRC)	○	●	
	Hard materials (over 40HRC)			

Insert		Description		Dimension (mm) W	rε	L	H	Cermet TN60	CVD Coated Carbide CR9025	Applicable Toolholder
 Molded Chipbreaker		GIA	30	3.0	0.20	25	5.0	●	●	KGIA$^{R/L}$ ···3
			40	4.0	0.25			●	●	KGIA$^{R/L}$ ···4
			50	5.0	0.30	30		●	●	KGIA$^{R/L}$ ···5

For recommended cutting conditions, see page ➡ G74

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Summary of Face Grooving

Micro Face Grooving ø6~



G55

STW

Min. Face Grooving Dia.: ø6
Width: 0.5~2.0
Depth: 1.0~3.0



G55

STWS

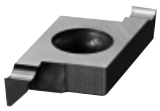
Min. Face Grooving Dia.: ø6
Width: 0.5~2.0
Depth: 1.0~3.0



G55

S..-STW

Min. Face Grooving Dia.: ø6
Width: 0.5~2.0
Depth: 1.0~3.0

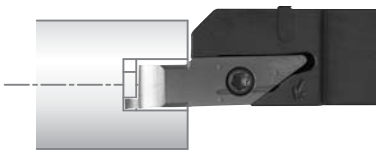


Lay-down twin bar



Up-right twin bar

Small Dia. Face Grooving ø8~



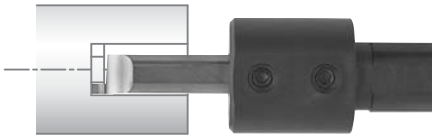
G56

VNFG

Min. Face Grooving Dia.: ø8
Width: 1.0~3.0
Depth: 2.0~3.0



System Tip-Bar



G53

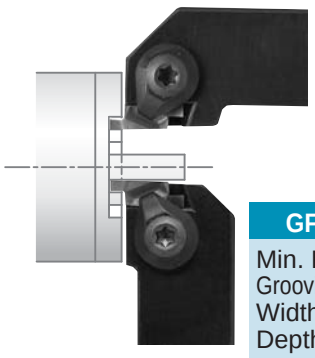
HPFG

Min. Face Grooving Dia.: ø8
Width: 1.0~3.0
Depth: 2.0~3.0



2-Edge Tip-Bar

Small Dia. Face Grooving ø8~



GFVS-AA

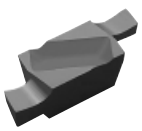
Min. Face Grooving Dia.: ø8
Width: 1.0~3.0
Depth: 2.2

G58

GFVT-AA

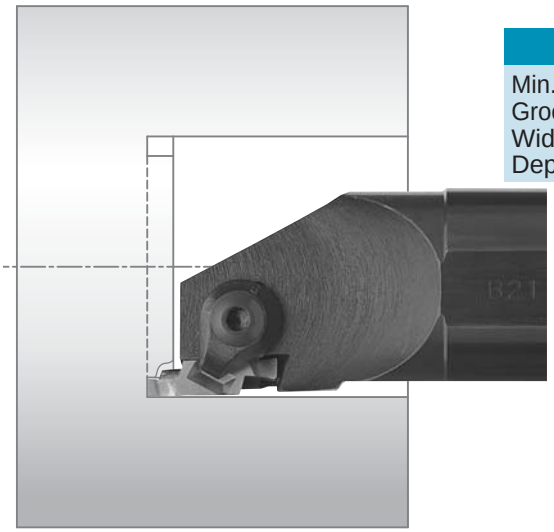
Min. Face Grooving Dia.: ø8
Width: 1.0~3.0
Depth: 2.2

G58



Ground Chipbreaker

Face Grooving ø35~



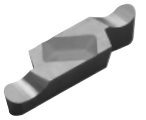
G70

GIFV

Min. Face Grooving Dia.: ø35~50
Width: 2.0~6.0
Depth: 2.2~8.1



Ground Chipbreaker



Ground Chipbreaker Full-R

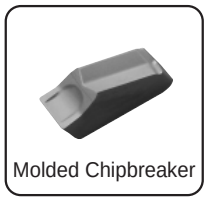
Summary of Face Grooving

General Face Grooving ø20~

➡G69

KFTB

Min. Face
Grooving Dia.: ø65~250
Width: 4.0~5.0
Depth: 25~38



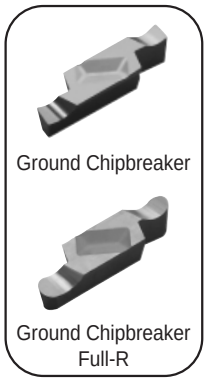
Molded Chipbreaker



➡G62

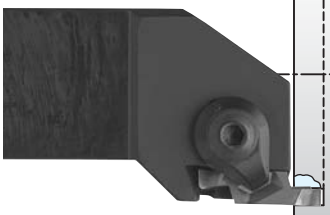
GFVS

Min. Face
Grooving Dia.: ø35~150
Width: 2.0~6.0
Depth: 4.6~8.1



Ground Chipbreaker

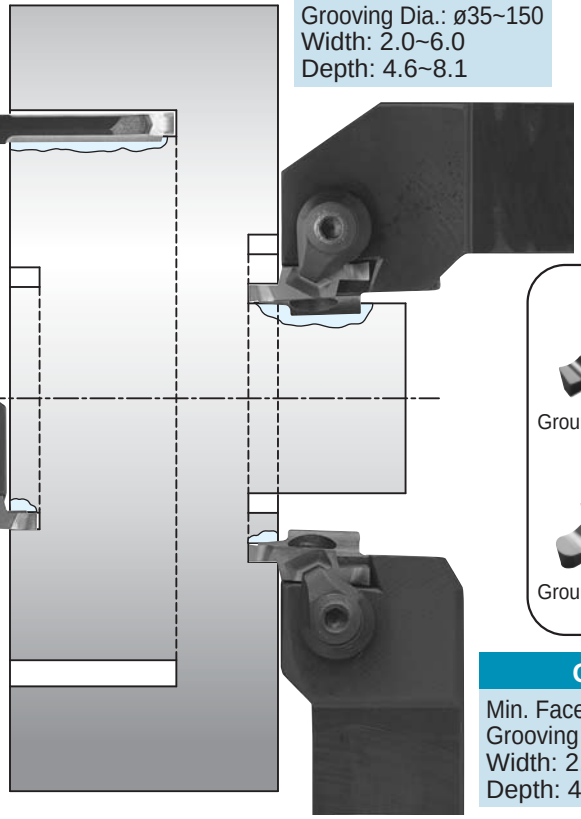
Ground Chipbreaker
Full-R

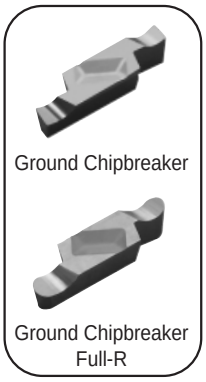


GFV

Min. Face
Grooving Dia.: ø20~150
Width: 2.0~6.0
Depth: 2.2~8.1

➡G60





Ground Chipbreaker

Ground Chipbreaker
Full-R

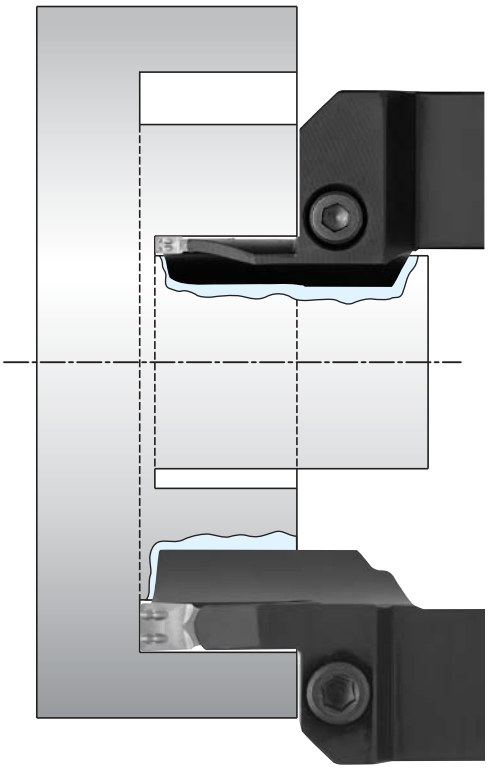
GFVT

Min. Face
Grooving Dia.: ø35~150
Width: 2.5~6.0
Depth: 4.6~8.1

➡G62

Face Grooving & Traversing ø25~

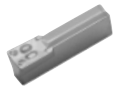
(CERACUT Plunge & Turn)



KFMS

Min. Face
Grooving Dia.: ø25~235
Width: 3.0~6.0
Depth: 13~32

➡G66

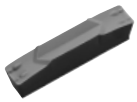


Molded Chipbreaker

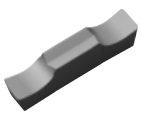
➡G68

KFMS-8

Min. Face
Grooving Dia.: ø54~155
Width: 8
Depth: 25



Molded
Chipbreaker



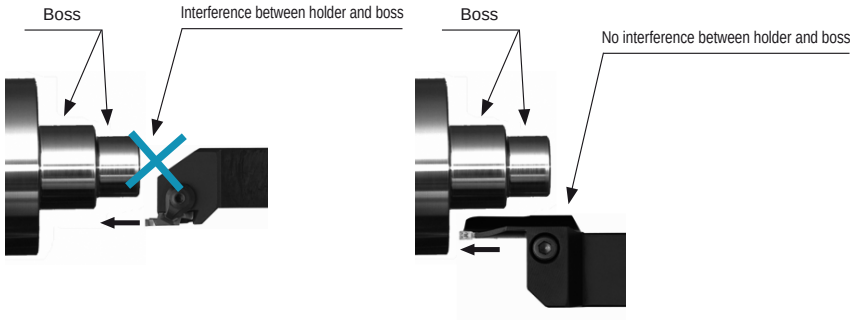
Ground
Chipbreaker



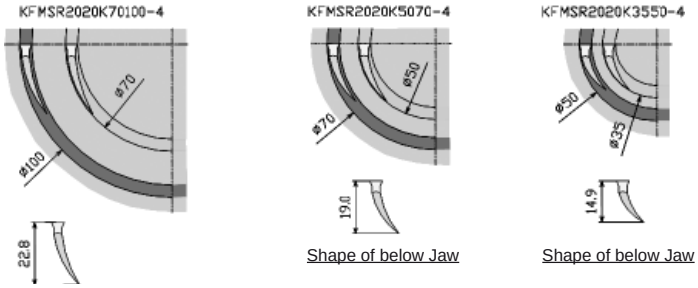
Ground Chipbreaker
Full-R

Caution for Face Grooving

1) For face grooving, holder description to be selected is different depending on with or without boss

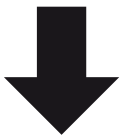


2) Selection of Face Grooving Toolholder

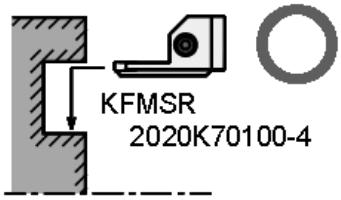


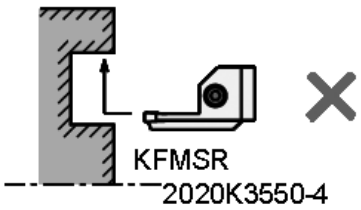
Shape of below Jaw | Shape of below Jaw | Shape of below Jaw

For holders which can machine a face groove of the same dimension, the holders with larger cutting dia. have longer dimension of below jaw and higher holder rigidity.



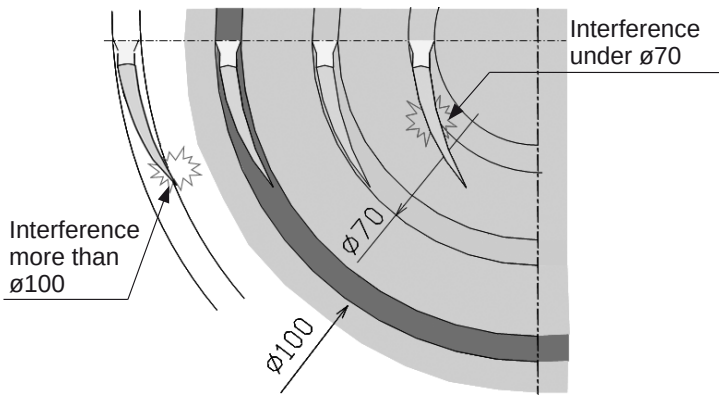
Widening groove (traversing) should be performed from outer to inner





3) Interference of Face Grooving Toolholder

e.g.) KFMSR2525M70100-4



- Usage example of face grooving toolholder.

When face grooving, KFMSR2525M70100-4 should be between ø70~ø100 for groove outer diameter at first. If it is machined for ø100 and over or ø70 and below at first, the jaw of holder interferes with the workpiece.

Face Grooving Diameter Table

● Specification Table of Shallow Grooving Insert (Depth ≦ 8.1mm)

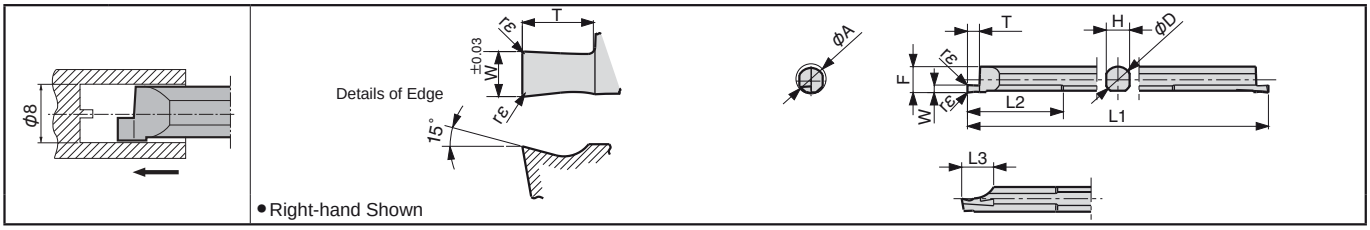
Type	Width (mm)	Depth (mm)	Face Grooving Dia.øD (mm)	Reference Page
TWFG (Lay-down Twin Bar)	0.5~2.0	1.0~3.0	6~∞ (Traversing is not available)	**G54**
TWFGT (Up-right Twin Bar)	0.5~2.0	1.0~3.0	6~∞ (Traversing is not available)	
VNFG (System Tip-Bar)	1.0~3.0	2.0~3.0	8~∞ (Traversing is not available)	**G56**
HPFG (2 Edges Tip-Bar)	1.0~3.0	2.0~3.0	8~∞ (Traversing is not available)	**G53**
PSFG-S (Tip-Bar)	1.0~3.0	2.0	8~∞ (Traversing is not available)	**G57**
GFVS-AA, GFVT-AA	1.0~3.0	2.2	8~∞ (ap has to be less than corner-R(rε) when traversing with edge width 1.0mm)	**G58**
GFV 201A	2.0~3.4	2.2	20~∞	**G60**
KGMM KGMS	3.0	3.0~3.5	22~∞	**G24**
	4.0	4.0	28~∞	
	5.0	4.0	30~∞	
GIFV 201A	2.0~3.4	2.2	35~∞	**G70**
GFV, GFVS, GFVT 351B	2.5~3.5	4.6	35~50	**G60 G62 G70**
GIFV 352B	4.0~4.9	5.1	35~50	
GFV, GFVS, GFVT GIFV 501B	2.5~3.5	4.6	50~70	
502B	4.0~4.9	5.1	50~70	
501C	3.5~4.5	6.6	50~70	
502C	5.0~6.0	8.1	50~70	
GFV, GFVS, GFVT 701B	2.5~3.5	4.6	70~100	**G60 G62**
702B	4.0~4.9	5.1	70~100	
701C	3.5~4.5	6.6	70~100	
702C	5.0~6.0	8.1	70~100	
GFV, GFVS, GFVT 1001C	3.5~4.5	6.6	100~150	
1002C	5.0~6.0	8.1	100~150	
GFV, GFVS, GFVT 1501C	3.5~4.5	6.6	150~250	
1502C	5.0~6.0	8.1	150~250	

● Specification Table of Deep Grooving Insert (Depth ＞ 8.1mm)

Toolholder Type	Width (mm)	Depth (mm)	Face Grooving Dia.øD (mm)	Reference Page
KFMS$^{R}_{L}$-3	3.0	13	25~30	**G66**
			30~40	
			40~50	
		22	50~65	
			65~85	
		25	85~110	
			110~145	
KFMS$^{R}_{L}$-4	4.0	12	25~35	
		20	35~50	
		25	50~70	
			70~100	
			100~150	
			150~220	
			220~∞	
KFMS$^{R}_{L}$-5	5.0 6.0	20	25~35	**G67**
			35~50	
		25	50~75	
			75~115	
			115~180	
			180~235	
			235~∞	
KFMS$^{R}_{L}$-8	8.0	25	54~64	**G68**
			63~82	
			80~115	
			105~160	
			155~510	

Blade type	Width (mm)	Depth (mm)	Face Grooving Dia.øD (mm)	Reference Page
KFTB$^{R}_{L}$-4S	4.0	25	65~100	**G69**
		30	90~150	
			140~250	
			230~∞	
KFTB$^{R}_{L}$-5S	5.0	30	90~150	
		32	150~250	
		38	250~∞	

HPFG

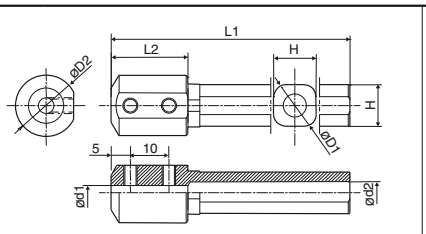


Tip-Bar Dimensions

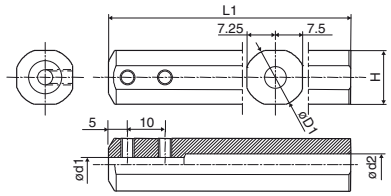
Description	Min. Face Grooving Dia.	Dimension (mm)									Insert Grade			
											PVD Coated Carbide		Carbide	
	øA	W±0.03	rε	øD	H	L1	L2	L3	F	T	PR930		KW10	
											R	L	R	L
HPFGR/L 0807-10	8	1	+0 -0.02 0.05	7	6.2	80	25	8.5	6.9	2	●	●	●	
0807-20		2								3	●	●	●	
0807-30		3									●	●	●	

・Dimension T: shows available grooving depth.

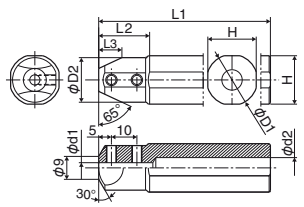
Applicable Sleeve



(Tip-Bar installation side) Fig.1



(Tip-Bar installation side) Fig.2



(Tip-Bar installation side) Fig.3

Description	Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Machine Manufactuer	Applicable Tip-Bar
		*ød1	øD1	øD2	ød2	H	L1	L2	L3		Screw	Wrench		
PSH 0712-80	●	7	12	16	8	11	80	20	-	Fig.1	HS4×4P	LW-2	(General use)	HPFGR/L0807…
PSH 0716-100	●	7	16	-	8	15	100	-	-	Fig.2				
PSH 0720-120	●	7	20	17.5	8	19	120	20	7.5	Fig.3	HS4×4P	LW-2	Amada Wasino Eguro Precision Tsugami Miyano (General use)	
PSH 0725.0-135	●	7	25	18	8	24	135	23	8					
PSH 0719-120	●	7	19.05	17.5	8	18	120	20	7.5	Fig.3	HS4×4P	LW-2	Citizen Machinery	
PSH 0720-120	●	7	20	17.5	8	19	120	20	7.5					
PSH 0725-120	●	7	25.4	18	8	24.4	120	23	8					
PSH 0722-135	●	7	22	18	8	21	135	22	8	Fig.3	HS4×4P	LW-2	Star Micronics Nomura VTC	
PSH 0723-120	●	7	23	18	8	22	120	22	8	Fig.3	HS4×4P	LW-2	Nomura VTC	

*: Length of ød1…25mm (PSH07)

・Names of machine builders are listed in the order of the Japanese syllabary with omitted titles of respect.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)		HPFGR / L 0807-10	HPFGR / L 0807-20	HPFGR / L 0807-30	Remarks
	PVD Coated Carbide	Carbide				
	PR930	KW10	f (mm/rev)			
Carbon Steel / Alloy Steel	★ 30~100	–	~0.02	~0.04	~0.05	Coolant
Stainless Steel	★ 30~80	–	~0.01	~0.02	~0.03	
Non-ferrous Metals	–	★ ~300	~0.04	~0.06	~0.08	

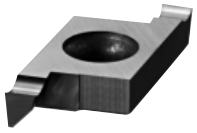
★: 1st Recommendation ☆: 2nd Recommendation

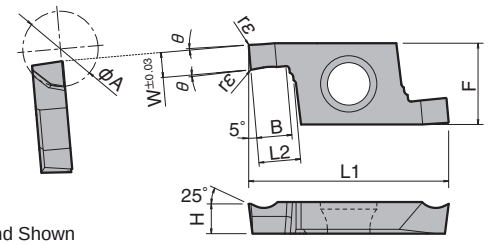
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Tip-Bars are sold in 1 piece boxes.

Micro Face Grooving (Twin Bar)

TWFG (Lay-down type)





• Left-hand Shown



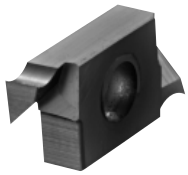
Example of installing insert for straight square shank

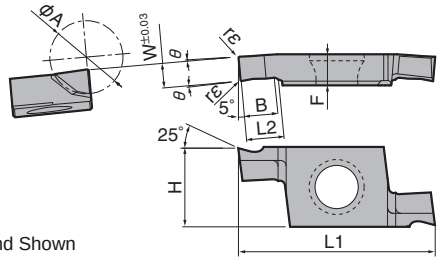
Insert Dimensions

Description		Min. Cutting Dia.	Dimension (mm)							Angle (°)	Insert Grade PVD Coated Carbide		Insert Grade Carbide	Ref. Page for Toolholder
		øA	W	rε	H	L1	L2	F	B	θ	PR1025		KW10	
TWFGL	050	6	0.5	0.05	2.38	16	3	6.5	1.0	1.5°	L		L	G55
	080		0.8						1.5		L		L	
	100		1.0						2.2	2°	L		L	
	125		1.25								L		L	
	150		1.5								L		L	
	180		1.8						3.0		L		L	
	200		2.0								L		L	

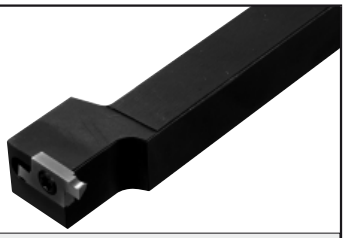
· Dimension B: shows available grooving depth.

TWFGT (Up-right type)





• Right-hand Shown



Example of installing insert for L-shape square shank

Insert Dimensions

Description		Min. Cutting Dia.	Dimension (mm)							Angle (°)	Insert Grade PVD Coated Carbide		Insert Grade Carbide	Ref. Page for Toolholder
		øA	W	rε	H	L1	L2	F	B	θ	PR1025		KW10	
TWFGTR	050	6	0.5	0.05	6.4	16	3	2.35	1.0	1.5°	R		R	G55
	080		0.8						1.5		R		R	
	100		1.0						2.2	2°	R		R	
	125		1.25								R		R	
	150		1.5								R		R	
	180		1.8						3.0		R		R	
	200		2.0								R		R	

· Dimension B: shows available grooving depth.

Recommended Cutting Conditions (TWFG / TWFGT)

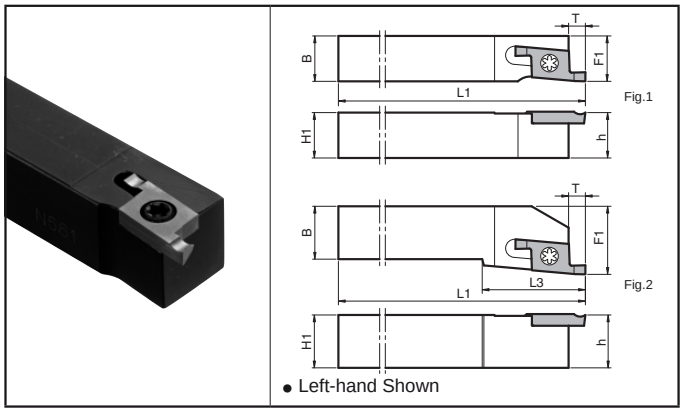
Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)		TWFGL050 TWFGL080 TWFGL100 TWFGTR050 TWFGTR080 TWFGTR100	TWFGL125 TWFGL150 TWFGTR125 TWFGTR150	TWFGL180 TWFGL200 TWFGTR180 TWFGTR200	Remarks
	PVD Coated Carbide	Carbide				
	PR1025	KW10	f (mm/rev)			
Carbon Steel / Alloy Steel	★ 30~100		~0.02	~0.03	~0.04	Coolant
Stainless Steel	★ 30~80		~0.01	~0.02	~0.02	
Non-ferrous Metals		★ ~300	~0.03	~0.04	~0.06	

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

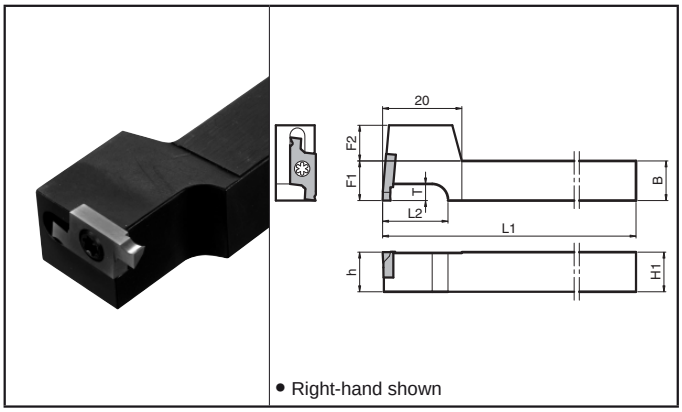
Twin Bars are sold in 5 piece boxes.

STW (Square shank for Lay-down type inserts)



● Left-hand Shown

STWS (Square shank for Up-right inserts: L-shape)



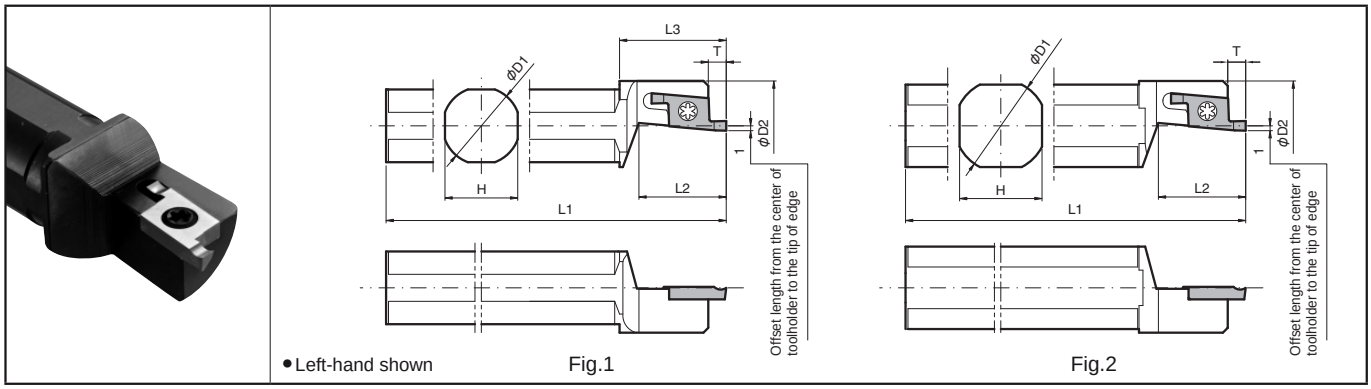
● Right-hand shown

Toolholder Dimensions

Description		Std.	Dimension (mm)									Drawing	Spare Parts		Applicable Inserts ➔ G54
			H1=h	B	L1	L2	L3	F1	F2	T	F3		Clamp Screw	Wrench	
STWL	1010F-15	●	10	10	80	-	-	10	-	3	-	Fig.1	SB-3080TR	LTW-10S	TWFGL ○○○
	1212F-15	●	12	12				12							
	1010K-15	●	10	10	125			10							
	1212K-15	●	12	12				12							
	1616K-15	●	16	16				16							
	2020K-15	●	20	20			25	25				Fig.2			
	2525M-15	●	25	25	150			32							
STWSR	1010F-15T	●	10	10	80	16	-	10	9	3	-	-	SB-3080TR	LTW-10S	TWFGTR ○○○
	1212F-15T	●	12	12				12	7						
	1010K-15T	●	10	10	125			10	9						
	1212K-15T	●	12	12				12	7						
	1616K-15T	●	16	16		20		16	3						

・Dimension T shows the distance from the Toolholder to the cutting edge. Dimension B shows available grooving depth.

S..-STW (Round shank for Lay-down type inserts)



● Left-hand shown Fig.1 Fig.2

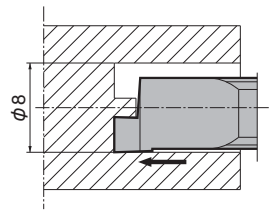
Toolholder Dimensions

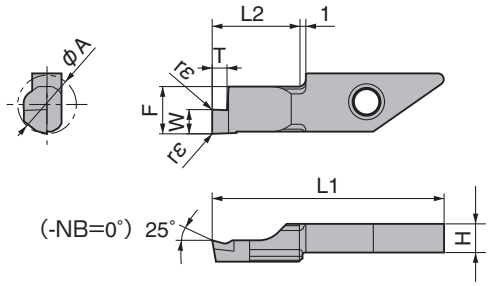
Description		Std.	Dimension (mm)								Drawing	Spare Parts		Applicable Inserts ➔ G54
			øD1	øD2	H	L1	L2	L3	T			Clamp Screw	Wrench	
S12F-	STWL15	●	12	20	11	80	18	22	3		Fig.1	SB-3080TR	LTW-10S	TWFGL ○○○
S14H-	STWL15	●	14		13	100								
S15F-	STWL15	●	15.875		15	85								
S16F-	STWL15	●	16											
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	23	120								

・Dimension T shows the distance from the Toolholder to the cutting edge. Dimension B shows available grooving depth.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

VNFG (System Tip-Bar)





• Right-hand Shown

Insert Dimensions

Classification of usage			
● : Continuous / 1st Choice	P	Carbon Steel / Alloy Steel	●
○ : Continuous / 2nd Choice	M	Stainless Steel	○
	K	Cast Iron	●
	N	Non-ferrous Metals	○ ●
	S	Titanium Alloy	○ ●
	H	Hard materials (under 40HRC)	●
		Hard materials (over 40HRC)	

Description		Min. Cutting Dia.	Dimension (mm)							Cermet	PVD Coated Carbide			Carbide	PCD		Ref. Page for Toolholder
		øA	W±0.03	rε	H	L1	L2	F	T	TC60	PR630	PR915	PR930	KW10	KPD001	KPD010	
VNFGR	0810-10	8	1.0	0.05	3.9	29.6	10	7.3	2.0	●	●		●	●			F12 F13 F14
	0820-10	8	2.0							●	●		●	●			
	0830-10	8	3.0						3.0	●	●		●	●			
VNFGR	0820-10NB	8	2.0	0.05	3.9	29.6	10	7.3	2.0						○	○	
	0830-10NB	8	3.0						3.0						○	○	

• Dimension T shows available grooving depth.

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)				VNFG0810	VNFG0820	VNFG0830	Remarks
	Cermet	PVD Coated Carbide		Carbide	f (mm/rev)			
	TC60	PR630	PR930	KW10				
Carbon Steel / Alloy Steel	☆ 60~120	☆ 30~100	★ 30~100		~0.02	~0.04	~0.05	Coolant
Stainless Steel	☆ 50~100	☆ 30~80	★ 30~80		~0.01	~0.02	~0.03	
Non-ferrous Metals				★ ~300	~0.04	~0.06	~0.08	

★ : 1st Recommendation ☆ : 2nd Recommendation

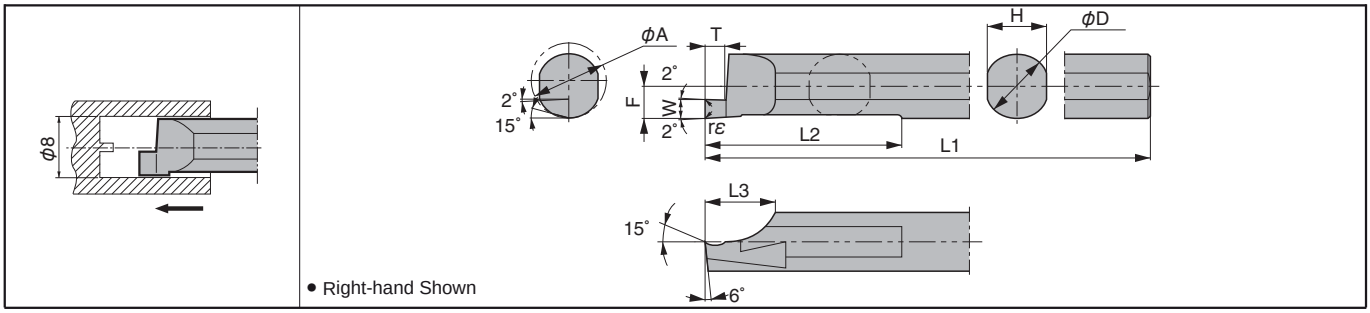
System Tip-Bars are sold in 5 piece boxes.

CBN & PCD Tools are sold in 1 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PSFG-S (Tip Bar)

This insert will be switched to **HPFG** (2-Edge See Page ➡ **G53**).



Tip-Bar Dimensions

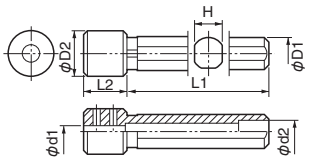
Classification of usage									
● : Continuous / 1st Choice ○ : Continuous / 2nd Choice	P	Carbon Steel / Alloy Steel				●			
	M	Stainless Steel				●			
	K	Cast Iron					●		
	N	Non-ferrous Metals					●		
	S	Titanium Alloy					●		
	H	Hard materials (under 40HRC)				●			
		Hard materials (over 40HRC)							

Description		Min. Cutting Dia.	Dimension (mm)									Cermet	PVD Coated Carbide			Carbide	PCD	
		øA	W±0.03	rε	H	L1	L2	F	T	F	T	TC60	PR630	PR915	PR930	KW10	KPD001	KPD010
PSFG R/L	0810-20S	8	1.0	0.05	6.8	6.2	80	25.5	7	3.4	2.0	●	●		●	●		
	0820-20S	8	2.0									●	●		●	●		
	0830-20S	8	3.0									●	●		●	●		

・Dimension T shows available grooving depth.

Applicable Sleeve

This sleeve is for 1-Edge Tip-Bar. For 2-Edge Tip-Bar, use ➡ **G53**.

Shape	Description	(Previous Description)	Std.	Dimension (mm)							Spare Parts		Applicable Tip-Bar
				øD1	øD2	ød1	ød2	H	L1	L2	Screw	Wrench	
 (Tip-Bar installation side)	PH 0712-60	PH -0712	●	12	19	6.8	8	11	60	20	HS4X4	LW-2	PSFG R/L 08○○-20S
	PH 0716-80	PH -0716	●	16	22	6.8	Rp¼ (PS¼)	15	80	20	HS4X4	LW-2	PSFG R/L 08○○-20S

・Besides the above Sleeves, Collet Chucks are also available in the market.

Recommended Cutting Conditions

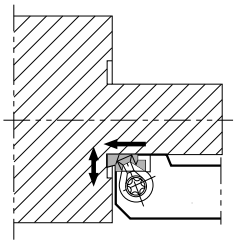
Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)				PSFG0810	PSFG0820	PSFG0830	Remarks
	Cermet	PVD Coated Carbide		Carbide	f (mm/rev)			
	TC60	PR630	PR930	KW10				
Carbon Steel / Alloy Steel	☆ 60~120	☆ 30~100	★ 30~100		~0.02	~0.04	~0.05	Coolant
Stainless Steel	☆ 50~100	☆ 30~80	★ 30~80		~0.01	~0.02	~0.03	
Non-ferrous Metals				★ ~300	~0.04	~0.06	~0.08	

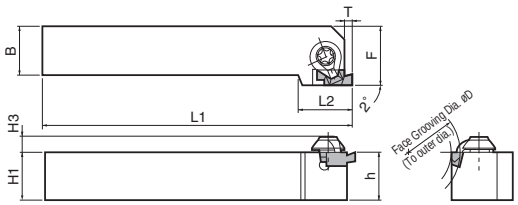
★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

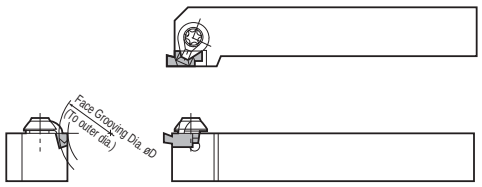
Tip-Bars are sold in 1 piece boxes.

GFVS-AA





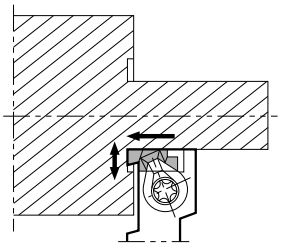
● Right-hand Shown



● Left-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

GFVT-AA



Without Offset (□10mm, □12mm)

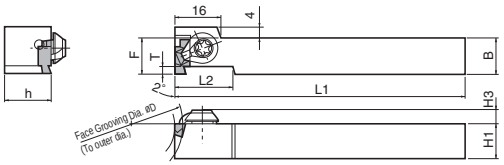
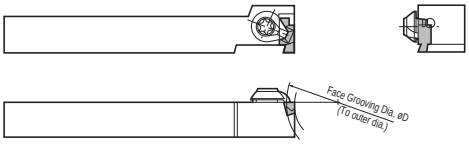


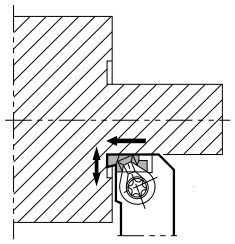
Fig.1

● Right-hand Shown



● Left-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.



With Offset (□16mm, □20mm, □25mm)

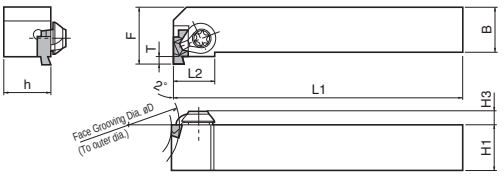
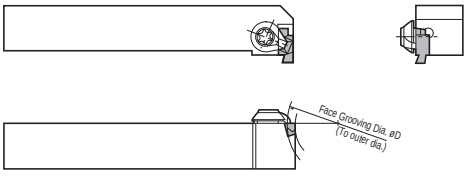


Fig.2

● Right-hand Shown



● Left-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1	h	H3	B	L1	L2	F	T	Face Grooving Dia. øD MIN.	Face Grooving Dia. øD MAX.	Drawing	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts ➔ G59
GFVS R/L	1010F-08AA	●	●	10	10		10	80		15							
	1212H-08AA	●	●	12	12		12	100		16							
	1616H-08AA	●	●	16	16	5.5	16	100	18	20	2.2	8 (0)	∞ (∞)	-	CPS-5V	FT-15	GVF L/R 100-005AA ⟆ GVF L/R 300-005AA
	2020K-08AA	●	●	20	20		20	125		25							
	2525M-08AA	●	●	25	25		25	150		32							
GFVT R/L	1010F-08AA	●	●	10	10		10	80	20	10				Fig.1			
	1212H-08AA	●	●	12	12		12	100		12							
	1616H-08AA	●	●	16	16	5.5	16	100		20	2.2	8 (0)	∞ (∞)		CPS-5V	FT-15	GVF L/R 100-005AA ⟆ GVF L/R 300-005AA
	2020K-08AA	●	●	20	20		20	125	14	25				Fig.2			
	2525M-08AA	●	●	25	25		25	150		32							

Note 1: Dimension T shows available grooving depth.

2. The value ( ) of Face Grooving External Dia. (øD Max) is the maximum outer diameter value after the initial groove between MIN~MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving External Dia. (øD 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 MIN~MAX.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

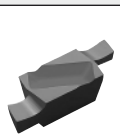
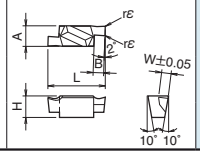
(mm)

Description		A	L	H
GVF$^{R}_{L}$	...-100AA	4.3	12	4.5
	...-200AA			
	...-300AA			

P	Carbon Steel / Alloy Steel					●			
M	Stainless Steel					●			
K	Cast Iron						◕		
N	Non-ferrous Metals						◕		
S	Titanium Alloy						◕		
H	Hard materials (under 40HRC)					●			
	Hard materials (over 40HRC)								

Classification of usage

◕ : Continuous-Light Interruption / 1st Choice
◔ : Continuous-Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Insert (R-hand shown)		Description	(Previous Description)	Dimension (mm) W	B	rε	Cermet TN90	Cermet TC40	Cermet TC60	PVD Coated Carbide PR630	PVD Coated Carbide PR930	Carbide KW10	PCD KPD001	PCD KPD010	Applicable Toolholder	Ref. Page for Toolholder
		GVF$^{R}_{L}$ 100-005AA	GVF$^{R}_{L}$ 100AA	1.00	2.2	0.05					●	○			GVFS$^{R}_{L}$····08AA GVFT$^{R}_{L}$····08AA	G58
		200-005AA	200AA	2.00							●	○				
		300-005AA	300AA	3.00							●	○				

・Dimension B: shows available grooving depth.

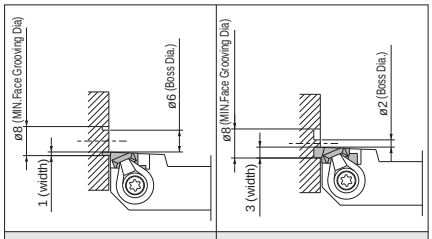
・GVF$^{R}_{L}$...005AA inserts are not compatible with GVF$^{R}_{L}$...−○○○A (see page **G65**) inserts because their Side Relief Angle is 10˚.

Face Grooving Diameter of GFVS-AA (also GFVT-AA)

Description		Face Grooving Dia. øD MIN.	Face Grooving Dia. øD MAX.	Applicable Inserts
GFVS$^{R}_{L}$	1010F-08AA	8	∞	GVF$^{L}_{R}$100AA ~ GVF$^{L}_{R}$300AA
	1212H-08AA			
	1616H-08AA			
	2020K-08AA	(0)	(∞)	
	2525M-08AA			

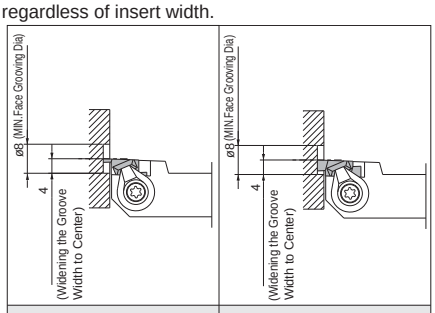
- It is available to infinity ∞ in case of machining the first groove bigger than MIN.
- It is available to infinity ∞ when machining toward outer diameter.
- Refers to the machining of the initial groove with MIN.ø8.

If the initial groove is made smaller than this, the toolholder interferes with the workpiece.



Installing GVFL100AA | Installing GVFL300AA

- When widening the groove width to inner diameter. For machining up to the center of the workpiece regardless of insert width.



Installing GVFL100AA | Installing GVFL300AA

Recommended Cutting Conditions (GFVS-AA / GFVT-AA)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min) PVD Coated Carbide PR630	PVD Coated Carbide PR930	Carbide KW10	Grooving f (mm/rev)	Traversing* ap (mm)	Traversing* 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	

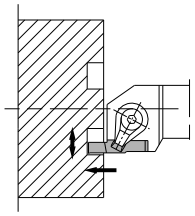
* ap has to be set for less than corner-R(rε) when traversing of edge width 1.0 mm (GVF$^{R}_{L}$100AA).

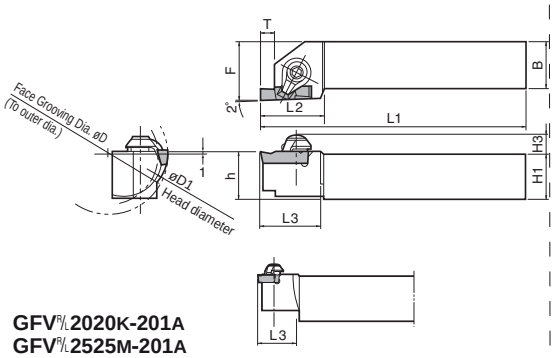
★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

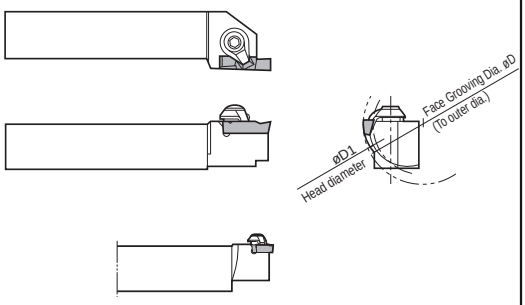
GFV





GFV$^{R}_{L}$2020K-201A
GFV$^{R}_{L}$2525M-201A
Shows right Figure.

● Right-hand Shown



● Left-hand Shown

R-hand Insert is for R-hand Toolholder, L-hand Insert is for L-hand Toolholder.

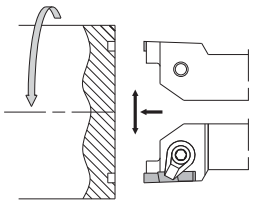
Toolholder Dimensions

Description		Std. R	Std. L	H1	h	H3	B	L1	L2	L3	F	T	øD1	Face Grooving Dia. øD MIN.	Face Grooving Dia. øD MAX.	Spare Parts: Clamp Set	Spare Parts: Clamp Set	Spare Parts: Wrench	Applicable Inserts G65
GFV$^{R}_{L}$	2020K-201A	●	●	20	21	6.5	20	125	20	19	25	2.2	40	20 (12)	∞	CPS-5V	-	FT-15	GVF$^{R}_{L}$200A~340A
	2525M-201A	●	●	25	26		25	150	23	22	32								GVF$^{R}_{L}$100AR~150AR
GFV$^{R}_{L}$	2020K-351B	●	●	20	21	8.0	20	125	28	26	25	4.6	35	35 (25)	50 (∞)	-	CPS-6V	LW-3	GVF$^{R}_{L}$250B~350B
	2525M-351B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$150BR
	2020K-352B	●	●	20	21		20	125	28	26	25	5.1							GVF$^{R}_{L}$400B~490B
	2525M-352B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$200BR
	2020K-501B	●	●	20	21		20	125	28	26	25	4.6	50	50 (25)	70 (∞)				GVF$^{R}_{L}$250B~350B
	2525M-501B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$150BR
	2020K-502B	●	●	20	21		20	125	28	26	25	5.1							GVF$^{R}_{L}$400B~490B
	2525M-502B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$200BR
	2020K-701B	●	●	20	21		20	125	28	26	25	4.6	70	70 (25)	100 (∞)				GVF$^{R}_{L}$250B~350B
	2525M-701B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$150BR
	2020K-702B	●	●	20	21		20	125	28	26	25	5.1							GVF$^{R}_{L}$400B~490B
	2525M-702B	●	●	25	26		25	150	30	28	32								GVF$^{R}_{L}$200BR
GFV$^{R}_{L}$	2525M-501C	●	●	25	26	9.5	25	150	35	33	32	6.6	50	50 (25)	70 (∞)	-	CPS-8V	LW-4	GVF$^{R}_{L}$350C~450C
	2525M-502C	●	●									8.1							GVF$^{R}_{L}$500C~600C
	2525M-701C	●	●									6.6	70	70 (25)	100 (∞)				GVF$^{R}_{L}$350C~450C
	2525M-702C	●	●									8.1							GVF$^{R}_{L}$500C~600C
	2525M-1001C	●	●							35		6.6	100	100 (25)	150 (∞)				GVF$^{R}_{L}$350C~450C
	2525M-1002C	●	●									8.1							GVF$^{R}_{L}$500C~600C
	2525M-1501C	●	●									6.6	150	150 (25)	250 (∞)				GVF$^{R}_{L}$350C~450C
	2525M-1502C	●	●									8.1							GVF$^{R}_{L}$500C~600C

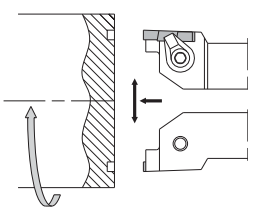
Note1. Dimension T shows available grooving depth.
2. øD1 shows toolholder head diameter to L3.
3. The value ( ) of Face Grooving Dia. (øD Max) is the maximum outer diameter value after the initial groove between MIN~MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving Dia. (øD 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 MIN~MAX.
4. 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	R-hand
Insert	R-hand



Toolholder	L-hand
Insert	L-hand



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

◆ Face Grooving Diameter of GFV

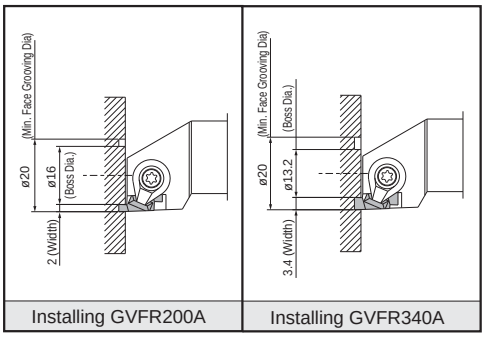
① e.g.) GFV$^{R}_{L}$…-201A

Description		Face Grooving Dia. øD MIN.	Face Grooving Dia. øD MAX.	Applicable Inserts
GFV$^{R}_{L}$	**2020K-201A**	20	∞	GVF$^{R}_{L}$200A~340A
	2525M-201A	(12)	(∞)	GVF$^{R}_{L}$100AR~150AR

- It is available to infinity ∞ in case of machining the first groove bigger than MIN.
- It is available to infinity ∞ when machining toward outer diameter.

- When machining the initial groove on the face of MIN. ø20

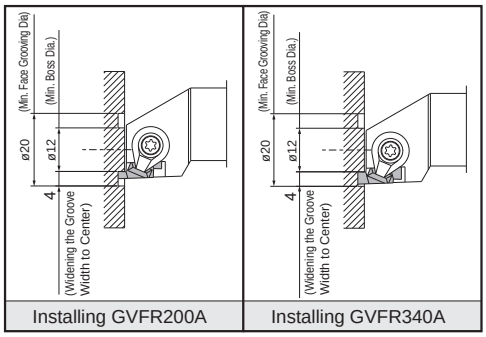
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.



Installing GVFR200A | Installing GVFR340A

- When widening the groove width to inner diameter.

Face groove diameter D MIN (12) is the limit; the toolholder interferes with the workpiece in case of smaller than ø12.



Installing GVFR200A | Installing GVFR340A

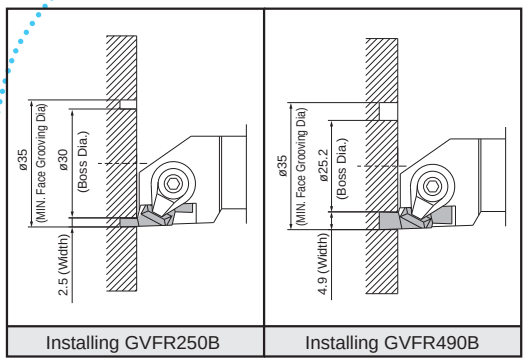
② e.g.) GFV$^{R}_{L}$…-351B / 352B (same as GFV$^{R}_{L}$…-○○○B type, GFV$^{R}_{L}$…-○○○C type)

Description		Face Grooving Dia. øD MIN.	Face Grooving Dia. øD MAX.	Applicable Inserts
GFV$^{R}_{L}$	**2020K-351B**	35	50	GVF$^{R}_{L}$250B~350B
	2525M-351B			GVF$^{R}_{L}$150BR
	2020K-352B	(25)	(∞)	GVF$^{R}_{L}$400B~490B
	2525M-352B			GVF$^{R}_{L}$200BR

- It is possible to widen the groove to infinity ∞ when machining the initial groove within MIN-MAX. and then widening to outer diameter.

- When machining the initial groove on the face at MIN.ø35

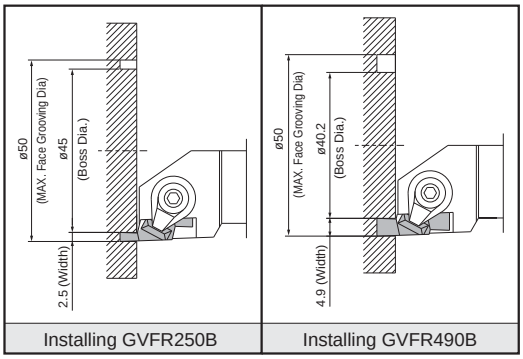
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.



Installing GVFR250B | Installing GVFR490B

- When machining the initial groove on the face at MAX.ø50.

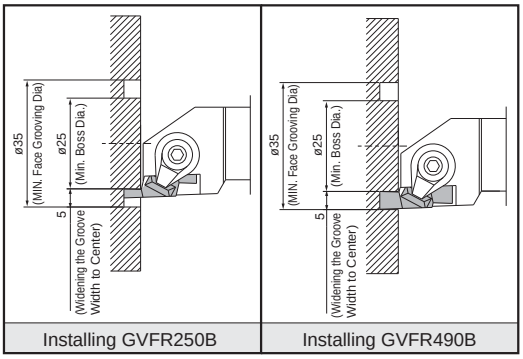
If the first groove is bigger than this, the toolholder intereferes with the workpiece.



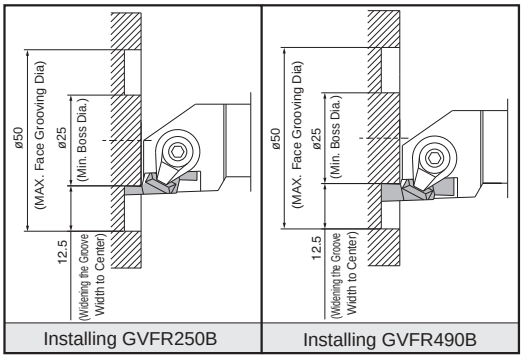
Installing GVFR250B | Installing GVFR490B

- When widening the groove width to inner diameter.

Face Grooving Dia.øD MIN.(ø25 Boss Dia.) is the limitation regardless of insert width, even widening the groove width to the center from the initial groove at øD MIN.(ø35) or øD MAX.(ø50). The toolholder interferes with the workpiece when closer to the center.



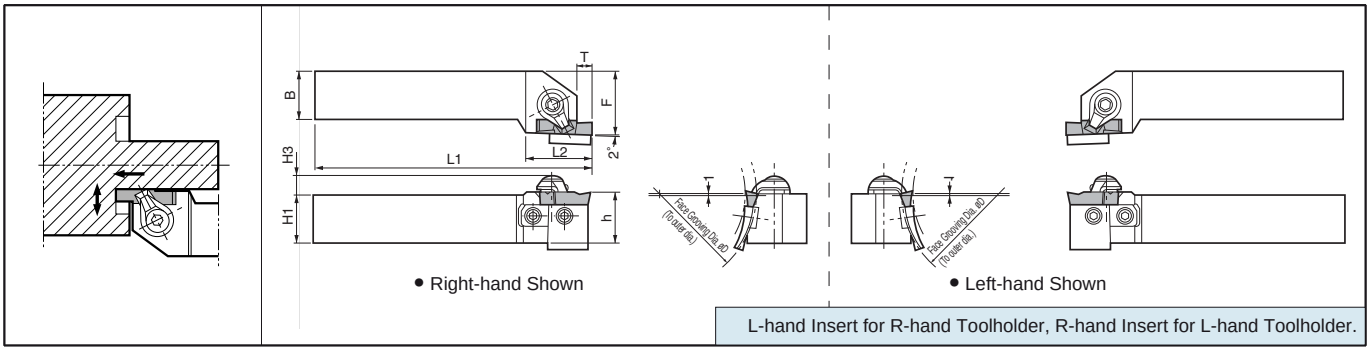
Installing GVFR250B | Installing GVFR490B



Installing GVFR250B | Installing GVFR490B

GFVS

This toolholder can machine various face grooving diameters by replacing the Blade.

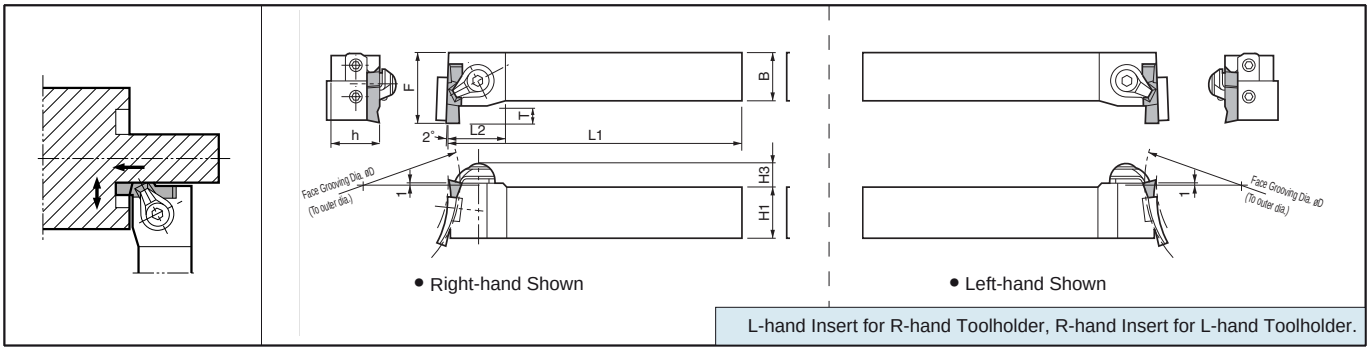


● Right-hand Shown ● Left-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

GFVT

This toolholder can machine various face grooving diameters by replacing the Blade.

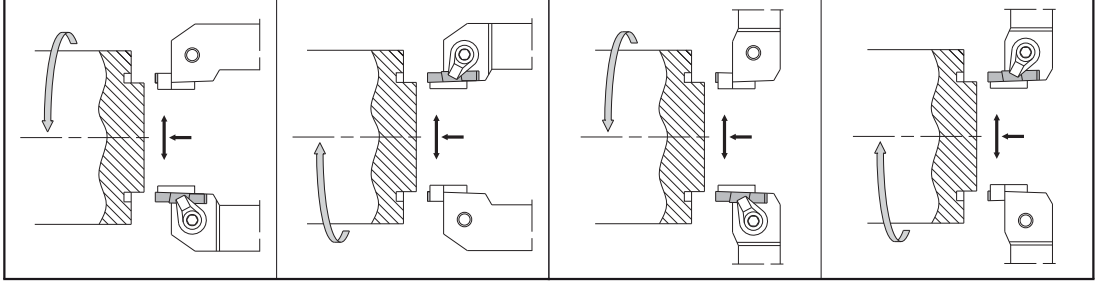


● Right-hand Shown ● Left-hand Shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

◆ Selection of Toolholder & Insert

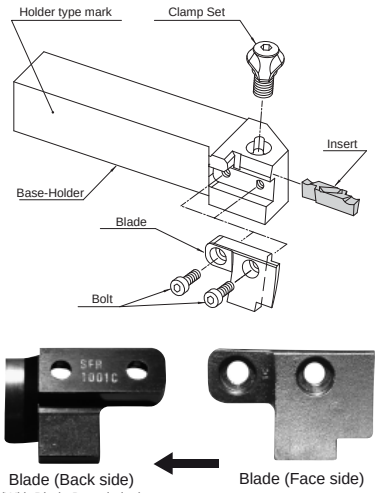
GFVS type		GFVT type	
Toolholder R-hand / Insert L-hand	Toolholder L-hand / Insert R-hand	Toolholder R-hand / Insert L-hand	Toolholder L-hand / Insert R-hand



● Combination of Base-Holder & Blade

Base-Holder (Stamped below)	Std. R	Std. L	Blade Description	Toolholder (Integrated Tool)
GFVS$^{R}_{L}$2020K-HB GFVT$^{R}_{L}$2020K-HB	●	●	SF$^{R}_{L}$ -351B -352B -501B -502B -701B -702B	GFVS$^{R}_{L}$2020K -351B GFVT$^{R}_{L}$2020K -352B -501B -502B -701B -702B
GFVS$^{R}_{L}$2525M-HB GFVT$^{R}_{L}$2525M-HB	●	●	SF$^{R}_{L}$ -351B -352B -501B -502B -701B -702B	GFVS$^{R}_{L}$2525M -351B GFVT$^{R}_{L}$2525M -352B -501B -502B -701B -702B
GFVS$^{R}_{L}$2525M-HC GFVT$^{R}_{L}$2525M-HC	●	●	SF$^{R}_{L}$ -501C -502C -701C -702C -1001C -1002C -1501C -1502C	GFVS$^{R}_{L}$2525M -501C GFVT$^{R}_{L}$2525M -502C -701C -702C -1001C -1002C -1501C -1502C

Example of installation (GFVS)



How to refer to the face grooving toolholder and blade

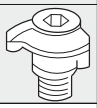
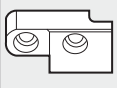
Q: Though "GFVSR2525M-HC" is marked on the face grooving holder, the size of cutting dia. is unknown. How could it be found out?

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 holder in the catalog. If "SFR-1001C" is integrated to "GFVSR2525M-HC", the description of the holder is "GVFSR2525M-1001C".

・R-hand Blade for R-hand Toolholder, L-hand Blade for L-hand Toolholder.
・Installation of GFVT type is also pursuing example of installation of GFVS type.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description		Std.		Dimension (mm)								Face Grooving Dia. øD		Spare Parts				Applicable Inserts ➔ G65
														Clamp Set	Wrench	Blade	Bolt	
		R	L	H1	h	H3	B	L1	L2	F	T	MIN.	MAX.					
GFVS R/L	2020K-351B	●	●	20	21	8.0	20	125	30	25	5.1 (4.6)	35 (25)	50 (∞)	CPS-6V	LW-3	SF R/L-351B	HH4X12	GVF R/L 250B~350B
	2525M-351B	●	●	25	26		25	150	32	32								GVF R/L 150BR
	2020K-352B	●	●	20	21		20	125	30	25	5.1 (5.1)					SF R/L-352B		GVF R/L 400B~490B
	2525M-352B	●	●	25	26		25	150	32	32								GVF R/L 200BR
	2020K-501B	●	●	20	21		20	125	30	25	5.1 (4.6)	50 (25)	70 (∞)			SF R/L-501B		GVF R/L 250B~350B
	2525M-501B	●	●	25	26		25	150	32	32								GVF R/L 150BR
	2020K-502B	●	●	20	21		20	125	30	25	5.1 (5.1)					SF R/L-502B		GVF R/L 400B~490B
	2525M-502B	●	●	25	26		25	150	32	32								GVF R/L 200BR
	2020K-701B	●	●	20	21		20	125	30	25	5.1 (4.6)	70 (25)	100 (∞)			SF R/L-701B		GVF R/L 250B~350B
	2525M-701B	●	●	25	26		25	150	32	32								GVF R/L 150BR
	2020K-702B	●	●	20	21		20	125	30	25	5.1 (5.1)					SF R/L-702B		GVF R/L 400B~490B
	2525M-702B	●	●	25	26		25	150	32	32								GVF R/L 200BR
GFVS R/L	2525M-501C	●	●	25	26	9.5	25	150	32	32	8.1(6.6)	50 (25)	70 (∞)	CPS-8V	LW-4	SF R/L-501C	HH4X12	GVF R/L 350C~450C
	2525M-502C	●	●								8.1(8.1)					SF R/L-502C		GVF R/L 500C~600C
	2525M-701C	●	●								8.1(6.6)	70 (25)	100 (∞)			SF R/L-701C		GVF R/L 350C~450C
	2525M-702C	●	●								8.1(8.1)					SF R/L-702C		GVF R/L 500C~600C
	2525M-1001C	●	●								8.1(6.6)	100 (25)	150 (∞)			SF R/L-1001C		GVF R/L 350C~450C
	2525M-1002C	●	●								8.1(8.1)					SF R/L-1002C		GVF R/L 500C~600C
	2525M-1501C	●	●								8.1(6.6)	150 (25)	250 (∞)			SF R/L-1501C		GVF R/L 350C~450C
	2525M-1502C	●	●								8.1(8.1)					SF R/L-1502C		GVF R/L 500C~600C
GFVT R/L	2020K-351B	●	●	20	21	8.0	20	125	22	30	5.1 (4.6)	35 (25)	50 (∞)	CPS-6V	LW-3	SF R/L-351B	HH4X12	GVF R/L 250B~350B
	2525M-351B	●	●	25	26		25	150	25	35								GVF R/L 150BR
	2020K-352B	●	●	20	21		20	125	22	30	5.1 (5.1)					SF R/L-352B		GVF R/L 400B~490B
	2525M-352B	●	●	25	26		25	150	25	35								GVF R/L 200BR
	2020K-501B	●	●	20	21		20	125	22	30	5.1 (4.6)	50 (25)	70 (∞)			SF R/L-501B		GVF R/L 250B~350B
	2525M-501B	●	●	25	26		25	150	25	35								GVF R/L 150BR
	2020K-502B	●	●	20	21		20	125	22	30	5.1 (5.1)					SF R/L-502B		GVF R/L 400B~490B
	2525M-502B	●	●	25	26		25	150	25	35								GVF R/L 200BR
	2020K-701B	●	●	20	21		20	125	22	30	5.1 (4.6)	70 (25)	100 (∞)			SF R/L-701B		GVF R/L 250B~350B
	2525M-701B	●	●	25	26		25	150	25	35								GVF R/L 150BR
	2020K-702B	●	●	20	21		20	125	22	30	5.1 (5.1)					SF R/L-702B		GVF R/L 400B~490B
	2525M-702B	●	●	25	26		25	150	25	35								GVF R/L 200BR
GFVT R/L	2525M-501C	●	●	25	26	9.5	25	150	27	38	8.1(6.6)	50 (25)	70 (∞)	CPS-8V	LW-4	SF R/L-501C	HH4X12	GVF R/L 350C~450C
	2525M-502C	●	●								8.1(8.1)					SF R/L-502C		GVF R/L 500C~600C
	2525M-701C	●	●								8.1(6.6)	70 (25)	100 (∞)			SF R/L-701C		GVF R/L 350C~450C
	2525M-702C	●	●								8.1(8.1)					SF R/L-702C		GVF R/L 500C~600C
	2525M-1001C	●	●								8.1(6.6)	100 (25)	150 (∞)			SF R/L-1001C		GVF R/L 350C~450C
	2525M-1002C	●	●								8.1(8.1)					SF R/L-1002C		GVF R/L 500C~600C
	2525M-1501C	●	●								8.1(6.6)	150 (25)	250 (∞)			SF R/L-1501C		GVF R/L 350C~450C
	2525M-1502C	●	●								8.1(8.1)					SF R/L-1502C		GVF R/L 500C~600C

Note 1. Dimension T shows the distance from the Toolholder to the cutting edge.
The grooving depth is the mentioned in ( ).

2. The value ( ) of Face Grooving diameter. (øD Max) is the maximum outer diameter value after the initial groove between MIN~MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving diameter. (øD 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 MIN~MAX.

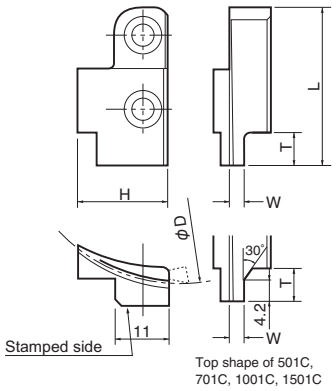
3. Standard toolholders are designed with the edge position 1.0mm above the center.
When using non-standard Toolholder, set the Edge position 1.0mm above the center.

4. GFVS and GFVT are composed of a base body 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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Face Grooving Toolholders

Blade Dimension

Shape	Description	Std. R	Std. L	Dimension (mm) L	H	T	W	Face Grooving Dia. øD MIN.	MAX.	Applicable Inserts	Applicable Toolholder
	SF R/L -351B	●	●	30.5	11	4.7	2.0	35	50	GVF R/L 250B~350B,150BR	GFV(S / T) R/L ○○○○□ -○○○B (Toolholder Stamp GFV(S / T) R/L ○○○○□ -HB)
	-352B	●	●				3.4			GVF R/L 400B~490B,200BR	
	SF R/L -501B	●	●		15		2.0	50	70	GVF R/L 250B~350B,150BR	
	-502B	●	●				3.4			GVF R/L 400B~490B,200BR	
	SF R/L -701B	●	●		17		2.0	70	100	GVF R/L 250B~350B,150BR	
	-702B	●	●				3.4			GVF R/L 400B~490B,200BR	
	SF R/L -501C	●	●	35	15	7.5	2.8	50	70	GVF R/L 350C~450C	GFV(S / T) R/L ○○○○□ -○○○C (Toolholder Stamp GFV(S / T) R/L ○○○○□ -HC)
	-502C	●	●				4.3			GVF R/L 500C~600C	
	SF R/L -701C	●	●		20		2.8	70	100	GVF R/L 350C~450C	
	-702C	●	●				4.3			GVF R/L 500C~600C	
	SF R/L -1001C	●	●		23		2.8	100	150	GVF R/L 350C~450C	
	-1002C	●	●				4.3			GVF R/L 500C~600C	
	SF R/L -1501C	●	●		23		2.8	150	250	GVF R/L 350C~450C	
	-1502C	●	●				4.3			GVF R/L 500C~600C	

● Right-hand shown

・R-hand Blade for R-hand Toolholder, L-hand Blade for L-hand Toolholder.

Face Groove Diameter of GFVS / GFVT

ex) GFVS R/L. . . -351B / 352B

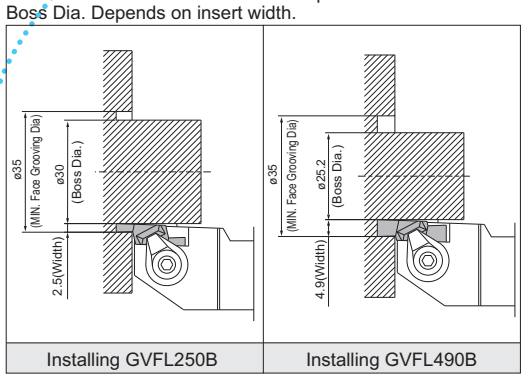
(same as GFVS R/L…-○○○B, GFVS R/L…-○○○C G63
GFVT R/L…-○○○B, GFVT R/L…-○○○C G63)

Description		Face Grooving Dia. øD MIN.	MAX.	Applicable Inserts
GFVS R/L	2020K-351B	35	50	GVF L/R 250B~350B
	2525M-351B			GVF L/R 150BR
	2020K-352B	(25)	(∞)	GVF L/R 400B~490B
	2525M-352B			GVF L/R 200BR

● It is available to infinity ∞ when machining toward outer diameter.

● When machining the initial groove on the face at MIN.ø35.

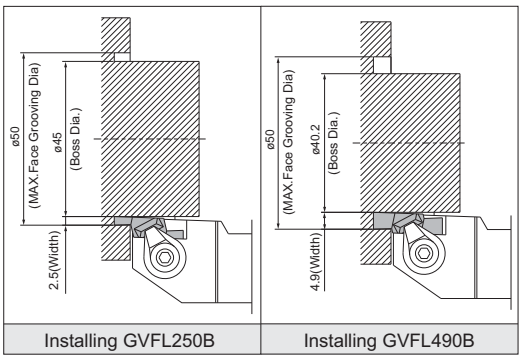
If the initial groove is made smaller than this, the toolholder interferes with the workpiece.
Boss Dia. Depends on insert width.



Installing GVFL250B | Installing GVFL490B

● When machining the initial groove on the face at MAX.ø50.

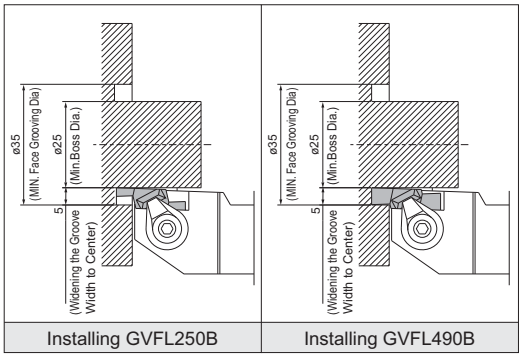
If the first groove is bigger than this, the toolholder intereferes with the workpiece.
Boss Dia. Depends on insert width.



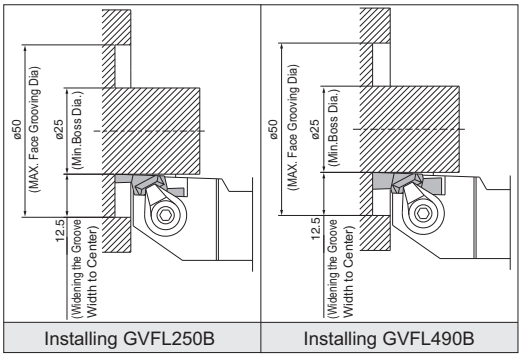
Installing GVFL250B | Installing GVFL490B

● When widening the groove width to inner diameter.

Face Grooving Dia.øD MIN.(ø25 Boss Dia.) is the limitation regardless of insert width, even widening the groove width to the center from the initial groove at øD MIN.(ø35) or øD MAX.(ø50). The toolholder interferes with the workpiece when closer to the center.



Installing GVFL250B | Installing GVFL490B



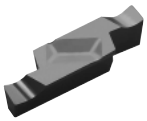
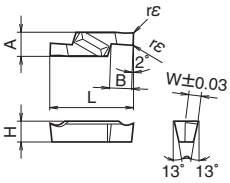
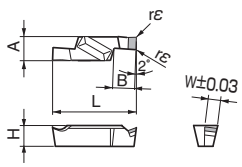
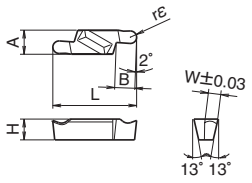
Installing GVFL250B | Installing GVFL490B

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts (mm)

Description	A	L	H
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 Alloy	
H	Hard materials (under 40HRC)	
	Hard materials (over 40HRC)	

Insert (R-hand shown)	Description	(Previous Description)	W	B	rε	Cermet TN90	Cermet TC40	Cermet TC60	PVD Coated Carbide PR630	PVD Coated Carbide PR930	Carbide KW10	PCD KPD001	PCD KPD010	Applicable Toolholder	Ref. Page for Toolholder
 	GVF$^{R}_{L}$ 200-020A	GVF$^{R}_{L}$ 200A	2.00	2.3	0.2			●		●	●			GFV$^{R}_{L}$ ···-201A	G60
	GVF$^{R}_{L}$ 230-020A	GVF$^{R}_{L}$ 230A	2.30					●		●	●				
	GVF$^{R}_{L}$ 250-020A	GVF$^{R}_{L}$ 250A	2.50					●		●	●				
	GVF$^{R}_{L}$ 270-020A	GVF$^{R}_{L}$ 270A	2.70					●		●	●				
	GVF$^{R}_{L}$ 290-020A	GVF$^{R}_{L}$ 290A	2.90					●		●	●				
	GVF$^{R}_{L}$ 340-020A	GVF$^{R}_{L}$ 340A	3.40					●		●	●				
	GVF$^{R}_{L}$ 250-020B	GVF$^{R}_{L}$ 250B	2.50	4.8	0.2			●		●	●			GFV$^{R}_{L}$ ···-○○ 1B	
	GVF$^{R}_{L}$ 300-020B	GVF$^{R}_{L}$ 300B	3.00					●		●	●			GFVS$^{R}_{L}$ ···-○○ 1B	
	GVF$^{R}_{L}$ 350-020B	GVF$^{R}_{L}$ 350B	3.50					●		●	●			GFVT$^{R}_{L}$ ···-○○ 1B	
	GVF$^{R}_{L}$ 400-020B	GVF$^{R}_{L}$ 400B	4.00	5.3				●		●	●			GFV$^{R}_{L}$ ···-○○ 2B	
	GVF$^{R}_{L}$ 430-020B	GVF$^{R}_{L}$ 430B	4.30					●		●	●			GFVS$^{R}_{L}$ ···-○○ 2B	
	GVF$^{R}_{L}$ 460-020B	GVF$^{R}_{L}$ 460B	4.60					●		●	●			GFVT$^{R}_{L}$ ···-○○ 2B	
	GVF$^{R}_{L}$ 490-020B	GVF$^{R}_{L}$ 490B	4.90					●		●	●				
	GVF$^{R}_{L}$ 350-040C	GVF$^{R}_{L}$ 350C	3.50	6.8	0.4			●		●	●			GFV$^{R}_{L}$ ···-○○ 1C	
	GVF$^{R}_{L}$ 400-040C	GVF$^{R}_{L}$ 400C	4.00					●		●	●			GFVS$^{R}_{L}$ ···-○○ 1C	
	GVF$^{R}_{L}$ 450-040C	GVF$^{R}_{L}$ 450C	4.50					●		●	●			GFVT$^{R}_{L}$ ···-○○ 1C	
	GVF$^{R}_{L}$ 500-040C	GVF$^{R}_{L}$ 500C	5.00	8.3				●		●	●			GFV$^{R}_{L}$ ···-○○ 2C	
	GVF$^{R}_{L}$ 550-040C	GVF$^{R}_{L}$ 550C	5.50					●		●	●			GFVS$^{R}_{L}$ ···-○○ 2C	
	GVF$^{R}_{L}$ 600-040C	GVF$^{R}_{L}$ 600C	6.00					●		●	●			GFVT$^{R}_{L}$ ···-○○ 2C	G60
  1-Edge	GVF$^{R}_{L}$ 250-020B	GVF$^{R}_{L}$ 250B	2.50	4.8	0.2								●	GFV$^{R}_{L}$ ···-○○ 1B	G62
	300-020B	300B	3.00										●	GFVS$^{R}_{L}$ ···-○○ 1B	
	400-020B	400B	4.00	5.3									○	GFVT$^{R}_{L}$ ···-○○ 1B	
	GVF$^{R}_{L}$ 350-020C	-	3.50	6.8	0.2								○	GFV$^{R}_{L}$ ···-○○ 2B	
	400-020C	-	4.00										○	GFVS$^{R}_{L}$ ···-○○ 2B	
	GVF$^{R}_{L}$ 350-040C	GVF$^{R}_{L}$ 350C	3.50	6.8	0.4								○	GFVT$^{R}_{L}$ ···-○○ 2B	
	400-040C	400C	4.00										○	GFV$^{R}_{L}$ ···-○○ 1C	
														GFVS$^{R}_{L}$ ···-○○ 1C	
														GFVT$^{R}_{L}$ ···-○○ 1C	
  Full-R	GVF$^{R}_{L}$ 200-100AR	GVF$^{R}_{L}$ 100AR	2.00	2.3	1.00					●	●			GFV$^{R}_{L}$ ···-201A	G60
	GVF$^{R}_{L}$ 250-125AR	GVF$^{R}_{L}$ 125AR	2.50		1.25					●	●				
	GVF$^{R}_{L}$ 300-150AR	GVF$^{R}_{L}$ 150AR	3.00		1.50					●	●				
	GVF$^{R}_{L}$ 300-150BR	GVF$^{R}_{L}$ 150BR	3.00	4.8	1.50					●	●			GFV$^{R}_{L}$ ···-○○ 1B	
														GFVS$^{R}_{L}$ ···-○○ 1B	
														GFVT$^{R}_{L}$ ···-○○ 1B	G60
	400-200BR	200BR	4.00	5.3	2.00					●	●			GFV$^{R}_{L}$ ···-○○ 2B	G62
														GFVS$^{R}_{L}$ ···-○○ 2B	
														GFVT$^{R}_{L}$ ···-○○ 2B	

· Dimension B: shows available grooving depth.

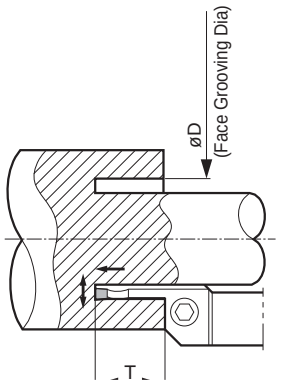
For recommended cutting conditions, see page G75

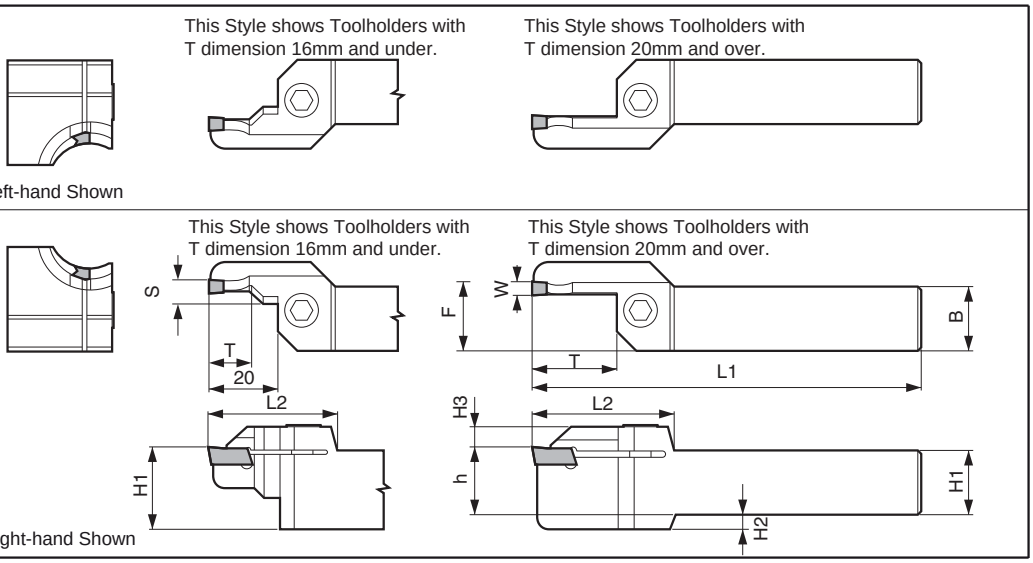
● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

KFMS





Toolholder Dimensions

Description		Std.		Dimension (mm)									Width (mm)	Face Grooving Dia. øD		Spare Parts			
		R	L	H1=h	H2	H3	B	L1	L2	F	S	T	W	MIN.	MAX.	Screw	Wrench		
KFMS R/L	2020K2530-3	●		20	-	10	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	-	10	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	-	10	20	125	39	20.7	7.1	12	4	25	35	HH5X20	LW-4		
	2020K3550-4	●									-	20		35	50				
	2020K5070-4	●												50	70				
	2020K70100-4	●			5				44			25		70	100				
	2020K100150-4	●												100	150				
	2020K150220-4	●												150	220				
	2020K220800-4	●												220	∞				
	2525M2535-4	●	●	25	-	10	25	150	39	25.7	7.1	12		25	35	HH5X25	LW-4		
	2525M3550-4	●	●								-	20		35	50				
	2525M5070-4	●	●											50	70				
	2525M70100-4	●	●						44			25		70	100				
	2525M100150-4	●	●											100	150				
	2525M150220-4	●	●											150	220				
	2525M220800-4	●	●											220	∞				

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F	S	T	Width (mm) W	Face Grooving Dia. øD MIN.	MAX.	Spare Parts Screw	Wrench
KFMS$^{R}_{L}$	2020K2535-5	●		20	-	10	20	125	39	20.7 (21.2)	-	20	5 (6)	25	35	HH5X20	LW-4
	2020K3550-5	●												35	50		
	2020K5075-5	●							44			25		50	75		
	2020K75115-5	●			5	10								75	115		
	2020K115180-5	●												115	180		
	2020K180235-5	●												180	235		
	2020K235800-5	●												235	∞		
	2525M2535-5	●	●	25	-	10	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	∞		

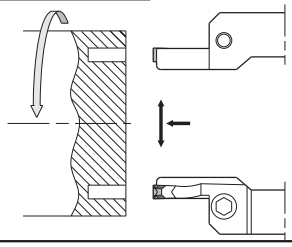
・Dimension T shows available grooving depth.

・Face Grooving Dia.øD: The diameter range of the initial groove.

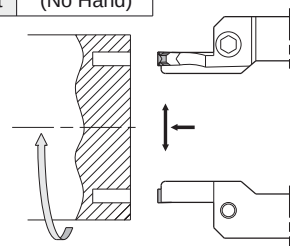
・For KFMS$^{R}_{L}$…-5 Toolholder can hold a 6mm width insert. ( ) value shows the dimension of a 6mm width insert.

Selection of Toolholder & Insert

Toolholder	R-hand
Insert	(No Hand)



Toolholder	L-hand
Insert	(No Hand)



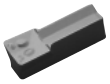
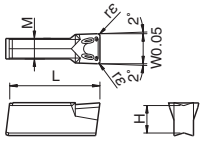
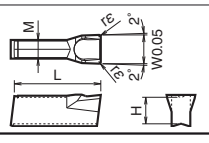
Applicable Inserts (mm)

Description	L	H
FMM30-03 ~ FMM60-04	12	3.5
FMN3 ~ FMN6	12	3.5

		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 Alloy				○		●
H	Hard materials (under 40HRC)						
	Hard materials (over 40HRC)						

Classification of usage

● : Continuous-Light Interruption / 1st Choice
◔ : Continuous-Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

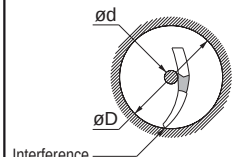
Insert		Description		Dimension (mm) W	rε	M	TN90	CR9025	PR915	PR930	PR905	KW10	Applicable Toolholder
 Face Grooving Chip Control Oriented / M Class		FMM	30-03	3.0	0.3	2.0	●	●	●	●	●	●	KFMS$^{R}_{L}$··· 3
			40-04	4.0	0.4	2.6	●	●	●	●	●	●	KFMS$^{R}_{L}$··· 4
			50-04	5.0		3.4	●	●	●	●	●	●	KFMS$^{R}_{L}$··· 5
			60-04	6.0		4.0	●	●		●	●	●	
 Face Grooving Sharp-Cutting Oriented / M Class		FMN	3	3.0	0.25	2.0	●	●		●		●	KFMS$^{R}_{L}$··· 3
			4	4.0		2.6	●	●		●		●	KFMS$^{R}_{L}$··· 4
			5	5.0		3.4	●	●		●		●	KFMS$^{R}_{L}$··· 5
			6	6.0		4.0		●		●		●	

・FMN type inserts are only for Deep Grooving and not applicable for Traversing.

Recommended Cutting Conditions G77

Limit of Traversing toward Center

Traversing towards the Center causes the toolholder to interfere with the groove wall depending on the initial cut's diameter.



Description \ øD	25	26	27	28 and over
	ød			
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	
KFMS$^{R}_{L}$ 2020K2535-5 / KFMS$^{R}_{L}$ 2525M2535-5	7 *(5)	4 *(2)	1 *(0)	(No remaining Boss)

e.g.)
KFMSR 2525M2530-3 with ø25 as first cut towards the center, it will encounter rubbing of the holder cartridge when ød is 4.0mm.

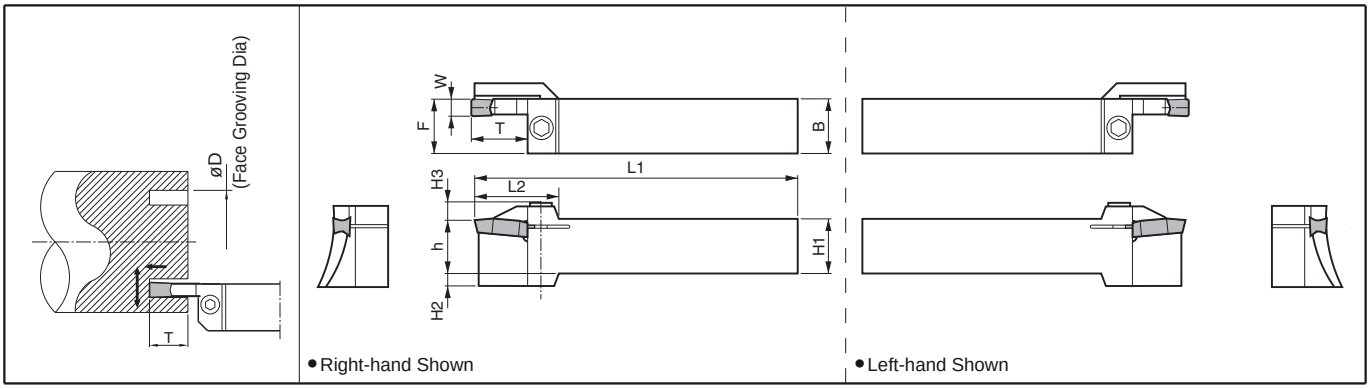
*( ) value shows the Dimension using FMM60-04 Insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Face Grooving Toolholders

KFMS-8



Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F	T	Width (mm) W	Face Grooving Dia. øD MIN.	Face Grooving Dia. øD MAX.	Spare Parts Screw	Spare Parts Wrench	Ref. Page for Recommended Cutting Conditions
KFMS$^{R}_{L}$	2525M5464-8	●	●	25	-	9	25	150	41	26	25	8	54 (0)	64 (∞)	HH6X25	LW-5	G76
	2525M6382-8	●	●		2.4								63 (0)	82 (∞)			
	2525M80115-8	●	●		6	8			40				80 (0)	115 (∞)			
	2525M105160-8	●	●										105 (0)	160 (∞)			
	2525M155510-8	●	●	25	6	8	25	150	43	26	25	8	155 (0)	510 (∞)			
	3232P155510-8	●		32	-		32	170		33							

・Dimension T shows available grooving depth.

・The value ( ) of Face Grooving Dia. (øD Max) is the maximum outer diameter value after the initial groove between MIN ～ MAX. (It is possible to widen the groove to infinity ∞).
The value ( ) of Face Grooving Dia. (øD 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 MIN ～ MAX.

Applicable Inserts

(mm)

Description	L	H
GMM 8030-080MW	30	5.5
GMG 8030-050MG		
GMGA 8030-400R		

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 Alloy						●	● : Continuous / 1st Choice
H	Hard materials (under 40HRC)			○	●			○ : Continuous / 2nd Choice
	Hard materials (over 40HRC)							

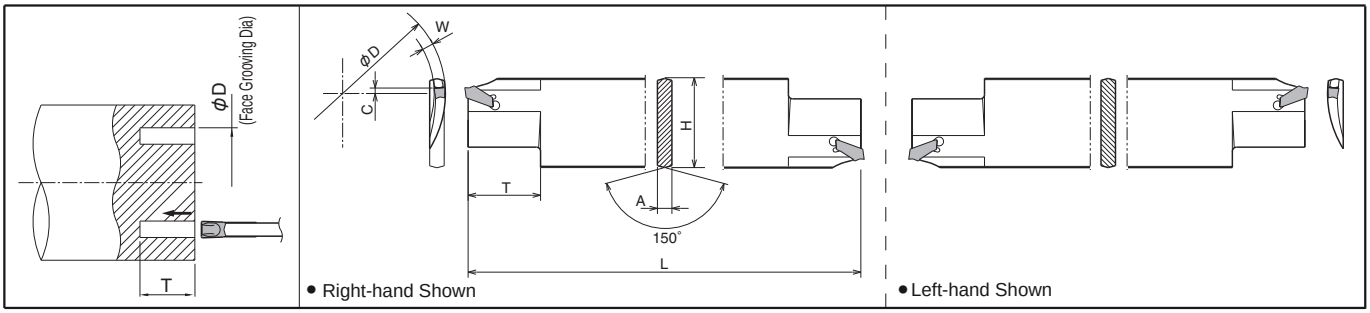
Insert		Description	(Previous Description)	Dimension (mm) W	rε	M	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PVD Coated Carbide PR930	PVD Coated Carbide PR905	Carbide KW10	Applicable Toolholder	Ref. Page for Toolholder
Chip Control Oriented / M Class		GMM 8030-080MW	GMM 8030-08	8.0	0.8	6.0		●	●	●	●	●	KFMS$^{R}_{L}$ ···8	G68
Sharp-Cutting Oriented / Precision Class Ground Chipbreaker		GMG 8030-050MG	GMG 8030-05MG	8.0	0.5	6.0	●	●		●	●	●		
Sharp-Cutting Oriented / Precision Class Full-R / Copying		GMGA 8030-400R	GMGA 8030-40R	8.0	4.0	6.0						●		

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Face Grooving Blade

KFTB-S



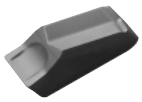
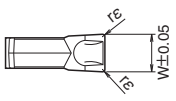
Blade Dimensions

Description		Std. R	Std. L	Dimension (mm) *H	L	A	T	C			Width (mm) W	Face Grooving Dia. øD MIN.	MAX.	Spare Parts Wrench	Applicable Inserts	Applicable Blocks ➔ H19
KFTB R/L	65100-4S	●	●	32	150	5.2	25	4			4.0	65	100	LTK-5	FTK4	KTKTB20-32 25-32 32-32
	90150-4S	●	●				30	0				90	150			
	150250-4S	●	●									140	250			
	250800-4S	●	●			3.2						230	∞			
KFTB R/L	90150-5S	●	●	32	150	5.2	30	0			5.0	90	150		FTK5	KTKTBF25-32 32-32
	150250-5S	●	●				32					150	250			
	250800-5S	●	●			4.0	38					250	∞			

・Dimension T shows available grooving depth.
・Face Grooving Dia.øD: 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).
・KFTBR/L65100-4S toolholder is designed with the edge position 4mm above the Center.
* Dimension H shows the length between virtual tops.

Applicable Inserts

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 Alloy					●	● : Continuous / 1st Choice
H	Hard materials (under 40HRC)				○		○ : Continuous / 2nd Choice
	Hard materials (over 40HRC)						

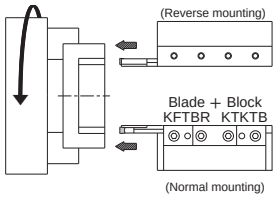
Insert		Description		Dimensions (mm) W	rε	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR660	PR930	Carbide KW10	Applicable Toolholder	Ref. Page for Toolholder
		FTK	4	4.0	0.25	●	●	●	●	●	KFTB R/L 65100-4S 90150-4S 150250-4S 250800-4S	G69
			5	5.0		●	●	●	●	●	KFTB R/L 90150-5S 150250-5S 250800-5S	

For recommended cutting conditions, see page ➔ G75

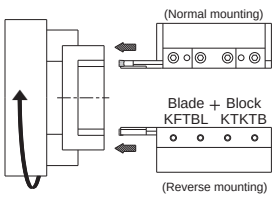
Selection of Blade and Insert

Combination of Blade + KTKTB

Blade	R-hand
Insert	No Hand

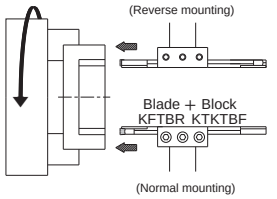


Blade	L-hand
Insert	No Hand

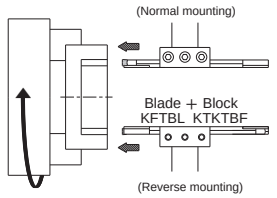


Combination of Blade + KTKTBF

Blade	R-hand
Insert	No Hand

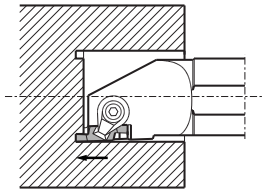


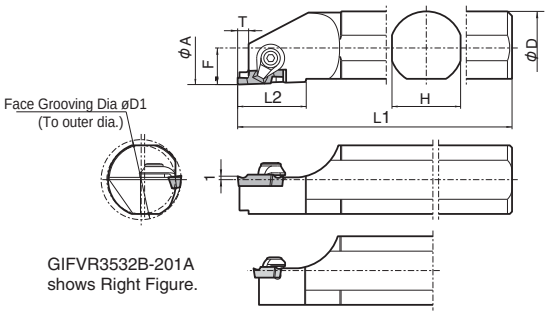
Blade	L-hand
Insert	No Hand



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

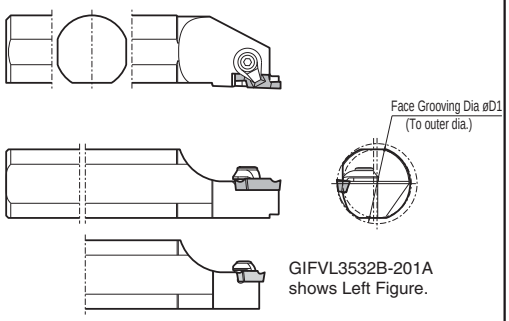
GIFV





GIFVR3532B-201A shows Right Figure.

● Right-hand Shown



GIFVL3532B-201A shows Left Figure.

● Left-hand Shown

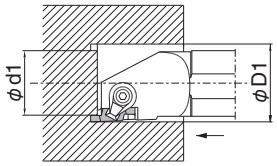
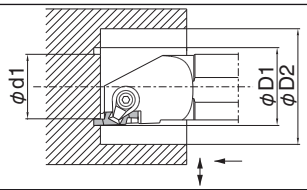
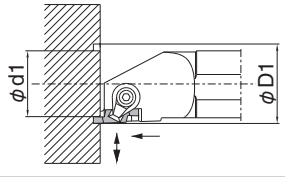
R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

● Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) øA	øD	H	L1	L2	F	T	Face Grooving Dia. øD1 MIN.	MAX.	Spare Parts: Clamp Set		Spare Parts: Wrench		Applicable Inserts ➔ G71
GIFV$^{R}_{L}$	3532B-201A	●	●	35	32	30	250	23	16	2.2	35 (12)	∞	CPS-5V	-	FT-15	-	GVF$^{R}_{L}$200A~340A GVF$^{R}_{L}$100AR~150AR
GIFV$^{R}_{L}$	3532B-351B	●	●	35				30		4.6	35 (25)	50 (∞)	-	CPS-6V	-	LW-3	GVF$^{R}_{L}$250B~350B GVF$^{R}_{L}$150BR
	3532B-352B	●	●							5.1	35 (25)	50 (∞)					GVF$^{R}_{L}$400B~490B GVF$^{R}_{L}$200BR
	5032B-501B	●	●	50						4.6	50 (25)	70 (∞)					GVF$^{R}_{L}$250B~350B GVF$^{R}_{L}$150BR
	5032B-502B	●	●							5.1	50 (25)	70 (∞)					GVF$^{R}_{L}$400B~490B GVF$^{R}_{L}$200BR
GIFV$^{R}_{L}$	5032B-501C	●	●	50				35		6.6	50 (25)	70 (∞)		CPS-8V		LW-4	GVF$^{R}_{L}$350C~450C
	5032B-502C	●	●							8.1	50 (25)	70 (∞)					GVF$^{R}_{L}$500C~600C

Note 1. Dimension T shows available grooving depth.
2. Standard toolholders are designed with the edge position 1.0mm above the center.

◆ Face Grooving Dia. øD1 depends on the application.

Application	Description		Face Grooving Dia. ød1 (MIN.)	Face Grooving Dia. øD1 MIN.	MAX.	(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 øD2 ≧ 58-2W, the Face Grooving Dia. can be expanded to ød1 (MIN.) toward the Center. W = Edge Width If øD2 ≧ 75-2W, the Face Grooving Dia. can be expanded to ød1 (MIN.) toward the Center. W = 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 Face Grooving Dia. (øD1 (Max)) is the maximum outer diameter value after the initial groove between MIN~MAX. (It is possible to widen the groove to infinity ∞)
・The value ( ) of Face Grooving Dia. (ød1 (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 MIN~MAX.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

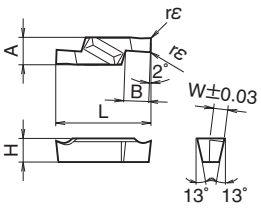
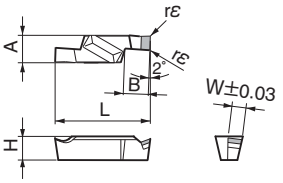
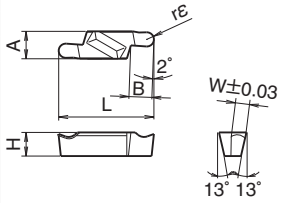
(mm)

Description	A	L	H
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

		Cermet			PVD Coated Carbide	Carbide		PCD	
		TN90	TC40	TC60	PR630	PR930	KW10	KPD001	KPD010
P	Carbon Steel / Alloy Steel					●			
M	Stainless Steel					●			
K	Cast Iron						●		
N	Non-ferrous Metals						●		●
S	Titanium Alloy						●		●
H	Hard materials (under 40HRC)					○			
	Hard materials (over 40HRC)								

Classification of usage

● : Continuous-Light Interruption / 1st Choice
◔ : Continuous-Light Interruption / 2nd Choice
● : Continuous / 1st Choice
○ : Continuous / 2nd Choice

Insert (R-hand shown)	Description	(Previous Description)	W	B	rε	Applicable Toolholder	Ref. Page for Toolholder
 	GVF$^{R}_{L}$ 200-020A	GVF$^{R}_{L}$ 200A	2.00	2.3	0.2	GIFV$^{R}_{L}$ ···-201A	G70
	GVF$^{R}_{L}$ 230-020A	GVF$^{R}_{L}$ 230A	2.30				
	GVF$^{R}_{L}$ 250-020A	GVF$^{R}_{L}$ 250A	2.50				
	GVF$^{R}_{L}$ 270-020A	GVF$^{R}_{L}$ 270A	2.70				
	GVF$^{R}_{L}$ 290-020A	GVF$^{R}_{L}$ 290A	2.90				
	GVF$^{R}_{L}$ 340-020A	GVF$^{R}_{L}$ 340A	3.40				
	GVF$^{R}_{L}$ 250-020B	GVF$^{R}_{L}$ 250B	2.50	4.8	0.2	GIFV$^{R}_{L}$···-○○1B	
	GVF$^{R}_{L}$ 300-020B	GVF$^{R}_{L}$ 300B	3.00				
	GVF$^{R}_{L}$ 350-020B	GVF$^{R}_{L}$ 350B	3.50				
	GVF$^{R}_{L}$ 400-020B	GVF$^{R}_{L}$ 400B	4.00	5.3		GIFV$^{R}_{L}$···-○○2B	
	GVF$^{R}_{L}$ 430-020B	GVF$^{R}_{L}$ 430B	4.30				
	GVF$^{R}_{L}$ 460-020B	GVF$^{R}_{L}$ 460B	4.60				
	GVF$^{R}_{L}$ 490-020B	GVF$^{R}_{L}$ 490B	4.90				
	GVF$^{R}_{L}$ 350-040C	GVF$^{R}_{L}$ 350C	3.50	6.8	0.4	GIFV$^{R}_{L}$···-○○1C	
	GVF$^{R}_{L}$ 400-040C	GVF$^{R}_{L}$ 400C	4.00				
	GVF$^{R}_{L}$ 450-040C	GVF$^{R}_{L}$ 450C	4.50				
	GVF$^{R}_{L}$ 500-040C	GVF$^{R}_{L}$ 500C	5.00	8.3		GIFV$^{R}_{L}$···-○○2C	
	GVF$^{R}_{L}$ 550-040C	GVF$^{R}_{L}$ 550C	5.50				
	GVF$^{R}_{L}$ 600-040C	GVF$^{R}_{L}$ 600C	6.00				
 1-Edge 	GVF$^{R}_{L}$ 250-020B	GVF$^{R}_{L}$ 250B	2.50	4.8	0.2	GIFV$^{R}_{L}$···-○○1B	
	GVF$^{R}_{L}$ 300-020B	GVF$^{R}_{L}$ 300B	3.00				
	GVF$^{R}_{L}$ 400-020B	GVF$^{R}_{L}$ 400B	4.00	5.3		GIFV$^{R}_{L}$···-○○2B	
	GVF$^{R}_{L}$ 350-020C	-	3.50	6.8	0.2	GIFV$^{R}_{L}$···-○○1C	
	GVF$^{R}_{L}$ 400-020C	-	4.00				
	GVF$^{R}_{L}$ 350-040C	GVF$^{R}_{L}$ 350C	3.50	6.8	0.4		
	GVF$^{R}_{L}$ 400-040C	GVF$^{R}_{L}$ 400C	4.00				
 Full-R 	GVF$^{R}_{L}$ 200-100AR	GVF$^{R}_{L}$ 100AR	2.00	2.3	1.00	GIFV$^{R}_{L}$···-201A	
	GVF$^{R}_{L}$ 250-125AR	GVF$^{R}_{L}$ 125AR	2.50		1.25		
	GVF$^{R}_{L}$ 300-150AR	GVF$^{R}_{L}$ 150AR	3.00		1.50		
	GVF$^{R}_{L}$ 300-150BR	GVF$^{R}_{L}$ 150BR	3.00	4.8	1.50	GIFV$^{R}_{L}$···-○○1B	
	GVF$^{R}_{L}$ 400-200BR	200BR	4.00	5.3	2.00	GIFV$^{R}_{L}$···-○○2B	

・Dimension B: shows available grooving depth.

Recommended Cutting Conditions ➔ G75

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

CBN & PCD Inserts are sold in 1 piece boxes.

Recommended Cutting Conditions

GBA insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)									① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ 〃 ap (mm)					Remarks
	Cermet		PVD Coated Carbide				Carbide	CBN	PCD						
	TC40	TN90	PR630	PR930	PR1115	PR905	KW10	KBN510 KBN525	KPD001 (KPD010)	GBA○○R/L 033~100	GBA○○R/L 125~200	GBA○○R/L 230~300	GBA○○R/L 330~400	GBA○○R/L 400~480	
Carbon Steel	☆ 150-220	☆ 150-220	☆ 80-200	☆ 80-180	★ 80-180	-	-	-	-	①0.03~0.08 ②Traversing N.A. ③Traversing N.A.	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.8	Coolant
Alloy Steel	☆ 130-200	☆ 130-200	☆ 80-180	☆ 80-160	★ 80-160	-	-	-	-	①0.03~0.07 ②Traversing N.A. ③Traversing N.A.	①0.04~0.08 ②0.04~0.08 ③Max. 0.3	①0.05~0.09 ②0.05~0.09 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.8	
Stainless Steel	-	☆ 70-150	☆ 60-150	☆ 60-130	★ 60-130	-	-	-	-	①0.03~0.07 ②Traversing N.A. ③Traversing N.A.	①0.04~0.08 ②0.04~0.08 ③Max. 0.3	①0.05~0.09 ②0.05~0.09 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.8	
Cast Iron	-	-	-	-	-	★ 80-180	☆ 60-120	★ 150-400	-	①0.03~0.08 ②Traversing N.A. ③Traversing N.A.	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.8	
Aluminum	-	-	-	-	-	-	★ 150-400	-	★ 150-2000	①0.05~0.12 ②Traversing N.A. ③Traversing N.A.	①0.05~0.15 ②0.05~0.15 ③Max. 0.5	①0.05~0.15 ②0.05~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	
Brass	-	-	-	-	-	-	★ 150-300	-	★ 200-800	①0.05~0.12 ②Traversing N.A. ③Traversing N.A.	①0.05~0.15 ②0.05~0.15 ③Max. 0.5	①0.05~0.15 ②0.05~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	
Hard Materials	-	-	-	-	-	-	-	★ 80-120	-	-	①0.02~0.05 ②Traversing N.A. ③Traversing N.A.	①0.03~0.07 ②0.01~0.04 ③Max. 0.1	-	-	

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving. ★ : 1st Recommendation ☆ : 2nd Recommendation

GBA insert (MY Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ 〃 ap (mm)					Remarks
	Cermet		PVD Coated Carbide			Carbide	CBN	PCD						
	TN6020	TC40	PR630	PR930	PR1115	KW10	KBN510	KPD001 (KPD010)	GBA43R/L 175MY~200MY	GBA43R/L 230MY~265MY	GBA43R/L 300MY	GBA43R/L 330MY ~350MY	GBA43R/L 400MY	
Carbon Steel	☆ 150-220	-	-	☆ 80-200	★ 80-200	-	-	-	①0.03~0.08 ②0.03~0.08 ③Max. 0.3	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.8	Coolant
Alloy Steel	☆ 130-200	-	-	☆ 80-180	★ 80-180	-	-	-	①0.03~0.07 ②0.03~0.1 ③Max. 0.3	①0.04~0.08 ②0.04~0.08 ③Max. 0.3	①0.05~0.09 ②0.05~0.09 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.8	
Stainless Steel	☆ 70-150	-	-	☆ 60-150	★ 60-150	-	-	-	①0.03~0.07 ②0.03~0.1 ③Max. 0.3	①0.04~0.08 ②0.04~0.08 ③Max. 0.3	①0.05~0.09 ②0.05~0.09 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.8	

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving. ★ : 1st Recommendation ☆ : 2nd Recommendation

GB insert (Ground Chipbreaker)

➡ changes to GBA type.

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ 〃 ap (mm)					Remarks
	Cermet			PVD Coated Carbide		Carbide	CBN	PCD						
	TN90	TC40	TC60	PR630	PR930	KW10	KBN510	KPD001 (KPD010)	GB○○R/L 050~100	GB○○R/L 125~200	GB○○R/L 230~300	GB○○R/L 330~400	GB○○R/L 400~480	
Carbon Steel	-	☆ 150-220	☆ 100-150	☆ 80-200	★ 80-180	-	-	-	①0.03~0.08 ②Traversing N.A. ③Traversing N.A.	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.8	Coolant
Alloy Steel	-	☆ 130-200	☆ 80-130	☆ 80-180	★ 80-160	-	-	-	①0.03~0.07 ②Traversing N.A. ③Traversing N.A.	①0.04~0.08 ②0.04~0.08 ③Max. 0.3	①0.05~0.09 ②0.05~0.09 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.8	
Stainless Steel	-	-	☆ 60-100	☆ 60-150	★ 60-130	-	-	-	①0.03~0.07 ②Traversing N.A. ③Traversing N.A.	①0.04~0.08 ②0.04~0.08 ③Max. 0.3	①0.05~0.09 ②0.05~0.09 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.1 ②0.05~0.1 ③Max. 0.8	
Cast Iron	-	-	-	-	-	★ 60-100	-	-	①0.03~0.08 ②Traversing N.A. ③Traversing N.A.	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.1 ③Max. 0.8	
Aluminum	-	-	-	-	-	★ 150-400	-	★ 150-2000	①0.05~0.12 ②Traversing N.A. ③Traversing N.A.	①0.05~0.15 ②0.05~0.15 ③Max. 0.5	①0.05~0.15 ②0.05~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	
Brass	-	-	-	-	-	★ 150-300	-	★ 200-800	①0.05~0.12 ②Traversing N.A. ③Traversing N.A.	①0.05~0.15 ②0.05~0.15 ③Max. 0.5	①0.05~0.15 ②0.05~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	①0.08~0.15 ②0.08~0.15 ③Max. 0.8	

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving. ★ : 1st Recommendation ☆ : 2nd Recommendation

◆ TGF insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ // ap (mm)				Remarks
	Cermet			PVD Coated Carbide		Carbide	CBN	PCD					
	TN90	TC40	TC60	PR930	PR1115	KW10	KBN510	KPD001 (KPD010)	TGF32R/L 033~050	TGF32R/L 075~095	TGF32R/L 100~145	TGF32R/L 150~250	
Carbon Steel	☆ 150-220	☆ 150-220	☆ 100-150	☆ 80-180	★ 80-180	-	-	-	①0.01~0.05 ②Traversing N.A. ③Traversing N.A.	①0.02~0.07 ②Traversing N.A. ③Traversing N.A.	①0.03~0.08 ②0.03~0.06 ③Max. 0.2	①0.03~0.08 ②0.03~0.06 ③Max. 0.2	Coolant
Alloy Steel	☆ 130-200	☆ 130-200	☆ 80-130	☆ 80-160	★ 80-160	-	-	-	①0.01~0.04 ②Traversing N.A. ③Traversing N.A.	①0.02~0.06 ②Traversing N.A. ③Traversing N.A.	①0.03~0.07 ②0.02~0.05 ③Max. 0.2	①0.03~0.07 ②0.02~0.05 ③Max. 0.2	
Stainless Steel	☆ 70-150	-	☆ 60-100	☆ 60-130	★ 60-130	-	-	-	①0.01~0.04 ②Traversing N.A. ③Traversing N.A.	①0.02~0.06 ②Traversing N.A. ③Traversing N.A.	①0.03~0.07 ②0.02~0.05 ③Max. 0.2	①0.03~0.07 ②0.02~0.05 ③Max. 0.2	
Cast Iron	-	-	-	-	-	★ 60-100	-	-	①0.01~0.05 ②Traversing N.A. ③Traversing N.A.	①0.02~0.07 ②Traversing N.A. ③Traversing N.A.	①0.03~0.08 ②0.03~0.06 ③Max. 0.2	①0.03~0.08 ②0.03~0.06 ③Max. 0.2	
Aluminum	-	-	-	-	-	★ 150-400	-	★ 150-2000	①0.01~0.05 ②Traversing N.A. ③Traversing N.A.	①0.02~0.07 ②Traversing N.A. ③Traversing N.A.	①0.03~0.08 ②0.03~0.06 ③Max. 0.2	①0.03~0.08 ②0.03~0.06 ③Max. 0.2	
Brass	-	-	-	-	-	★ 150-300	-	★ 200-800	①0.01~0.04 ②Traversing N.A. ③Traversing N.A.	①0.02~0.06 ②Traversing N.A. ③Traversing N.A.	①0.03~0.07 ②0.02~0.05 ③Max. 0.2	①0.03~0.07 ②0.02~0.05 ③Max. 0.2	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ TG insert (Ground Chipbreaker)

changes to GBA.

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								Feed Rate (mm/rev)					Remarks
	Cermet			PVD Coated Carbide		Carbide	CBN	PCD						
	TN60	TC40	TC60	PR630	PR930	KW10	KBN510	KPD001 (KPD010)	TG○○R/L 075~095	TG○○R/L 125~200	TG○○R/L 230~300	TG○○R/L 330~400	TG○○R/L 430~450	
Carbon Steel	★ 150-220	-	-	-	-	-	-	-	0.03~0.07	0.03~0.08	0.05~0.1	0.05~0.12	0.05~0.12	Coolant
Alloy Steel	★ 130-200	-	-	-	-	-	-	-	0.02~0.06	0.03~0.07	0.05~0.09	0.05~0.1	0.05~0.1	

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GH insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ // ap (mm)				Remarks
	Cermet			PVD Coated Carbide		Carbide	Ceramic						
	TN90	TC40	TC60	PR630	PR930	KW10	A65	A66N	GH 40~50	GH 55~70	GH 75~80	GH 100~120	
Carbon Steel	☆ 150-220	☆ 150-220	☆ 100-150	☆ 80-200	★ 80-180	-	-	-	①0.07~0.2 ②0.07~0.15 ③Max. 1.0	①0.07~0.2 ②0.07~0.15 ③Max. 1.0	①0.1~0.25 ②0.1~0.2 ③Max. 1.5	①0.15~0.3 ②0.15~0.25 ③Max. 2.0	Coolant
Alloy Steel	☆ 130-200	☆ 130-200	☆ 80-130	☆ 80-180	★ 80-160	-	-	-	①0.07~0.18 ②0.07~0.13 ③Max. 1.0	①0.07~0.18 ②0.07~0.13 ③Max. 1.0	①0.1~0.23 ②0.1~0.18 ③Max. 1.5	①0.15~0.27 ②0.15~0.22 ③Max. 2.0	
Stainless Steel	☆ 70-150	-	☆ 60-100	☆ 60-150	★ 60-130	-	-	-	①0.07~0.16 ②0.07~0.13 ③Max. 1.0	①0.07~0.16 ②0.07~0.13 ③Max. 1.0	①0.1~0.21 ②0.1~0.18 ③Max. 1.5	①0.15~0.25 ②0.15~0.22 ③Max. 2.0	
Cast Iron	-	-	-	-	-	★ 60~100	☆ 150~300	☆ 150~300	KW10 ①0.07~0.2 ②0.07~0.15 ③Max. 1.0 A65 / A66N ①0.03~0.07 ②Traversing N.A. ③Traversing N.A.	KW10 ①0.07~0.2 ②0.07~0.15 ③Max. 1.0 A65 / A66N ①0.03~0.07 ②Traversing N.A. ③Traversing N.A.	KW10 ①0.1~0.25 ②0.1~0.2 ③Max. 1.5 A65 / A66N ①0.05~0.09 ②Traversing N.A. ③Traversing N.A.	KW10 ①0.15~0.3 ②0.15~0.25 ③Max. 2.0 A65 / A66N ①0.05~0.09 ②Traversing N.A. ③Traversing N.A.	
Aluminum	-	-	-	-	-	★ 150-400	-	-	①0.07~0.2 ②0.07~0.15 ③Max. 1.0	①0.07~0.2 ②0.07~0.15 ③Max. 1.0	①0.1~0.25 ②0.1~0.2 ③Max. 1.5	①0.15~0.3 ②0.15~0.25 ③Max. 2.0	
Brass	-	-	-	-	-	★ 150-300	-	-	①0.07~0.2 ②0.07~0.15 ③Max. 1.0	①0.07~0.2 ②0.07~0.15 ③Max. 1.0	①0.1~0.25 ②0.1~0.2 ③Max. 1.5	①0.15~0.3 ②0.15~0.25 ③Max. 2.0	
Hard Materials	-	-	-	-	-	-	☆ 40-80	☆ 40-80	①0.02~0.05 ②0.01~0.03 ③Max. 0.1	①0.02~0.05 ②0.01~0.03 ③Max. 0.2	①0.02~0.05 ②0.01~0.04 ③Max. 0.2		

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ GHU insert (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ // ap (mm)					Remarks
	Cermet			CVD Coated Carbide	PVD Coated Carbide		Ceramic							
	TN60	TC40	TC60	CR9025	PR630	PR930	A65	A66N	GHU 40	GHU 50	GHU 60			
Carbon Steel	☆ 130-200	-	-	☆ 80-180	-	-	-	-	①0.06~0.12 ②0.05~0.1 ③Max. 1.0	①0.06~0.12 ②0.05~0.1 ③Max. 1.0	①0.06~0.15 ②0.05~0.12 ③Max. 1.5			Coolant
Alloy Steel	☆ 100-180	-	-	☆ 80-160	-	-	-	-	①0.06~0.12 ②0.05~0.1 ③Max. 1.0	①0.06~0.12 ②0.05~0.1 ③Max. 1.0	①0.06~0.15 ②0.05~0.12 ③Max. 1.5			
Stainless Steel	-	-	-	☆ 60-130	-	-	-	-	①0.06~0.1 ②0.05~0.08 ③Max. 0.8	①0.06~0.1 ②0.05~0.08 ③Max. 0.8	①0.06~0.12 ②0.05~0.1 ③Max. 1.2			

* Above cutting condition is for external grooving. Set both cutting speed and feed rate lower than 10% for internal grooving.

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions

GA insert (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ 〃 ap (mm)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide		Carbide						
	TN60	TN90	TC40	TC60	CR9025	PR630	PR930	KW10	GA 30	GA 40	GA 50			
Carbon Steel	☆ 130-200	-	-	-	★ 80-180	-	-	-	①0.06~0.18 ②0.05~0.15 ③Max. 0.8	①0.06~0.21 ②0.05~0.17 ③Max. 1.0	①0.06~0.25 ②0.05~0.2 ③Max. 1.3			Coolant
Alloy Steel	☆ 100-180	-	-	-	★ 80-160	-	-	-	①0.06~0.15 ②0.05~0.12 ③Max. 0.3	①0.06~0.18 ②0.05~0.15 ③Max. 0.5	①0.06~0.22 ②0.05~0.18 ③Max. 0.8			
Stainless Steel	-	-	-	-	★ 60-130	-	-	-	①0.06~0.1 ②0.05~0.08 ③Max. 0.8	①0.06~0.1 ②0.05~0.08 ③Max. 0.8	①0.06~0.12 ②0.05~0.1 ③Max. 1.2			

★ : 1st Recommendation ☆ : 2nd Recommendation

GIA insert (Molded Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ 〃 ap (mm)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide		Carbide						
	TN60	TN90	TC40	TC60	CR9025	PR630	PR930	KW10	GIA 30	GIA 40	GIA 50			
Carbon Steel	☆ 60-120	-	-	-	★ 60-120	-	-	-	①0.04~0.08 ②0.02~0.08 ③Max. 0.3	①0.04~0.09 ②0.02~0.08 ③Max. 0.4	①0.05~0.1 ②0.05~0.08 ③Max. 0.5			Coolant
Alloy Steel	☆ 60-100	-	-	-	★ 60-100	-	-	-	①0.04~0.07 ②0.02~0.07 ③Max. 0.3	①0.04~0.07 ②0.02~0.07 ③Max. 0.4	①0.05~0.08 ②0.05~0.08 ③Max. 0.5			
Stainless Steel	-	-	-	-	★ 60-80	-	-	-	①0.04~0.07 ②0.02~0.07 ③Max. 0.3	①0.04~0.07 ②0.02~0.07 ③Max. 0.4	①0.05~0.08 ②0.05~0.08 ③Max. 0.5			

★ : 1st Recommendation ☆ : 2nd Recommendation

GMN insert (CBN / PCD)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)		① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ 〃 ap (mm)				Remarks
	CBN	PCD					
	KBN510 KBN525 (KBN10B)	KPD001 (KPD010)	GMN2	GMN3	GMN4 GMN5	GMN6	
Aluminum	-	★ 150-2000	①0.05~0.15 ②0.05~0.15 ③Max. 0.5	①0.05~0.15 ②0.05~0.15 ③Max. 0.8	①0.08~0.18 ②0.08~0.18 ③Max. 0.8	①0.10~0.20 ②0.10~0.20 ③Max. 0.8	Coolant
Brass	-	★ 200-800	①0.05~0.15 ②0.05~0.15 ③Max. 0.5	①0.05~0.15 ②0.05~0.15 ③Max. 0.8	①0.08~0.18 ②0.08~0.18 ③Max. 0.8	①0.10~0.20 ②0.10~0.20 ③Max. 0.8	
Cast Iron	★ 150-400	-	①0.04~0.09 ②0.04~0.09 ③Max. 0.3	①0.05~0.1 ②0.05~0.1 ③Max. 0.5	①0.05~0.12 ②0.05~0.12 ③Max. 0.5	①0.05~0.15 ②0.05~0.15 ③Max. 0.8	
Hard Materials	★ 80-120	-	①0.02~0.05 ②0.01~0.03 ③Max. 0.1	①0.03~0.07 ②0.01~0.05 ③Max. 0.2	①0.03~0.08 ②0.03~0.08 ③Max. 0.3	①0.05~0.1 ②0.05~0.1 ③Max. 0.4	

* Above cutting condition is for external grooving. Set feed rate lower than 20% for face grooving.

★ : 1st Recommendation

GV insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)						① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ // ap (mm)							Remarks
	Cermet			PVD Coated Carbide		Carbide	GVR/L 100SS~300SS 100S~300S	GVR/L 145B~185B	GVR/L 200B~280B	GVR/L 300B~400B				
	TN90	TC40	TC60	PR630	PR930	KW10	GVR/L 100A~340A 100AR~150AR		GVR/L 100BR	GVR/L 150BR	GVR/L 280C~300C	GVR/L 340C~400C	GVR/L 430C~500C	
Carbon Steel	☆ 120-180	☆ 120-180	☆ 80-120	☆ 80-160	★ 80-140	-	①0.03-0.08 ②0.03-0.08 ③Max. 0.3	①0.03-0.08 ②0.03-0.08 ③Max. 0.3	①0.04-0.09 ②0.04-0.09 ③Max. 0.3	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	①0.04-0.09 ②0.04-0.09 ③Max. 0.3	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	Coolant
Alloy Steel	☆ 100-160	☆ 100-160	☆ 80-100	☆ 80-140	★ 80-120	-	①0.03-0.07 ②0.03-0.1 ③Max. 0.3	①0.03-0.07 ②0.03-0.1 ③Max. 0.3	①0.04-0.08 ②0.04-0.08 ③Max. 0.3	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.04-0.08 ②0.04-0.08 ③Max. 0.3	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	
Stainless Steel	☆ 70-130	-	☆ 60-100	☆ 60-130	★ 60-110	-	①0.03-0.07 ②0.03-0.1 ③Max. 0.3	①0.03-0.07 ②0.03-0.1 ③Max. 0.3	①0.04-0.08 ②0.04-0.08 ③Max. 0.3	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.04-0.08 ②0.04-0.08 ③Max. 0.3	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	
Cast Iron	-	-	-	-	-	★ 60-100	①0.03-0.08 ②0.03-0.08 ③Max. 0.3	①0.03-0.08 ②0.03-0.08 ③Max. 0.3	①0.04-0.09 ②0.04-0.09 ③Max. 0.3	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	①0.04-0.09 ②0.04-0.09 ③Max. 0.3	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	
Aluminum	-	-	-	-	-	★ 150-300	①0.05-0.12 ②0.05-0.12 ③Max. 0.5	①0.05-0.12 ②0.05-0.12 ③Max. 0.5	①0.05-0.15 ②0.05-0.15 ③Max. 0.5	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	①0.05-0.15 ②0.05-0.15 ③Max. 0.5	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	
Brass	-	-	-	-	-	★ 100-250	①0.05-0.12 ②0.05-0.12 ③Max. 0.5	①0.05-0.12 ②0.05-0.12 ③Max. 0.5	①0.05-0.15 ②0.05-0.15 ③Max. 0.5	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	①0.05-0.15 ②0.05-0.15 ③Max. 0.5	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	

* Use PVD coated grade or carbide for traversing with edge width 1mm (GVR/L 100SS / 100S / 100A)

★ : 1st Recommendation ☆ : 2nd Recommendation

GVF insert (Ground Chipbreaker)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)								① f at Grooving (mm/rev) ② f at Traversing (mm/rev) ③ // ap (mm)					Remarks
	Cermet				CVD Coated Carbide	PVD Coated Carbide		Carbide	GVFR/L 200A~340A	GVFR/L 250B~350B	GVFR/L 400B~490B	GVFR/L 350C~450C	GVFR/L 500C~600C	
	TN60	TN90	TC40	TC60	CR9025	PR630	PR930	KW10	GVFR/L 100AR~150AR	GVFR/L 150BR	GVFR/L 200BR			
Carbon Steel	-	☆ 150-220	☆ 150-220	☆ 100-150	-	☆ 80-200	★ 80-180	-	①0.03-0.08 ②0.03-0.08 ③Max. 0.3	①0.04-0.09 ②0.04-0.09 ③Max. 0.3	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	①0.05-0.12 ②0.05-0.1 ③Max. 0.8	Coolant
Alloy Steel	-	☆ 130-200	☆ 130-200	☆ 80-130	-	☆ 80-180	★ 80-160	-	①0.03-0.07 ②0.03-0.1 ③Max. 0.3	①0.04-0.08 ②0.04-0.08 ③Max. 0.3	①0.05-0.09 ②0.05-0.09 ③Max. 0.5	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.05-0.1 ②0.05-0.1 ③Max. 0.8	
Stainless Steel	-	☆ 70-150	-	☆ 60-100	-	☆ 60-150	★ 60-130	-	①0.03-0.07 ②0.03-0.1 ③Max. 0.3	①0.04-0.08 ②0.04-0.08 ③Max. 0.3	①0.05-0.09 ②0.05-0.09 ③Max. 0.5	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.05-0.1 ②0.05-0.1 ③Max. 0.8	
Cast Iron	-	-	-	-	-	-	-	★ 60-100	①0.03-0.08 ②0.03-0.08 ③Max. 0.3	①0.04-0.09 ②0.04-0.09 ③Max. 0.3	①0.05-0.1 ②0.05-0.1 ③Max. 0.5	①0.05-0.12 ②0.05-0.1 ③Max. 0.5	①0.05-0.12 ②0.05-0.1 ③Max. 0.8	
Aluminum	-	-	-	-	-	-	-	★ 150-400	①0.05-0.12 ②0.05-0.12 ③Max. 0.5	①0.05-0.15 ②0.05-0.15 ③Max. 0.5	①0.05-0.15 ②0.05-0.15 ③Max. 0.8	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	
Brass	-	-	-	-	-	-	-	★ 150-300	①0.05-0.12 ②0.05-0.12 ③Max. 0.5	①0.05-0.15 ②0.05-0.15 ③Max. 0.5	①0.05-0.15 ②0.05-0.15 ③Max. 0.8	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	①0.08-0.15 ②0.08-0.15 ③Max. 0.8	

・The ap should be under 0.5mm if a good surface finish is required.

★ : 1st Recommendation ☆ : 2nd Recommendation

FTK Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)					Edge Width (mm)					Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide		Carbide	4.0	5.0				
	TN90	CR9025	PR660	PR930	KW10	f (mm/rev)					
Carbon Steel	☆ 120~200	★ 80~180	☆ 60~130	☆ 60~130	-	0.05~0.15	0.05~0.15				Coolant
Alloy Steel	☆ 100~160	★ 70~150	☆ 60~130	☆ 60~130	-	0.05~0.15	0.05~0.15				
Stainless Steel	☆ 80~150	☆ 60~140	★ 50~120	☆ 50~120	-	0.05~0.15	0.05~0.15				
Cast Iron	-	-	-	-	★ 50~100	0.10~0.30	0.10~0.30				
Aluminum	-	-	-	-	★ 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

GMG • GMM • GMN • GMGA

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)						Grooving				Traversing				Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Width (mm)				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	-	-	-	-	-	★ 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	

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ See the notes below for traversing conditions.

① Case of KGM Toolholder

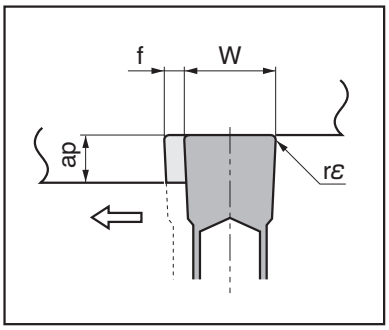
	Recommended Conditions
ap (MAX) mm	under 80% of Edge Width
f (MAX) mm/rev	under 10% of Edge Width

・ap≦0.8w
・f≦0.1w

(ap)×(f) shall not exceed 1/2 of ap(Max)×f(Max)

Load (mm^2) \ Edge Width (mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap×f	~0.20	~0.36	~0.64	~1.00	~1.44	~2.56

・ap×f≦ $\frac{1}{2}$×0.8w×0.1w=0.04w^2



② Case of KGM-T Toolholder (Deep Grooving Type)
Use 90% of KGM conditions

③ Case of KGMM / KGMS / KFMS-8 Toolholder

	Recommended Conditions
ap (MAX) mm	under 50% of Edge Width
f (MAX) mm/rev	under 4% of Edge Width

・ap≦0.5w
・f≦0.04w

ap×f should be as follows. (Under 50% of KGM)

Load (mm^2) \ Edge Width (mm)	2.0~2.5	3.0	4.0	5.0	6.0	8.0
ap×f	~0.10	~0.18	~0.32	~0.50	~0.72	~1.28

・ap×f≦0.02w^2

④ Case of KIGM Toolholder

	Recommended Conditions
ap (MAX) mm	under 70% of Edge Width
f (MAX) mm/rev	under 8% of Edge Width

・ap≦0.7w
・f≦0.08w

ap×f should be as follows. (Under 70% of KGM)

Load (mm^2) \ Edge Width (mm)	3.0	4.0	5.0
ap×f	~0.25	~0.44	~0.70

・ap×f≦0.04w^2

GMG / GMM / GMGA 8030 (Face Grooving)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)						Face Grooving			Traversing			Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Width (mm)			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	-	-	-	-	-	★ 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

FMM • FMN

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)						Face Grooving (FMM type / FMN type)			Traversing (Case of FMM type)			Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide			Carbide	Width (mm)			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	-	-	-	-	-	★ 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 traversing. set to ap=0.2mm and under.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ See the notes below for traversing conditions.

ap and f of FMM

	Recommended Conditions	
ap (MAX) mm	under 50% of Edge Width	・ap≦0.5w
f (MAX) mm/rev	under 3~5% of Edge Width	・f≦ [0.03 (Min.)~0.05 (MAX.)] w

ap×f should be as follows.

Load (mm^2) \ Edge Width (mm)	3.0	4.0	5.0	6.0
ap×f	~0.09	~0.14	~0.25	~0.36

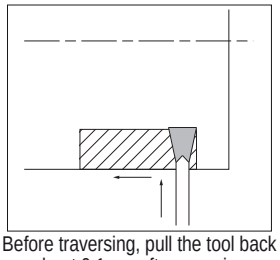
・ap×f≦0.01 w^2

Guide for External Machining

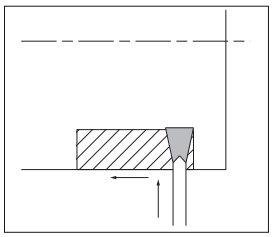
Point (Ⅰ) (Traversing after Grooving)

① Grooving Depth Over 0.5mm: At roughing (Refer to Fig.1)
Before traversing, pull the tool back about 0.1mm after grooving, instead of traversing subsequent to grooving.
(Failure to pull the tool back before traverse cutting will result in an unbalanced load applied on only one side of the cutting edge.)

② Grooving Depth under 0.5mm: At finishing (Refer to Fig.2)
Traversing subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Dwell-motion is not necessary.)



Before traversing, pull the tool back about 0.1mm after grooving
(Grooving Depth Over 0.5mm: At roughing)
Fig.1



Traversing subsequent to grooving
(Grooving Depth under 0.5mm: At finishing)
Fig.2

Point (Ⅱ)

When widening the groove width, apply the “Step Turning” as shown in Fig.3.
The widened groove and side walls should be finished last.
(For better chip control, ap over 0.5mm is recommended.)
Note: If the workpiece is not supported at the center, reduce the feed rate when grooving towards center

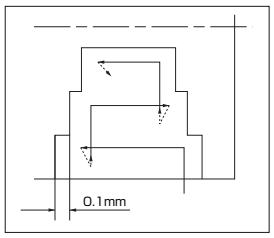


Fig.3

Guide for Face Grooving

〈Toolholder Selection〉

① Choose the best tool depending on the groove width.
The machining Dia. øD listed in the catalog indicates the depth of the first plunge of face grooving as shown in Fig.1.

② Confirm Grooving Depth (dimension T)

③ Toolholder's hand is recommended so as to be mounted in reverse. (Fig.2)
This will provide smooth chip flow and chip clearance.

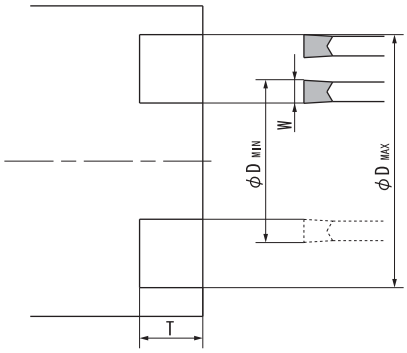


Fig.1

Toolholder	R-hand	Toolholder	L-hand
Insert	(No Hand)	Insert	(No Hand)

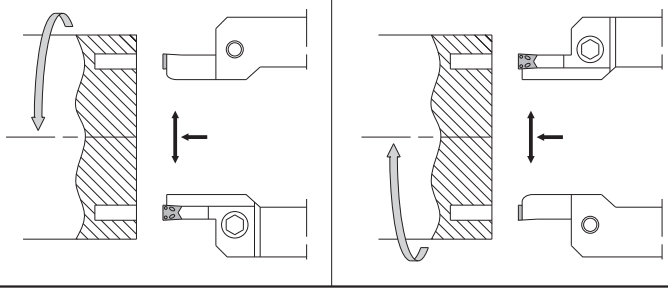


Fig.2 Toolholder's Hand and Rotation

〈Traversing Tips〉

Traversing direction should be from the outer diameter to the inner diameter as shown in Fig.3.
This improves chip evacuation.

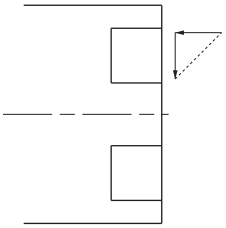
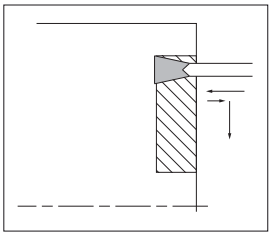


Fig.3

Guide for Face Grooving (Continued)

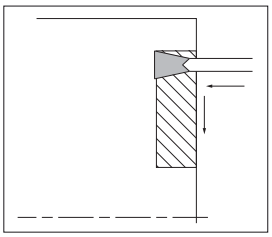
Point (Ⅰ) (Traversing after Grooving)

① Grooving Depth Over 0.5mm: At roughing (Refer to Fig.4)
Before traversing, pull the tool back about 0.1mm after grooving, instead of traversing subsequent to grooving.
(Failure to pull the tool back before traverse cutting will result in an unbalanced load applied on only one side of the cutting edge.)



Before traversing, pull the tool back about 0.1mm after grooving
(Grooving Depth Over 0.5mm: At roughing)
Fig.4

② Grooving Depth under 0.5mm: At finishing (Refer to Fig.5)
Traversing subsequent to grooving is possible because shallow groove depths relate a small load on the cutting edge.
(Dwell-motion is not necessary.)



Traversing subsequent to grooving
(Grooving Depth under 0.5mm: At finishing)
Fig.5

Point (Ⅱ)

When widening the groove width, apply the “Step Turning” as shown in Fig.6.
The widened groove and side walls should be finished last.
(For better chip control, ap over 0.5mm is recommended.)

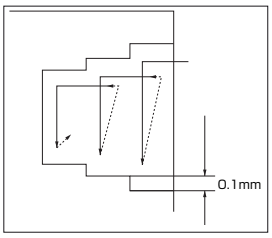
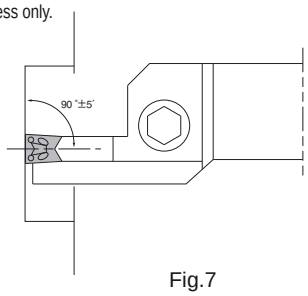


Fig.6

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 work face and adjust the toolholder within the angle of ±5'. (Fig.7)  Fig.7
Chips are entangled.	① Apply the toolholder's reverse mounting. 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 traversing.	Reverse the facing direction.
Groove is not straight.	Check the edge's parallelness. Decrease the feed rate.

Guide for Grooving by Cermet Insert (Steel)

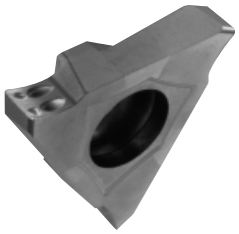
1. Set the f under 0.12mm/rev (0.05~0.10mm/rev normally).
2. Coolant is recommended.
3. Set the cutting speed V_C=150-220m/min.
4. Set the toolholder overhang as short as possible.



How to Improve Surface Finish (when surface roughness below 3 μm Rz is required)

1. Increase the cutting speed (V_C=220m/min.MAX)
2. Program dwell-motion at the groove bottom.
3. Apply a light hone to the cutting edge by hand lapper.

Chip Control of Grooving Insert with Molded Chipbreaker

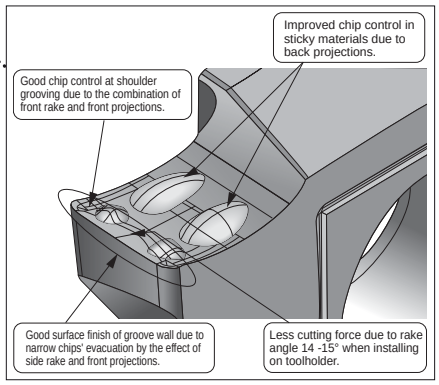


GBA-MY

3-Edge Molded Chipbreaker

- Advantages of MY Chipbreaker

1. Molded chipbreaker curls chips spirally and evacuates chips easily.
2. High precision molded Insert with economical 3 cutting edges.
3. Can be used in automated production.



H

Cut-off

H1~H20

Product Lineup H2

Guide for Cut-Off H3

Summary of Cut-Off H4~H5

Cut-Off Toolholders (for small diameter cut-off) H6~H9

KTKF	Lateral side screw clamp holder	H6
KTKFS (For sub spindle tooling)	Lateral side screw clamp holder	H8

Cut-Off Toolholders (for 2-edge insert) Grooving / Plunge&Turn H12~H13

KGM (For automatic lathe)	Solid type toolholder	H12
KGM	Solid type toolholder	H13
KGM-T	Solid type toolholder	H13

Cut-Off Toolholders (for 1-edge insert) Cut-Off H16~H19

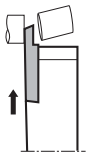
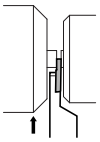
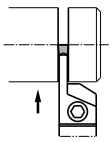
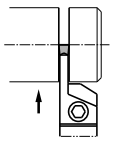
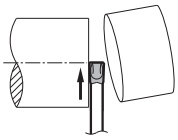
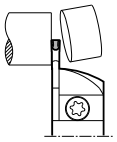
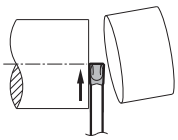
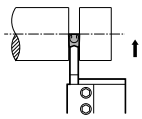
KTKH-S / KTKH-B	Solid type toolholder	H16
KTKB-SS / KTKB-S	Blade	H18
KTKTB / KTKTBF	Toolblock	H19

Technical Information H20

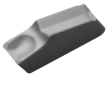
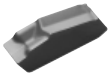
Recommended Cutting Conditions H20



Product Lineup

For Small Diameter Cut-Off	Toolholder (Long Shank for Automatic Lathe) Cut-Off Dia. ø5~ø12 ~ø16	**KTKF** (H6)  Width: 0.5~2.0 mm		For sub spindle tooling Cut-Off Dia. ø6~ø12	**KTKFS** (H8)  Width: 1.0~2.0 mm
CERACUT / Plunge & Turn (2-edge)	Bolt Clamp Cut-Off Dia. ø10~ø32 ø18~ø50	**KGM** (H12~H13)  Width: 1.5~4.0mm, 3~8mm	**KGM-T** (H13)  Width: 2.0~6.0mm		
CERACUT Cut-Off (1-edge)	Toolholder (Long Shank for Automatic Lathe) Cut-Off Dia. ø30~ø45	**KTKH-S** (H16)  Width: 2.2~3.1mm		Toolholder (Long Shank for Automatic Lathe) Bolt Clamp Cut-Off Dia. ø10~ø32	**KTKH-B** (H16)  Width: 1.6~3.1mm
	Toolholder Type Cut-Off Dia. ø30~ø79	**KTKH-S** (H16)  Width: 2.2~5.1mm		Blade type Cut-Off Dia. ø32~ø120	**KTKB-S(S)** (H18)  Width: 1.6~9.6mm

Cut-Off Tools

Series Name	Shape	Advantage	Application
For Small Diameter Cut-Off		1) Insert clamp is side screw type from lateral side 2) 2-edge Insert 3) Ground Chipbreaker & No Chipbreaker 4) Width: 0.5~2.0mm 5) Cut-off Diameter is prepared for two sizes from ø5~ø12 and max.ø16.	1) For cut-off and grooving of small workpieces 2) For automatic lathe, small machine
CERACUT / Plunge & Turn		1) Insert is clamped from top side 2) 1-edge and 2-edge inserts available 3) Molded Chipbreaker & No Chipbreaker Insert 4) MT-Chipbreaker • • • Smaller Corner-R(rε) 0.0, 0.05 TK-Chipbreaker • • • Larger Corner-R(rε) 0.2~0.3 TMR-Chipbreaker • • • Corner-R(rε) 0.2 5) Max. Cutting Dia.: ø50	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.
CERACUT Cut-Off		1) Self-Clamping System Tap the insert lightly with a plastic hammer to set it in the pocket. 2) 1-edge insert 3) Molded Chipbreaker • Standard (e.g.: TKN3) • P-Chipbreaker (e.g.: TKN3-P) 4) Blade type and Integral Shank type 5) Max. Cutting Dia.: ø120	1) For cut-off and deep grooving 2) Standard chipbreaker is general cut-off type. Feed rate : over 0.1mm/rev  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 Dia. Cut-Off	CERACUT / Plunge & Turn	CERACUT Cut-Off
Insert	1. Insert 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	GMM	TKN
	3. Use angled insert to reduce the size of the remaining boss.	TKF...DR	GMM-R/L (➡Fig.2)	TKR/L (➡Fig.1)
	4. Use sharp-cornered lead-angled Insert to make the remaining boss much smaller when machining small parts and thin parts.	TKF...DR	GMM-R/L (➡Fig.2)	-
	5. Use the minimum width insert suitable for the machining operation.		○	○
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 Set Up (TKN / TKR/L)

1. Tap the insert lightly with a plastic hammer to push it in to the extent that it can not be removed by hand.	-	-	○ (➡Fig.3)
2. Remove the insert by using the supplied wrench.	-		○ (➡Fig.4)

Caution

1. Set the cutting edge height 0.1-0.2mm above the center height.	○ (➡Fig.5)	○ (➡Fig.5)	○ (➡Fig.5)
2. Always apply sufficient coolant to the cutting edge.	○	○	○
3. Constant spindle revolution is recommended to obtain stable tool life.	○	○	○
4. Cut-off as close to the chuck as possible	○	○	○
5. Decrease the feed rate from 1/2 to 1/3 at the near center to prevent chipping.	○	○	○
●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.	○	○	○

○: Applicable —: Not Applicable

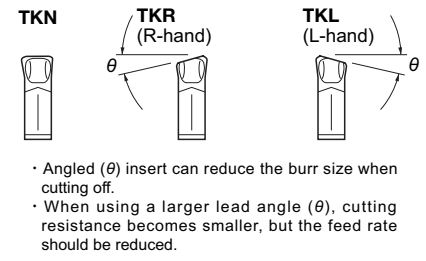


Fig.1

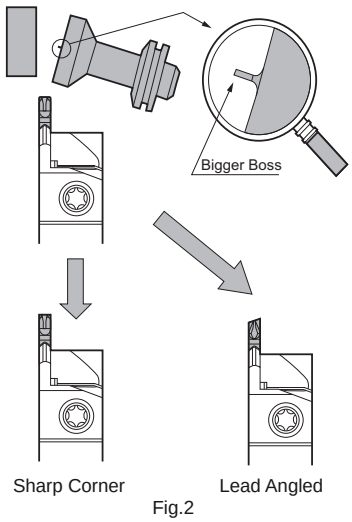


Fig.2

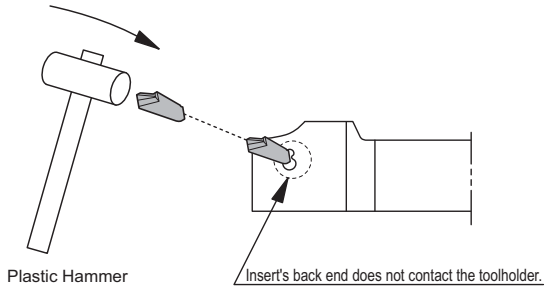


Fig.3

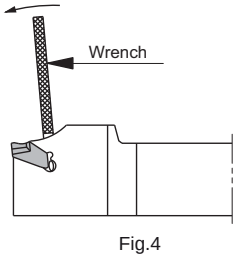


Fig.4

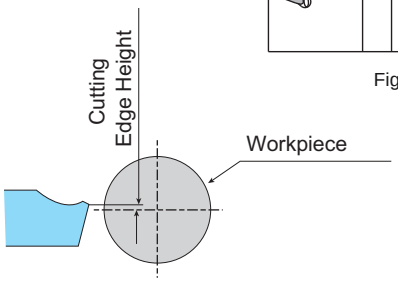
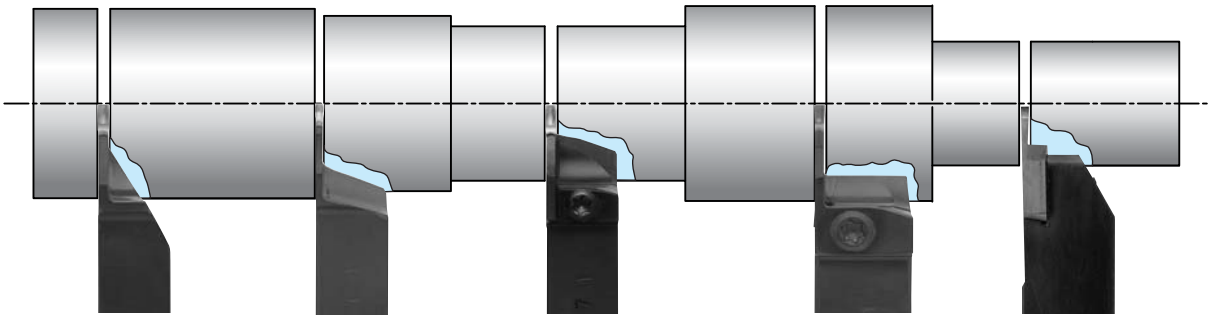


Fig.5

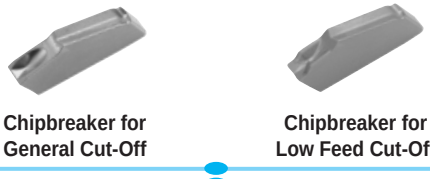
Summary of Cut-Off

Small Dia. Cut-off ~ø45

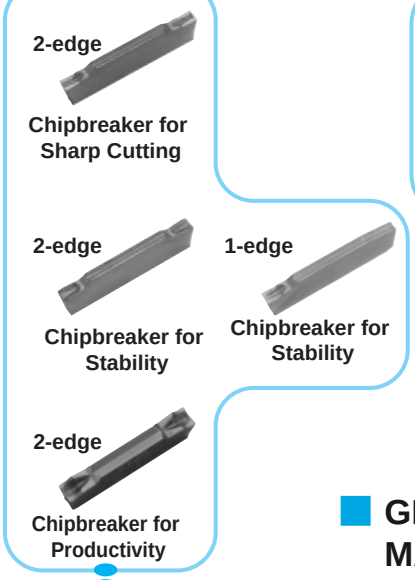
Small Shank



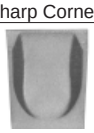
KTKH	KTKH	KTKH-B	KGM	KTKF	KTKFS
Cutting Dia: ~ø45 Shank: □10~16 Edge Width: 2.2~3.1 Self Clamp	Cutting Dia: ~ø35 Shank: □8~14 Edge Width: 1.6 Self Clamp	Cutting Dia: ~ø32 Shank: □8~16 Edge Width: 1.6~3.1 Top Clamp	Cutting Dia: ~ø32 Shank: □8~16 Edge Width: 1.5~4.0 Top Clamp	Cutting Dia: ~ø16 Shank: □8~16 Edge Width: 0.5~2.0 Lateral Side Clamp	Cutting Dia: ~ø16 Shank: □10~12 Edge Width: 1.0~2.0 Lateral Side Clamp
➡H17	➡H17	➡H17	➡H12	➡H6	➡H8



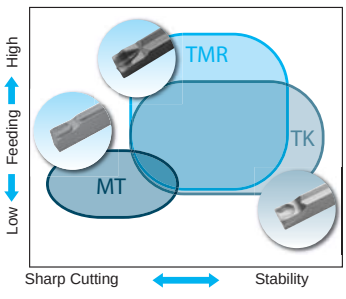
Chipbreaker edge shape	CERACUT Cut-Off ➡H15		
	General Cut-Off		Low Feed Cut-Off
	Chamfer + hone	Sharp Edge	Hone
			





Chipbreaker edge shape	Grooving / Plunge&Turn ➡H11				
	Sharp Cutting (MT-Chipbreaker)		Stable Cutting (TK-Chipbreaker)		Productivity Oriented (TMR-Chipbreaker)
	Chamfer + hone	Chamfer + hone	Chamfer + hone	Sharp Edge	Chamfer + hone
	Corner-R 0.05	Sharp Corner	Corner-R 0.2-0.3	Corner-R 0.2-0.3	Corner-R 0.2
					

GMM Chipbreaker MAP





CERACUT Cut-Off
➡H16 (Self Clamp)

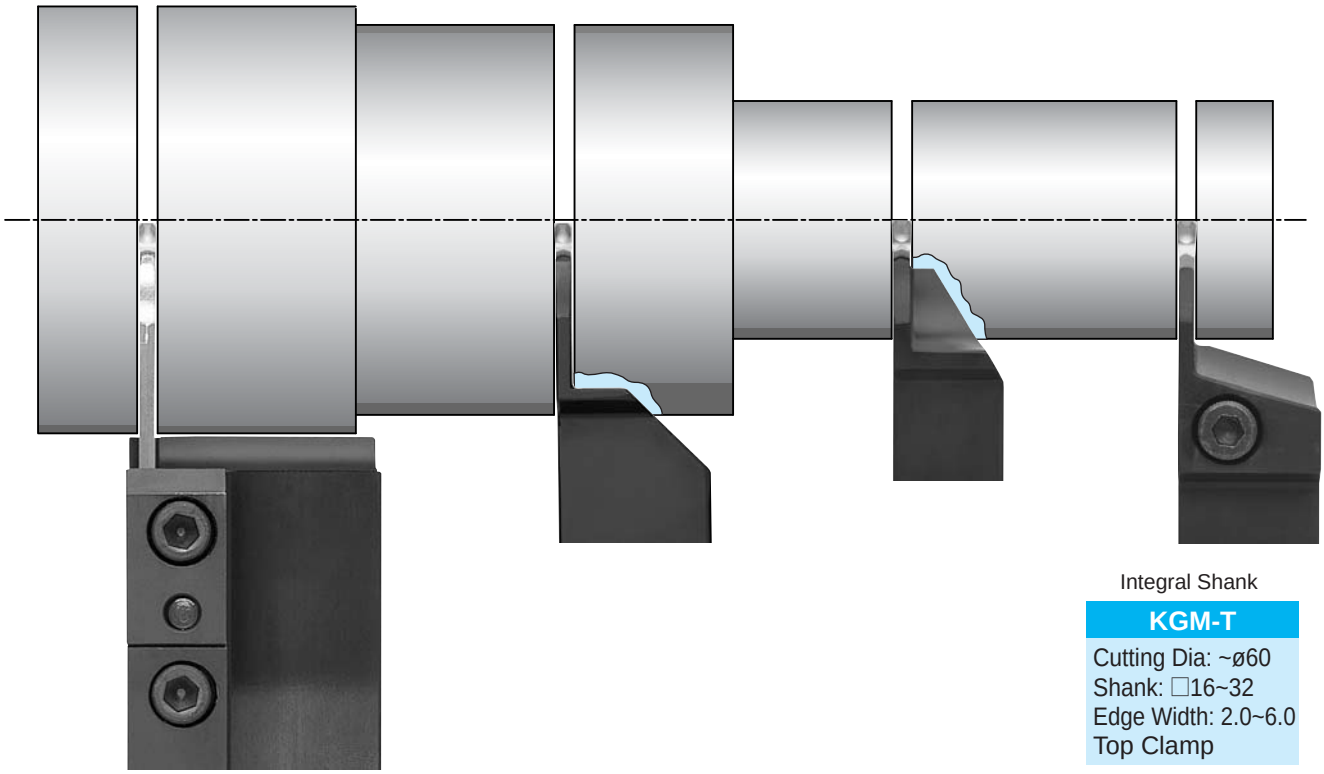


CERACUT / Plunge & Turn
➡H12 (Top Clamp)



For Small Diameter Cut-Off
➡H6 (Lateral Side Clamp)

General Cut-Off ~ø120



Integral Shank

KGM-T

Cutting Dia: ~ø60
Shank: □16~32
Edge Width: 2.0~6.0
Top Clamp

H13

Blade + Toolblock

KTKB

Cutting Dia: ~ø120
Shank: □16~32
Edge Width: 1.6~9.6
Self Clamp

H18

Integral Shank

KTKH

Cutting Dia: ~ø79
Shank: □20~25
Edge Width: 3.1~5.1
Self Clamp

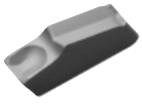
H17

Integral Shank

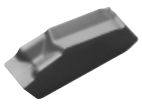
KTKH

Cutting Dia: ~ø41
Shank: □10~20
Edge Width: 2.2~3.1
Self Clamp

H17



Chipbreaker for General Cut-Off



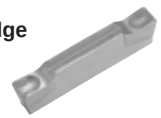
Chipbreaker for Low Feed Cut-Off

2-edge



Chipbreaker for Sharp Cutting

2-edge



Chipbreaker for Stability

1-edge

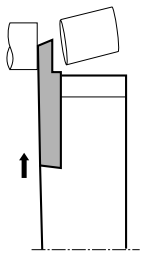


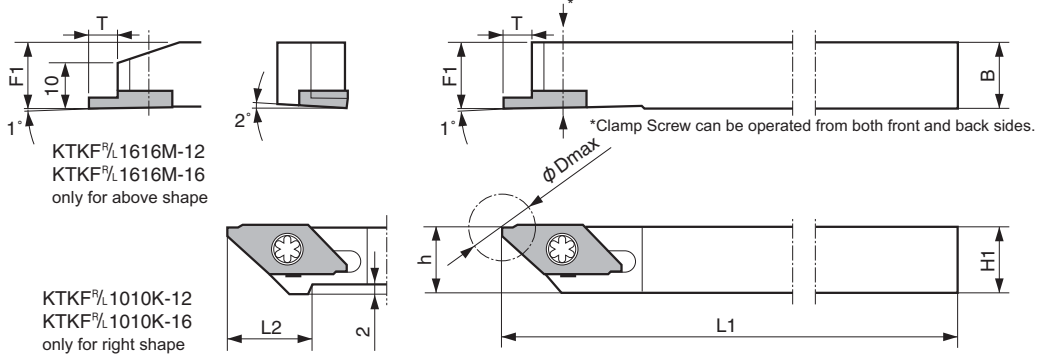
Chipbreaker for Stability

Blade + Toolblock	Integral Shank	
		
CERACUT Cut-Off H18	CERACUT Cut-Off H16	CERACUT / Plunge & Turn H12

Cut-Off Toolholders (for small diameter)

KTKF (For small diameter cut-off)





● Right-hand shown

R-hand Insert for R-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Cutting Dia. øDmax	Dimension (mm) H1=h	B	L1	L2	F1	T	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ⇒H7
KTKF R/L	1010K-12	●	●	12	10	10	125	15	10	6	SB-4590TRWN	LTW-10S	TKF12 R/L ···
	1212F-12	●			12	12	85	-	12				
	1212M-12	●	●				150						
	1616M-12	●	●		16	16			16				
KTKF R/L	1010K-16	●	●	16	10	10	125	20	10	8	SB-4590TRWN	LTW-10S	TKF16 R/L ···
	1212F-16	●			12	12	85	-	12				
	1212M-16	●	●				150						
	1616M-16	●	●		16	16			16				

• Dimension T shows the distance from the Toolholder to the cutting edge. ⇒H7 for the actual cutting diameter.

For recommended cutting conditions, see page ⇒H7

Note: Cutting diameter of -12 type toolholder(øDmax) depends on the insert grooving width.

When using Main Spindle only

Workpiece maximum øD1 (Fig.1)=øDmax
Even if the cutting edge runs beyond the center line, the insert does not contact the workpiece, since the workpiece falls off.
(The clearance between the insert and the workpiece is 0.2mm)

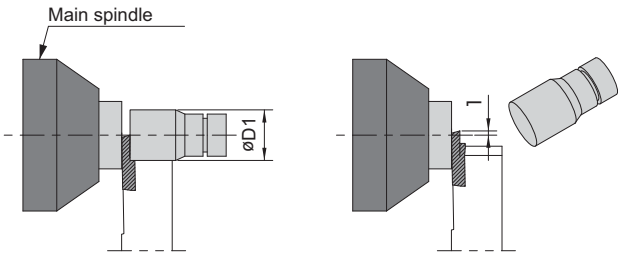


Fig.1 (When the edge is at the center)

Fig.2 (When the edge is 1mm beyond the center)

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.
Workpiece maximum, øD2 (Fig.4) = [øDmax - 1mm×2] (mm)
(The clearance between the insert and the workpiece is 0.2mm)

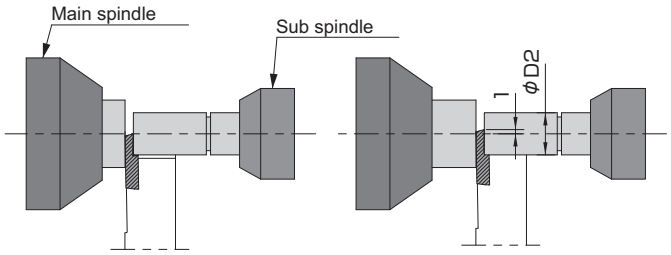


Fig.3 (When the edge is at the center)

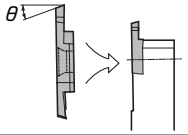
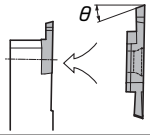
Fig.4 (When the edge is 1mm beyond the center)

Identification of Description (See Table.1)

TKF 12 R 050 – S – 16D R

Name of Insert	Insert Size	Insert Hand	Groove Width	Name of breaker	Lead angle (θ) (Front cutting edge angle)	Lead Angle Hand
		R:R-hand L:L-hand		S: S-Chipbreaker NB: Without Chipbreaker		R:R-hand L:L-hand

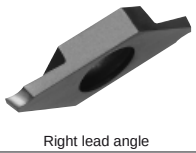
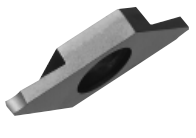
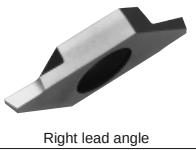
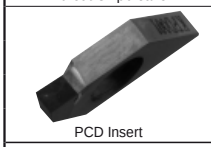
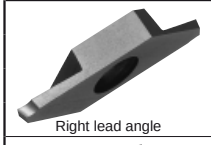
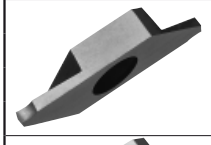
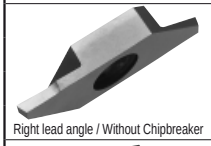
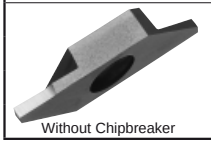
Table1

Toolholder	R-hand (R)	Toolholder	L-hand (L)
Insert	R-hand (R)	Insert	L-hand (L)
Lead Angle	R-hand (R)	Lead Angle	R-hand (R)
			

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Classification of usage					
● : Continuous-Low Interruption / 1st Choice ◔ : Continuous-Low 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 (TKF)

Insert (Handed Insert shows Right-hand)	Description		Dimension (mm) W	øD max	rε	T	H	ød	S	Angle (°) *1 θ	PVD Coated Carbide PR1025	Carbide KW10	PCD KPD001	Applicable Toolholder
 Right lead angle	TKF12R/L	050-S-16DR	0.5	5	0.03	3	8.7	5	-	16°	●	●		KTKFR/L … -12
		070-S-16DR	0.7	8							●	●		
		100-S-16DR	1.0	12							●	●		
		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							●	●		
		150-S	1.5								●	●		
		200-S	2.0								●	●		
 Right lead angle	TKF12R/L	050-NB-20DR	0.5	5	0.00	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	0.00	3	8.7	5	-	0°	●	●		
		070-NB	0.7	8							●	●		
		100-NB	1.0	12							●	●		
		150-NB	1.5								●	●		
		200-NB	2.0								●	●		
 PCD Insert	TKF12R/L	150-NB	1.5	7.0	0.1 +0 -0.05	3	8.7	5	2.0	0°			●	KTKFR/L … -12 • Please use PCD Insert for traverse machining.
		200-NB	2.0	8.0					3.0				●	
		250-NB	2.5	8.0					3.0				●	
		250-NB4.5	2.5	10.0					4.5				●	
 Right lead angle	TKF16R/L	150-S-16DR	1.5	16	0.05	4	9.5	5	-	16°	●	●		KTKFR/L … -16
		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 / Without Chipbreaker	TKF16R/L	150-NB-20DR	1.5	16	0.00	4	9.5	5	-	20°	●	●		
		200-NB-20DR	2.0								●	●		
 Without Chipbreaker	TKF16R/L	150-NB	1.5	16	0.00	4	9.5	5	-	0°	●	●		
		200-NB	2.0								●	●		

* 1 Lead angle shows the angle when installed in toolholder.

Recommended Cutting Conditions (For TKF12)

Workpiece Material	Recommended Insert Grade (Vc: m/min) PVD Coated Carbide PR1025	Carbide KW10	Dimension (mm) 0.5	0.7	1.0	1.5	2.0	Remarks
			f (mm/rev)					
Carbon Steel	60~130	-	0.01~0.02	0.01~0.03	0.01~0.04	0.01~0.04	0.01~0.04	Coolant
Alloy Steel	60~130	-	0.01~0.02	0.01~0.03	0.01~0.04	0.01~0.04	0.01~0.04	
Stainless Steel	50~100	-	0.005~0.015	0.01~0.02	0.01~0.02	0.01~0.02	0.01~0.02	
Cast Iron	-	50~100	0.01~0.03	0.01~0.04	0.01~0.05	0.01~0.05	0.01~0.05	
Non-ferrous Metals	-	200~450	0.01~0.03	0.01~0.04	0.01~0.05	0.01~0.05	0.01~0.05	

Recommended Cutting Conditions (For TKF16)

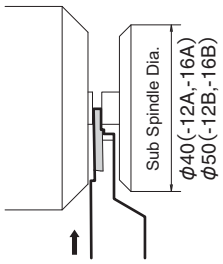
Workpiece Material	Recommended Insert Grade (Vc: m/min) PVD Coated Carbide PR1025	Carbide KW10	Width (mm) 1.5	2.0	Remarks
			f (mm/rev)		
Carbon Steel	60~130	-	0.02~0.07	0.02~0.07	Coolant
Alloy Steel	60~130	-	0.02~0.07	0.02~0.07	
Stainless Steel	50~100	-	0.01~0.04	0.01~0.04	
Cast Iron	-	50~100	0.02~0.08	0.02~0.08	
Non-ferrous Metals	-	200~450	0.02~0.08	0.02~0.08	

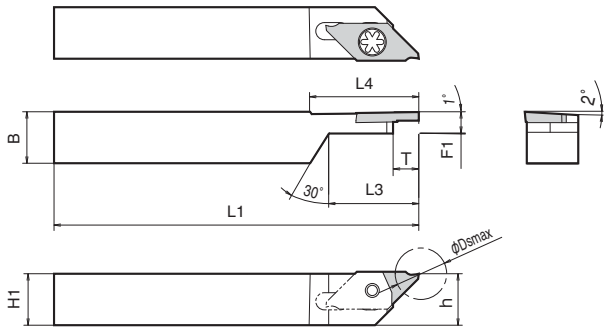
● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

CBN & PCD Tools are sold in 1 piece boxes.

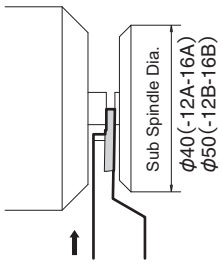
KTKFS (For Small diameter cut-off)

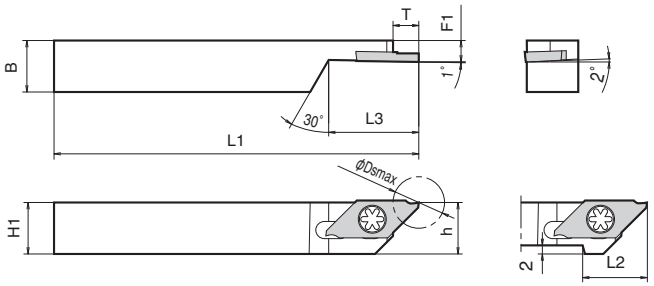




●Right-hand Shown

R-hand Insert for R-hand Toolholder.





KTKFS$^{R}_{L}$1010K-12A
KTKFS$^{R}_{L}$1010K-16A
only for left shape.

●Left-hand Shown

L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Cutting Dia. øDsmax	Dimension (mm) H1=h	B	L1	L2	L3	*L4	F1	T	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡H9
KTKFS$^{R}_{L}$	1010K-12A	●	●	6~12	10	10	120	15	22	26	5	6	SB-4050TRN	LTW-10S	TKFS12$^{R}_{L}$
	1212F-12A	●	●		12	12	85	-							
	1212K-12B	●	●				120		26						
KTKFS$^{R}_{L}$	1010K-16A	●	●	14~16	10	10	120	20	22	30	5	8	SB-4050TRN	LTW-10S	TKFS16$^{R}_{L}$
	1212F-16A	●	●		12	12	85	-							
	1212K-16B	●	●				120		26						

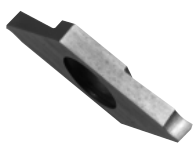
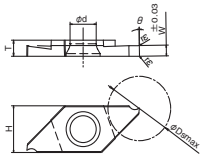
• Dimension T shows the distance from the Toolholder to the cutting edge. ➡H8 for the actual cutting diameter.

For recommended cutting conditions, see page ➡H9

• Cutting diameter (øDmax) depends on the insert grooving width.

* Only R-hand is available for L4 dimension.

TKFS (øDmax)

Insert (Handed insert indicates Left-hand)		Description		Dimension (mm) W	Dimension (mm) øDsmax
		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

Note) As Fig.2 shows, the cutting diameter of the insert is indicated when the top of the cutting edge progresses 1mm from the center.

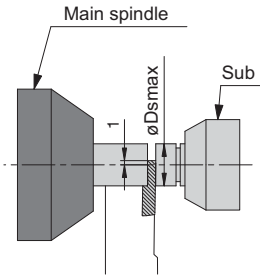


Fig.1

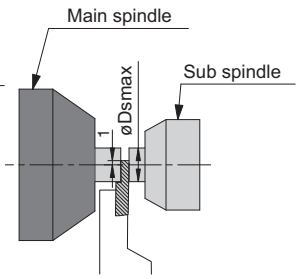


Fig.2

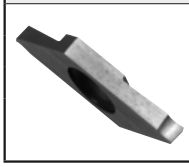
● As Fig.1 shows, use KTKFL (L-hand) for the distance between main spindle and sub spindle.

● As Fig.2 shows, KTKFS is recommended for small diameters and for the short distance between the main spindle and sub spindle.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

Classification of usage					
● : Continuous-Low Interruption / 1st Choice	P	Carbon Steel and Alloy Steel	●		
◔: Continuous-Low Interruption / 2nd Choice	M	Stainless Steel	◔		
● : Continuous / 1st Choice	K	Cast Iron		●	
○ : Continuous / 2nd Choice	N	Non-ferrous Metals		●	

Insert (Handed insert indicates Left-hand)	Description		Dimension (mm) W	øDs max	rε	T	H	ø d	Angle (°) θ	PVD Coated Carbide PR1025 R	PR1025 L	Carbide KW10 R	KW10 L	PCD KPD001	Applicable Toolholder
	TKFS12R/L	100-S	1.0	6	0.05	2.2	8.7	4.4	0°	●	●	●	●		KTKFSR/L ···-12
		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	0°	●	●	●	●		KTKFSR/L ···-16
		200-S	2.0	16						●	●	●	●		

• As Fig.2 of H8 shows, the cutting diameter of the insert is indicated when the top of the cutting edge progresses 1mm from the center.
• Lead angle shows the angle when installed in toolholder.

Recommended Cutting Conditions (For TKFS12)

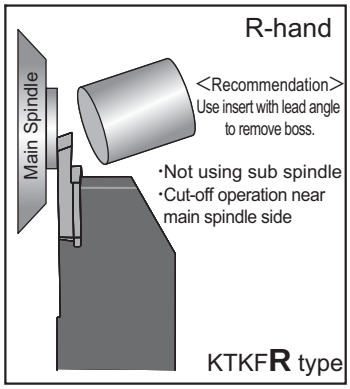
Workpiece Material	Recommended Insert Grade (Vc: m/min) PVD Coated Carbide PR1025	Carbide KW10	Width (mm) 1.0 f (mm/rev)	1.5 f (mm/rev)	2.0 f (mm/rev)	Remarks
Carbon Steel	60~130	-	0.01~0.03	0.01~0.03	0.01~0.03	Coolant
Alloy Steel	60~130	-	0.01~0.03	0.01~0.03	0.01~0.03	
Stainless Steel	50~100	-	0.01~0.02	0.01~0.02	0.01~0.03	
Cast Iron	-	50~100	0.01~0.03	0.01~0.03	0.01~0.03	
Non-ferrous Metals	-	200~450	0.01~0.03	0.01~0.03	0.01~0.03	

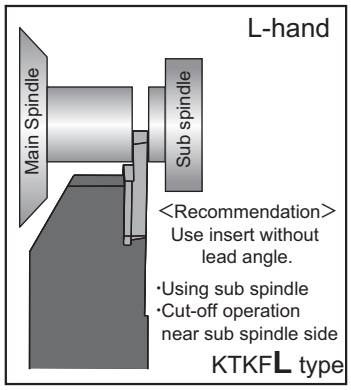
Recommended Cutting Conditions (For TKFS16)

Workpiece Material	Recommended Insert Grade (Vc: m/min) PVD Coated Carbide PR1025	Carbide KW10	Width (mm) 1.5 f (mm/rev)	2.0 f (mm/rev)	Remarks
Carbon Steel	60~130	-	0.01~0.03	0.01~0.03	Coolant
Alloy Steel	60~130	-	0.01~0.03	0.01~0.03	
Stainless Steel	50~100	-	0.01~0.02	0.01~0.03	
Cast Iron	-	50~100	0.01~0.03	0.01~0.03	
Non-ferrous Metals	-	200~450	0.01~0.03	0.01~0.03	

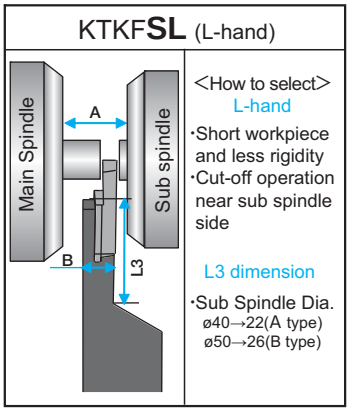
How to use small diameter cut-off tool

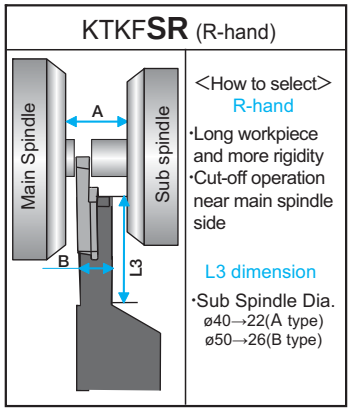
• Both Right-hand and Left-hand types are applicable to gang tool post.
• Basically Left-hand type is used at cut-off operation using sub-spindle.





• When machining workpiece with small diameter, use KTKFS to reduce overhang distance from the main spindle.





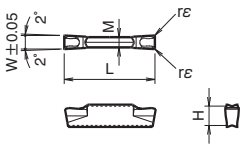
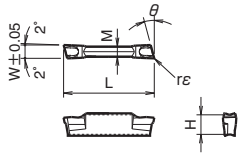
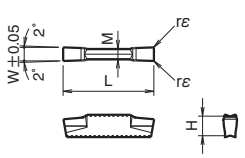
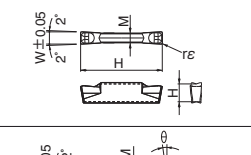
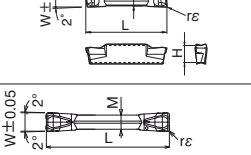
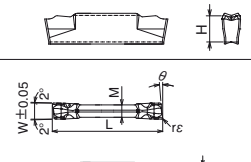
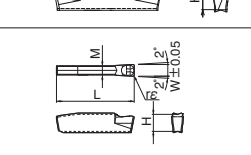
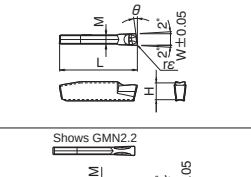
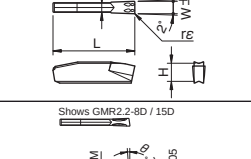
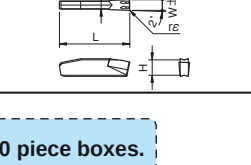
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Cut-Off Inserts

GMM / GMN / GM$^{R}_{L}$

Classification of usage							
● : Continuous-Low Interruption / 1st Choice	P	Carbon Steel / Alloy Steel	○	◔	●	◔	●	
◔ : Continuous-Low Interruption / 2nd Choice	M	Stainless Steel		◔	●	◔	●	
● : Continuous / 1st Choice	K	Cast Iron						●
○ : Continuous / 2nd Choice	N	Non-ferrous Metals						●

Insert (Handed Insert shows Right-hand)		Description		Dimension (mm) W	rε	L	H	M	Angle (°) θ	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR915	PR930	PR1115	Carbide KW10	Ref. Page for Applicable Toolholder
Cut-Off / Sharp-Cutting 2-edge		GMM	1520-MT	1.5	0.0 / 0.05	20	4.3	1.2	-			●	●		●	H12 H13
			2020-MT	2.0	0.0 / 0.05			1.5			●	●				
			2520-MT	2.5	0.0 / 0.05			1.9			●	●			●	
			3020-MT	3.0	0.0 / 0.05			2.3			●	●			●	
Cut-Off / Sharp-Cutting 2-edge / Lead Angled		GMM	1520$^{R}_{L}$-MT-15D	1.5	0.0 / 0.05	20	4.3	1.2	15°			R	●		●	
			2020$^{R}_{L}$-MT-15D	2.0	0.0 / 0.05			1.5			●	R	●		●	
			2520$^{R}_{L}$-MT-15D	2.5	0.0 / 0.05			1.9			●	R	●		●	
			3020$^{R}_{L}$-MT-15D	3.0	0.0 / 0.05			2.3			●	R	●		●	
Cut-Off / Sharp-Cutting 2-edge / Without Chipbreaker		GMM	1520-NB	1.5	0.0 / 0.05	20	4.3	1.2	-				●		●	
			2020-NB	2.0	0.0 / 0.05			1.5			●		●		●	
			2520-NB	2.5	0.0 / 0.05			1.9			●		●		●	
			3020-NB	3.0	0.0 / 0.05			2.3			●		●		●	
Cut-Off / Stability-oriented 2-edge		GMM	2020-TK	2.0	0.20	20	4.3	1.5	-			●	●		●	
			2520-TK	2.5	0.20			1.9			●	●	●		●	
			3020-TK	3.0	0.25			2.3			●	●	●		●	
Cut-Off / Stability-oriented 2-edge / Lead Angled		GMM	2020$^{R}_{L}$-TK-8D	2.0	0.20	20	4.3	1.5	8°			R	R		R	
			2520$^{R}_{L}$-TK-8D	2.5	0.20			1.9			R	R	R		R	
			3020$^{R}_{L}$-TK-8D	3.0	0.25			2.3			R	R	R		R	
Cut-Off / High Feed 2-edge		GMM	2020-TMR	2.0	0.20	20	4.3	1.5	-					●		
			2520-TMR	2.5	0.20			1.9						●		
			3020-TMR	3.0	0.25			2.3						●		
Cut-Off / High Feed 2-edge / Lead Angled		GMM	2020$^{R}_{L}$-TMR-6D	2.0	0.20	20	4.3	1.5	6°					R		
			2520$^{R}_{L}$-TMR-6D	2.5	0.20			1.9						R		
			3020$^{R}_{L}$-TMR-6D	3.0	0.25			2.3						R		
Cut-Off / Stability-oriented 1-edge		GMN	2-TK	2.0	0.20	20	4.3	1.8	-			●	●		●	
			3-TK	3.0	0.25			2.3			●	●	●		●	
			4-TK	4.0	0.30			3.3			●	●	●		●	
Cut-Off / Stability-oriented 1-edge / Lead Angled		GM$^{R}_{L}$	2-TK-8D	2.0	0.20	20	4.3	1.8	8°			R	R		R	
			3-TK-8D	3.0	0.25			2.3			R	R	R		R	
			4-TK-8D	4.0	0.30			3.3			R	R	R		R	
Shows GMN2.2 Cut-Off / Sharp-Cutting 1-edge		GMN	2.2	2.2	0.17	20	4.3	1.8	-	●	●		●		●	
			3	3.0	0.20			2.3		●	●		●		●	
			4	4.0	0.25			3.3		●	●		●		●	
			5	5.0	0.80			4.2		●	●		●		●	
			6	6.0	0.80			5.2		●	●		●		●	
Shows GMR2.2-8D / 15D Cut-Off / Sharp-Cutting 1-edge / Lead Angled		GM$^{R}_{L}$	2.2-8D	2.2	0.17	20	4.3	1.8	8°	R	●		●		●	
			2.2-15D	2.2	0.00			1.8	15°	R	●		●		●	
			3-4D	3.0	0.20			2.3	4°	R	●		●		●	
			3-15D	3.0	0.20			2.3	15°		●					
			4-4D	4.0	0.25			3.3	4°		●		R			

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Edge Preparation

Series	MT-Chipbreaker		TK-Chipbreaker		TMR-Chipbreaker	Without Chipbreaker (NB)	
Edge Specification	Chamfer + hone	Chamfer + hone	Chamfer + hone	Sharp Edge	Chamfer + hone	Hone	Sharp Edge
	Corner-R0.05	Sharp Corner	Corner-R0.2-0.3	Corner-R0.2-0.3	Corner-R0.2	Corner-R0.05	Sharp Corner
							
	CR9025 / PR915	**PR930 / KW10**	**CR9025 / PR915**	**PR930 / KW10**	**PR1115**	**CR9025**	**PR930 / KW10**

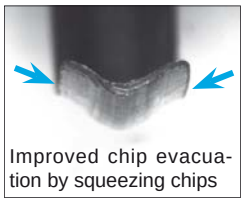
• Sharp Edge Spec. can reduce cutting resistance by 40% compared to chamfer edge.

Series	Advantage
GMM-MT	Specific chipbreaker for cut-off operations requiring sharp cutting performance. Minimizes the Boss.
GMM-NB	Cutting edge is flat with no chipbreaker. Good performance for brass, etc.
GMM-TK	Stable design with chipbreaker for cut-off. Large corner-R. 2-edge for economical performance.
GMN-TK	Same chipbreaker geometry as GMM-TK. 1-edge. Wide application range.
GMN (Std.)	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

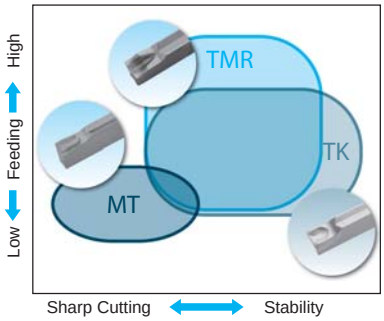
Chipbreaker Advantages





Chip width < grooving width

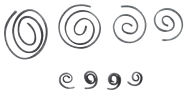
GMM Chipbreaker MAP



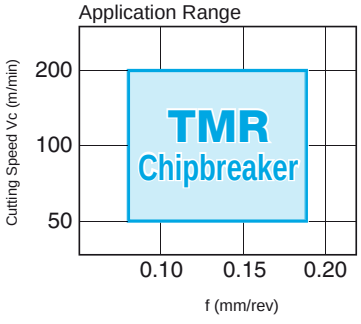
The TMR chipbreaker provides stable chip control up to high feed rate range.

Good chip control even when cutting speed (spindle revolution) is increased.

(Cutting Condition: 15CrMo4 (SCM415), ø30, constant spindle revolution)

Description	n=1060min^{-1}(Vc=100m/min)		n=2123min^{-1}(Vc=200m/min)	
	f=0.12mm/rev	f=0.18mm/rev	f=0.12mm/rev	f=0.18mm/rev
GMM 3020-TMR (Without Hand)				
GMM 3020R-TMR-6D (R-hand)				

Application Range

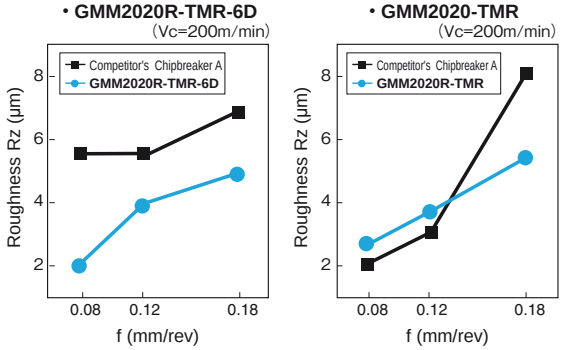


Recommended Cutting Conditions

Workpiece Material	Vc (m/min)	f (mm/rev)
Carbon Steel	60~200	0.08~0.18
Alloy Steel	60~150	
Stainless Steel	50~140	

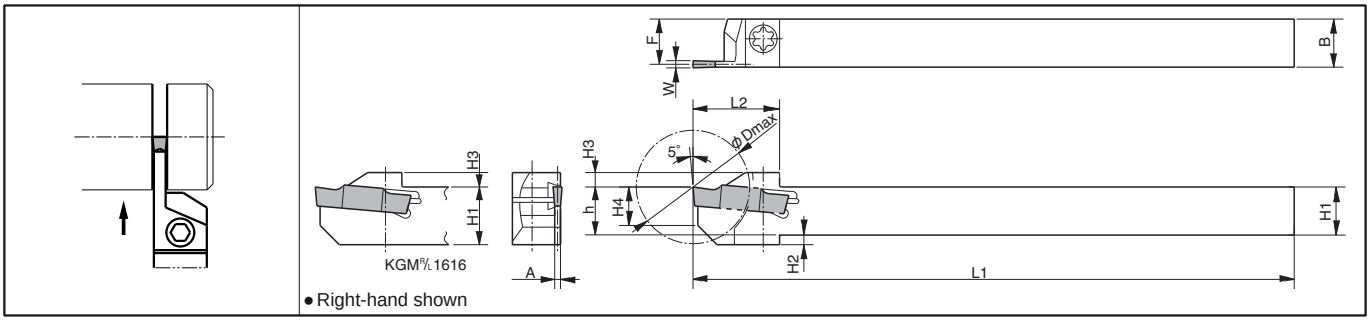
Workpiece Surface Roughness

TMR-Chipbreaker provides good surface roughness on the workpiece end face at high feed rate ranges.



KGM (For automatic lathe)

Edge Width: 1.5~4.0mm



Toolholder Dimensions

Description		Std R	Std L	Cutting Dia. øDmax	Dimension (mm) H1=h	H2	H3	H4	B	L1	L2	F	A	Width W (mm) MIN.	Width W (mm) MAX.	Spare Parts Screw	Spare Parts Wrench
KGMR/L	0810K-1.5-125	●	●	10	8	4	3	8	10	125	18	9.4	1.2	1.5	2.0	SE-40120TR	LTW-15S
	1010K-1.5-125	●	●	20	10	2											
	1212F-1.5-85	●		25	12		4	10	12	85	19	11.4					
	1212M-1.5-150	●	●							150							
	0810K-2-125	●	●	10	8	4	3	8	10	125	18	9.2	1.6	2.0	3.0	SE-40120TR	LTW-15S
	1010 K-2-125	●	●	20	10	2						9.15					
	1212F-2-85	●		25	12		4	10	12	85	19	11.15	1.7				
	1212M-2-150	●	●							150							
	1616M-2-150	●	●	32	16	-	4	9	16	150	24.5	15.15				SE-50125TR	LTW-20
	1010K-2.5-125	●	●	20	10	2	3	8	10	125	18	9	2.0	2.4	3.0	SE-40120TR	LTW-15S
	1212F-2.5-85	●		25	12		4	10	12	85	19	11					
	1212M-2.5-150	●	●							150							
	1616M-2.5-150	●	●	32	16	-		9	16	150	25.5	15				SE-50125TR	LTW-20
	1616M-3-150	●	●	32	16	-	4	9	16	150	25.5	14.8	2.4	3.0	4.0	SE-50125TR	LTW-20

Applicable Inserts

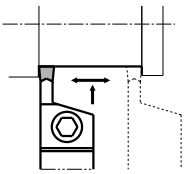
Applications	Grooving / Turning	Grooving / Turning	Grooving	Full-R / Copying	Full-R / Copying	Cut-Off	Cut-Off	Cut-Off	Cut-Off	Cut-Off
Ref. Page	G18	G18	G18	G18	G19	H10	H10	H10	H10	H10
Insert / Toolholder	MW	MS	MG			MT	NB	TK / TMR	TK	
KGMR/L···1.5	-	-	-	-	-	GMM1520..MT GMM2020..MT GMM1520R/L..MT GMM2020R/L..MT	GMM1520..NB GMM2020..NB	GMM2020..T. GMM2020R/L..T.	GMN2..TK GMR/L 2..TK	-
KGMR/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 GMM2020R/L..MT GMM2520R/L..MT GMM3020R/L..MT	GMM2020..NB GMM2520..NB GMM3020..NB	GMM2020..T. GMM2520..T. GMM3020..T. GMM2020R/L..T. GMM2520R/L..T. GMM3020R/L..T.	GMN2..TK GMN3..TK GMR/L2..TK GMR/L3..TK	GMN2 GMN2.2 GMN3 GMR/L2.2 GMR/L3
KGMR/L···2.5	GMM2420..MW GMM3020..MW	GMG3020..MS GMM3020..MS	GMG2520..MG GMG3020..MG	GMG3020..R GMM3020..R	-	GMM2520..MT GMM3020..MT GMM2520R/L..MT GMM3020R/L..MT	GMM2520..NB GMM3020..NB	GMM2520..T. GMM3020..T. GMM2520R/L..T. GMM3020R/L..T.	GMN3..TK GMR/L3..TK	GMN3 GMR/L3
KGMR/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 GMM3020R/L..MT	GMM3020..NB	GMM3020..T. GMM3020R/L..T.	GMN3..TK GMN4..TK GMR/L3..TK GMR/L4..TK	GMN3 GMN4 GMR/L3 GMR/L4
KGMR/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 GMR/L4..TK	GMN4 GMN5 GMR/L4
KGMR/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
KGMR/L···6T	GMM6020..MW	GMG6020..MS GMM6020..MS	GMG6020..MG	GMG6020..R GMM6020..R	GMGA6020..R	-	-	-	-	GMN6
KGMR/L···8	GMM8030..MW	-	GMG8030..MG	-	GMGA8030..R	-	-	-	-	-

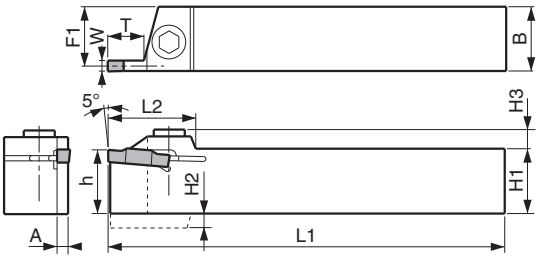
For recommended cutting conditions, see page H20

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KGM

Width: 3.0~8.0mm





● Right-hand shown

Toolholder Dimensions

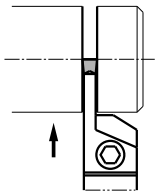
Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T		Width W (mm) MIN.	Width W (mm) MAX.	Spare Parts: Screw	Spare Parts: Screw	Spare Parts: Wrench	Spare Parts: Wrench
KGM$^{R/L}$	1212H-3	●	●	12	4	6	12	100	27	10.8	2.4	9		3.0	3.0	SB-5TR	-	LTW-20	-
	1616H-3	●	●	16		7	16			14.8				3.0	4.0	-	HH5X16	-	LW-4
	2020K-3	●	●	20	-	7	20	125		18.8									
	2525M-3	●	●	25			25	150		23.8							HH5X25		
	2020K-4	●	●	20	-	7	20	125	27	18.3	3.4	10		4.0	5.0	-	HH5X16	-	LW-4
	2525M-4	●	●	25			25	150		23.3							HH5X25		
	2020K-5	●	●	20	-	7	20	125	27	17.8	4.4	10		5.0	6.0	-	HH5X16	-	LW-4
	2525M-5	●	●	25			25	150		22.8							HH5X25		
	3232P-5	●	●	32			32	170		29.8									
	2525M-8	●	●	25	7.5	10.5	25	150	40	22.0	6.0	25		8.0	8.0	-	HH6X25	-	LW-5
	3232P-8	●	●	32	-		32	170		29.0									

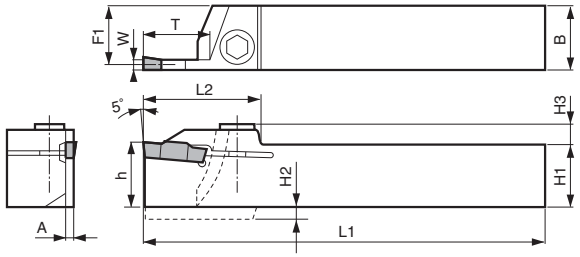
• Dimension T shows the distance from the Toolholder to the cutting edge.

• 4.0mm width Insert can be installed in KGM$^{R/L}$1212H-3, but is not recommended due to the toolholder's rigidity.

KGM-T

Width: 2.0~6.0mm





● Right-hand shown

Toolholder Dimensions

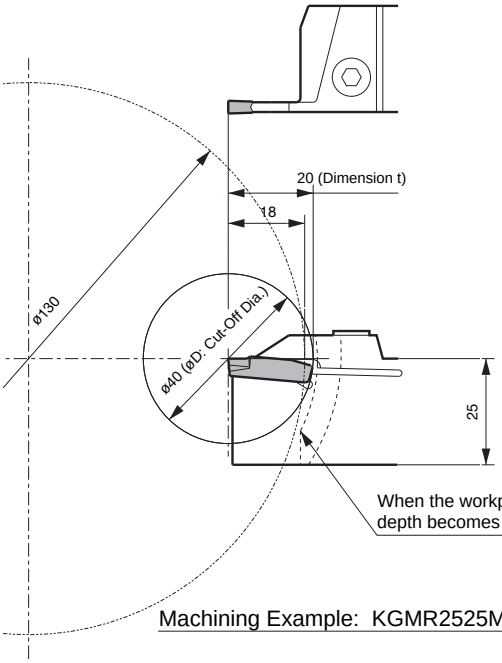
Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F1	A	T		Width W (mm) MIN.	Width W (mm) MAX.	Spare Parts: Screw	Spare Parts: Screw	Spare Parts: Wrench	Spare Parts: Wrench
KGM$^{R/L}$	2012K-2T17	●	●	20	-	7	12	125	33	11.15	1.7	17		2.0	3.0	SB-5TR	-	LTW-20	-
	2020K-2T17	●	●	20			20	125		19.15						-	HH5X16	-	LW-4
	2525M-2T17	●	●	25			25	150		24.15							HH5X25		
	1616H-3T20	●	●	16	4	7	16	100	36	14.8	2.4	20		3.0	4.0	-	HH5X16	-	LW-4
	2012K-3T20	●	●	20	-		12	125		10.8						SB-5TR	-	LTW-20	-
	2020K-3T20	●	●				20			18.8						-	HH5X16	-	LW-4
	2525M-3T20	●	●	25			25	150		23.8							HH5X25		
	2020K-4T20	●	●	20	-	7.5	20	125	36	18.3	3.4	20		4.0	5.0	-	HH5X16	-	LW-4
	2525M-4T20	●	●	25			25	150	36	23.3		20					HH5X25		
	2525M-4T25	●	●						41			25							
	2525M-5T25	●	●	25	-	8.5	25	150	42	22.8	4.4	25		5.0	6.0	-	HH5X25	-	LW-4
	3232P-5T25	●	●	32			32	170		29.8									
	2525M-6T30	●	●	25	-	9.5	25	150	45	22.4	5.2	30		6.0	6.0	-	HH5X25	-	LW-4

• Dimension T shows the distance from the Toolholder to the cutting edge. See the Table (H14) for the relationship between the Grooving Depth and the Cutting Dia..
• When using GMG / GMM type (2-edge) Insert, set the grooving depth under 15mm.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Available cut-off diameter of KGM / KGM-T type

There is a limit to available grooving depth depending on the workpiece diameter.



When the workpiece diameter becomes large, the available grooving depth becomes smaller due to interferes with toolholder.

Machining Example: KGMR2525M-3T20+GMN3

KGM (For Automatic Lathe) Available Cutting Dia. Table

Toolholder		øD (Cut-Off Dia.)																
KGMR/L	0810K-1.5-125	-	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	∞
	1010K-1.5-125	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212F-1.5-85 1212M-1.5-150	-	-	-	-	25	26	28	32	36	40	60	100					
	0810K-2-125	-	-	-	-	-	-	-	-	-	-	-	-	10	14	16	32	
	1010K-2-125	-	-	-	-	-	-	-	20	25	32	40	60	∞	∞	∞	∞	
	1212F-2-85 1212M-2-150	-	-	-	-	25	26	28	50	∞	∞	∞	∞					
	1616M-2-150	32	40	50	60	80	100	∞	∞									
	1010K-2.5-125	-	-	-	-	-	-	-	20	25	32	40	60					
	1212F-2.5-85 1212M-2.5-150	-	-	-	-	25	26	28	32	36	40	60	100					
	1616M-2.5-150	32	40	50	60	80	100	∞	∞	∞	∞	∞	∞					
	1616M-3-150	32	40	50	60	80	100											
Grooving Depth t (mm)		16	15	14	13	12.5	12	11	10	9	8	7	6	5	4	3	2	1

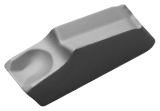
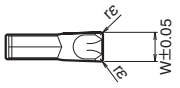
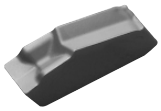
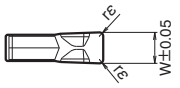
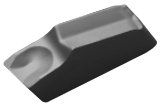
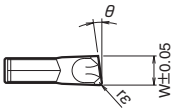
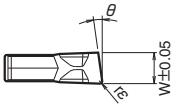
KGM-T Available Cutting Dia. Table (GMN, GMR/L type When using 1-edge inserts)

Toolholder		øD (Cutting Dia.)												
KGMR/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	∞	∞	∞								
Grooving Depth t (mm)		30	27	25	23	22	20	19	18	17	16	15	14	under 13

Cut-Off Inserts

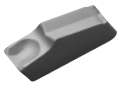
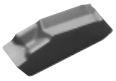
TKN / TK$^{R}/_{L}$

Classification of usage								Ref. Page for Applicable Toolholder
● : Continuous-Low Interruption / 1st Choice	P	Carbon Steel and Alloy Steel	○	●		○		
◔ : Continuous-Low Interruption / 2nd Choice	M	Stainless Steel		◔	●	○		
● : Continuous / 1st Choice	K	Cast Iron					●	
○ : Continuous / 2nd Choice	N	Non-ferrous Metals					●	

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) W	Dimension (mm) rε	Angle (°) θ	Cermet TN90	CVD Coated Carbide CR9025	PVD Coated Carbide PR660	PVD Coated Carbide PR930	Carbide KW10	Ref. Page for Applicable Toolholder
		**TKN 1.6**	1.6	0.15	-	●	●	●	●	●	**H16 H17 H18**
		2	2.2	0.20		●	●	●	●	●	
		2.4	2.4	0.20		●	●	●	●	●	
		3	3.1	0.25		●	●	●	●	●	
		4	4.1	0.30		●	●	●	●	●	
		4.8	4.8	0.30			●				
		5	5.1	0.30			●	●	●	●	
		6	6.4	0.35			●	●		●	
		8	8.0	0.40			●	●			
		9	9.6	0.45			●	●			
 Low Feed		**TKN 1.6-P**	1.6	0.20	-		●	●	●	●	
		2-P	2.2	0.20		●	●	●	●	●	
		3-P	3.1	0.25		●	●	●	●	●	
 Lead Angle		**TK$^{R}/_{L}$ 1.6**	1.6	0.15	8°		●	●	R	●	
		2	2.2	0.20		R	●	●	R	●	
		2.4	2.4	0.20			●	●	R	●	
		3	3.1	0.25		R	●	●	●	●	
		4	4.1	0.30		R	●	●		●	
		5	5.1	0.30			●	●		●	
 Low Feed / Lead-Angled		**TK$^{R}/_{L}$ 1.6-P**	1.6	0.20	8°		R	●	R	R	
		2-P	2.2	0.20			R	●	R	R	
		3-P	3.1	0.25		R	R	●	R	R	

For recommended cutting conditions, see page ➡ **H20**

◆ Cut-Off Tools

Cutting Range	Chipbreaker		Advantage
General Cut-Off	Standard (No Indication)		General cut-off type for feed rates over 0.1mm/rev. 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.

◆ Insert's Edge Shape (CERACUT Cut-Off)

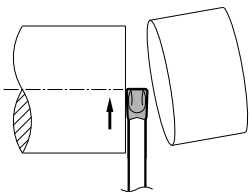
Edge Shape	Chamfer + hone	Sharp Edge	Hone
			
Std. Chipbreaker	TN90 CR9025 / PR660	PR930 / KW10	-
P-Chipbreaker	-	-	TN90 / CR9025 PR660 / PR930 / KW10

• Sharp Edge Spec. can reduce cutting resistance 40% less than that of chamfer edge.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes

KTKH-S / KTKH-B



For Automatic Lathe (Long Shank Type: Self Clamp)

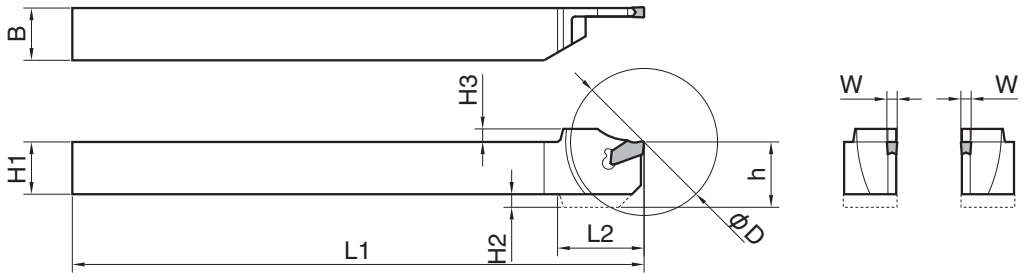


Fig.1

● Right-hand shown

For General Cut-Off (Self Clamp)

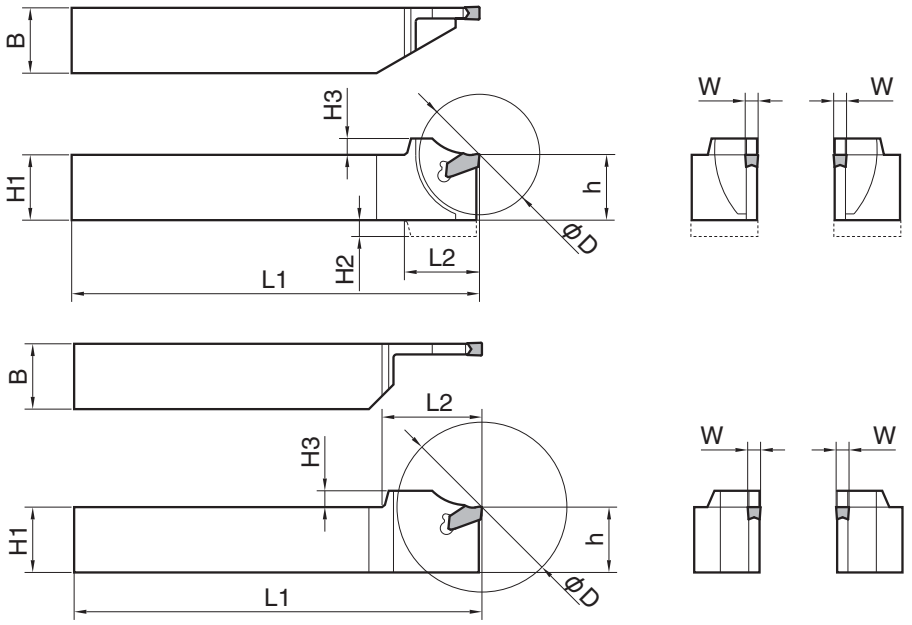
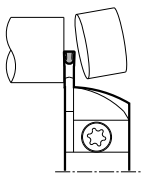


Fig.2

Fig.3

● Right-hand shown



For Automatic Lathe (Long Shank Type: Bolt Clamp Type)

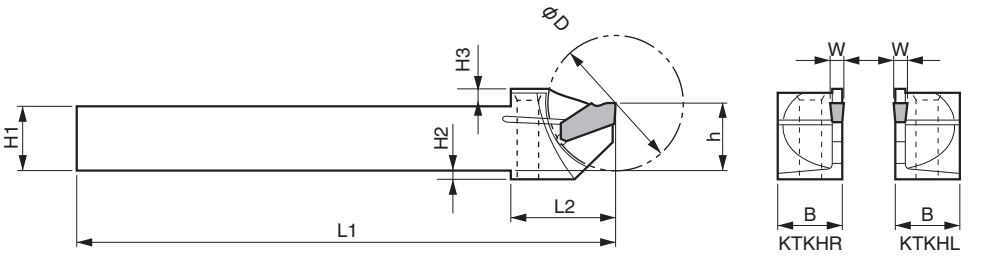


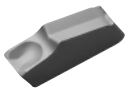
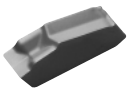
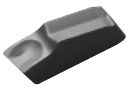
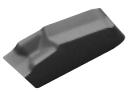
Fig.4

● Right-hand shown

Toolholder Dimensions

Description		Std. R	Std. L	Cut-Off Dia. øDmax	Dimension (mm) H1=h	H2	H3	B	L1	L2	Width (mm) W	Drawing	Spare Parts: Releasing Wrench	Spare Parts: Clamp Bolt	Spare Parts: Wrench	Ref.Page for Recommended Cutting Conditions
For Automatic Lathe (Long Shank Type: Self Clamp)																
KTKH$^{R}_{L}$	1010K-2-125S	●	●	30	10	5	3	10	125	17.5	2.2	Fig.1	LTK-5			H20
	1212M-2-150S	●	●	30	12	4	3	12	150	18.0	2.4					
	1616M-2-150S	●	●	36	16	-	3	16	150	20.7						
	1616M-3-150S	●	●	45	16	4	4	16	150	25.6	3.1					
For General Cut-Off (Self Clamp)																
KTKH$^{R}_{L}$	1010F-2S	●	●	30	10	5	4	10	80	18.6	2.2 2.4	Fig.2	LTK-5			H20
	1212H-2S	●	●	33	12	4	5	12	100	19.8						
	1612H-2S	●	●	33	16	-	3	12	100	19.8						
	1616H-2S	●	●	33	16	-	3	16	100	19.8						
	2012K-2S	●	●	38	20	-	4	12	125	22.8						
	2020K-2S	●	●	38	20	-	4	20	125	22.8						
	1612H-3S	●	●	36	16	4	4	12	100	21.7	3.1	Fig.2				
	1616H-3S	●	●	36	16	4	4	16	100	21.7						
	2012K-3S	●	●	41	20	-	5	12	125	25.3						
	2020K-3S	●	●	52	20	-	5	20	125	31.0		Fig.3				
	2525M-3S	●	●	53	25	-	5	25	150	31.5						
	2012K-4S	●	●	44	20	-	5	12	125	26.3	4.1	Fig.2				
	2020K-4S	●	●	62	20	-	5	20	125	35.0		Fig.3				
	2525M-4S	●	●	68	25	-	5	25	150	38.0						
	2525M-5S	●	●	79	25	-	5	25	150	43.5	4.8, 5.1	Fig.3				
KTKH$^{R}_{L}$	2020K-3T17S	●	●	35	20	-	5	20	125	21.8	3.1	Fig.2	LTK-5			H20
	2525M-3T22S	●	●	45	25	-	5	25	150	26.8						
	2020K-4T22S	●	●	45	20	-	5	20	125	26.8	4.1					
	2525M-4T22S	●	●	45	25	-	5	25	150	26.8						
For Automatic Lathe (Long Shank Type: Bolt Clamp Type)																
KTKH$^{R}_{L}$	0808K-1.6-125B	●	●	10	8	4	2	8	125	13.0	1.6	Fig.4	-	SE-40120TR	FT-15	H20
	1010K-1.6-125B	●	●	20	10	2.5	2	10	125	16.8						
	1212M-1.6-150B	●	●	25	12	-	2	12	150	18.8						
	1414M-1.6-150B	●	●	26	14	-	2	14	150	19.8						
	1010K-2-125B	●	●	20	10	5	3	10	125	16.8	2.2 2.4			SE-40120TR	FT-15	
	1212M-2-150B	●	●	25	12	2	3	12	150	18.8						
	1616M-2-150B	●	●	32	16	-	3	16	150	23.8				SE-50125TR	LTW-20	
	1616M-3-150B	●	●	32	16	4	4	16	150	23.8	3.1					

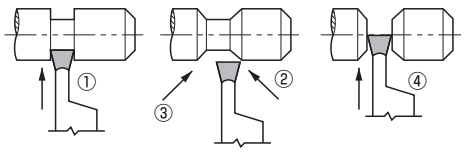
Applicable Inserts

Ref. Page	➡H15			
Toolholder \ Insert		 Low Feed	 Lead Angle	 Low Feed / Lead-Angled
KTKH$^{R}_{L}$ ...-1.6...	TKN1.6	TKN1.6-P	TK$^{R}_{L}$1.6	TK$^{R}_{L}$1.6-P
KTKH$^{R}_{L}$ ...-2...	TKN2 TKN2.4	TKN2-P	TK$^{R}_{L}$2 TK$^{R}_{L}$2.4	TK$^{R}_{L}$2-P
KTKH$^{R}_{L}$ ...-3...	TKN3	TKN3-P	TK$^{R}_{L}$3	TK$^{R}_{L}$3-P
KTKH$^{R}_{L}$ ...-4...	TKN4	-	TK$^{R}_{L}$4	-
KTKH$^{R}_{L}$ ...-5...	TKN4.8 TKN5	-	TK$^{R}_{L}$5	-

Application Example of CERACUT Cut-Off

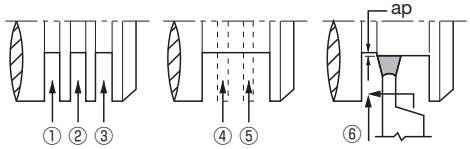
1. Cut-Off after Chamfering

① Grooving ②③ Chamfering ④ Cut-Off



2. Wide Grooving

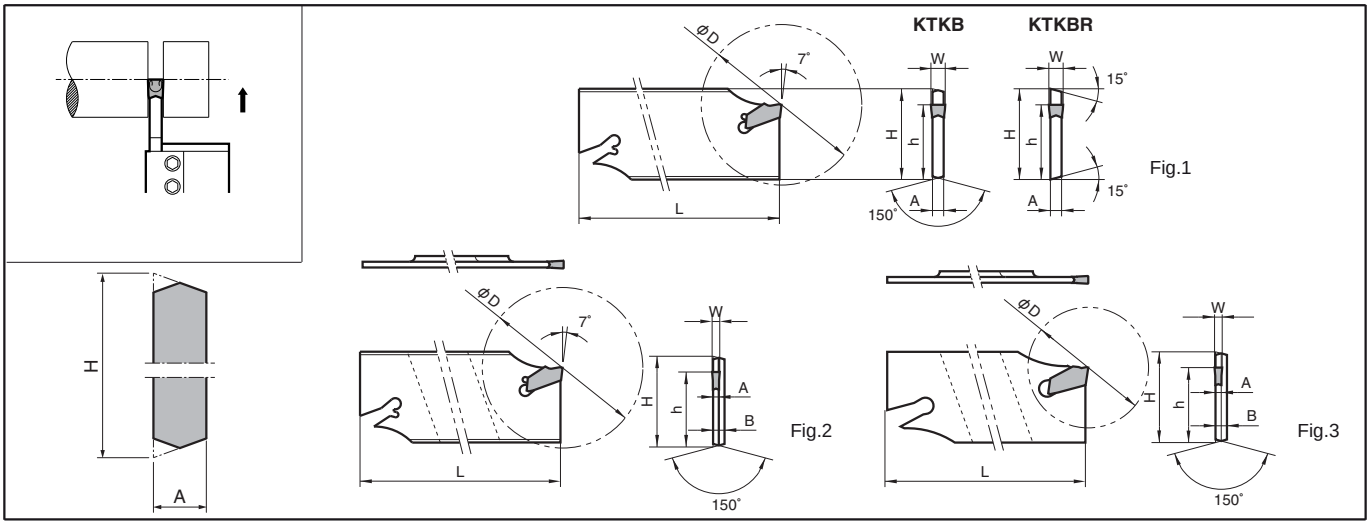
① ~ ⑤ Groove Widening
⑥ Traverse Finishing
(Value of "ap" shall be under the value of Corner-R)



(In order to prevent both corners' unequal wear)

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KTKB-S / KTKB-SS



Blade Dimensions

Description		Std.	Cutting Dia.	Dimension (mm)					Width (mm)	Drawing	Applicable Inserts H15				Applicable Block H19	
			øDmax	* H	h	B	L	A	W			Low Feed	With Lead Angle	Low Feed / Lead-Angled		
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}$1.6-P	KTKTB	16-26 20-26
KTKB	**32-1SS**	●	35	32	25	2.4	150	1.2	1.6	Fig.3	TKN1.6	TKN1.6-P	TK$^{R/L}$1.6	TK$^{R/L}$1.6-P	KTKTB KTKTBF	20-32 25-32 32-32 25-32 32-32
KTKB	**19-2S**	●	40	19	15.7	-	86	1.8	2.2 2.4	Fig.1	TKN2 TKN2.4	TKN2-P	TK$^{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}$2-P	KTKTB	16-26 20-26
	26-3S	●	75					2.6	3.1		TKN3	TKN3-P	TK$^{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}$2-P	KTKTB KTKTBF	20-32 25-32 32-32 25-32 32-32
	32-3S	●	100			-		2.6	3.1	Fig.1	TKN3	TKN3-P	TK$^{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	-	-	-		

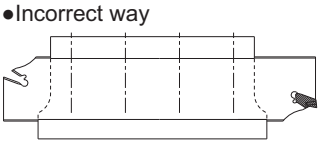
Note) 1. Suffix "-SS" means silver coating.
2. Releasing wrench is "LTK-5".
* Dimension H shows virtual apex distance.

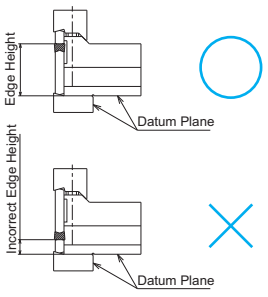
How to install toolblock and blade.

●Correct way

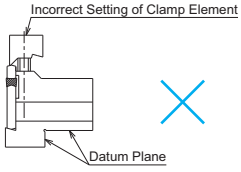


●Incorrect way





●Incorrect Setting of Clamp Element



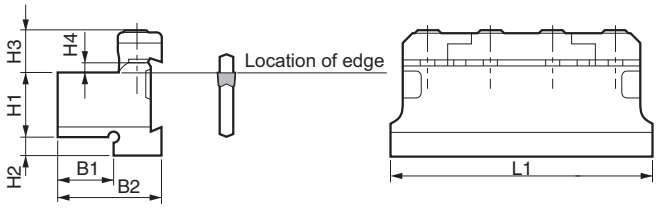
If the clamp element is mounted backward, a large gap will occur between the clamp and the toolblock, and the blade may come off during cutting. Be careful when installing the clamp for safety.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolblocks (for Holding Blade)

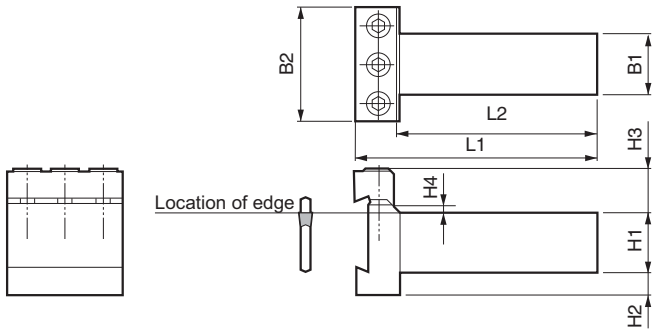
KTKTB (Separate type)





KTKTBF (Separate / Perpendicular type)

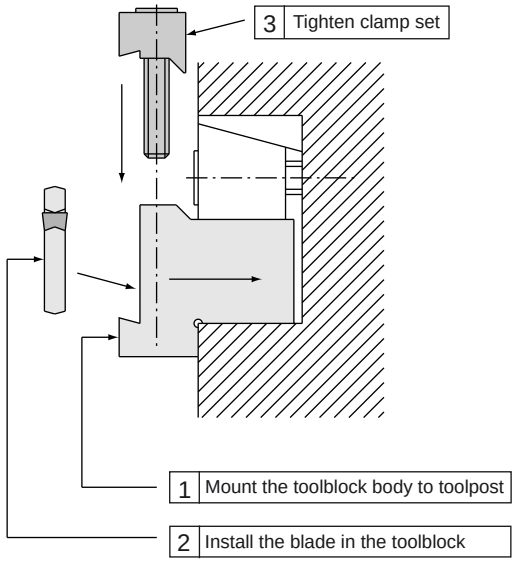


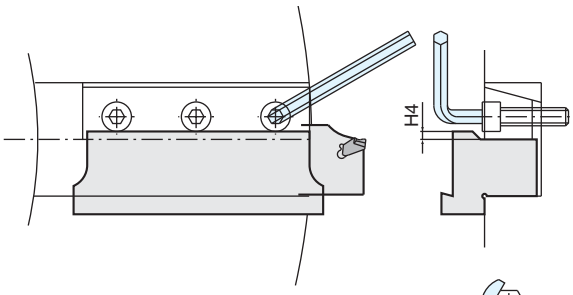


Toolblock Dimensions

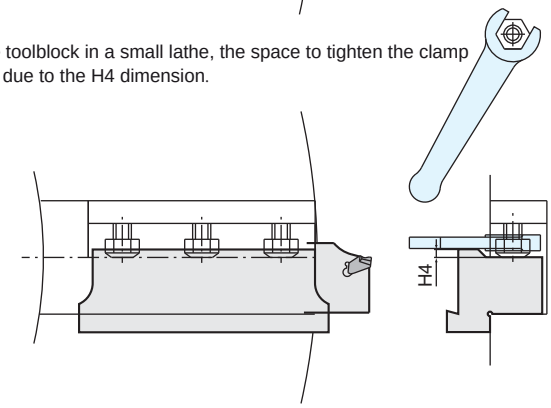
Description		Std.	Dimension (mm)								Spare Parts				Applicable Blade	
											Clamp Set		Screw	Wrench	Cut-off	Face Grooving
			H1	H2	H3	H4	B1	B2	L1	L2	Separate Type	Integral Type			➡ H18	➡ G69
KTKTB	**16-19**	●	16	4	12	2	15.5	29.5	76	-	-	BCS-1	HH5X25	LW-4	KTKB19-○S KTKB19-1SS	-
	20-19	●	20				19	34								
	16-26	●	16	13	14	2.5	15.5	31.5	86	-	BCS-2	-	HH6X30	LW-5	KTKB26-○S KTKB26-1SS	-
	20-26	●	20	9			19	36								
	20-32	●	20	13	17	3.5	19	38	100	-	BCS-3	-	HH6X30	LW-5	KTKB32-○S KTKB32-1SS KTKB$^{R}_{L}$32-○S	KFTB$^{R}_{L}$○○○○-4S KFTB$^{R}_{L}$○○○○-5S
	25-32	●	25	8			23	42	110		BCS-4					
	32-32	●	32	5			29	48								
KTKTBF	**25-32**	●	25	9.5	17	3.5	25	48	102	84.5	-	BCS-5	HH6X30	LW-5	KTKB32-○S KTKB32-1SS KTKB$^{R}_{L}$32-○S	KFTB$^{R}_{L}$○○○○-4S KFTB$^{R}_{L}$○○○○-5S
	32-32	●	32	2.5			32		117	99.5						

How to mount the Toolblock





When mounting the toolblock in a small lathe, the space to tighten the clamp bolt may be narrow due to the H4 dimension.



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

Recommended Cutting Conditions (In case of using GMM-MT, GMM-TK, GMM-NB insert)

Workpiece Material	Recommended Insert Grade (Vc: m/min)					Dimension (mm)					Remarks
	Cermet	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		
Non-ferrous Metals	-	-	-	-	★ 200~450	0.01~0.05	0.05~0.10	0.05~0.20	0.05~0.25		

• When machining Steel and Stainless Steel by 4mm width Insert of PR930, decrease the Feed Rate by 20%.

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (TKN, TK$^{R}/_{L}$ type Insert)

Workpiece Material	Recommended Insert Grade (Vc: m/min)					Dimension (mm)					Remarks
	Cermet	CVD Coated Carbide	PVD Coated Carbide		Carbide	1.6	2.2 / 2.4	3.1	4.1	4.8~9.6	
	TN90	**CR9025**	**PR660**	**PR930**	**KW10**	f (mm/rev)					
Carbon Steel	☆ 120~200	★ 80~180	☆ 60~130	☆ 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	☆ 100~160	★ 70~150	☆ 60~130	☆ 60~130		0.02~0.08	0.04~0.18	0.05~0.25	0.08~0.30	0.15~0.40	
Stainless Steel	☆ 80~150	☆ 60~40	★ 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	
Non-ferrous Metals	-	-	-	-	★ 100~450	0.02~0.10	0.05~0.10	0.05~0.20	0.05~0.25	0.10~0.25	

★ : 1st Recommendation ☆ : 2nd Recommendation

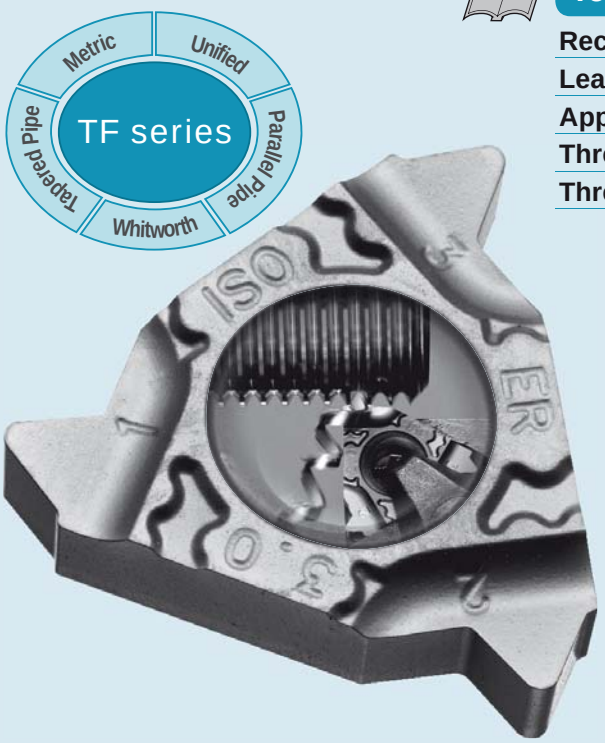
Recommended Cutting Conditions (In case of using GMM-TMR type Insert)

Workpiece Material	Vc (m/min)	f (mm/rev)
Carbon Steel	60~200	0.08~0.18
Alloy Steel	60~150	
Stainless Steel	50~140	

Threading

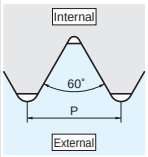
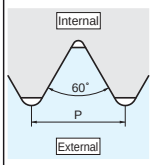
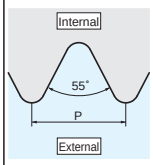
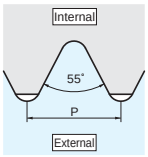
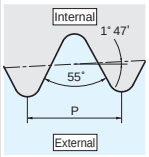
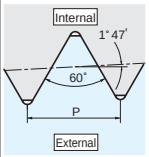
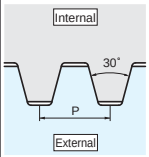
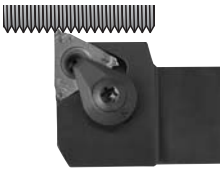
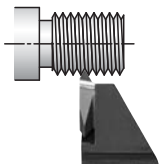
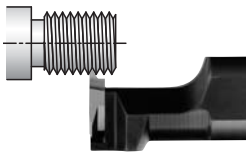
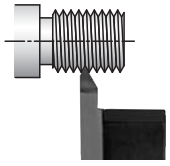
J1~J46

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60°Angle (Partial Profile / M, UN)		J12
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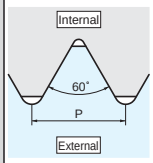
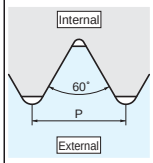
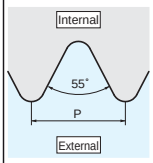
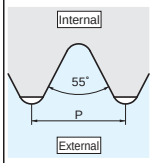
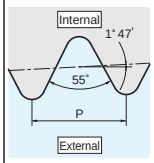
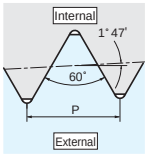
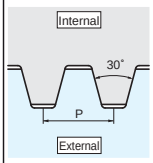
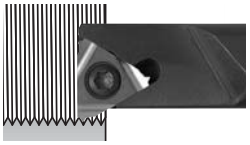
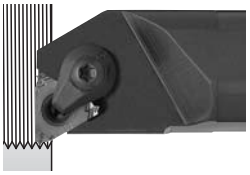
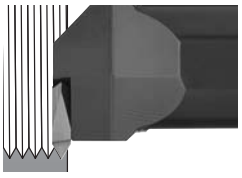
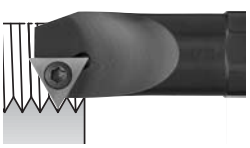
Summary of External Threading

Tooling Application Table (External Threading)

Thread Type		Metric	Unified	Parallel Pipe	Whitworth	Tapered Pipe	American National 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 ⇒ J16 	Full Profile	0.5~5.0 ⇒ **J6**	28~8 ⇒ **J8**	19~11 ⇒ **J8**	16~11 ⇒ **J8**	28~11 ⇒ **J10**	18~11.5 ⇒ **J10**	–
	Partial Profile	0.5~5.0 ⇒ **J12**	48~5 ⇒ **J12**	28~11 ⇒ **J14**	48~5 ⇒ **J14**	28~11 ⇒ **J14**	–	2.0~5.0 ⇒ **J14**
KTNS ⇒ J16 	Full Profile	0.5~3.0 ⇒ **J6**	28~8 ⇒ **J8**	19~11 ⇒ **J8**	16~11 ⇒ **J8**	28~11 ⇒ **J10**	18~11.5 ⇒ **J10**	–
	Partial Profile	0.5~3.0 ⇒ **J12**	48~8 ⇒ **J12**	28~11 ⇒ **J14**	48~8 ⇒ **J14**	28~11 ⇒ **J14**	–	2.0~3.0 ⇒ **J14**
KTT ⇒ J22 	Full Profile	1.0~2.0 ⇒ **J22**	–	–	–	–	–	–
	Partial Profile	0.5~3.5 ⇒ **J22**	56~8 ⇒ **J22**	28~11 ⇒ **J22**	24~7 ⇒ **J22**	28~11 ⇒ **J22**	–	–
KTTX ⇒ J20 	Partial Profile	0.5~2.0 ⇒ **J21**	56~14 ⇒ **J21**	28~11 ⇒ **J21**	24~11 ⇒ **J21**	28~11 ⇒ **J21**	–	–
S-KTTX ⇒ J20 	Partial Profile	0.5~2.0 ⇒ **J21**	56~14 ⇒ **J21**	28~11 ⇒ **J21**	24~11 ⇒ **J21**	28~11 ⇒ **J21**	–	–
KTKF ⇒ J18 	Partial Profile	0.5~2.0 ⇒ **J18**	56~14 ⇒ **J18**	28~11 ⇒ **J18**	24~11 ⇒ **J18**	28~11 ⇒ **J18**	–	–

Summary of Internal Threading

Tooling Application Table (Internal Threading)

Thread Type	Metric	Unified	Parallel Pipe	Whitworth	Tapered Pipe	American National Pipe	30° Trapezoidal
	M	UN. UNC UNF. UNEF	G(PF) Rp(PS)	W	Rc (PT) (BSPT)	NPT	Tr
Thread shape							
Pitch / Toolholder Shape	mm	TPI	TPI	TPI	TPI	TPI	mm
VNT ⇒ J27  Partial Profile	0.75~1.5 ⇒ **J27**	28~18 ⇒ **J27**	–	–	–	–	–
HPT ⇒ J24 (PST ⇒ J26)  Partial Profile	0.75~1.5 (0.75~1.5) ⇒ **J24** (⇒ **J26**)	28~16 (28~18) ⇒ **J24** (⇒ **J26**)	–	24~18 ⇒ **J24**	28~19 ⇒ **J24**	–	–
SIN ⇒ J17  Full Profile	0.5~5.0 ⇒ **J7**	24~8 ⇒ **J9**	19~11 ⇒ **J9**	16~11 ⇒ **J9**	28~11 ⇒ **J11**	18~11.5 ⇒ **J11**	–
 Partial Profile	0.5~5.0 ⇒ **J13**	48~8 ⇒ **J13**	28~11 ⇒ **J15**	24~11 ⇒ **J15**	28~11 ⇒ **J15**	–	2.0~5.0 ⇒ **J15**
CIN ⇒ J17  Full Profile	1.0~5.0 ⇒ **J7**	24~8 ⇒ **J9**	19~11 ⇒ **J9**	14~11 ⇒ **J9**	28~11 ⇒ **J11**	11.5 ⇒ **J11**	–
Partial Profile	0.5~5.0 ⇒ **J13**	48~8 ⇒ **J13**	28~11 ⇒ **J15**	24~11 ⇒ **J15**	28~11 ⇒ **J15**	–	2.0~5.0 ⇒ **J15**
KITG ⇒ J23  Partial Profile	0.5~3.0 ⇒ **J23**	48~8 ⇒ **J23**	28~11 ⇒ **J23**	24~8 ⇒ **J23**	28~11 ⇒ **J23**	–	–
STWP ⇒ J28  Partial Profile	0.75~3.5 ⇒ **J28**	28~8 ⇒ **J28**	–	–	–	–	–

・For parallel pipe and tapered pipe which is not suitable for bottom diameter, it is considered to be outside of recommendation.
・Pitch inside ( ) indicates PST.

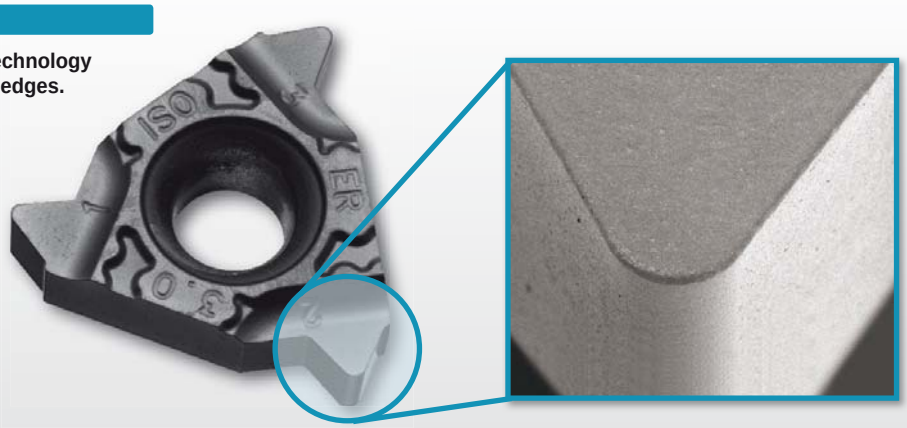
■ TF Series Threading Inserts

High quality edge and new grade insert PR1115 achieve long tool life. In addition, its molding specification makes it economical.

High Quality Cutting Edge

TF series

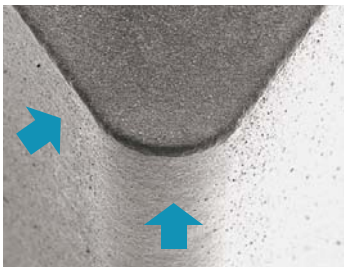
- **High precision fine molding technology produces high quality cutting edges.**



Cutting Edge close-up picture

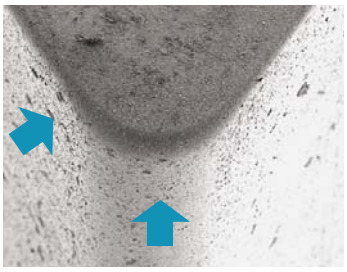
Consistent micro horning technology enables sharpness and high quality thread shape.

Sharp cutting



16ER150ISO-TF

Inconsistent edge horning condition.

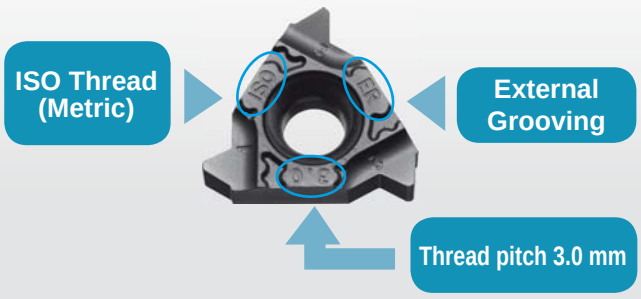


Competitor

Available for every standard screw thread.

Metric (M)	Tapered Pipe [R, Rc (PT), (BSPT)]
Unified (UN)	60°Angle (Partial Profile)
Parallel Pipe [G(PF)]	55°Angle (Partial Profile)
Whitworth (W)	

Clear makings provide user friendly insert identification.

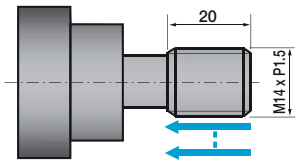


●**16···-TF** has the mark on its top face side, and **11···-TF** has the mark on its seating face side (bottom side).

● Case Studies

15CrMo4 (SCM415)

- **Machine Part**
- **Vc=65m/min**
- **WET**



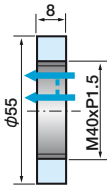
16ER150ISO-TF(PR1115)	1800 pcs/edge
Competitor A	600 pcs/edge

New TF Series extended the tool life 3 times compared to Competitor A.

(Evaluation by the user)

C25 (S25C)

- **Nut**
- **Vc=262m/min**
- **WET**



16IR150ISO-TF(PR1115)	500 pcs/edge
Competitor B	300 pcs/edge

New TF Series extended the tool life 1.7 times compared to Competitor B.

(Evaluation by the user)

Outlines of Threading Inserts

KTKF J18

"Threading" is added to Small Tools special tool series.

Threading

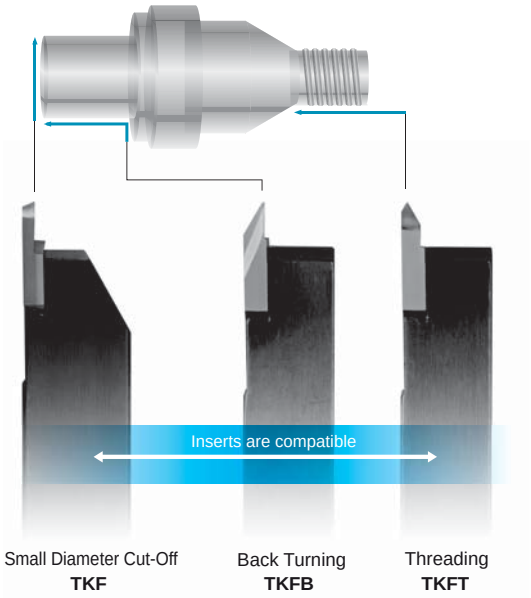
For Threading

TKFT



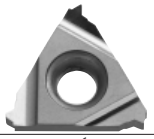
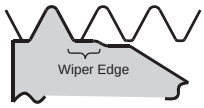
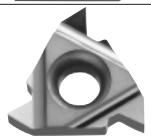
● Applicable for various type of threading

Metric (M)	Parallel Pipe [G (PF)]
Unified (UN)	Tapered Pipe [R (PT) (BSPT)]



Threading Insert Features

● Full Profile and Partial Profile

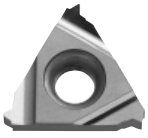
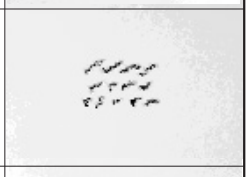
	Shape	Function	Features
Full Profile			① Burr-free thread surface; high quality (Smooth feeling) ② Additional stock must be left on the part diameter for full topping ③ Every pitch size requires a specific insert
Partial Profile			① Thread's corner tends to be sharp edged ② Thread's O.D. or I.D. needs to be finished to the size before threading ③ One insert can machine various pitch sizes

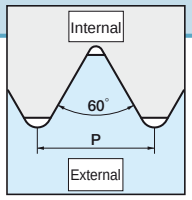
● Thread Precision

Type of Thread		Thread Precision Strict ⟷ Loose		
M	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 Full Profile Insert		×	○	○

* Not recommended if strict thread precision is required.

● With and Without Chipbreaker

	Shape	Condition	Cutting Force	Chip Length
Without Chipbreaker		・When less cutting force is needed for small or thin part machining	Small	
1-Thread, With Chipbreaker	-TS 	・When Better Chip Control is needed	Smaller	
2-Thread, With Chipbreaker	-M02 	① Fewer passes and less machining time ② For rigid workpiece ③ Wider dead space	Large (2 Edges engage in threading)	



External Threading Inserts

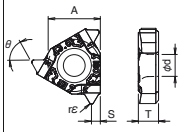
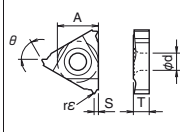
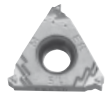
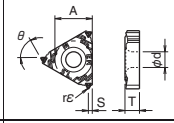
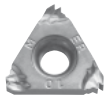
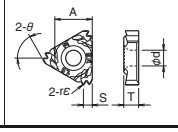
Metric (M)

Full Profile 60° (mm)

Description	Previous Description	A	T	ød
16E$^{R}_{L}$	TNN32E$^{R}_{L}$	9.525	3.68	4.0
22E$^{R}_{L}$	TNN43E$^{R}_{L}$	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	Previous Description	Applicable Thread M Pitch mm	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	L	PVD Coated Carbide PR630 R	L	PR930 R	L	PR1115 R	L	Carbide GW15 R	L	KW10 R	L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			16E$^{R}_{L}$ 100ISO-TF	-	1.0	0.12	0.80	60°							●						J30
			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	TNN32E$^{R}_{L}$ 050M	0.5	0.06	0.40	60°	●				●		●	●	●				
			075ISO	075M	0.75	0.09	0.53		●				●		●	●	●				
			100ISO	100M	1.0	0.12	0.80		●				●	●		●	●		●		
			125ISO	125M	1.25	0.15	0.90		●				●	●		●	●				
			150ISO	150M	1.5	0.19	1.00		●				●	●		●	●		●		
			175ISO	175M	1.75	0.22	1.50		●				●								
			200ISO	200M	2.0	0.25	1.50		●				●	●		●	●		●		
			250ISO	250M	2.5	0.32	1.60		●				●				●				
			22E$^{R}_{L}$ 300ISO	TNN43E$^{R}_{L}$ 300M	3.0	0.41	2.10		●				●								
			350ISO	350M	3.5	0.48	2.10		●				●		●						
			400ISO	400M	4.0	0.55	2.80		●				●		●						
			450ISO	450M	4.5	0.62	2.80		●				●		●						
			500ISO	500M	5.0	0.70	2.80		●				●		●						
	1-Thread, With Chipbreaker 		16E$^{R}_{L}$ 100ISO-TS	TNN32E$^{R}_{L}$ 100M-TS	1.0	0.12	0.80	60°					●								J35
			125ISO-TS	125M-TS	1.25	0.15	0.90						●								
			150ISO-TS	150M-TS	1.5	0.19	1.00						●								
			200ISO-TS	200M-TS	2.0	0.25	1.50						●								
	2-Thread, With Chipbreaker 		16E$^{R}_{L}$ 100ISO-M02	TNN32E$^{R}_{L}$ 100M02	1.0	0.12	1.80	60°	●				●								J35
			150ISO-M02	150M02	1.5	0.19	2.25		●				●								
			200ISO-M02	200M02	2.0	0.25	2.90		●				●								

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER ···	KTNR··-16 KTNSR··-16	J16
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 Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Internal Threading Inserts

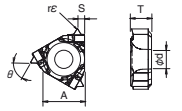
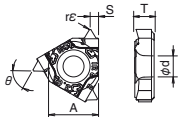
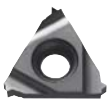
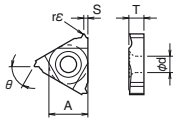
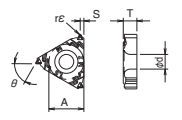
Metric (M)

Full Profile 60° (mm)

Description	Previous Description	A	T	ød
11IR/L	**TNN22IR/L**	6.35	3.18	3.0
16IR/L	**TNN32IR/L**	9.525	3.68	4.0
22IR/L	**TNN43IR/L**	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	Previous Description	Applicable Thread M Pitch mm	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	L	PVD Coated Carbide PR630 R	L	PR930 R	L	PR1115 R	L	Carbide GW15 R	L	KW10 R	L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			**11IR/L 100ISO-TF**	-	1.0	0.07	0.8	60°							●						
			125ISO-TF		1.25	0.08	1.1								●						
			150ISO-TF		1.5	0.11	1.1								●						
			175ISO-TF		1.75	0.12	1.1								●						
			**16IR/L 100ISO-TF**	-	1.0	0.07	0.8	60°							●						
			125ISO-TF		1.25	0.08	1.1								●						
			150ISO-TF		1.5	0.11	1.1								●						
			175ISO-TF		1.75	0.12	1.1								●						
			200ISO-TF		2.0	0.14	1.5								●						
			250ISO-TF		2.5	0.17	1.5								●						
			300ISO-TF		3.0	0.19	1.6								●						
			**11IR/L 050ISO**	**TNN22IR/L 050M**	0.5	0.03	0.55	60°	●				●		●		●				J30
			075ISO	**075M**	0.75	0.05	0.68		●				●		●		●				
			100ISO	**100M**	1.0	0.07	0.8		●				●	●		●	●		●		
			125ISO	**125M**	1.25	0.08	1.1		●				●				●				
			150ISO	**150M**	1.5	0.11	1.1		●				●	●		●	●		●		
			175ISO	**175M**	1.75	0.12	1.1		●				●								
			200ISO	**200M**	2.0	0.14	0.9						●								
			16IR/L 100ISO	**TNN32IR/L 100M**	1.0	0.07	0.8		●				●			●	●		●		
			125ISO	**125M**	1.25	0.08	1.1		●				●								
			150ISO	**150M**	1.5	0.11	1.1		●				●	●		●	●		●		
			175ISO	**175M**	1.75	0.12	1.1		●				●								
			200ISO	**200M**	2.0	0.14	1.5		●				●	●		●	●		●		
			250ISO	**250M**	2.5	0.16	1.5		●				●				●				
			300ISO	**300M**	3.0	0.19	1.6						●				●				
			22IR/L 300ISO	**TNN43IR/L 300M**	3.0	0.19	1.8	60°	●				●								
			350ISO	**350M**	3.5	0.23	2.1		●				●		●						
			400ISO	**400M**	4.0	0.26	2.8		●				●		●						
			450ISO	**450M**	4.5	0.30	2.8		●				●		●						
			500ISO	**500M**	5.0	0.34	2.8		●				●		●						
	1-Thread, With Chipbreaker 		**16IR/L 100ISO-TS**	**TNN32IR/L 100M-TS**	1.0	0.07	0.8	60°					●								J35
			150ISO-TS	**150M-TS**	1.5	0.11	1.1						●								
			200ISO-TS	**200M-TS**	2.0	0.14	1.5						●								

For recommended cutting conditions, see page ➡ **J29**

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
11IR ···	**SINR··-11E** **SINR··-11**	**J17**
11IL ···	**SINL··-11E** **SINL··-11**	

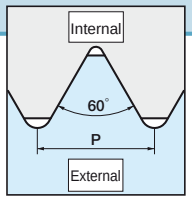
Description	Applicable Toolholder	Ref. Page for Toolholder
16IR ···	**SINR··-16** **CINR··-16**	**J17**
16IL ···	**SINL··-16** **CINL··-16**	
22IR ···	**SINR··-22** **CINR··-22**	

Applicable Thread	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.



External Threading Inserts

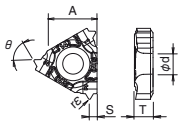
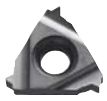
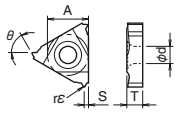
Unified (UN)

Full Profile 60° (mm)

Description	Previous Description	A	T	ød
16E$^{R}_{L}$	TNN32E$^{R}_{L}$	9.525	3.68	4.0
22E$^{R}_{L}$	TNN43E$^{R}_{L}$	12.70	4.9	4.9

Classification of usage ● : 1st Choice ○ : 2nd Choice

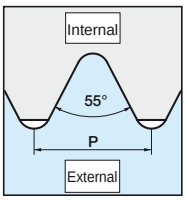
P	Carbon Steel / Alloy Steel			○	●		
M	Stainless Steel			○	●		
K	Cast Iron						
N	Non-ferrous Metals						

Insert (Handed Insert shows Right-hand)			Description	Previous Description	Applicable Thread UN, UNF / Pitch / TPI	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	L	PVD Coated Carbide PR630 R	L	PR930 R	L	PR1115 R	L	Carbide GW15 R	L	KW10 R	L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			16E$^{R}_{L}$ 24UN-TF	-	24	0.12	0.80	60°							●						J30
			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								●						
			16E$^{R}_{L}$ 24UN	TNN32E$^{R}_{L}$ 24UN	24	0.13	0.8	60°	●				●								
			20UN	20UN	20	0.16	1.0		●				●								
			18UN	18UN	18	0.18	1.0		●				●								
			16UN	16UN	16	0.20	1.1		●				●								
			14UN	14UN	14	0.23	1.5		●				●								
			12UN	12UN	12	0.27	1.5		●				●								
			22E$^{R}_{L}$ 08UN	TNN43E$^{R}_{L}$ 08UN	8	0.43	2.1		●				●		●						

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER ···	KTNR··-16 KTNSR··-16	J16
22ER ···	KTNR··-22	



External Threading Inserts

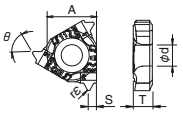
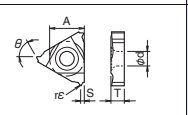
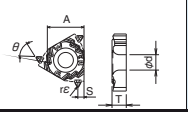
Parallel Pipe [G (PF)] Whitworth (W)

Full Profile 55° (mm)

Description	Previous Description	A	T	ød
16E$^{R}_{L}$	TNN32E$^{R}_{L}$	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	Previous Description	Applicable Thread G (PF) / W / Pitch / TPI	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	L	PVD Coated Carbide PR630 R	L	PR930 R	L	PR1115 R	L	Carbide GW15 R	L	KW10 R	L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			16E$^{R}_{L}$ 19W-TF	-	19 -	0.16	1.0	55°							●						J31
			16W-TF		- 16	0.19	1.1								●						
			14W-TF		14 14	0.23	1.5								●						
			11W-TF		11 11	0.30	1.5								●						
			16E$^{R}_{L}$ 19W	TNN32E$^{R}_{L}$ 19W	19 -	0.16	1.0		●				●								
			14W	14W	14 14	0.23	1.5		●				●								
			11W	11W	11 11	0.30	1.5		●				●								
	1-Thread, With Chipbreaker 		16E$^{R}_{L}$ 19W-TS	TNN32E$^{R}_{L}$ 19W-TS	19 -	0.16	1.0						●								
			14W-TS	14W-TS	14 14	0.23	1.5						●								
			11W-TS	11W-TS	11 11	0.30	1.5						●								

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER ···	KTNR··-16 KTNSR··-16	J16

Applicable Thread		
	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Internal Threading Inserts

Unified (UN)

Full Profile 60° (mm)

Description	Previous Description	A	T	ød
16IR/L	**TNN32IR/L**	9.525	3.68	4.0
22IR/L	**TNN43IR/L**	12.70	4.9	4.85

Classification of usage
● : 1st Choice
○ : 2nd Choice

		Cermet	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	Previous Description	Applicable Thread UN, UNF Pitch TPI	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	Cermet TC60 L	PVD Coated Carbide PR630 R	PR630 L	PR930 R	PR930 L	PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	KW10 R	KW10 L	Ref. Page for Depth of Cut & Number of Passes
Full Profile	**16IR/L 24UN-TF**	-	24	0.06	0.8	60°							●						J30
	20UN-TF		20	0.08	1.0								●						
	18UN-TF		18	0.09	1.0								●						
	16UN-TF		16	0.10	1.1								●						
	14UN-TF		14	0.12	1.5								●						
	13UN-TF		13	0.13	1.5								●						
	12UN-TF		12	0.14	1.5								●						
	10UN-TF		10	0.17	1.5								●						
	08UN-TF		8	0.21	1.8								●						
	16IR/L 24UN	**TNN32IR/L 24UN**	24	0.05	0.8	60°	●				●								
	20UN	**20UN**	20	0.07	1.0		●				●								
	18UN	**18UN**	18	0.09	1.0		●				●								
	16UN	**16UN**	16	0.10	1.1		●				●								
	14UN	**14UN**	14	0.12	1.5		●				●								
	12UN	**12UN**	12	0.14	1.5		●				●								
	22IR/L 08UN	**TNN43IR/L 08UN**	8	0.20	1.8	60°	●				●		●						

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16IR ···	**SINR··-16** **CINR··-16**	**J17**
22IR ···	**SINR··-22** **CINR··-22**	

Internal Threading Inserts

Parallel Pipe [G (PF)] Whitworth (W)

Full Profile 55° (mm)

Description	Previous Description	A	T	ød
16IR/L	**TNN32IR/L**	9.525	3.68	4.0

Classification of usage
● : 1st Choice
○ : 2nd Choice

		Cermet	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	Previous Description	Applicable Thread G (PF)	W Pitch TPI	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	Cermet TC60 L	PVD Coated Carbide PR630 R	PR630 L	PR930 R	PR930 L	PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	KW10 R	KW10 L	Ref. Page for Depth of Cut & Number of Passes
Full Profile	**16IR/L 19W-TF**	-	19	- 16	0.16	1.0	55°							●						J31
	16W-TF		-	16	0.19	1.1								●						
	14W-TF		14	14	0.23	1.5								●						
	11W-TF		11	11	0.30	1.5								●						
	16IR/L 14W	**TNN32IR/L 14W**	14	14	0.23	1.5	55°	●				●								
	11W	**11W**	11	11	0.30	1.5		●				●								
1-Thread, With Chipbreaker	**16IR/L 14W-TS**	**TNN32IR/L 14W-TS**	14	14	0.23	1.5	55°					●								J35
	11W-TS	**11W-TS**	11	11	0.30	1.5						●								

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16IR ···	**SINR··-16** **CINR··-16**	**J17**
16IL ···	**SINL··-16** **CINL··-16**	

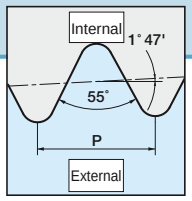
- No wiper effect is expected when threading the internal whitworth screw using 16IR ○○ W- ○○ insert.

Applicable Thread		
	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.



External Threading Inserts

Tapered Pipe [R (PT) (BSPT)]

Full Profile 55° (mm)

Description	Previous Description	A	T	ød
16IR/L	**TNN32ER/L**	9.525	3.68	4.0

Classification of usage ● : 1st Choice ○ : 2nd Choice

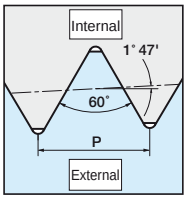
P	Carbon Steel / Alloy Steel			○	●		
M	Stainless Steel			○	●		
K	Cast Iron					●	
N	Non-ferrous Metals					●	

Insert (Handed Insert shows Right-hand)			Description		Previous Description		Applicable Thread R (PT) (BSPT) Pitch TPI	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	L	PVD Coated Carbide PR630 R	L	PR930 R	L	PR1115 R	L	Carbide GW15 R	L	KW10 R	L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			16ER/L	28BSPT-TF			28	0.10	0.8	55°							●						
				19BSPT-TF			19	0.16	1.0								●						
				14BSPT-TF			14	0.22	1.6								●						
				11BSPT-TF			11	0.29	1.6								●						J31
			16ER/L	28BSPT	TNN32ER/L	28PT	28	0.10	0.8		●				●				●				
				19BSPT		19PT	19	0.16	1.0		●				●				●		●		
				14BSPT		14PT	14	0.22	1.6		●				●				●		●		
				11BSPT		11PT	11	0.29	1.6		●				●				●		●		J31
	1-Thread, With Chipbreaker		16ER/L	19BSPT-TS	TNN32ER/L	19PT-TS	19	0.16	1.0						●								
				14BSPT-TS		14PT-TS	14	0.22	1.6						●								J35
				11BSPT-TS		11PT-TS	11	0.29	1.6						●								

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER ···	**KTNR··-16 KTNSR··-16**	**J16**



External Threading Inserts

American National Pipe (NPT60°)

Full Profile 60° (mm)

Description	Previous Description	A	T	ød
16ER/L	**TNN32ER/L**	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		Previous Description		Applicable Thread NPT Pitch TPI	Dimension (mm) rε	S	Angle (°) θ	Cermet TC60 R	L	PVD Coated Carbide PR630 R	L	PR930 R	L	PR1115 R	L	Carbide GW15 R	L	KW10 R	L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			16ER/L	18NPT	TNN32ER/L	18NPT	18	0.04	0.9	60°	●				●		●		●				
				14NPT		14NPT	14	0.05	1.5		●				●		●		●				J31
				11.5NPT		11.5NPT	11.5	0.06	1.5		●				●		●		●				

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER ···	**KTNR··-16 KTNSR··-16**	**J16**

Applicable Thread		
	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

Internal Threading Inserts

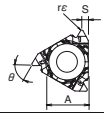
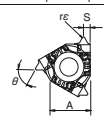
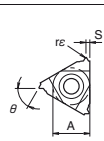
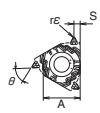
Tapered Pipe [Rc (PT) (BSPT)]

Full Profile 55° (mm)

Description	Previous Description	A	T	ød
11IR/L	**TNN22IR/L**	6.35	3.18	3.0
16IR/L	**TNN32IR/L**	9.525	3.68	4.0

Classification of usage
● : 1st Choice
○ : 2nd Choice

		Carbon Steel / Alloy Steel	Cermet		PVD Coated Carbide				Carbide			
			TC60		PR630		PR930		PR1115		GW15	KW10	
P	Carbon Steel / Alloy Steel						○		●				
M	Stainless Steel						○		●				
K	Cast Iron										●		
N	Non-ferrous Metals										●		

Insert (Handed Insert shows Right-hand)			Description	Previous Description	Applicable Thread RC (PT) (BSPT) Pitch TPI	Dimension (mm) rε	S	Angle (°) θ	TC60 R	TC60 L	PR630 R	PR630 L	PR930 R	PR930 L	PR1115 R	PR1115 L	GW15 R	GW15 L	KW10 R	KW10 L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			**11IR/L 28BSPT-TF**	-	28	0.10	0.6	55°							●						J31
			19BSPT-TF		19	0.16	0.78								●						
			14BSPT-TF		14	0.22	0.97								●						
			**16IR/L 14BSPT-TF**	-	14	0.22	0.97								●						
			11BSPT-TF		11	0.29	1.5								●						
			**11IR/L 28BSPT**	**TNN22IR/L 28PT**	28	0.10	0.6	55°	●				●				●				
			19BSPT	**19PT**	19	0.16	0.78		●				●				●		●		
			14BSPT	**14PT**	14	0.22	0.97		●				●				●		●		
			16IR/L 14BSPT	**TNN32IR/L 14PT**	14	0.22	0.97		●				●				●		●		
			11BSPT	**11PT**	11	0.29	1.5		●				●				●		●		
	1-Thread, With Chipbreaker 		**11IR/L 19BSPT-TS**	**TNN22IR/L 19PT-TS**	19	0.16	0.78	55°					●								J35
			14BSPT-TS	**14PT-TS**	14	0.22	0.97						●								
			16IR/L 14BSPT-TS	**TNN32IR/L 14PT-TS**	14	0.22	0.97						●								
			11BSPT-TS	**11PT-TS**	11	0.29	1.5						●								

For recommended cutting conditions, see page ➡ **J29**

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
11IR ··	**SINR···-11E SINR···-11**	**J17**
11IL ··	**SINL···-11E SINL···-11**	
16IR ··	**SINR···-16 CINR···-16**	

Internal Threading Inserts

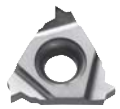
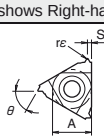
American National Pipe (NPT60°)

Full Profile 60° (mm)

Description	Previous Description	A	T	ød
16IR/L	**TNN32IR/L**	9.525	3.68	4.0

Classification of usage
● : 1st Choice
○ : 2nd Choice

		Carbon Steel / Alloy Steel	Cermet		PVD Coated Carbide				Carbide			
			TC60		PR630		PR930		PR1115		GW15	KW10	
P	Carbon Steel / Alloy Steel						○		●				
M	Stainless Steel						○		●				
K	Cast Iron										●		
N	Non-ferrous Metals										●		

Insert (Handed Insert shows Right-hand)			Description	Previous Description	Applicable Thread NPT Pitch TPI	Dimension (mm) rε	S	Angle (°) θ	TC60 R	TC60 L	PR630 R	PR630 L	PR930 R	PR930 L	PR1115 R	PR1115 L	GW15 R	GW15 L	KW10 R	KW10 L	Ref. Page for Depth of Cut & Number of Passes
Full Profile			**16IR/L 18NPT**	**TNN32IR/L 18NPT**	18	0.04	0.9	60°	●				●		●		●				J31
			14NPT	**14NPT**	14	0.05	1.5		●				●		●		●				
			11.5NPT	**11.5NPT**	11.5	0.06	1.5		●				●		●		●				

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16IR ···	**SINR···-16 CINR···-16**	**J17**

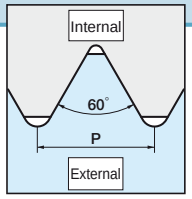
For recommended cutting conditions, see page ➡ **J29**

Applicable Thread		
	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.



External Threading Inserts

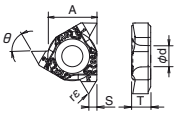
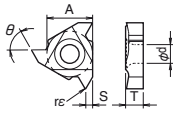
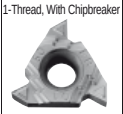
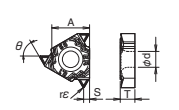
60°Type [Partial Profile / M, UN]

Partial Profile60° (mm)

Description	Previous Description	A	T	ød
16E$^{R}_{L}$	**TNN32E$^{R}_{L}$**	9.525	3.68	4.0
22E$^{R}_{L}$	**TNN43E$^{R}_{L}$**	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	Previous Description	Applicable Thread M Pitch mm	Applicable Thread UN UNF Pitch TPI	Dimension (mm) rε	Dimension (mm) S	Angle (°) θ	Cermet TC60 R	Cermet TC60 L	PVD Coated Carbide PR630 R	PVD Coated Carbide PR630 L	PVD Coated Carbide PR930 R	PVD Coated Carbide PR930 L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Carbide KW10 R	Carbide KW10 L	Ref. Page for Depth of Cut & Number of Passes
Partial Profile			**16E$^{R}_{L}$ A60-TF**	-	0.5~1.5	48~16	0.06	1.00	60°							●						
			G60-TF		1.75~3	14~8	0.22	1.60								●						
			AG60-TF		0.5~3	48~8	0.06	1.60								●						
			**16E$^{R}_{L}$ A60**	-	0.5~1.5	48~16	0.06	1.00	60°									●				**J31** **J32**
			G60		1.75~3	14~8	0.22	1.60										●				
			AG60		0.5~3	48~8	0.06	1.60										●				
			22E$^{R}_{L}$ N60		3.5~5	7~5	0.48	2.50								●		●				
			16E$^{R}_{L}$ 6001	TNN32E$^{R}_{L}$ 6001	1.0~2.5	24~11	0.10	1.50		●				●						●		
			6002	6002	1.5~2.5	16~11	0.20	1.50		●				●						●		
	1-Thread, With Chipbreaker 		**16E$^{R}_{L}$ 6001-TS**	TNN32E$^{R}_{L}$ 6001-TS	1.0~2.5	24~11	0.09	1.50	60°					●								**J35**
			6002-TS	6002-TS	1.5~2.5	16~11	0.19	1.50						●								

For recommended cutting conditions, see page ➡ **J29**

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER ···	**KTNR··-16** **KTNSR··-16**	**J16**
22ER ···	**KTNR··-22**	

Applicable Thread	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Internal Threading Inserts

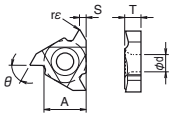
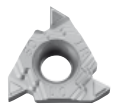
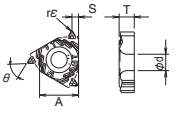
60°Type [Partial Profile / M, UN]

Partial Profile 60° (mm)

Description	Previous Description	A	T	ød
06IR/L	**TNN06IR/L**	3.97	1.91	2.3
08IR/L	**TNN08IR/L**	4.76	2.38	2.3
11IR/L	**TNN22IR/L**	6.35	3.18	3.0
16IR/L	**TNN32IR/L**	9.525	3.68	4.0
22IR/L	**TNN43IR/L**	12.70	4.9	4.85

Classification of usage
● : 1st Choice
○ : 2nd Choice

		Cermet	PVD Coated Carbide			Carbide	
		TC60	PR630	PR930	PR1115	GW15	KW10
P	Carbon Steel / Alloy Steel			○	●		
M	Stainless Steel			○	●		
K	Cast Iron					●	○
N	Non-ferrous Metals					●	○

Insert (Handed Insert shows Right-hand)			Description	Previous Description	Applicable Thread M	Applicable Thread UN UNF	Dimension (mm) rε	Dimension (mm) S	Angle (°) θ	TC60 R	TC60 L	PR630 R	PR630 L	PR930 R	PR930 L	PR1115 R	PR1115 L	GW15 R	GW15 L	KW10 R	KW10 L	Ref. Page for Depth of Cut & Number of Passes
					Pitch mm	Pitch TPI																
Partial Profile			**11IR/L A60**	-	0.5~1.5	48~16	0.02	1.00	60°							●		●				
			16IR/L 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/L N60		3.5~5	7~5	0.22	2.50								●		●				**J32**
			06IR/L 60005	**TNN06IR/L 60005**	0.75~1.25	28~20	0.05	0.60	60°					●		●						**J33**
			08IR/L 60007	**TNN08IR/L 60007**	1.0~1.75	20~16	0.07	0.80						●		●						
			11IR/L 60005	**TNN22IR/L 60005**	0.75~1.5	32~16	0.05	1.00		●				●	●					●		
			16IR/L 6001	**TNN32IR/L 6001**	1.5~2.5	16~10	0.10	1.50		●				●						●		
			60015	**60015**	2.5	11~10	0.15	1.50		●				●						●		
	1-Thread, With Chipbreaker 		**16IR/L 6001-TS**	**TNN32IR/L 6001-TS**	1.5~2.5	16~11	0.09	1.50	60°					●								**J35**
			60015-TS	**60015-TS**	2.5	11~10	0.14	1.50						●								

For recommended cutting conditions, see page ➡ **J29**

Applicable Toolholder

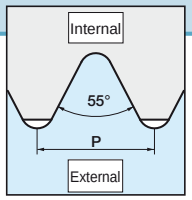
Description	Applicable Toolholder	Ref. Page for Toolholder
06IR ··	**SINR···-06E**	**J17**
08IR ··	**SINR···-08E**	
11IR ··	**SINR···-11E** **SINR···-11**	
11IL ··	**SINL···-11E** **SINL···-11**	
16IR ··	**SINR···-16** **CINR···-16**	
22IR ··	**SINR···-22** **CINR···-22**	

Applicable Thread	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.



External Threading Inserts

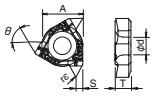
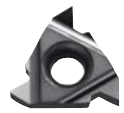
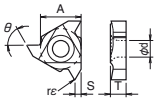
● 55°Type [Partial Profile / G (PF) R (PT, BSPT) (W)]

Partial Profile 55° (mm)

Description	Previous Description	A	T	ød
16ER/L	**TNN32ER/L**	9.525	3.68	4.0
22ER/L	**TNN43ER/L**	12.70	4.9	4.85

Classification of usage ● : 1st Choice ○ : 2nd Choice

		Carbon Steel / Alloy Steel	Cermet	PVD Coated Carbide				Carbide		Ref. Page for Depth of Cut & Number of Passes
			TC60	PR630	PR930	PR1115		GW15	KW10	
P	Carbon Steel / Alloy Steel					●				
M	Stainless Steel					●				
K	Cast Iron							●		
N	Non-ferrous Metals							●		

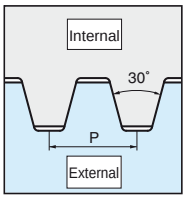
Insert (Handed Insert shows Right-hand)			Description	Previous Description	Applicable Thread G(PF) R(PT)	Applicable Thread W	Dimension (mm) rε	Dimension (mm) S	Angle (°) θ	Ref. Page for Depth of Cut & Number of Passes
					Pitch					
					TPI					
Partial Profile			**16ER/L A55-TF**	-	28, 19	48~16	0.06	1.00	55°	**J33 J34**
			G55-TF		14, 11	14~8	0.22	1.60		
			AG55-TF		28~11	48~8	0.06	1.60		
			**16ER/L A55**	-	28, 19	48~16	0.06	1.00	55°	
			G55		14, 11	14~8	0.22	1.60		
			AG55		28~11	48~8	0.06	1.60		
			22ER/L N55	-	-	7~5	0.47	2.50		
			16ER/L 5501	TNN32ER/L 5501	28~11	24~10	0.10	1.50		
			5502	5502	14, 11	16~9	0.20	1.50		

Insert (Handed Insert shows Right-hand)			Description	Previous Description	Cermet TC60 R	Cermet TC60 L	PVD Coated Carbide PR630 R	PR630 L	PR930 R	PR930 L	PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	KW10 R	KW10 L
Partial Profile			**16ER/L A55-TF**	-							●					
			G55-TF								●					
			AG55-TF								●					
			16ER/L A55	-									●			
			G55										●			
			AG55										●			
			22ER/L N55	-							●		●			
			16ER/L 5501	TNN32ER/L 5501	●				●						●	
			5502	5502	●				●						●	

For recommended cutting conditions, see page ➡ **J29**

● Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER···	**KTNR··-16 KTNSR··-16**	**J16**
22ER···	**KTNR··-22**	



External Threading Inserts

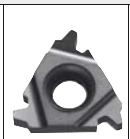
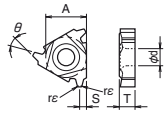
● 30°Trapezoidal (Tr)

Partial Profile 30° (mm)

Description	Previous Description	A	T	ød
16ER/L	**TNN32ER/L**	9.525	3.68	4.0
22ER/L	**TNN43ER/L**	12.70	4.9	4.85

Classification of usage ● : 1st Choice ○ : 2nd Choice

		Carbon Steel / Alloy Steel	Cermet	PVD Coated Carbide				Carbide		Ref. Page for Depth of Cut & Number of Passes
			TC60	PR630	PR930	PR1115		GW15	KW10	
P	Carbon Steel / Alloy Steel				○	●				
M	Stainless Steel				○	●				
K	Cast Iron									
N	Non-ferrous Metals									

Insert (Handed Insert shows Right-hand)			Description	Previous Description	Applicable Thread Tr	Applicable Thread Pitch	Applicable Thread mm	Dimension (mm) rε	Dimension (mm) S	Angle (°) θ	Ref. Page for Depth of Cut & Number of Passes
Partial Profile			**16ER/L 200TR**	TNN32ER/L 200TR	2.0	0.20	1.6	60°	**J34**
			300TR	300TR	3.0	0.20	1.6		
			22ER/L 400TR	TNN43ER/L 400TR	4.0	0.20	2.5	60°	
			500TR	500TR	5.0	0.20	2.5		

Insert (Handed Insert shows Right-hand)			Description	Previous Description	Cermet TC60 R	Cermet TC60 L	PVD Coated Carbide PR630 R	PR630 L	PR930 R	PR930 L	PR1115 R	PR1115 L	Carbide GW15 R	GW15 L	KW10 R	KW10 L
Partial Profile			**16ER/L 200TR**	TNN32ER/L 200TR	●				●		●					
			300TR	300TR	●				●		●					
			22ER/L 400TR	TNN43ER/L 400TR	●				●		●					
			500TR	500TR	●				●		●					

For recommended cutting conditions, see page ➡ **J29**

● Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16ER · · ·	**KTNR··-16 KTNSR··-16**	**J16**
22ER · · ·	**KTNR··-22**	

Applicable Thread	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Internal Threading Inserts

55°Type [Partial Profile / G(PF) Rc(PT, BSPT) (W)]

Partial Profile 55° (mm)

Description	Previous Description	A	T	ød
06IR/L	TNN06IR/L	3.97	1.91	2.3
08IR/L	TNN08IR/L	4.76	2.38	2.3
11IR/L	TNN22IR/L	6.35	3.18	3.0
16IR/L	TNN32IR/L	9.525	3.68	4.0
22IR/L	TNN43IR/L	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	Previous Description	Applicable Thread G(PF) Rc(PT)	Applicable Thread W Pitch TPI	Dimension (mm) rε	Dimension (mm) S	Angle (°) θ	Cermet TC60 R	Cermet TC60 L	PVD Coated Carbide PR630 R	PVD Coated Carbide PR630 L	PVD Coated Carbide PR930 R	PVD Coated Carbide PR930 L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Carbide KW10 R	Carbide KW10 L	Ref. Page for Depth of Cut & Number of Passes
Partial Profile	11IR/L A55		28, 19	48~16	0.06	1.00	55°							●		●				J33 J34
	16IR/L A55		28, 19	48~16	0.06	1.00								●		●				
	G55	-	14, 11	14~8	0.22	1.70								●		●				
	AG55		28~11	48~8	0.06	1.70								●		●				
	22IR/L N55		-	7~5	0.47	2.50								●		●				
	06IR/L 5501	TNN06IR/L 5501	28	24	0.10	0.60						●		●						
	08IR/L 5501	TNN08IR/L 5501	28, 19	24. 20	0.10	0.80						●		●						
	11IR/L 55005	TNN22IR/L 55005	28~14	24~14	0.05	1.10		●				●						●		
	16IR/L 5501	TNN32IR/L 5501	28~11	24~11	0.10	1.50		●				●						●		
	5502	5502	14, 11	16~11	0.20	1.50		●				●						●		

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
06IR···	SINR···-06E	J17
08IR···	SINR···-08E	
11IR···	SINR···-11E SINR···-11	

Description	Applicable Toolholder	Ref. Page for Toolholder
16IR···	SINR···-16 CINR···-16	J17
22IR···	SINR···-22 CINR···-22	

Internal Threading Inserts

30°Trapezoidal (Tr)

Partial Profile 30° (mm)

Description	Previous Description	A	T	ød
16IR/L	TNN32IR/L	9.525	3.68	4.0
22IR/L	TNN43ER/L	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	Previous Description	Applicable Thread Tr Pitch mm	Dimension (mm) rε	Dimension (mm) S	Angle (°) θ	Cermet TC60 R	Cermet TC60 L	PVD Coated Carbide PR630 R	PVD Coated Carbide PR630 L	PVD Coated Carbide PR930 R	PVD Coated Carbide PR930 L	PVD Coated Carbide PR1115 R	PVD Coated Carbide PR1115 L	Carbide GW15 R	Carbide GW15 L	Carbide KW10 R	Carbide KW10 L	Ref. Page for Depth of Cut & Number of Passes
Partial Profile	16IR/L 200TR	TNN32IR/L 200TR	2.0	0.20	1.6	30°	●				●		●						J34
	300TR	300TR	3.0	0.20	1.6		●				●		●						
	22IR/L 400TR	TNN43IR/L 400TR	4.0	0.20	2.5		●				●		●						
	500TR	500TR	5.0	0.20	2.5		●				●		●						

For recommended cutting conditions, see page ➡ J29

Applicable Toolholder

Description	Applicable Toolholder	Ref. Page for Toolholder
16IR···	SINR···-16 CINR···-16	J17
22IR···	SINR···-22 CINR···-22	

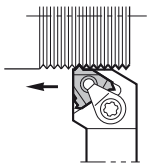
Applicable Thread	M: Metric	R, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PR930 / PR1115 / GW15 (Threading Insert) is sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

KTN



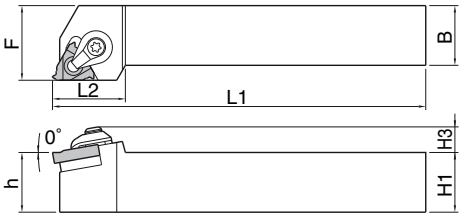
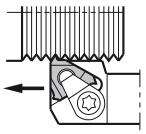


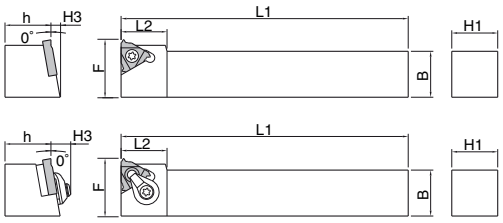
Fig.1

● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

KTNS (For Gang Type NC Lathe)





KTNSR1010H-16
1212K-16

Fig.2

KTNSR1616K-16
2020K-16

Fig.3

● Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H3	B	L1	L2	F	Drawing	Spare Parts: Clamp Screw	Clamp Set	Wrench	Shim	Shim Screw	Applicable Inserts
											5S 6S		FT LW	TN TNW		
KTNR/L	1616H-16	●	●	16	8.5	16	100	25	20	Fig.1	CPS-5S	-	FT-15	TN-32 (TNW-32)	SP3X8	16ER/L
	2020H-16*	●		20		20			25							
	2020K-16	●	●				125									
	2525M-16	●	●	25		25	150		30							
	2525M-22	●		25	10	25	150	29	32		CPS-6S	-	LW-3	TN-43	SP3X8	22ER/L
	3225P-22	●		32			170	34								
KTNSR/L	1010H-16	●		10	8.5	10	100	16	16	Fig.2	-	SB-3.5TR	FT-15	-	-	16ER/L
	1212K-16	●		12		12	125	18	18							
	1616K-16	●		16		16			22	Fig.3	CPS-5S	-		TN-32 (TNW-32)	SP3X8	
	2020K-16	●		20		20		20	27.4							

∗ mark indicates short shank type.

・Shim (TNW-32), when using 2-Thread Insert such as 16ER100ISO-M02, TNN32ER100M02. Purchase separately as necessary.

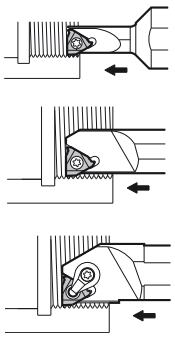
Reference page for applicable inserts

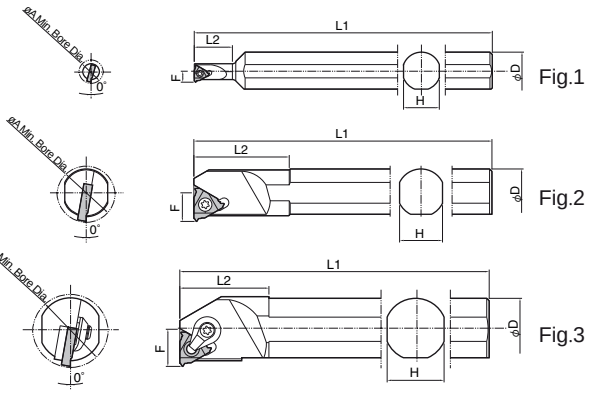
Type of Thread	Full Profile	Partial Profile	Type of Thread	Full Profile	Partial Profile
M: Metric	**J6**	**J12**	R(PT)(BSPT) Tapered Pipe	**J10**	**J14**
UN: Unified UNF: Unified Fine Thread	**J8**	**J12**	W: Whitworth	**J8**	**J14**
			NPT American National Pipe	**J10**	**-**
G (PF): Parallel Pipe	**J8**	**J14**	Tr: 30°Trapezoidal	**-**	**J14**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Internal Threading Toolholders

SIN / CIN

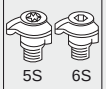
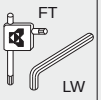




●Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	Drawing	Spare Parts: Clamp Screw	Clamp Set	Wrench	Shim	Shim Screw	Applicable Inserts
												 5S 6S	 FT LW			
SINR/L	**0612S-06E**	●		6.4	12	11	100	10	3.8	Fig.1	SB-2040TR	-	FT-6	-	-	**06 I**R/L**...**
	0816S-08E	●		7.8	16	15	125	16	4.0		SB-2050TR	-	FT-6	-	-	**08 I**R/L**...**
	1216S-11E	●	●	12	16	14	150	25	6.3		SB-2TR	-	FT-8	-	-	**11 I**R/L**...**
	1516S-11	●	●	15				30	7.5							
	2016S-16	●	●	20	16	14	150	37	10.0	Fig.2	SB-3.5TR	-	FT-15	-	-	**16 I**R/L**...**
	2420S-16	●	●	24	20	18	180	40	12.0							
	2420S-22	●		24	20	18	180	40	13.5		SB-4085TR	-	FT-15	-	-	**22 I**R/L**...**
CINR/L	**3025S-16**	●	●	30	25	23	200	36	15.0	Fig.3	-	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 I**R/L**...**
	3732S-22	●		37	32	30	250	45	20							

Reference page for applicable inserts

Type of Thread	Full Profile	Partial Profile	Type of Thread	Full Profile	Partial Profile
M: Metric	**J7**	**J13**	Rc(PT) (BSPT) Tapered Pipe	**J11**	**J15**
UN: Unified UNF: Unified Fine Thread	**J9**	**J13**	W: Whitworth	**J9**	**J15**
			NPT American National Pipe	**J11**	**-**
G (PF): Parallel Pipe	**J9**	**J15**	Tr: 30°Trapezoidal	**-**	**J15**

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(rε), 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”

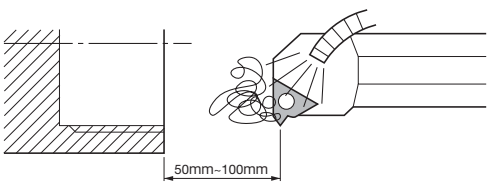
If cutting process is continued when chips are tangled with a holder and other parts of the machine, it may cause damages to the insert. Therefore, please confirm if there are no tangled chips in the machine by the following method.

<When processing the first work piece>

Move 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.

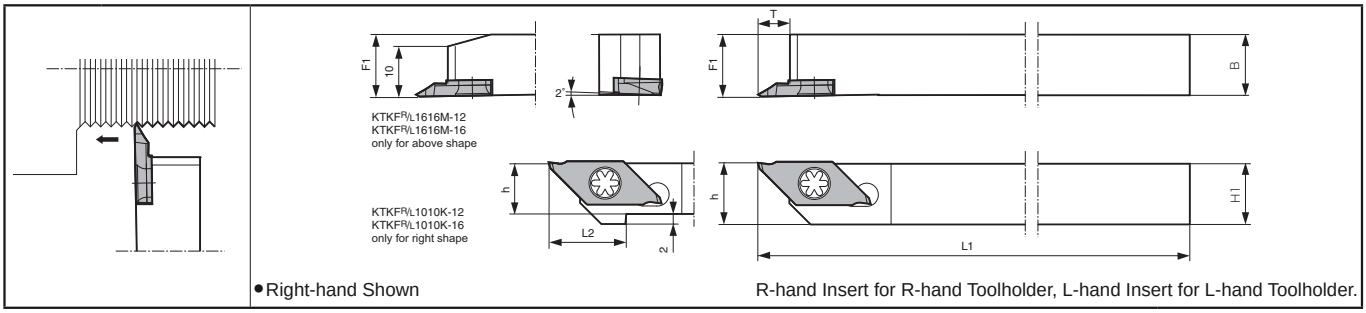
<When processing the second workpiece and later>

Confirm that chips are not tangled; then, execute continuous run.



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KTKF



●Right-hand Shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	B	L1	L2	F1	T	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts
KTKFR/L	1010K-12	●	●	10	10	125	15	10	6	SB-4590TRWN	LTW-10S	TKFT12R/L ...
	1212F-12	●		12	12	85	-	12				
	1212M-12	●	●			150						
	1616M-12	●	●	16	16			16				

*Dimension T: shows the distance from the Toolholder to the cutting edge.

Applicable Inserts

Insert		Description		Applicable Thread	Pitch mm	Pitch TPI	T	W	H	ød	R(rε)	S1	S2	Angle (°) θ	Insert Grade PVD Coated Carbide PR1025	Insert Grade Carbide KW10	Applicable Toolholder
Partial Profile		TKFT	12RA6000	M UN	0.2~0.6	64~48 TPI	3.0	2.5	8.7	5.2	Max 0.05 Flat	0.4	2.1	60°	●	●	KTKFR ...12
			12RB6000									2.1	0.4		●	●	
			12RA60005		0.5~1.25	48~24 TPI					0.05	0.8	1.7		●	●	
			12RB60005									1.7	0.8		●	●	
			12RN6001		1~1.5	24~18 TPI					0.1	1.25	1.25		●	●	
			12RA55005	G, R W	-	40~16 TPI					0.05	0.8	1.7	55°	●	●	
			12RB55005									1.7	0.8		●	●	
		TKFT	12LA6000	M UN	0.2~0.6	64~48 TPI	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 TPI					0.05	1.7	0.8		●	●	
			12LB60005									0.8	1.7		●	●	
			12LN6001		1~1.5	24~18 TPI					0.1	1.25	1.25		●	●	
			12LA55005	G, R W	-	40~16 TPI					0.05	1.7	0.8	55°	●	●	
			12LB55005									0.8	1.7		●	●	

Insert Description (See Table-1)

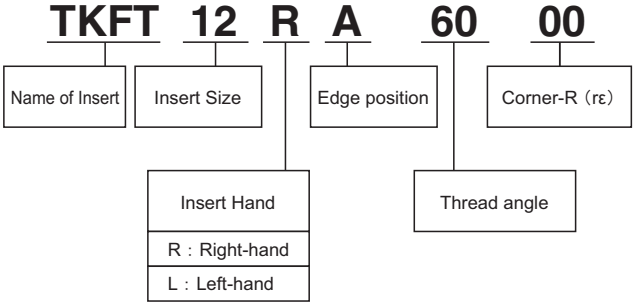
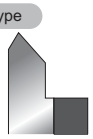


Table-1

R-hand Insert

A type	B type	N type
 TKFT12RA..	 TKFT12RB..	 TKFT12RN..

L-hand Insert

A type	B type	N type
 TKFT12LA..	 TKFT12LB..	 TKFT12LN..

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade			
	PVD Coated Carbide		Carbide	
	PR1025		**KW10**	
Carbon Steel	Vc = 60~150 m/mim		–	
	First ap (Radial)	under 0.2mm		
Alloy Steel	Vc = 60~150 m/mim		–	
	First ap (Radial)	under 0.2mm		
Stainless Steel	Vc = 50~80 m/mim		–	
	First ap (Radial)	under 0.15mm		
Cast Iron	–		Vc = 100 m/mim	
			First ap (Radial)	under 0.2mm
Non-ferrous Metals	–		Vc = 150~400 m/mim	
			First ap (Radial)	under 0.2mm

・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

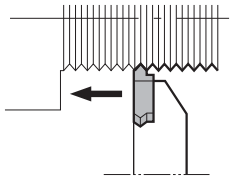
60° / 55° Partial Profile

(ap shows the value of radial ap)

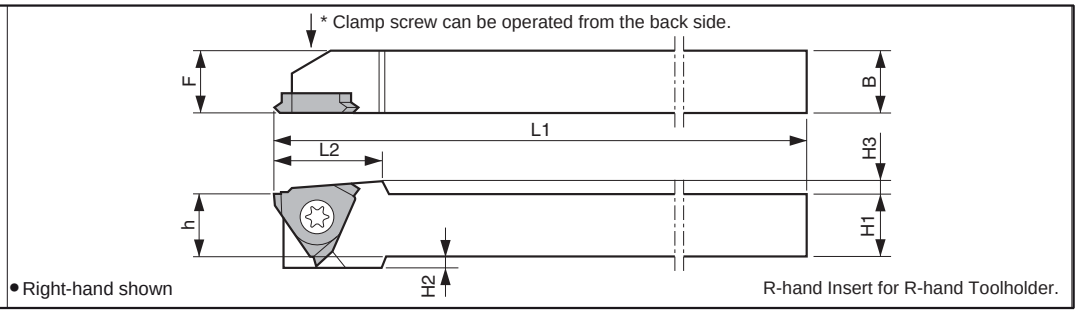
Type		Pitch mm・TPI	Description	R(rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12
External Thread	Metric	0.20mm	**TKFT 12R/L A/B6000**	0.00	0.15	4	0.06	0.04	0.03	0.02								
		0.25mm		0.00	0.19	4	0.07	0.06	0.04	0.02								
		0.30mm		0.00	0.23	4	0.08	0.07	0.06	0.02								
		0.35mm		0.00	0.27	5	0.08	0.07	0.06	0.04	0.02							
		0.40mm		0.00	0.30	5	0.10	0.08	0.06	0.04	0.02							
		0.45mm		0.00	0.34	6	0.10	0.08	0.06	0.04	0.04	0.02						
		0.50mm	**TKFT 12R/L A/B6000**	0.00	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**	0.00	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**	0.05	0.71	8	0.15	0.15	0.12	0.10	0.08	0.06	0.03	0.02				
			12R/L N6001	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	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	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	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KTTX



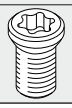
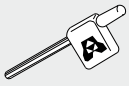
Thread to shoulder



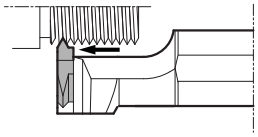
● Right-hand shown

R-hand Insert for R-hand Toolholder.

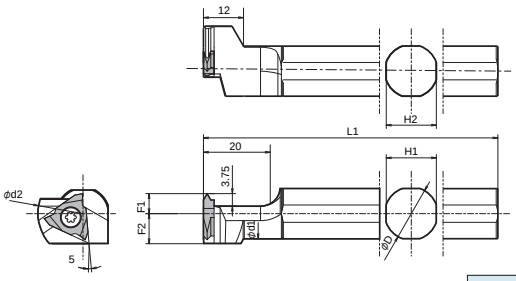
Toolholder Dimensions

Description		Std.	Dimension (mm)							Spare Parts				
										Clamp Screw	Wrench			
			H1=h	H2	H3	B	L1	L2	F					
KTTXR	**1010K-16F**	●	10	2	2.5	10	125	17.6	10	SB-4070TRW	FT-8			
	1212F-16F	●	12	-		12	85		12					
	1212M-16F	●	12			12	150		12					
	1616M-16F	●	16			16	150		16					
	2020K-16F	●	20			20	125		20					

S···KTTX (External Sleeve Holder)



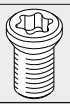
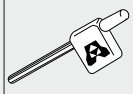
Thread to shoulder



● Left-hand shown

Right-hand Insert for Left-hand Toolholder.

Toolholder Dimensions

Description	Std.	Dimension (mm)							Spare Parts				
									Clamp Screw	Wrench			
		øD	L1	F1	F2	ød1	ød2	H1=H2					
S12F-KTTXL16	●	12.0	80	6.0	9.0	11.0	27	11	SB-4070TRW	FT-8			
S14H-KTTXL16	●	14.0	100			13.0		13					
S15F-KTTXL16	●	15.875	85			14.6		15					
S16F-KTTXL16	●	16.0											
S19G-KTTXL16	●	19.05	90		10.5	17.6		17					
S19K-KTTXL16	●		120										
S20G-KTTXL16	●	20.0	90		11.0	18.6		18					
S20K-KTTXL16	●		120										
S25.0H-KTTXL16	●	25.0	100	10.0	14.0	23.6	32	23					
S25K-KTTXL16	●	25.4	120										

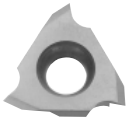
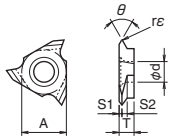
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

(mm)

Description	A	T	ød
TTX32R	9.525	3.18	4.4

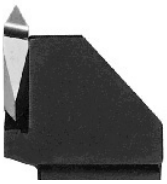
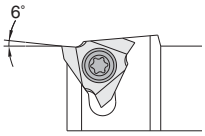
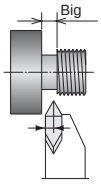
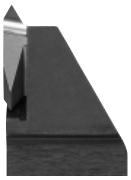
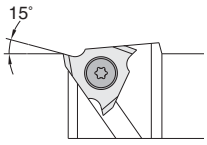
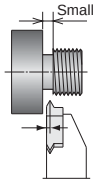
						Classification of usage
P	Carbon Steel / Alloy Steel	○	○	●		● : 1st Choice
M	Stainless Steel		○	●		○ : 2nd Choice
K	Cast Iron				●	
N	Non-ferrous Metals				●	

Insert (Right-hand Shown)			Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) rε	S1	S2	Angle (°) θ	Cermet TC60	PVD Coated Carbide PR930	PVD Coated Carbide PR1115	Carbide KW10	Applicable Toolholder	Ref. Page for Depth of Cut & No. 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**	**J38**
				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, Rc (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

For recommended cutting conditions, see page **J29**

TT and TTX

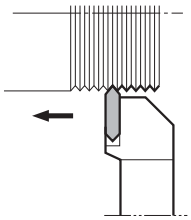
Type	Shape	Features: Rake Angle after Installation	Features: Condition	Features: Dead Space
TT			・One insert can machine various pitch sizes	
TTX			・The Least Cutting Resistance ・Thread to shoulder (Less dead space) ・One Insert can machine various pitch sizes. (less than TT)	

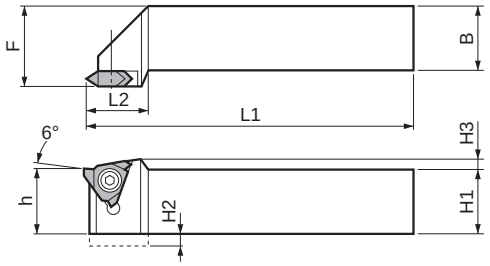
● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PR930 / PR1115 (Threading) are sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

KTT





• Right-hand shown

R-hand Insert for R-hand Toolholder, L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		Std. R	Std. L	Dimension (mm) H1=h	H2	H3	B	L1	L2	F	Spare Parts: Clamp Screw		Spare Parts: Wrench		
KTT$^{R}_{L}$	1010F -16	●	●	10	4		10	80		12					
	1212H -16	●	●	12	2		12	100		16	SB-4070TRS	-	FT-10	-	
	1616H -16	●	●	16	-	2.5	16	100	18	20					
	2020K -16	●	●	20	-		20	125		25	SB-4TR	-	FT-15	-	
	2525M-16	●	●	25	-		25	150		30					
	2020K -22	●	●	20	-	3.0	20	125	25	25	-	GS-50	-	LW-3	
	2525M-22	●	●	25	-		25	150		30					

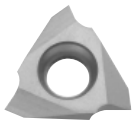
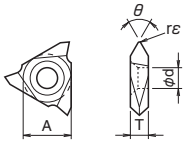
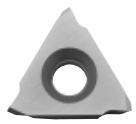
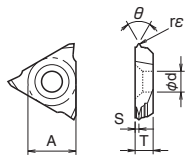
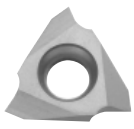
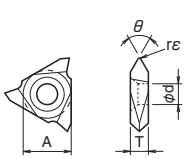
Applicable Inserts

(mm)

Description	A	T	ød
TT32$^{R}_{L}$	9.525	3.18	4.4
TT43$^{R}_{L}$	12.70	4.76	5.5

P	Carbon Steel / Alloy Steel	○	○	●	
M	Stainless Steel		○	●	
K	Cast Iron				●
N	Non-ferrous Metals				●

Classification of usage
● : 1 st Choice
○ : 2nd Choice

	Insert (Right-hand Shown)		Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) rε	S1	S2	Angle (°) θ	Cermet TC60	PVD Coated Carbide PR930	PVD Coated Carbide PR1115	Carbide KW10	Applicable Toolholder	Ref. Page for Depth of Cut & No. of Passes
Partial Profile			TT32$^{R}_{L}$	6000	M UN	0.5~2.5 -	- 56~10	0.0	-	-	60°	●	●	●		KTT$^{R}_{L}$···-16	J37
				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				●	R	R			
			TT32$^{R}_{L}$	5501	G, PT W	-	28~11 24~10	0.1	-	-	55°	●	●	R	●		J37
				5502	G, PT W	-	14~11 14~10	0.2				●	●	R	●		J38
Full Profile			TT43E$^{R}_{L}$	100M	M	1.00	-	0.12	0.8	-	60°	R	R	R		KTT$^{R}_{L}$···-16	J38
				125M		1.25		0.15	0.9			R	R	R			
				150M		1.50		0.19	1.0			R	R	R			
				200M		2.00		0.25	1.7			R	R	R			
Partial Profile			TT43$^{R}_{L}$	6001	M UN	1.0~3.5 -	- 24~8	0.1	-	-	60°	●	●	●	●	KTT$^{R}_{L}$···-22	J37
				6002	M UN	1.5~3.5 -	- 16~8	0.2				●	●	●	●		
				6003	M UN	2.5~3.5 -	- 11~8	0.3				●	●	R			
				6004	M UN	3.0~3.5 -	- 8	0.4				●	●	R			
			TT43$^{R}_{L}$	5501	G, PT W	-	28~11 24~7	0.1	-	-	55°	●	R	R	●		J31 J38
				5502	G, PT W	-	14~11 16~7	0.2				●	R	R	●		
				5503	G, PT W	-	11 10~7	0.3				●	R	R			
				5504	G, PT W	-	- 8~7	0.4				●					

For recommended cutting conditions, see page J29

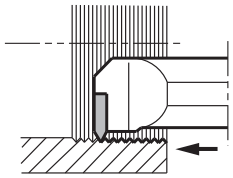
Applicable Thread	M: Metric	R, Rc(PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

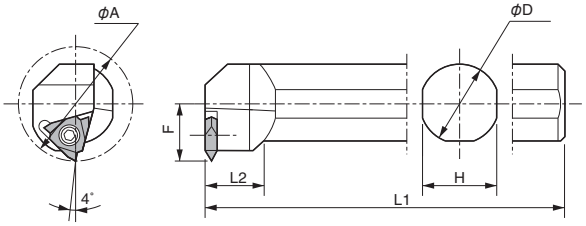
PR930 / PR1115 (Threading) are sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KITG

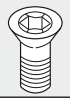
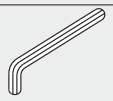




• Right-hand shown

L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Toolholder Dimensions

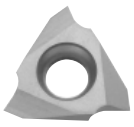
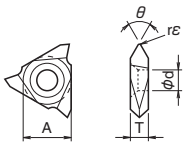
Description		Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	F	Spare Parts: Clamp Screw		Spare Parts: Wrench		
														
KITG R/L	3525T-16	●	●	35	25	23	220	18	17.5	SB-4TR	-	FT-15	-	
	4532T-22	●	●	45	32	30	250	20	22.5	-	GS-50	-	LW-3	

・Max. available Pitch: KITG R/L 3525T-16…P2.5 or 10 TPI, KITG R/L 4532T-22…P3.0 or 8 TPI.

Applicable Inserts

Description	A	T	ød
TT32 R/L	9.525	3.18	4.4
TT43 R/L	12.70	4.76	5.5

						Classification of usage
P	Carbon Steel / Alloy Steel		○	○	●	● : 1st Choice
M	Stainless Steel			○	●	○ : 2nd Choice
K	Cast Iron					●
N	Non-ferrous Metals					●

Insert (Right-hand Shown)			Description		Applicable Thread	Pitch mm	Pitch TPI	Dimension (mm) rε		Angle (°) θ	Cermet TC60	PVD Coated Carbide PR930	PVD Coated Carbide PR1115	Carbide KW10	Applicable Toolholder	Ref. Page for Depth of Cut & No. of Passes
Partial Profile			TT32 R/L	6000	M UN	0.5~2.5 -	- 48~10	0.0		60°	●	●	●		KITG R/L···-16	J37 J38
				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°	●	●	R	●		
				5502	G,PT W		- 16~18	0.2			●	●	R	●		
			TT43 R/L	6001	M UN	1.5~3.0 -	14~11 16~10	0.1		60°	●	●	●	●		
				6002	M UN	3.0 -	- 8	0.2			●	●	●	●		
			TT43 R/L	5501	G,PT W	-	28~11 24~8	0.1		55°	●	R	R	●	KITG R/L···-22	
				5502	G,PT W		14~11 16~8	0.2			●	R	R	●		
				5503	G,PT W		11 11~8	0.3			●	R	R			
				5504	G,PT W		- 8	0.4			●					

For recommended cutting conditions, see page J29

Applicable Thread	M: Metric	R, Rc(PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

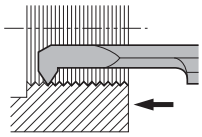
● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

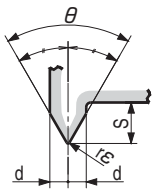
PR930 / PR1115 (Threading) are sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

2 Edges Tip-Bar for Micro Internal Threading HPT

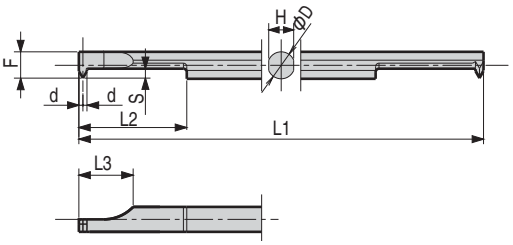
HPT (Micro Internal Threading)





Details of Edge





• Right-hand shown

Dimensions

Description		Min. Bore Dia.	Dimension (mm)										Insert Grade		Applicable Thread			
													PVD Coated Carbide	Carbide	Metric		Unified	
		øA	øD	H	L1	L2	L3	F	S	d	rε	θ	PR930	KW10	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)
HPTR	04504-60-005	4.5	4	3.7	60	16	8	3.9	1.3	0.6	0.05	60°	●	●	M6 and over	P0.75 ~P1.25	1/4-20UNC 1/4-28UNF and over	28~20
	06005-60-005	6	5	4.6	70	21		4.9	1.6	0.8			●	●	M8 and over	P0.75 ~P1.50	5/16-18UNC 5/16-24UNF and over	24~18
	07507-60-005	7.5	7	6.4	80	26	10	6.9	2	1			●	●	M10 and over	P0.75 ~P1.50	3/8-16UNC 3/8-24UNF and over	24~16
															Whitworth		Parallel Pipe Tapered Pipe	
HPTR	06005-55-010	6	5	4.6	70	21	8	4.9	1.6	0.8	0.1	55°	●	●	W10 TPI 20 W10 TPI 24 and over	24~20	G1/16 and over R1/16 and over	28
	08007-55-010	8	7	6.4	80	26	10	6.9	2.0	1.0			●	●	W11 TPI 18 W11 TPI 20 and over	20~18	G1/8 and over R1/8 and over	28~19

Description Table for Tip-Bars and Applicable Sleeves

Description		Applicable Sleeve J25	
HPTR	04504-60-005	PSH	04··-··
	06005-60-005		05··-··
	07507-60-005		07··-··
HPTR	06005-55-010	PSH	05··-··
	08007-55-010		07··-··

Recommended Cutting Conditions

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)	
	PVD Coated Carbide	Carbide
	PR930	KW10
Carbon Steel / Alloy Steel	★ 30~100	–
Stainless Steel	★ 30~80	–
Non-ferrous Metals	–	★ ~300

★: 1st Recommendation ☆: 2nd Recommendation

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	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03

Depth of Cut & Number of Passes (Whitworth/W)

TPI	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
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	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	18 Pass
28	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	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	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				
18	0.87	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	0.03	0.03	0.03	
16	0.98	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	0.05	0.05	0.04	0.04	0.04	0.03

Depth of Cut & Number of Passes (Parallel Pipe/G(PF), Tapered Pipe/BSPT (PT) (Rc))

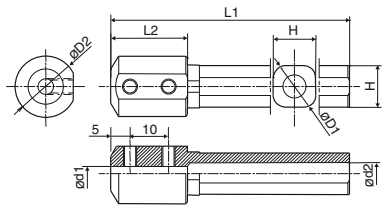
TPI	Total ap (mm)	No. of Passes	1 Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11 Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass	18 Pass
28	0.61	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03						
19	0.95	18	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03	0.03

<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.

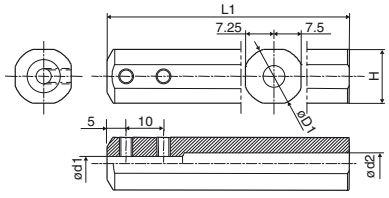
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Tip-Bars are sold in 1 piece boxes.

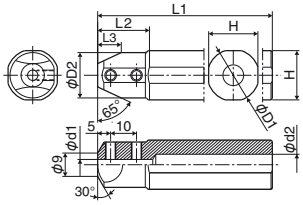
Applicable Sleeves



(Tip-Bar installation side) Fig.1



(Tip-Bar installation side) Fig.2



(Tip-Bar installation side) Fig.3

Description		Std.	Dimension (mm) * ød1	øD1	øD2	ød2	H	L1	L2	L3	Drawing	Spare Parts Screw	Spare Parts Wrench	Applicable Machine manufacturer	Ref. Page for Applicable Tip-Bar (Ref. Page for Other Applicable Tip-Bar)
PSH	**0412-80**	●	4	12	16	6	11	80	20	-	Fig.1	HS4×4P	LW-2	(General use)	Threading Tip-Bar (HPT)⇒**J24** Boring Tip-Bar (HPB)⇒**F18** Back Boring Tip-Bar (HPBT)⇒**F18** Grooving Tip-Bar (HPG)⇒**G30** Face Grooving Tip-Bar (HPFG)⇒**G53**
	0512-80	●	5												
	0712-80	●	7			8									
PSH	**0416-100**	●	4	16	-	6	15	100	-	-	Fig.2	HS4×4P	LW-2		
	0516-100	●	5												
	0716-100	●	7			8									
PSH	**0420-120**	●	4	20	17.5	6	19	120	20	9	Fig.3	HS4×4P	LW-2	Amada Wasino Eguro Precision Tsugami Miyano (General use)	
	0520-120	●	5												
	0720-120	●	7			8				7.5					
PSH	**0425.0-135**	●	4	25	18	6	24	135	23	9.5	Fig.3	HS4×4P	LW-2		
	0525.0-135	●	5												
	0725.0-135	●	7			8				8					
PSH	**0419-120**	●	4	19.05	17.5	6	18	120	20	9	Fig.3	HS4×4P	LW-2	Citizen Machinery	
	0519-120	●	5												
	0719-120	●	7			8				7.5					
PSH	**0420-120**	●	4	20	17.5	6	19	120	20	9	Fig.3	HS4×4P	LW-2		
	0520-120	●	5												
	0720-120	●	7			8				7.5					
PSH	**0425-120**	●	4	25.4	18	6	24.4	120	23	9.5	Fig.3	HS4×4P	LW-2		
	0525-120	●	5												
	0725-120	●	7			8				8					
PSH	**0422-135**	●	4	22	18	6	21	135	22	9.5	Fig.3	HS4×4P	LW-2	Star Micronics Nomura VTC	
	0522-135	●	5												
	0722-135	●	7			8				8					
PSH	**0423-120**	●	4	23	18	6	22	120	22	9.5	Fig.3	HS4×4P	LW-2	Nomura VTC	
	0523-120	●	5												
	0723-120	●	7			8				8					

*: Length of ød1…20mm (PSH04 type)
…25mm (PSH05, PSH06, PSH07 type)

・Select a sleeve dimension ød1 by adjusting for tip-bar dimension øD.

・Names of machining manufacturer in random order.

Application of Parallel Pipe / Tapered Pipe Thread

Parallel Pipe: **G(PF), Rp(PS)**

Nominal Thread Symbol (Previous Symbol)	TPI (TPI)	Internal (G,Rp) Insert		Bore Dia.	Same Root's Radius
G 1/16 (-)	28	**HPTR**	**06005-55-010**	6.56	0.12
G 1/8 (PF 1/8)			**08007-55-010**	8.57	
G 1/4 (PF 1/4)	19	**HPTR**	**08007-55-010**	11.45	0.18
G 3/8 (PF 3/8)				14.95	

Tapered Pipe: **R, Rc(PT) (BSPT)**

Nominal Thread Symbol (Previous Symbol)	TPI (TPI)	Internal (G,Rp) Insert		Bore Dia.	Same Root's Radius
R 1/16, Rc 1/16 (-)	28	**HPTR**	**06005-55-010**	-	0.12
R 1/8, Rc 1/8 (PT 1/8)			**08007-55-010**	-	
R 1/4, Rc 1/4 (PT 1/4)	19	**HPTR**	**08007-55-010**	-	0.18
R 3/8, Rc 3/8 (PT 3/8)				-	

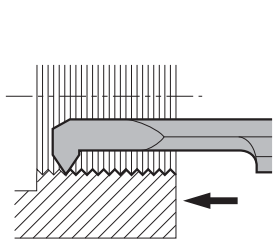
・When using "HPT type" for Parallel Pipe / Tapered Pipe threading, thread's corners become sharp edged due to its partial profile, and the shape will not be the same as the standard shape for Parallel Pipe / Tapered Pipe.

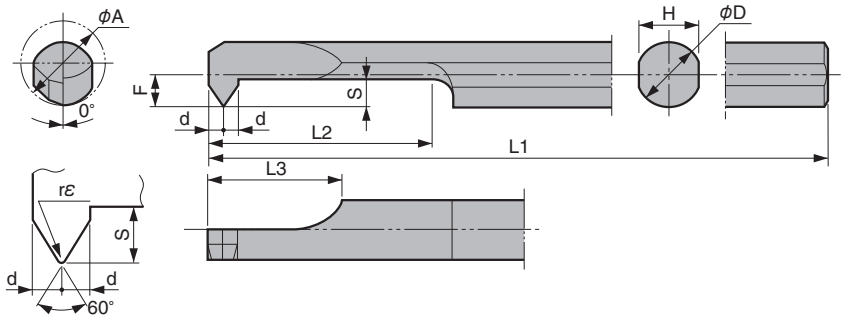
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Tip-Bar for Micro Internal Threading

PST-S (Tip-Bar)

This insert will be switched to **HPT** (2-Edge See Page ➡ **J24**).





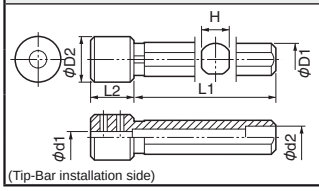
• Right-hand shown

Insert Dimensions

Description		Min. Bore Dia.	Dimension (mm)									Insert Grade				Applicable Thread			
												Cermet	PVD Coated Carbide		Carbide	Metric		Unified	
		øA	øD	H	L1	L2	L3	F	S	d	rε	TC60	PR630	PR930	KW10	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)
PSTR	**0604-60S**	4.5	3.8	3.6	60	15	8	1.7	1.6	0.8	0.05				●	M6 and over	P0.75 ~P1.25	1/4-20UNC, 1/4-28UNF and over	28~20
	0805-70S	6.0	4.8	4.4	70	20		2.2	2.1	1.0					●	M8 and over	P0.75 ~P1.50	5/16-18UNC, 5/16-24UNF and over	24~18

Applicable Sleeves

This sleeve is for 1-Edge Tip-Bar. For 2-Edges Tip-Bar, See Page ➡ **J25**.

Shape	Description	(Previous Description)	Std.	Dimension (mm)							Spare Parts		Applicable Tip-Bar
				øD1	øD2	ød1	ød2	H	L1	L2	Screw	Wrench	
 (Tip-Bar installation side)	**PH 0412-60**	**PH -0412**	●	12	19	3.8	6	11	60	20	HS4X4	LW-2	PSTR0604-60S
	0512-60	**-0512**	●			4.8							PSTR0805-70S
	PH 0416-80	**PH -0416**	●	16	22	3.8	Rp¼ (PS¼)	15	80	20	HS4X4	LW-2	PSTR0604-60S
	0516-80	**-0516**	●			4.8							PSTR0805-70S

Depth of Cut & Number of Passes

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	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03

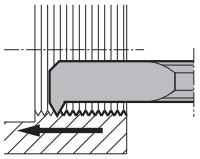
<Note> 1) The standard cutting speed is Vc=30~50m/min. The table feed may not follow the expected conditions when machining small diameter workpieces at high speeds.
2) Coolant is recommended.

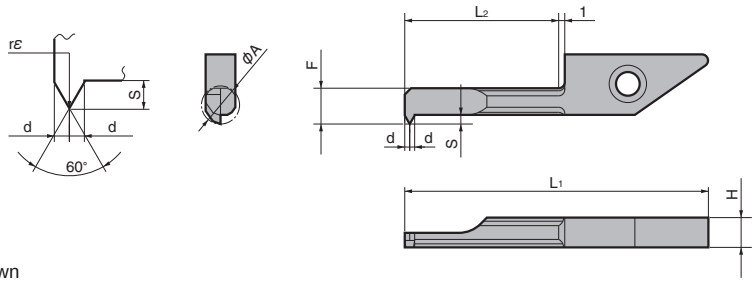
Tip-Bars are sold in 1 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

System Tip-Bar for Micro Threading

VNT (System Tip-Bar)





• Right-hand shown

Insert Dimensions

Description		Min. Bore Dia.	Dimension (mm)									Insert Grade			Applicable Thread			
												Cermet	PVD Coated Carbide	Carbide	Metric		Unified	
		øA	H	L1	L2	F	S	d	rε			TC60	PR930	KW10	Nominal Thread	Pitch (mm)	Nominal Thread	Pitch (TPI)
VNTR	045-11	4.5	3.9	30.8	11	3.6	1.3	0.6	0.05				●	●	M6 and over	P0.75 ~P1.25	1/4-20UNC, 1/4-28UNF and over	28~20
	060-11	6.0				4.6	1.6	0.8					●	●	M8 and over	P0.75 ~P1.50	5/16-18UNC, 5/16-24UNF and over	24~18

● For applicable Toolholder, see page **F12~F14.**

◆ Depth of Cut & Number of Passes (Metric)

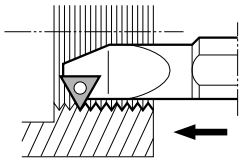
Pitch (mm)	Total ap (mm)	No. of Passes	1 Pass	2 Pass	3 Pass	4 Pass	5 Pass	6 Pass	7 Pass	8 Pass	9 Pass	10 Pass	11 Pass	12 Pass	13 Pass	14 Pass	15 Pass	16 Pass	17 Pass
0.75	0.44	10	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.03							
1.00	0.60	12	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	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	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.03

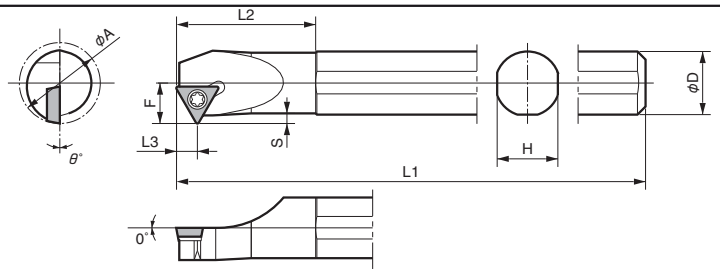
<Note> 1) The standard cutting speed is Vc=30~50m/min. The table feed may not follow the expected conditions when machining small diameter workpieces at high speeds.
2) Coolant is recommended.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

System Tip-Bars are are sold in 5 piece boxes.

S…STWP

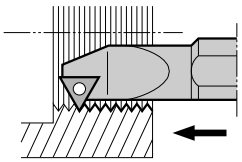


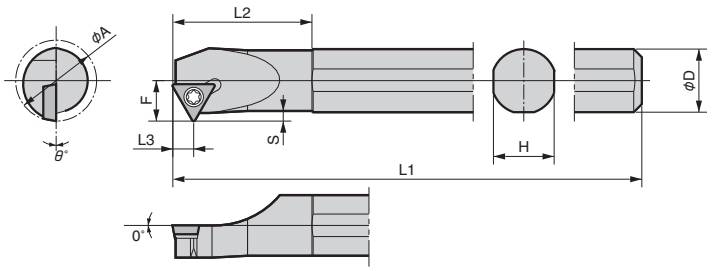


• Right-hand shown

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	(Previous Description)	Std. R	Std. L	Min. Bore Dia. øA	Dimension (mm) øD	H	L1	L2	L3	F	S	Available Pitch (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench
S10M -STWP R/L 11-12	SIT R/L 1210-11	●		12	10	9.2	150	23	5.5	6	1.0	1.5 and under	SB-3STR	FT-10
S12M -STWP R/L 11-16	1612-11	●		16	12	11	150	30		8	1.5	2.0 and under		
S16Q -STWP R/L 11-20	2016-11	●		20	16	15	180	35		10	2.0	3.0 and under	SB-3TR	
S20R -STWP R/L 11-25	2520-11	●		25	20	19	200	40		12.5	2.5	3.5 and under		
S10M -STWP R/L 11-12E	-	●	●	12	10	9.2	150	23	5.5	6	1.0	1.5 and under	SB-3STR	FT-10
S12M -STWP R/L 11-16E		●	●	16	12	11	150	30		8	1.5	2.0 and under		
S16R -STWP R/L 11-20E		●	●	20	16	15	200	35		10	2.0	3.0 and under	SB-3TR	
S20X -STWP R/L 11-25E		●	●	25	20	19	220	40		12.5	2.5	3.5 and under		

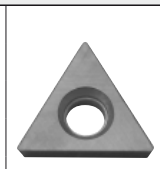
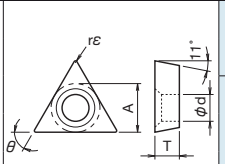
・Dimension S: shows the Max. available ap.

Applicable Inserts

(mm)

Description	A	T	ød
TPGB1102···	6.35 (11)	2.38	3.5
TPGB1103···	6.35 (11)	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) rε			Angle (°) θ	Cermet TN6020	Cermet TN60	PVD Coated Carbide PV7020	PVD Coated Carbide PV60	Carbide KW10	Applicable Toolholder	Ref. Page for Depth of Cut & No. of Passes
Partial Profile  	TPGB 1102005	M UN	0.75~1.5 -	- 28~16	0.05			60°		●			●	···STWP R/L 11-12(E)	J39
	110201	M UN	1.5 -	- 16	0.10					●			●		
	TPGB 1103005	M UN	0.75~3.5 -	- 28~11	0.05					●			●	···STWP R/L 11-16(E)	
	110301	M UN	1.5~3.5 -	- 16~8	0.10					●		●	●	···STWP R/L 11-20(E)	
	110302	M UN	3.0~3.5 -	- 8	0.20				●	●	●	●	●	···STWP R/L 11-25(E)	

For recommended cutting conditions, see page J29

Applicable Thread	M: Metric	R, RC (PT), (BSPT): Tapered Pipe
	UN: Unified	W: Whitworth
	UNF: Unified Fine Thread	NPT: American National Pipe
	G (PF): Parallel Pipe	Tr: 30°Trapezoidal

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

KTN / KTNS

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60	**PR930**	**PR1115**	**GW15 (KW10)**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Alloy Stee	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	under 0.25mm	under 0.25mm	under 0.25mm	
Cast Iron	-	-	-	★ 100
First ap (Radial)				under 0.3mm
Non-ferrous Metals	-	-	-	★ 150~400
First ap (Radial)				under 0.3mm

SIN / CIN

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60	**PR930**	**PR1115**	**GW15 (KW10)**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	under 0.25mm	under 0.25mm	under 0.25mm	
Cast Iron	-	-	-	★ 100
First ap (Radial)				under 0.3mm
Non-ferrous Metals	-	-	-	★ 150~400
First ap (Radial)				under 0.3mm

- For TNN06IR / 08IR, please lower it to a figure under 40% of above condition list

KTT

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	under 0.25mm	under 0.25mm	under 0.25mm	
Cast Iron	-	-	-	★ 100
First ap (Radial)				under 0.3mm
Non-ferrous Metals	-	-	-	★ 150~400
First ap (Radial)				under 0.3mm

S...STWP (-E)

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)				
	Cermet		PVD Coated Cermet		Carbide
	TN6020	**TN60**	**PV7020**	**PV60**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	☆ 100~150	-
First ap (Radial)	under 0.25mm	under 0.25mm	under 0.25mm	under 0.25mm	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	☆ 100~150	-
First ap (Radial)	under 0.25mm	under 0.25mm	under 0.25mm	under 0.25mm	
Stainless Steel	-	-	-	-	-
First ap (Radial)					
Cast Iron	-	-	-	-	★ 100
First ap (Radial)					under 0.25mm
Non-ferrous Metals	-	-	-	-	★ 150~400
First ap (Radial)					under 0.25mm

KTTX / S-KTTX

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	under 0.25mm	under 0.25mm	under 0.25mm	
Cast Iron	-	-	-	★ 100
First ap (Radial)				under 0.3mm
Non-ferrous Metals	-	-	-	★ 150~400
First ap (Radial)				under 0.3mm

KITG

Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)			
	Cermet	PVD Coated Carbide		Carbide
	TC60	**PR930**	**PR1115**	**KW10**
Carbon Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Alloy Steel	☆ 100~150	☆ 100~150	★ 100~150	-
First ap (Radial)	under 0.3mm	under 0.3mm	under 0.3mm	
Stainless Steel	☆ 60~80	☆ 60~80	★ 60~80	-
First ap (Radial)	under 0.25mm	under 0.25mm	under 0.25mm	
Cast Iron	-	-	-	★ 100
First ap (Radial)				under 0.3mm
Non-ferrous Metals	-	-	-	★ 150~400
First ap (Radial)				under 0.3mm

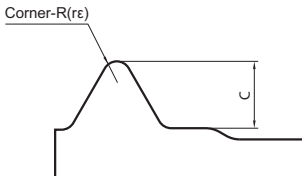
Indicates
★ : 1st Recommendation ☆ : 2nd Recommendation

- Coolant is recommended.
- In case of using cermet insert, horning edge with hand rapper slightly makes more stability.
- In case of threading stainless steel, please set two to three passes more than previous description of <ap - 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) Final ap for Finishing shall be 0.02~0.05mm
3) Prepare chamfering for C0.3~C0.5 to the Workpiece to prevent the Insert Crack at the 1st Pass.
4) Coolant is recommended.



11 / 16 / 22 (Full Profile) type

(ap shows the value of radial ap)

Type		Pitch/TPI mm/TPI	Description	C (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	1.00 mm	16E R/L 100ISO-TF	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05														
		1.25 mm	125ISO-TF	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05													
		1.50 mm	150ISO-TF	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05													
		1.75 mm	175ISO-TF	1.11	1.19	8	0.26	0.22	0.19	0.16	0.13	0.10	0.08	0.05											
		2.00 mm	200ISO-TF	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									
		2.50 mm	250ISO-TF	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							
		3.00 mm	300ISO-TF	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					
		0.50 mm	16E R/L 050ISO	0.33	0.38	4	0.14	0.12	0.08	0.04															
		0.75 mm	075ISO	0.48	0.53	5	0.17	0.14	0.10	0.08	0.04														
		1.00 mm	100ISO	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05														
		1.25 mm	125ISO	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05													
		1.50 mm	150ISO	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05													
		2.00 mm	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									
		2.50 mm	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							
		3.00 mm	22E R/L 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					
		3.50 mm	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				
		4.00 mm	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		
		4.50 mm	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	
		5.00 mm	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	1.00 mm	11I R/L 100ISO-TF	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25 mm	125ISO-TF	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50 mm	150ISO-TF	0.88	0.96	8	0.24	0.18	0.14	0.10	0.10	0.08	0.07	0.05											
		1.75 mm	175ISO-TF	1.02	1.10	9	0.24	0.18	0.16	0.14	0.10	0.10	0.08	0.05	0.05										
		0.50 mm	11I R/L 050ISO	0.31	0.36	4	0.14	0.10	0.08	0.04															
		0.75 mm	075ISO	0.45	0.50	5	0.15	0.14	0.10	0.07	0.04														
		1.00 mm	100ISO	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25 mm	125ISO	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50 mm	150ISO	0.88	0.96	8	0.24	0.18	0.14	0.10	0.10	0.08	0.07	0.05											
		1.75 mm	175ISO	1.02	1.10	9	0.24	0.18	0.16	0.14	0.10	0.10	0.08	0.05	0.05										
		2.00 mm	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									
		1.00 mm	16I R/L 100ISO-TF	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25 mm	125ISO-TF	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50 mm	150ISO-TF	0.88	0.96	8	0.22	0.18	0.14	0.12	0.10	0.08	0.07	0.05											
		1.75 mm	175ISO-TF	1.02	1.10	9	0.22	0.18	0.16	0.14	0.12	0.10	0.08	0.05	0.05										
		2.00 mm	200ISO-TF	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									
		2.50 mm	250ISO-TF	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							
		3.00 mm	300ISO-TF	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					
		1.00 mm	16I R/L 100ISO	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.25 mm	125ISO	0.74	0.82	7	0.20	0.18	0.14	0.12	0.08	0.06	0.04												
		1.50 mm	150ISO	0.88	0.96	8	0.22	0.18	0.14	0.12	0.10	0.08	0.07	0.05											
		2.00 mm	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									
		2.50 mm	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							
		3.00 mm	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					
		3.00 mm	22I R/L 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					
		3.50 mm	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				
		4.00 mm	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		
		4.50 mm	450ISO	2.63	2.71	18	0.27	0.26	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	
		5.00 mm	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	16E R/L 24UN-TF	0.67	0.75	5	0.24	0.20	0.16	0.10	0.05														
		20 TPI	20UN-TF	0.80	0.88	6	0.24	0.20	0.16	0.13	0.10	0.05													
		18 TPI	18UN-TF	0.89	0.97	6	0.26	0.22	0.18	0.15	0.11	0.05													
		16 TPI	16UN-TF	1.01	1.09	7	0.26	0.22	0.18	0.15	0.12	0.11	0.05												
		14 TPI	14UN-TF	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	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	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	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	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	16E R/L 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	22E R/L 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	16I R/L 24UN-TF	0.62	0.70	5	0.22	0.19	0.15	0.10	0.04														
		20 TPI	20UN-TF	0.75	0.83	6	0.22	0.20	0.16	0.12	0.08	0.05													
		18 TPI	18UN-TF	0.83	0.91	6	0.24	0.20	0.18	0.14	0.10	0.05													
		16 TPI	16UN-TF	0.94	1.02	7	0.24	0.20	0.18	0.14	0.11	0.10	0.05												
		14 TPI	14UN-TF	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	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	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	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	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	16I R/L 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	0.18	0.16	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	22I R/L 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				

11 / 16 (Full Profile) type

(ap shows the value of radial ap)

Type		Pitch/TPI mm/TPI	Description	C (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	16E R/L 19W-TF	0.89	0.97	6	0.27	0.22	0.18	0.15	0.10	0.05													
		14 TPI	14W-TF	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	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	16I R/L 19W-TF	0.88	0.96	6	0.25	0.21	0.20	0.15	0.10	0.05													
		14 TPI	14W-TF	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	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	16E R/L 16W-TF	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	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	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	16I R/L 16W-TF	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	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	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	16E R/L 28BSPT-TF	0.58	0.63	5	0.20	0.15	0.13	0.11	0.04														
		19 TPI	19BSPT-TF	0.86	0.94	6	0.26	0.20	0.18	0.15	0.10	0.05													
		14 TPI	14BSPT-TF	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	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	16E R/L 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	11I R/L 28BSPT-TF	0.58	0.63	5	0.20	0.16	0.13	0.10	0.04														
		19 TPI	19BSPT-TF	0.86	0.94	7	0.22	0.20	0.18	0.14	0.10	0.06	0.04												
		14 TPI	14BSPT-TF	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	11I R/L 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	16I R/L 14BSPT-TF	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	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	16I R/L 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 Pipe	External Thread	18 TPI	16E R/L 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	16I R/L 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° (Full 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	0.5 mm	16ER A60-TF	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
			AG60-TF	0.06	0.33	5	0.10	0.08	0.07	0.05	0.03														
		0.75 mm	16ER A60-TF	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
			AG60-TF	0.06	0.51	6	0.14	0.11	0.09	0.07	0.06	0.04													
		1.00 mm	16ER A60-TF	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
			AG60-TF	0.06	0.70	7	0.18	0.13	0.12	0.09	0.08	0.06	0.04												
		1.25 mm	16ER A60-TF	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
			AG60-TF	0.06	0.89	8	0.18	0.15	0.14	0.12	0.10	0.08	0.07	0.05											
		1.50 mm	16ER A60-TF	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	0.06	1.08	9	0.21	0.17	0.16	0.14	0.11	0.09	0.08	0.07	0.05										
		1.75 mm	16ER G60-TF	0.22	1.11	8	0.24	0.20	0.18	0.16	0.13	0.10	0.06	0.04											
			AG60-TF	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								
		2.00 mm	16ER G60-TF	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	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								
		2.50 mm	16ER G60-TF	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	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						
		3.00 mm	16ER G60-TF	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	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				
		0.5 mm	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														
		0.75 mm	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													
		1.00 mm	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												
		1.25 mm	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											
		1.50 mm	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										
		1.75 mm	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								
		2.00 mm	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								
		2.50 mm	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						
		3.00 mm	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				

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(rε)	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
Metric	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										
		0.5 mm	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														
		0.75 mm	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													
		1.00 mm	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													
		1.25 mm	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												
		1.50 mm	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										
		1.75 mm	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									
		2.00 mm	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							
		2.50 mm	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	1.6	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			
		3.00 mm	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			2.7	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	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
			AG60-TF	0.06	0.35	5	0.10	0.08	0.07	0.06	0.04														
		24 TPI	16ER A60-TF	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
			AG60-TF	0.06	0.75	7	0.18	0.15	0.13	0.10	0.08	0.07	0.04												
		20 TPI	16ER A60-TF	0.06	0.91	8	0.18	0.16	0.14	0.12	0.10	0.09	0.07	0.05											
			AG60-TF	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	0.06	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			AG60-TF	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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
	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	0.05	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					

60° / 55° (Partial Profile)

(ap shows the value of radial ap)

Type		Pitch/TPI mm/TPI	Description	Corner-R(rε)	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	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	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
			AG55-TF	0.06	0.67	7	0.16	0.14	0.10	0.09	0.08	0.06	0.04												
		19 TPI	16ER A55-TF	0.06	1.02	8	0.20	0.18	0.16	0.14	0.12	0.10	0.07	0.05											
			AG55-TF	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	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	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	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	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												
			A G55	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	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
			AG55-TF	0.06	0.37	5	0.12	0.09	0.07	0.05	0.04														
		24 TPI	16ER A55-TF	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
			AG55-TF	0.06	0.79	7	0.18	0.16	0.14	0.11	0.08	0.07	0.05												
		20 TPI	16ER A55-TF	0.06	0.96	8	0.20	0.18	0.15	0.13	0.10	0.08	0.07	0.05											
			AG55-TF	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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			
		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														

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(rε)	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	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			3.6	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				
		48 TPI	11IR A55	0.06	0.33	5	0.08	0.08	0.07	0.06	0.04														
		24 TPI			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			1.1	9	0.20	0.18	0.16	0.14	0.12	0.10	0.08	0.07	0.05										
		48 TPI	16IR A55	0.06	0.33	5	0.08	0.08	0.07	0.06	0.04														
			AG55	0.06	0.33	5	0.08	0.08	0.07	0.06	0.04														
		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	0.24	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	0.24	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 Selection for Partial Profiling Insert(rε)

	External Thread	Internal Thread
Metric Unified	rε ≦ 0.1443P	rε ≦ 0.0720P
Parallel Pipe (Whitworth) Tapered Pipe	(For Both External and Internal Thread) rε ≦ 0.1373P	

rε: Corner-R P: Pitch (= $\frac{25.4}{n}$) n: TPI

- **Metric, Unified Thread**

  Corner-R(rε) at Internal Threading is almost half of that of External.

- **Parallel Pipe, Tapered Pipe, Whitworth Thread**

  Same Corner-R(rε) for both External and Internal Threading

11 / 16 (Full Profile) type

1-Thread, With Chipbreaker (TS Chipbreaker)

(ap shows the value of radial ap)

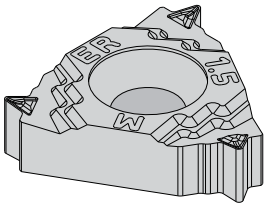
Type		Pitch/TPI mm/TPI	Description	(Previous Description)	C (mm)	*Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Metric	External Thread	1.00 mm	16ER/L 100ISO-TS	TNN32ER/L 100M-TS	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05														
		1.25 mm	125ISO-TS	125M-TS	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05													
		1.50 mm	150ISO-TS	150M-TS	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05													
		2.00 mm	200ISO-TS	200M-TS	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									
	Internal Thread	1.00 mm	16IR/L 100ISO-TS	TNN32IR/L 100M-TS	0.60	0.68	5	0.20	0.18	0.15	0.11	0.04														
		1.50 mm	150ISO-TS	150M-TS	0.88	0.96	8	0.24	0.18	0.14	0.10	0.10	0.08	0.07	0.05											
		2.00 mm	200ISO-TS	200M-TS	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									
Parallel Pipe	External Thread	19 TPI	16ER/L 19W-TS	TNN32ER/L 19W-TS	0.89	0.97	6	0.28	0.20	0.18	0.16	0.10	0.05													
		14 TPI	14W-TS	14W-TS	1.19	1.27	9	0.29	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TS	11W-TS	1.50	1.58	12	0.29	0.20	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	14 TPI	16IR/L 14W-TS	TNN32IR/L 14W-TS	1.19	1.27	9	0.29	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TS	11W-TS	1.50	1.58	12	0.29	0.20	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
Whitworth	External Thread	14 TPI	16ER/L 14W-TS	TNN32ER/L 14W-TS	1.19	1.27	9	0.29	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TS	11W-TS	1.50	1.58	12	0.29	0.20	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.07	0.07	0.05							
	Internal Thread	14 TPI	16IR/L 14W-TS	TNN32IR/L 14W-TS	1.19	1.27	9	0.29	0.20	0.18	0.16	0.11	0.10	0.10	0.08	0.05										
		11 TPI	11W-TS	11W-TS	1.50	1.58	12	0.29	0.20	0.18	0.16	0.12	0.12	0.12	0.10	0.10	0.10	0.07	0.05							
Tapered Pipe	External Thread	19 TPI	16ER/L 19BSPT-TS	TNN32ER/L 19PT-TS	0.86	0.94	6	0.26	0.20	0.18	0.15	0.10	0.05													
		14 TPI	14BSPT-TS	14PT-TS	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-TS	11PT-TS	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	19 TPI	11IR/L 19BSPT-TS	TNN22IR/L 19PT-TS	0.86	0.94	7	0.22	0.20	0.18	0.14	0.10	0.06	0.04												
		14 TPI	14BSPT-TS	14PT-TS	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/L 14BSPT-TS	TNN32IR/L 14PT-TS	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-TS	11PT-TS	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							

2-Thread, With Chipbreaker

(ap shows the value of radial ap)

Type		Pitch/TPI mm/TPI	Description	(Previous Description)	C (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	1.00 mm	16ER/L 100ISO-M02	TNN32ER/L 100M02	0.64	0.69	3	0.25	0.23	0.21																
		1.50 mm	150ISO-M02	150M02	0.95	1.00	3	0.36	0.34	0.30																
		2.00 mm	200ISO-M02	200M02	1.27	1.32	4	0.38	0.36	0.30	0.28															

Chip Control of Threading Insert with Chipbreaker



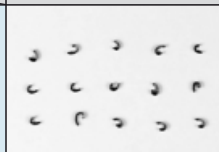
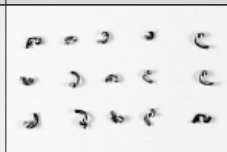
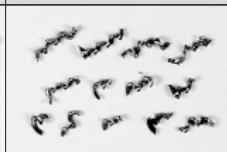
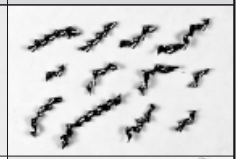
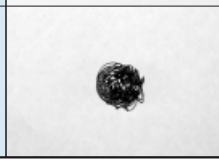
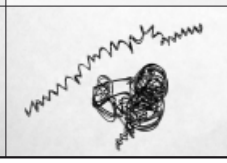
Insert with TS Chipbreaker

- Insert with TS Chipbreaker improves Chip Control.

・Features

1. “TS” breaks chips into small pieces and shows good chip evacuation.
2. Economical high precision molded insert .

- Cutting Conditions: Vc=100m/min, P=1.5 pitch, No. of Passes: 6, SCM435, WET, Flank Infeed (External Threading)

Pass	1st Pass	2nd Pass	3rd Pass	5th Pass	6th Pass
Insert with TS Chipbreaker					
Conventional					

Depth of Cut & Number of Passes

11 / 16 (60° / 55°Partial Profile) type

(ap shows the value of radial ap)

Type		Pitch/TPI mm/TPI	Description	(Previous Description)	Corner-R(rε)	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	1.00 mm	16ER/L 6001(-TS)	TNN32ER/L 6001(-TS)	0.10	0.66	5	0.20	0.18	0.12	0.09	0.05														
		1.25 mm	16ER/L 6001(-TS)	TNN32ER/L 6001(-TS)	0.10	0.85	6	0.23	0.20	0.14	0.12	0.07	0.05													
		1.50 mm	16ER/L 6001(-TS)	TNN32ER/L 6001(-TS)	0.10	1.04	8	0.23	0.21	0.19	0.15	0.11	0.06	0.05	0.04											
			6002(-TS)		0.20	0.94	7	0.23	0.20	0.18	0.14	0.10	0.05	0.04												
		1.75 mm	16ER/L 6001(-TS)	TNN32ER/L 6001(-TS)	0.10	1.23	9	0.25	0.22	0.20	0.17	0.14	0.09	0.07	0.05	0.04										
			6002(-TS)		0.20	1.13	8	0.25	0.22	0.20	0.16	0.14	0.07	0.05	0.04											
		2.00 mm	16ER/L 6001(-TS)	TNN32ER/L 6001(-TS)	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(-TS)		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									
		2.50 mm	16ER/L 6001(-TS)	TNN32ER/L 6001(-TS)	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(-TS)		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	0.75 mm	11IR/L 60005	TNN22IR/L 60005	0.05	0.44	5	0.14	0.12	0.10	0.06	0.02														
		1.00 mm	11IR/L 60005	TNN22IR/L 60005	0.05	0.60	6	0.18	0.15	0.10	0.08	0.05	0.04													
		1.25 mm	11IR/L 60005	TNN22IR/L 60005	0.05	0.76	7	0.18	0.15	0.12	0.10	0.10	0.07	0.04												
		1.50 mm	11IR/L 60005	TNN22IR/L 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/L 6001(-TS)	TNN32IR/L 6001(-TS)	0.10	0.87	8	0.18	0.16	0.12	0.10	0.10	0.08	0.08	0.05											
		1.75 mm	16IR/L 6001(-TS)	TNN32IR/L 6001(-TS)	0.10	1.04	9	0.20	0.18	0.15	0.12	0.12	0.10	0.08	0.05	0.04										
		2.00 mm	16IR/L 6001(-TS)	TNN32IR/L 6001(-TS)	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								
		2.50 mm	16IR/L 6001(-TS)	TNN32IR/L 6001(-TS)	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(-TS)	60015(-TS)	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/L 5501	TNN32ER/L 5501	0.10	0.61	5	0.20	0.16	0.12	0.08	0.05														
		19 TPI	16ER/L 5501	TNN32ER/L 5501	0.10	0.95	7	0.22	0.20	0.16	0.14	0.10	0.08	0.05												
		14 TPI	16ER/L 5501	TNN32ER/L 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/L 5501	TNN32ER/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							
	Internal Thread	28 TPI	11IR/L 55005	TNN22IR/L 55005	0.05	0.67	7	0.18	0.15	0.12	0.08	0.06	0.05	0.03												
			16IR/L 5501	TNN32IR/L 5501	0.10	0.61	6	0.18	0.15	0.12	0.08	0.05	0.03													
		19 TPI	11IR/L 55005	TNN22IR/L 55005	0.05	1.01	8	0.20	0.18	0.16	0.14	0.12	0.08	0.08	0.05											
			16IR/L 5501	TNN32IR/L 5501	0.10	0.95	7	0.20	0.18	0.16	0.14	0.12	0.10	0.05												
		14 TPI	11IR/L 55005	TNN22IR/L 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/L 5501	TNN32IR/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	16IR/L 5501	TNN32IR/L 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	0.12	0.08	0.05								
Whitworth (55°)	External Thread	24 TPI	16ER/L 5501	TNN32ER/L 5501	0.10	0.73	6	0.22	0.18	0.12	0.09	0.07	0.05													
		20 TPI	16ER/L 5501	TNN32ER/L 5501	0.10	0.90	6	0.22	0.18	0.17	0.16	0.12	0.05													
		18 TPI	16ER/L 5501	TNN32ER/L 5501	0.10	1.01	7	0.24	0.20	0.18	0.16	0.10	0.08	0.05												
		16 TPI	16ER/L 5501	TNN32ER/L 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/L 5501	TNN32ER/L 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/L 5501	TNN32ER/L 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/L 5501	TNN32ER/L 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/L 5501	TNN32ER/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						
		9 TPI	16ER/L 5502	TNN32ER/L 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/L 55005	TNN22IR/L 55005	0.05	0.71	7	0.18	0.15	0.12	0.10	0.08	0.05	0.03												
			16IR/L 5501	TNN32IR/L 5501	0.10	0.65	6	0.18	0.15	0.12	0.10	0.07	0.03													
		20 TPI	11IR/L 55005	TNN22IR/L 55005	0.05	0.87	8	0.18	0.16	0.14	0.12	0.10	0.06	0.06	0.05											
			16IR/L 5501	TNN32IR/L 5501	0.10	0.81	7	0.18	0.16	0.14	0.12	0.10	0.06	0.05												
		18 TPI	11IR/L 55005	TNN22IR/L 55005	0.05	0.97	8	0.20	0.18	0.16	0.14	0.10	0.08	0.06	0.05											
			16IR/L 5501	TNN32IR/L 5501	0.10	0.91	7	0.20	0.18	0.16	0.14	0.10	0.08	0.05												
		16 TPI	11IR/L 55005	TNN22IR/L 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/L 5501	TNN32IR/L 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/L 55005	TNN22IR/L 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/L 5501	TNN32IR/L 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/L 5501	TNN32IR/L 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/L 5501	TNN32IR/L 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(rε) 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 prevent cracking the insert at the 1st pass.
5) Coolant is recommended.

TT type (60° / 55°Partial Profile) Part 1

(ap shows the value of radial ap)

Type		Pitch mm/TPI	Description	Corner-R(rε)	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	0.50 mm	TT32R/L 6000	0.00	0.38	6	0.10	0.10	0.07	0.05	0.04	0.02											
		0.70 mm	TT32R/L 6000	0.00	0.53	7	0.10	0.10	0.10	0.08	0.07	0.06	0.02										
		0.75 mm	TT32R/L 6000	0.00	0.57	8	0.10	0.10	0.10	0.08	0.08	0.05	0.04	0.02									
		0.80 mm	TT32R/L 6000	0.00	0.61	8	0.10	0.10	0.10	0.10	0.08	0.06	0.05	0.02									
		1.00 mm	TT32R/L 6000	0.00	0.76	8	0.15	0.13	0.12	0.12	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											
		1.25 mm	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										
		1.50 mm	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									
		1.75 mm	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								
		2.00 mm	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							
		2.50 mm	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						
		3.00 mm	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					
		3.50 mm	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	0.50 mm	TT32R/L 6000	0.00	0.32	5	0.12	0.08	0.06	0.04	0.02												
		0.70 mm	TT32R/L 6000	0.00	0.45	6	0.15	0.10	0.08	0.06	0.04	0.02											
		0.75 mm	TT32R/L 6000	0.00	0.49	6	0.15	0.12	0.08	0.07	0.05	0.02											
		0.80 mm	TT32R/L 6000	0.00	0.52	6	0.15	0.12	0.10	0.08	0.05	0.02											
		1.00 mm	TT32R/L 6000	0.00	0.65	7	0.15	0.14	0.12	0.10	0.08	0.04	0.02										
		1.25 mm	TT32R/L 6000	0.00	0.81	8	0.18	0.16	0.14	0.12	0.10	0.05	0.04	0.02									
		1.50 mm	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									
		1.75 mm	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								
		2.00 mm	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						
		2.50 mm	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				
		3.00 mm	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 type (60° / 55°Partial Profile) Part 2

(ap shows the value of radial ap)

Type		Pitch mm/TPI	Description	Corner-R (rε)	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	T32 / 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 type (60°Full Profile)

(ap shows the value of radial ap)

Type		Pitch/TPI mm/TPI	Description	C (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	1.00 mm	TT43ER/L 100M	0.64	0.72	5	0.23	0.19	0.15	0.10	0.05												
		1.25 mm	125M	0.80	0.88	6	0.26	0.21	0.16	0.12	0.08	0.05											
		1.50 mm	150M	0.95	1.03	6	0.26	0.24	0.21	0.16	0.11	0.05											
		2.00 mm	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 type (60° / 55°Partial Profile)

(ap shows the value of radial ap)

Type		Pitch mm/TPI	Description	Corner-R (rε)	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	0.50 mm	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												
		0.70 mm	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											
		0.75 mm	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										
		0.80 mm	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										
		1.00 mm	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											
		1.25 mm	TTX32R 6001	0.10	0.85	7	0.25	0.20	0.13	0.10	0.10	0.05	0.02										
		1.50 mm		0.10	1.04	9	0.25	0.18	0.14	0.12	0.10	0.10	0.08	0.05	0.02								
		1.75 mm		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							
		2.00 mm		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	0.02					
Tapered Pipe Parallel 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(rε) 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 prevent the insert from cracking at the 1st pass.
5) Coolant is recommended.

TTX type

Suitable for threading of smaller pitch sizes or more TPI than TT type. Suitable for threading to the shoulder.

Insert \ Thread Types	Metric (mm)	Unified (TPI)	Parallel Pipe Tapered Pipe (TPI)	Whitworth (TPI)
TTX32R 6000	0.5~1.0	56~32	-	-
TTX32R 60005	0.5~1.0	48~32	-	-
TTX32R 6001	1.0~2.0	28~14	-	-
TTX32R 6000S	0.5	56~48	-	-
TTX32R 60005S	0.5	48	-	-
TTX32R 5501	-	-	28~19	24~20
TTX32R 55015	-	-	19~11	20~14

TPGB type (60°Partial Profile)

(ap shows the value of radial ap)

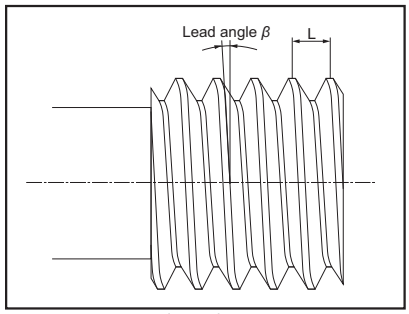
Type		Pitch mm/TPI	Description	Corner-R (rε)	Total ap (mm)	No. of Passes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Metric (55°)	Internal Thread	0.75 mm	TPGB1102005 1103005	0.05	0.44	5	0.15	0.12	0.10	0.05	0.02												
		0.80 mm	TPGB1102005 1103005	0.05	0.47	5	0.15	0.14	0.10	0.06	0.02												
		1.00 mm	TPGB1102005 1103005	0.05	0.60	6	0.18	0.14	0.12	0.10	0.04	0.02											
		1.25 mm	TPGB1102005 1103005	0.05	0.76	7	0.18	0.16	0.14	0.12	0.10	0.04	0.02										
		1.50 mm	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									
		1.75 mm	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								
		2.00 mm	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						
		2.50 mm	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				
		3.00 mm	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			
		3.50 mm	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		

Lead Angle of Thread

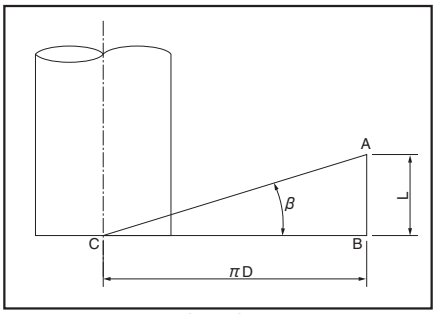
Thread's Lead Angle β as shown in Fig.1 decides from the Workpiece Diameter. (Pitch Dia.)
"D" and Lead "L" (in case of Single-start Thread, it is the same as Pitch "P").
Rolling a right-angled Triangle around a Cylinder and the Angle ACB in Fig.2 becomes the Lead Angle β.
The Calculation Formula is shown as follows.

$$\tan\beta = \frac{L}{\pi D} = \frac{nP}{\pi D}$$

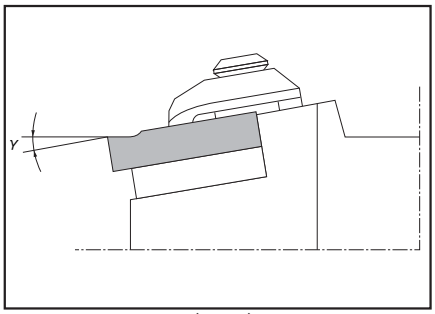
β : Lead Angle D: Pitch Dia. n: Number of Thread (Such as double-start thread) P: Pitch
L: Lead (In case of single-start thread, it is equal to P. In case of n-start thread, it is equal to n × P.)



(Fig.1)



(Fig.2)

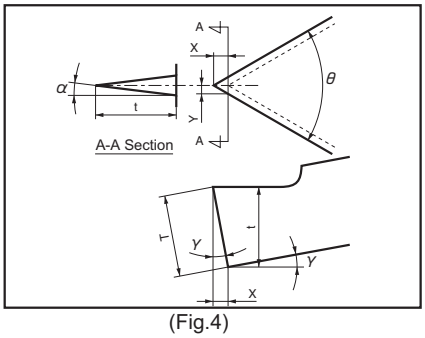


(Fig.3)

Relief Angle of Thread

Against this lead angle, the threading insert requires side relief angle α. TNN type threading insert is a negative insert and there is no relief angle. When installing the insert in the toolholder, the edge inclination angle γ (Fig.3) is set, and at the same time front relief angle as well as side relief angle are generated to 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°
θ: Insert's Thread Angle	Metric : 60° Tapered Pipe : 55° 30° Trapezoidal : 30°
T : Insert Thickness	

X=Tsinγ
Y=Xtan (θ/2)=t tanα
t =Tcosγ

(Table1)

Inserts	Side Relief Angle α	
	External	Boring
60° Thread (M, UN, NPT)	5°49′	8°47′
55° Thread (W, PT)	5°14′	7°56′
30° Thread (TR)	2°43′	5°7′

See 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°.

Applicable Toolholders & Inserts

The standard specification of the inch size thread is based on the dimension of 1/8 inch.

In Applicable Toolholder / Insert Lists on **J40~J43**, 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 **J46**.

Parallel Pipe: G(PF), Rp(PS)

Nominal Thread Symbol (Previous Symbol)	TPI	External Thread (G)			Internal Thread (G, Rp)				Same Root's Radius
		Toolholder	Insert		Toolholder	Insert		Bore Dia.	
			Partial Profile	Full Profile		Partial Profile	Full Profile		
G 1/16 (-)	28	**KTNR** ○○○○□ **-16** **KTNSR** ○○○○□ **-16**	16ERA55-TF 16ERAG55-TF 16ERA55 16ERAG55	-	**SINR0612S-06E**	06IR5501	-	6.56	0.12
G 1/8 (PF 1/8)								8.57	
G 1/4 (PF 1/4)	19	**KTNR** ○○○○□ **-16** **KTNSR** ○○○○□ **-16**	16ERA55-TF 16ERAG55-TF 16ERA55 16ERAG55	16ER19W-TF 16ER19W 16ER19W-TS	**SINR0816S-08E**	08IR5501	-	11.45	0.18
G 3/8 (PF 3/8)					**SINR1216S-11E**	11IRA55 11IR55005	-	14.95	
G 1/2 (PF 1/2)	14	**KTNR** ○○○○□ **-16** **KTNSR** ○○○○□ **-16**	16ERAG55-TF 16ERG55-TF 16ERAG55 16ERG55	16ER14W-TF 16ER14W 16ER14W-TS	**SINR1516S-11**	11IR55005	-	18.63	0.25
G 5/8 (PF 5/8)					**SINR2016S-16**	16IRAG55 16IRG55 16IR5501 16IR5502	16IR14W-TF 16IR14W 16IR14W-TS	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**	16ERAG55-TF 16ERG55-TF 16ERAG55 16ERG55	16ER11W-TF 16ER11W 16ER11W-TS	**SINR2420S-16**	16IRAG55 16IRG55 16IR5501 16IR5502	16IR11W-TF 16IR11W 16IR11W-TS	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 (G)			Internal Thread (G, Rp)				Same Root's Radius
		Toolholder	Insert		Toolholder	Insert			
			Partial Profile	Full Profile		Partial Profile	Full Profile		
R 1/16, Rc 1/16 (-)	28	**KTNR** ○○○○□ **-16** **KTNSR** ○○○○□ **-16**	(16ERA55-TF) (16ERAG55-TF) (16ERA55) (16ERAG55)	16ER28BSPT-TF 16ER28BSPT	**SINR0612S-06E**	06IR5501	-		0.12
R 1/8, Rc 1/8 (PT 1/8)									
R 1/4, Rc 1/4 (PT 1/4)	19	**KTNR** ○○○○□ **-16** **KTNSR** ○○○○□ **-16**	(16ERA55-TF) (16ERAG55-TF) (16ERA55) (16ERAG55)	16ER19BSPT-TF 16ER19BSPT 16ER19BSPT-TS	**SINR0816S-08E**	08IR5501	-		0.18
R 3/8, Rc 3/8 (PT 3/8)					**SINR1216S-11E**	(11IRA55) (11IRA55005)	11IR19BSPT-TF 11IR19BSPT 11IR19BSPT-TS		
R 1/2, Rc 1/2 (PT 1/2)	14	**KTNR** ○○○○□ **-16** **KTNSR** ○○○○□ **-16**	(16ERAG55-TF) (16ERG55-TF) (16ERAG55) (16ERG55)	16ER14BSPT-TF 16ER14BSPT 16ER14BSPT-TS	**SINR1516S-11**	(11IR55005)	11IR14BSPT-TF 11IR14BSPT-TS		0.25
R 3/4, Rc 3/4 (PT 3/4)					**SINR2016S-16**	(16IRAG55) (16IRG55) (16IR5501) (16IR5502)	16IR14BSPT-TF 16IR14BSPT 16IR14BSPT-TS		
R 1, Rc 1 (PT 1)	11	**KTNR** ○○○○□ **-16** **KTNSR** ○○○○□ **-16**	(16ERAG55-TF) (16ERG55-TF) (16ERAG55) (16ERG55)	16ER11BSPT-TF 16ER11BSPT 16ER11BSPT-TS	**SINR2420S-16**		16IR11BSPT-TF 16IR11BSPT 16IR11BSPT-TS		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 holder is recommended for internal threading holders.
Therefore it is available if minimum diameter is smaller than recommended holders.
(ex.) 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 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**	-	16ER18NPT	No Tools Available	-	-	
1/2 NPT	14	**KTNR ○○○○□ -16** **KTNSR ○○○○□ -16**	-	16ER14NPT	No Tools Available	-	-	
3/4 NPT					**SINR2016S-16**	-	16IR14NPT	
1 NPT	11.5	**KTNR ○○○○□ -16** **KTNSR ○○○○□ -16**	-	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**	16ER200TR	-				16.00 18.00
Tr 22X3	3	**KTNR ○○○○□ -16** **KTNSR ○○○○□ -16**	16ER300TR	-	No Tools Available	-	-	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 72.00 81.00 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.

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				3.24
M5	0.8				4.13
M6 M7	1.0 1.0	—	HPTR04504-60 / VNTR045-11		4.92 5.92
M8	1.25	—	HPTR06005-60 / VNTR060-11		6.65
		SINR0612S-06E	06IR60005	—	
M9	1.25	SINR0612S-06E	06IR60005	—	7.65
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 M20 M22	2.5 2.5 2.5	No Tools Available			15.29 17.29 19.29
M24 M27	3.0 3.0	SINR2016S-16	16IRAG60 / G60	16IR300ISO-○○	20.75 23.75
M30 M33	3.5 3.5	SINR2420S-22	—	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	37.19 40.19
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	
M 1×0.2 • • • M 5.5×0.5	0.2 0.5	No Tools Available	—	—	0.78 • • • 4.96
M 6×0.75	0.75	—	HPTR04504-60 / VNTR045-11		5.19
M 7×0.75	0.75	—	HPTR06005-60 / VNTR045-11		6.20
M 8×1.0	1.0	—	HPTR06005-60 / VNTR060-11		6.92
		SINR0612S-06E	06IR60005	—	
M 8×0.75	0.75	—	HPTR06005-60 / VNTR060-11		7.19
		SINR0612S-06E	06IR60005	—	
M 9×1.0	1.0	—	HPTR07507-60 / VNTR060-11		7.92
		SINR0612S-06E	06IR60005	—	
		SINR0816S-08E	08IR60007		
M 9×0.75	0.75	—	HPTR07507-60 / VNTR060-11		8.19
		SINR0612S-06E	06IR60005	—	
M10×1.25	1.25	—	HPTR07507-60 / VNTR060-11		8.65
		SINR0816S-08E	08IR60007	—	
M10×1.0	1.0	—	HPTR07507-60 / VNTR060-11		8.92
		SINR0816S-08E	08IR60007	—	
M10×0.75	0.75	—	HPTR07507-60 / VNTR060-11		9.19
		SINR0612S-06E	06IR600005	—	
M11×1.0	1.0	—	HPTR07507-60 / VNTR060-11		9.92
		SINR0816S-08E	08IR60007	—	
M11×0.75	0.75	—	HPTR07507-60 / VNTR060-11		10.19
		SINR0612S-06E	06IR60005	—	
M12×1.5 M12×1.25 M12×1.0	1.5 1.25 1.0	SINR0816S-08E	08IR60007	—	10.38 10.65 10.92
M14×1.5	1.5	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-○○	12.38
M14×1.25	1.25			11IR125ISO-○○	12.65
M14×1.0	1.0			11IR100ISO-○○	12.92
M15×1.5	1.5	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-○○	13.38
M15×1.0	1.0			11IR100ISO-○○	13.92
M16×1.5	1.5	SINR1216S-11E	11IRA60 11IR60005	11IR150ISO-○○	14.38
M16×1.0	1.0			11IR100ISO-○○	14.92

Metric Fine Thread: M

Part 2

Nominal Thread	Pitch (mm)	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
M17X1.5	1.5	SINR1516S-11	11IRA60 11IR60005	11IR150ISO-○○	15.38
M17X1.0	1.0			11IR100ISO-○○	15.92
M18X2.0	2.0	SINR1216S-11E	—	11IR200ISO	15.84
M18X1.5	1.5	SINR1516S-11	11IRA60 11IR60005	11IR150ISO-○○	16.38
M18X1.0	1.0			11IR100ISO-○○	16.92
M20X2.0	2.0	SINR1516S-11	—	11IR200ISO	17.84
M20X1.5	1.5		11IRA60 11IR60005	11IR150ISO-○○	18.38
M20X1.0	1.0			11IR100ISO-○○	18.92
M22X2.0	2.0	SINR2016S-16 (Additional machining required)	Table1	16IR200ISO-○○	19.84
M22X1.5	1.5	SINR2016S-16	Table2	16IR150ISO-○○	20.38
M22X1.0	1.0		Table3	16IR100ISO-○○	20.92
M24X2.0	2.0	SINR2016S-16	Table1	16IR200ISO-○○	21.84
M24X1.5	1.5		Table2	16IR150ISO-○○	22.38
M24X1.0	1.0		Table3	16IR100ISO-○○	22.92
M25X2.0	2.0	SINR2016S-16	Table1	16IR200ISO-○○	22.84
M25X1.5	1.5		Table2	16IR150ISO-○○	23.38
M25X1.0	1.0		Table3	16IR100ISO-○○	23.92
M26X1.5	1.5	SINR2420S-16	Table2	16IR150ISO-○○	24.38
M27X2.0	2.0	SINR2420S-16	Table1	16IR200ISO-○○	24.84
M27X1.5	1.5		Table2	16IR150ISO-○○	25.38
M27X1.0	1.0		Table3	16IR100ISO-○○	25.92
M28X2.0	2.0	SINR2420S-16	Table1	16IR200ISO-○○	25.84
M28X1.5	1.5		Table2	16IR150ISO-○○	26.38
M28X1.0	1.0		Table3	16IR100ISO-○○	26.92
M30X3.0	3.0	SINR2420S-22	—	22IR300ISO	26.75
		SINR2420S-16	16IRG60 16IRAG60	16IR300ISO-○○	
M30X2.0	2.0	SINR2420S-16	Table1	16IR200ISO-○○	27.84
M30X1.5	1.5		Table2	16IR150ISO-○○	28.38
M30X1.0	1.0		Table3	16IR100ISO-○○	28.92
M32X2.0	2.0	SINR2420S-16	Table1	16IR200ISO-○○	29.84
M32X1.5	1.5	CINR3025S-16	Table2	16IR150ISO-○○	30.38
M33X3.0	3.0	SINR2420S-22	—	22IR300ISO	29.75
		SINR2420S-16	16IRG60 16IRAG60	16IR300ISO-○○	
M33X2.0	2.0	CINR3025S-16	Table1	16IR200ISO-○○	30.84
M33X1.5	1.5		Table2	16IR150ISO-○○	31.38
M35X1.5	1.5	CINR3025S-16	Table2	16IR150ISO-○○	33.38
M36X3.0	3.0	CINR3025S-22	—	22IR300ISO	32.75
M36X2.0	2.0	CINR3025S-16	Table1	16IR200ISO-○○	33.84
M36X1.5	1.5		Table2	16IR150ISO-○○	34.38
M38X1.5	1.5	CINR3025S-16	Table2	16IR150ISO-○○	36.38
M39X3.0	3.0	CINR3025S-22	—	22IR300ISO	35.75
M39X2.0	2.0	CINR3025S-16	Table1	16IR200ISO-○○	36.84
M39X1.5	1.5	CINR3732S-16	Table2	16IR150ISO-○○	37.38
M40X3.0	3.0	CINR3025S-22	—	22IR300ISO	36.75
M40X2.0	2.0	CINR3732S-16	Table1	16IR200ISO-○○	37.84
M40X1.5	1.5		Table2	16IR150ISO-○○	38.38
M42X4.0	4.0	CINR3732S-22	22IRN60	22IR400ISO	37.67
M42X3.0	3.0		—	22IR300ISO	38.75
M42X2.0	2.0	CINR3732S-16	Table1	16IR200ISO-○○	39.84
M42X1.5	1.5		Table2	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 • • •

Table1 (P=2mm)	Table2 (P=1.5mm)	Table3 (P=1.0mm)
16IRG60 16IRAG60 16IR6001(-TS)	16IRA60 16IRAG60 16IR6001(-TS)	16IRA60 16IRAG60

- 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 • • • 10-24 UNC	56 24	No Tools Available	—	—	1.69 • • • 3.68
1/4-20 UNC	20	—	HPTR04504-60 / VNTR045-11		4.98
5/16-18 UNC	18	—	HPTR06005-60 / VNTR060-11		6.41
3/8-16 UNC	16	—	HPTR07507-60-005		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				16.30
7/8- 9 UNC • • •	9	* 3/8-16 UNC and over cannot be machined, because no inserts are available for the TPI.			19.17

Unified Fine Thread: UNF

Nominal Thread	TPI	Internal Thread			
		Toolholder	Insert		Bore Dia.
			Partial Profile	Full Profile	
0-80 UNF • • • 10-32 UNF	80 32	No Tools Available	—	—	1.18 • • • 3.97
1/4-28 UNF	28	—	HPTR04504-60 / VNTR045-11		5.37
5/16-24 UNF	24	—	HPTR06005-60 / VNTR060-11		6.79
		SINR0612S-06E	06IR60005	—	
3/8-24 UNF	24	—	HPTR06005-60 / VNTR060-11		8.38
		SINR0612S-06E	06IR60005	—	
7/16-20 UNF 1/2-20 UNF	20 20	SINR0816S-08E	08IR60007	—	9.74 11.33
9/16-18 UNF 5/8-18 UNF	18 18	SINR1216S-11E	11IRA60 11IR60005	—	12.76 14.35
3/4-16 UNF	16	SINR1516S-11	11IRA60 11IR60005	—	17.33
7/8-14 UNF	14	SINR2016S-16	16IRAG60 16IRG60 16IR6001(-TS)	16IR14UN(-TF)	20.26
1 -12 UNF	12	SINR2016S-16		16IR12UN(-TF)	23.10
1 1/8-12 UNF 1 1/4-12 UNF	12 12	SINR2420S-16			26.28 29.46
1 3/8-12 UNF 1 1/2-12 UNF	12 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 12				10.30 11.89
W 5/8	11				13.26
W 3/4	10				16.17
W 7/8	9				19.03
W 1	8				21.80
W 1 1/8 W 1 1/4	7 7				24.47 27.64
W 1 3/8 W 1 1/2	6 6				30.13 33.30
W 1 5/8	5				35.52
W 1 3/4 • • •	5				38.69
		* Because the toolholder does not fit to the pre-drilled hole or the insert does not match to the TPI, machining is not possible.			

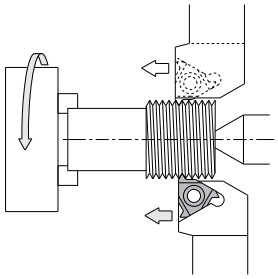
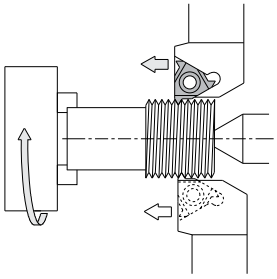
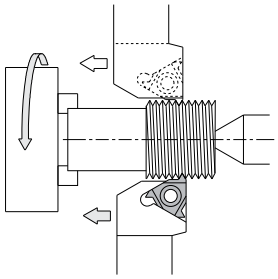
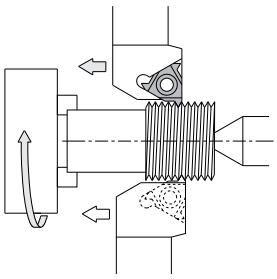
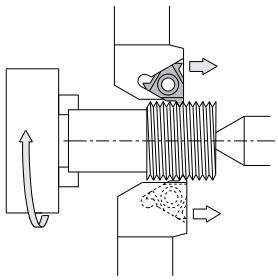
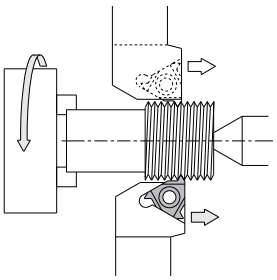
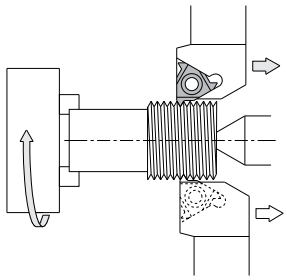
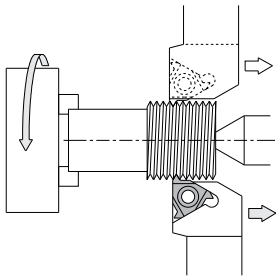
Whitworth Fine Thread: W

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
		—	HPTR06005-55		
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
		—	HPTR06005-55 HPTR08007-55		
W13.5 TPI 20	20	SINR1216S-11E	11IR55005	—	12.06
W11 TPI 18 W11.5 TPI 18 W12 TPI 18 W12.5 TPI 18	18	—	HPTR08007-55-010		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 W17 TPI 16 W18 TPI 16 W19 TPI 16 W20 TPI 16	16	SINR1216S-11E	11IRA55 11IR55005	—	12.20 12.70 13.20 15.20 16.20 17.20 18.20
W16 TPI 14 W17 TPI 14	14	SINR1216S-11E	11IR55005	—	13.94 14.94
W18 TPI 14 W21 TPI 14 W22 TPI 14	14	SINR1516S-11	11IR55005		15.94 18.94 19.94
W23 TPI 14 W24 TPI 14 W25 TPI 14 W26 TPI 14	14	SINR2016S-16	16IRAG55 16IRG55 16IR5501 16IR5502	(16IR14W-TF) (16IR14W-TS) (16IR14W)	20.94 21.94 22.94 23.94
W19 TPI 12 W20 TPI 12 W21 TPI 12 W22 TPI 12	12	No Tools Available			16.60 17.60 18.60 19.60
W28 TPI 12 W30 TPI 12 W32 TPI 12	12	SINR2016S-16	16IRAG55 16IRG55 16IR5501 16IR5502	—	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 16IR5501 16IR5502	—	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	No Tools Available			39.89 40.89 41.89 43.89 45.89 47.89
W55 TPI 6 W58 TPI 6 W60 TPI 6 W62 TPI 6 • • •	6				50.20 53.20 55.20 57.20 • • •
		* For 10 and more TPI Whitworth Fine Thread cannot be machined because the insert does not match to the TPI.			

● Above shows the usage example of applicable Toolholder / Insert.

External Threading (R-hand Thread / L-hand Thread)

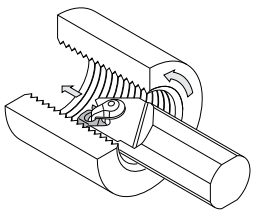
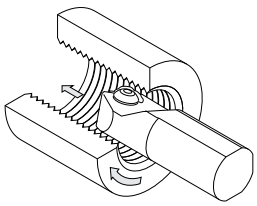
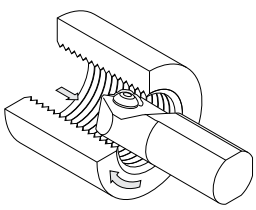
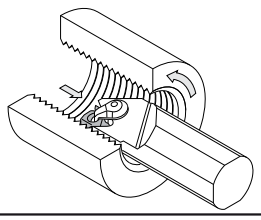
External Threading

R-hand Thread		L-hand Thread	
Toolholder	R-hand	Toolholder	L-hand
Insert	R-hand	Insert	L-hand
The direction of spindle revolution	M03	The direction of spindle revolution	M04
			
Toolholder	L-hand	Toolholder	R-hand
Insert	L-hand	Insert	R-hand
The direction of spindle revolution	M03	The direction of spindle revolution	M04
			
Toolholder	R-hand	Toolholder	L-hand
Insert	R-hand	Insert	L-hand
The direction of spindle revolution	M04	The direction of spindle revolution	M03
			
Toolholder	L-hand	Toolholder	R-hand
Insert	L-hand	Insert	R-hand
The direction of spindle revolution	M04	The direction of spindle revolution	M03
			

* These tables are based on KTN / KTNS / KTT / KTTX type Toolholder.

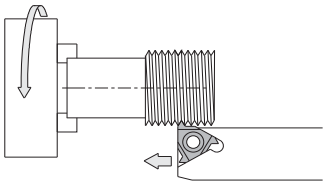
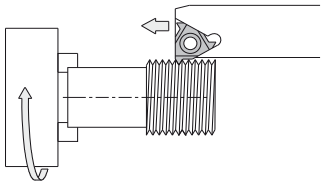
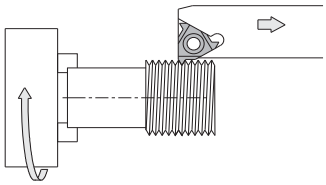
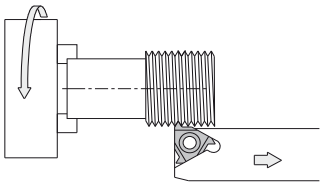
Internal Threading (R-hand Thread / L-hand Thread)

Internal Threading

R-hand Thread		L-hand Thread	
	Toolholder: R-hand Insert: R-hand The direction of spindle revolution: M03		Toolholder: L-hand Insert: L-hand The direction of spindle revolution: M04
	Toolholder: L-hand Insert: L-hand The direction of spindle revolution: M04		Toolholder: R-hand Insert: R-hand The direction of spindle revolution: M03

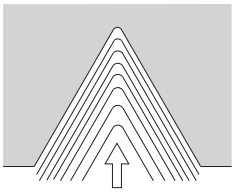
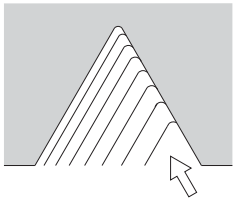
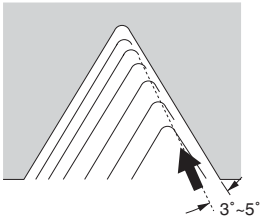
* These tables are based on SIN / CIN type Toolholder.
For KITG type (for large internal threading), L-hand Insert for R-hand Toolholder, R-hand Insert for L-hand Toolholder.

Internal threading tool holder and the method of cutting “External Thread”

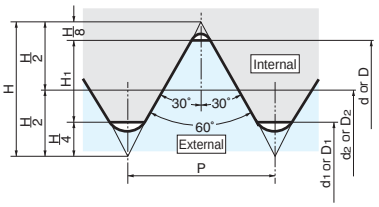
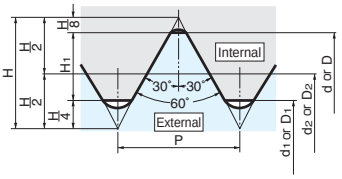
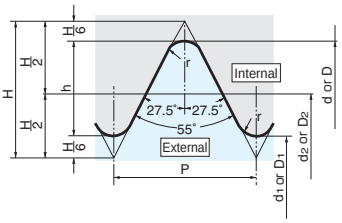
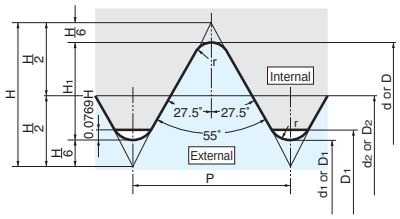
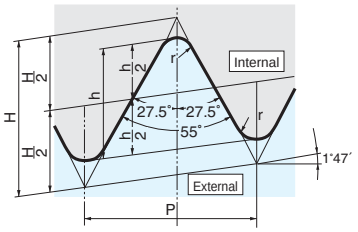
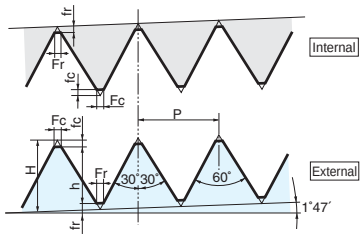
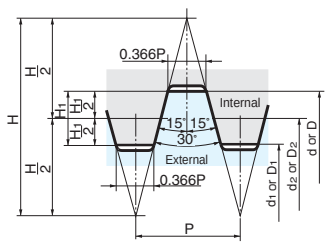
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<tr><th colspan="2">R-hand Thread</th><th colspan="2">L-hand Thread</th></tr>
<tr>
<td>Toolholder
Insert
The direction of spindle revolution</td>
<td>L-hand
L-hand
M03</td>
<td>  </td>
<td>Toolholder
Insert
The direction of spindle revolution</td>
<td>R-hand
R-hand
M04</td>
<td>  </td>
</tr>
<tr>
<td>Toolholder
Insert
The direction of spindle revolution</td>
<td>R-hand
R-hand
M04</td>
<td>  </td>
<td>Toolholder
Insert
The direction of spindle revolution</td>
<td>L-hand
L-hand
M03</td>
<td>  </td>
</tr>
</table>

・Use Inserts with Partial Profile.

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. • This method is recommended to threading by 2-thread insert.

Thread Types & Basic Profile / Applicable Toolholders & Inserts

	Basic Profile	Symbol (Previous Symbol)	Type	Applicable Insert	Applicable Toolholder
Metric		**M** **e.g.) M30**	External	○○ E$^{R}_{L}$○○○ ISO 16E$^{R}_{L}$○○○ ISO-TF 16E$^{R}_{L}$○○○ M02 16E$^{R}_{L}$60 ○○ (-TS)	KTN$^{R}_{L}$○○○○□-○○ KTNSR ○○○○□-16
				TT43E$^{R}_{L}$○○○ M TT ○○ $^{R}_{L}$60 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32$^{R}_{L}$60 ○○	KTTX$^{R}_{L}$○○○○□-16F, S ○○□-KTTX$^{R}_{L}$16
			Internal	○○ I$^{R}_{L}$○○○ ISO ○○ I$^{R}_{L}$○○○ ISO-TF ○○ I$^{R}_{L}$60 ○○ (○)(-TS)	SIN$^{R}_{L}$○○○○ S- ○○ (E) CIN$^{R}_{L}$○○○○ S- ○○
				TT ○○$^{L}/_{R}$ 60 ○○	KITG$^{R}_{L}$○○○○ T- ○○
				TPGB11 ○○○○ (○)	S ○○□-STWP$^{R}_{L}$11- ○○ (E)
Unified		**UN** **UNC** **UNF** **UNEF** **e.g.) ¾ -16 UNF**	External	○○ E$^{R}_{L}$○○○ UN-TF 16E$^{R}_{L}$60 ○○ (-TS)	KTN$^{R}_{L}$○○○○□-○○ KTNS$^{R}_{L}$○○○○□-16
				TT ○○ $^{R}_{L}$60 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32$^{R}_{L}$60 ○○	KTTX$^{R}_{L}$○○○○□-16F, S ○○□-KTTX$^{R}_{L}$16
			Internal	○○ I$^{R}_{L}$○○○ UN-TF ○○ I$^{R}_{L}$60 ○○ (○)(-TS)	SIN$^{R}_{L}$○○○○ S- ○○ (E) CIN$^{R}_{L}$○○○○ S- ○○
				TT ○○ $^{L}_{R}$60 ○○	KITG$^{R}_{L}$○○○○ T- ○○
				TPGB11 ○○○○ (○)	S ○○□ -STWP$^{R}_{L}$11- ○○ (E)
Parallel Pipe		**External: G (PF)** **Internal: G (PF)** **Rp (PS)** **e.g.) G¾ (PF¾)**	External	○○ E$^{R}_{L}$○○○ W 16E$^{R}_{L}$○○○ W-TF 16E$^{R}_{L}$55 ○○	KTN$^{R}_{L}$○○○○□-○○ KTNSR ○○○○□-16
				TT ○○ $^{R}_{L}$55 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32$^{R}_{L}$55 ○○	KTTX$^{R}_{L}$○○○○□-16F, S ○○□-KTTX$^{R}_{L}$16
			Internal	○○ I$^{R}_{L}$○○○ W ○○ I$^{R}_{L}$○○ W-TF ○○ I$^{R}_{L}$55 ○○ (○)	SIN$^{R}_{L}$○○○○ S- ○○ (E) CIN$^{R}_{L}$○○○○ S- ○○
				TT ○○ $^{L}_{R}$55 ○○	KITG$^{R}_{L}$○○○○ T- ○○
Whitworth		**W** **e.g.) W⅜**	External	○○ E$^{R}_{L}$○○ W 16E$^{R}_{L}$○○ W-TF 16E$^{R}_{L}$55 ○○	KTN$^{R}_{L}$○○○○□-○○ KTNS$^{R}_{L}$○○○○□-16
				TT ○○ $^{R}_{L}$55 ○○	KTT$^{R}_{L}$○○○○□-○○
				TTX32$^{R}_{L}$55 ○○	KTTX$^{R}_{L}$○○○○□-16F, S ○○□-KTTX$^{R}_{L}$16
			Internal	○○ I$^{R}_{L}$○○ W ○○ I$^{R}_{L}$○○ W-TF ○○ I$^{R}_{L}$55 ○○ (○)	SIN$^{R}_{L}$○○○○ S- ○○ (E) CIN$^{R}_{L}$○○○○ S- ○○
				TT ○○ $^{L}_{R}$55 ○○	KITG$^{R}_{L}$○○○○ T- ○○
Tapered Pipe		**External: R (PT) (BSPT)** **Internal: Rc (PT) (BSPT)** **e.g.) R½ (PT½)**	External	○○ E$^{R}_{L}$○○○ PT 16E$^{R}_{L}$○○○ PT-TS	KTN$^{R}_{L}$○○○○□-○○ KTNS$^{R}_{L}$○○○○□-16
				TT ○○ $^{R}_{L}$55 ○○ *	KTT$^{R}_{L}$○○○○□-○○
				TTX32$^{R}_{L}$55 ○○ *	KTTX$^{R}_{L}$○○○○□-16F, S ○○□-KTTX$^{R}_{L}$16
			Internal	○○ I$^{R}_{L}$○○○ PT ○○ I$^{R}_{L}$○○○ PT-TF	SIN$^{R}_{L}$○○○○ S- ○○ (E) CIN$^{R}_{L}$○○○○ S- ○○
				TT ○○ $^{L}_{R}$55 ○○ *	KITG$^{R}_{L}$○○○○ T- ○○
American National Pipe		**NPT** **e.g.) ⅜ -18 NPT**	External	○○ E$^{R}_{L}$○○○ NPT	KTN$^{R}_{L}$○○○○□-○○ KTNS$^{R}_{L}$○○○○□-16
			Internal	○○ I$^{R}_{L}$○○○ NPT	SIN$^{R}_{L}$○○○○ S- ○○ CIN$^{R}_{L}$○○○○ S- ○○
Trapezoidal 30°		**Tr** **e.g.) Tr 26×3**	External	○○ E$^{R}_{L}$○○○ Tr	KTN$^{R}_{L}$○○○○□-○○ KTNS$^{R}_{L}$○○○○□-16
			Internal	○○ I$^{R}_{L}$○○○ Tr	SIN$^{R}_{L}$○○○○ S- ○○ CIN$^{R}_{L}$○○○○ S- ○○

* For the case when the thread root's corner-R(rε) can be smaller than the standard.

K

Drilling

K1~K50









Product Lineup K2

MagicDrill DRC type K3~K17

SS-DRC	Cutting Depth: 3×D type	Straight Shank	K7
SS-DRC	Cutting Depth: 5×D type	Straight Shank	K8
SS-DRC	Cutting Depth: 8×D type	Straight Shank	K9
Chamfering attachment	for SS-DRC type		K10
SF-DRC	Cutting Depth: 3×D type	Flanged Shank	K12
SF-DRC	Cutting Depth: 5×D type	Flanged Shank	K13
SF-DRC	Cutting Depth: 8×D type	Flanged Shank	K14



MagicDrill DRX type K18~K36

DRX	Cutting Depth: 2×D type	ø13.5~ø60	K24
DRX	Cutting Depth: 3×D type	ø13.5~ø60	K26
DRX	Cutting Depth: 4×D type	ø13.5~ø60	K28
DRX	Cutting Depth: 5×D type	ø14~ø60	K30

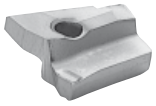
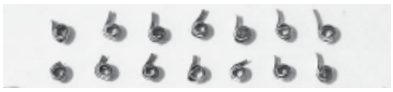
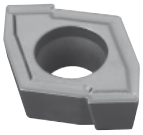
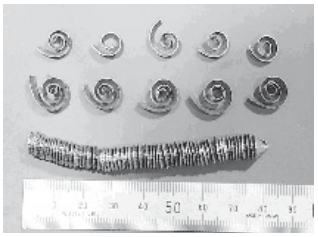
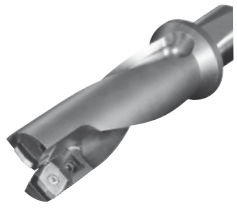
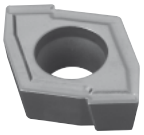
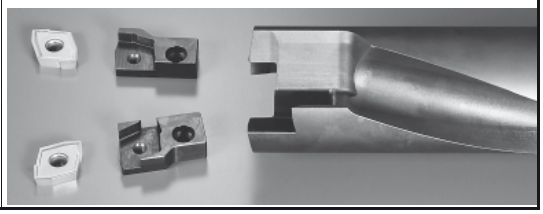


MagicDrill DRS & DRZ Type K37~K49

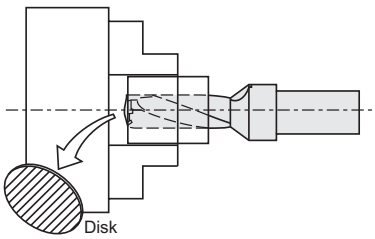
DRS Mini		ø10~ø12.5	K38
DRZ	Cutting Depth: 2×D type	ø13~ø59	K40
DRZ	Cutting Depth: 3×D type	ø13~ø59	K42
DRZ	Cutting Depth: 4×D type	ø13~ø50	K44
DRZ	Cutting Depth: 5×D type	ø27~ø50	K46
DRZ-CR	Cartridge type	ø60~	K47

Trouble Shooting (for DRS, DRX & DRZ) K50

Product Lineup

Type	Shape	Cutting Dia. (Cutting Depth)	Cutting edge	Remarks
DRC [MagicDrill]		ø7.94~ø20.99 (3D / 5D / 8D)	Inner & Outer Edges on One Insert. 	Lineup 
DRX [MagicDrill]	 Silver Coating	ø13.5~ø60 (2D / 3D / 4D) ø14~ø60 (5D)	Inner & Outer Edges on One type of Insert. (4 edges) 	Chip Shape (Workpiece: C50) Cutting Dia. ø24 Chip from outer Edge  Chip from inner Edge 
DRS [MagicDrill Mini]	 Silver Coating	ø10~ø12.5 (3.5D)	Inner & Outer Edges on One Insert. 	Chip Shape (Workpiece: C50) Cutting Dia. ø10  Chip from outer Edge  Chip from inner Edge
DRZ [MagicDrill]		ø13~ø59 (2D, 3D) ø13~ø50 (4D) ø27~ø50 (5D)	Inner & Outer Edges on One type of Insert. (4 edges) 	Chip Shape (Workpiece: C50) Cutting Dia. ø23 Chip from outer Edge Chip from inner Edge 
DRZ-CR [MagicDrill Cartridge]		ø60~ (2D / 3D / 4D)	Inner & Outer Edges on One type of Insert. (4 edges) 	Structure 

◆ 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.

MagicDrill® DRC type

High efficiency drill module Cutting Dia. ø7.94~ø20.99 Cutting Depth 3D / 5D / 8D

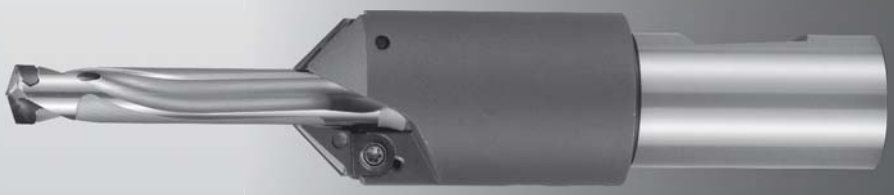
Straight Shank
SS-DRC



Flanged Shank DRC
SF-DRC



SS-DRC
+ Chamfering attachment

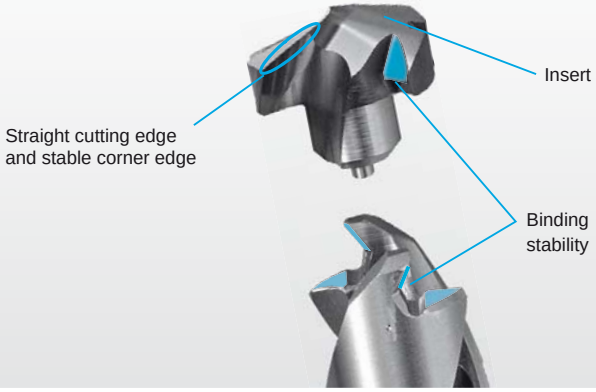


High efficiency | High feed rate | High reliability | High quality

4 unique features of DRC type MagicDrill® improve productivity as well as reduce machining cost by high speed and high feed rate machining.

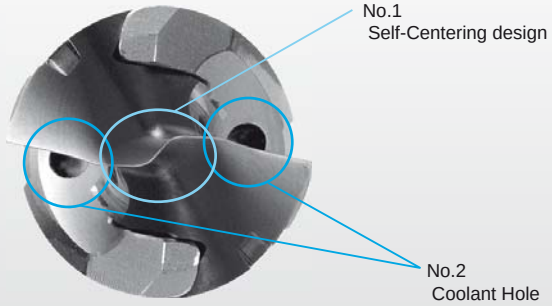
Feature 1. Self-Clamping design

- The clamp rigidity and resistance of the Magic Drills self-clamping method has significantly improved with the new design analysis and material technology.
- Easy replacement is possible on the machine.



Feature 2. Self-Centering design

- The S-curve top shape geometry of the insert known as the “Self-Centering design” enable smooth drilling, lowers cutting forces and produces a high quality hole surface finish.



Feature 3. Multiple Helical Angle Flute design

- Provides surperior drill body stiffness and chip evacuation.

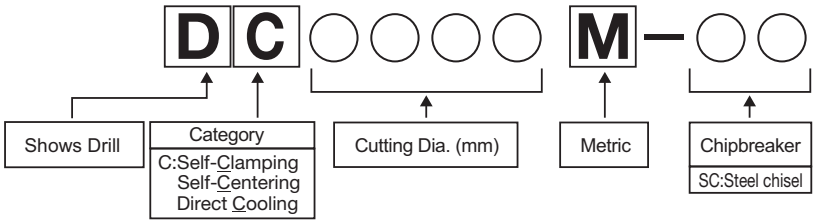


Feature 4. Direct Cooling design

- The coolant is fed directly into the inserts cutting face, cooling the top of the drill and preventing chip adhesion, which allows for quick and smooth chip evacuation.



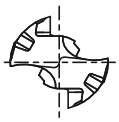
Description Identification System (Inserts)

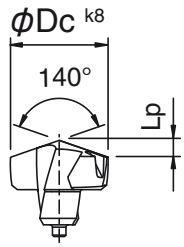


Insert Grades PR0315

PR0315 is tough super micro grain carbide grade with TiAlN coating, with excellent wear resistance and fracture resistance. It enable stable machining of various workpiece such as carbon steel, alloy steel and cast iron.

Insert	Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholder ➡K7~K9, K12~K14
			øDc	Lp	PR0315	
	DC	0794M-SC	7.94	1.44	●	SS10-DRC080M-○ SF12-DRC080M-○
		0800M-SC	8.00	1.46	●	
		0810M-SC	8.10	1.47	●	
		0820M-SC	8.20	1.49	●	
		0830M-SC	8.30	1.51	●	
		0840M-SC	8.40	1.53	●	
	DC	0850M-SC	8.50	1.55	●	SS10-DRC085M-○ SF12-DRC085M-○
		0860M-SC	8.60	1.56	●	
		0870M-SC	8.70	1.58	●	
		0880M-SC	8.80	1.60	●	
		0890M-SC	8.90	1.62	●	
	DC	0900M-SC	9.00	1.64	●	SS10-DRC090M-○ SF12-DRC090M-○
		0910M-SC	9.10	1.66	●	
		0920M-SC	9.20	1.67	●	
		0930M-SC	9.30	1.69	●	
		0940M-SC	9.40	1.71	●	
	DC	0950M-SC	9.50	1.73	●	SS10-DRC095M-○ SF12-DRC095M-○
		0960M-SC	9.60	1.75	●	
		0970M-SC	9.70	1.76	●	
		0980M-SC	9.80	1.78	●	
		0990M-SC	9.90	1.80	●	
	DC	1000M-SC	10.00	1.82	●	SS12-DRC100M-○ SF16-DRC100M-○
		1010M-SC	10.10	1.84	●	
		1020M-SC	10.20	1.86	●	
		1030M-SC	10.30	1.87	●	
		1040M-SC	10.40	1.89	●	
	DC	1050M-SC	10.50	1.91	●	SS12-DRC105M-○ SF16-DRC105M-○
		1060M-SC	10.60	1.93	●	
		1070M-SC	10.70	1.95	●	
		1080M-SC	10.80	1.96	●	
		1090M-SC	10.90	1.98	●	
	DC	1100M-SC	11.00	2.00	●	SS12-DRC110M-○ SF16-DRC110M-○
		1110M-SC	11.10	2.02	●	
		1120M-SC	11.20	2.04	●	
		1130M-SC	11.30	2.06	●	
		1140M-SC	11.40	2.07	●	
	DC	1150M-SC	11.50	2.09	●	SS12-DRC115M-○ SF16-DRC115M-○
		1160M-SC	11.60	2.11	●	
		1170M-SC	11.70	2.13	●	
		1180M-SC	11.80	2.15	●	
		1190M-SC	11.90	2.16	●	
	DC	1200M-SC	12.00	2.18	●	SS14-DRC120M-○ SF16-DRC120M-○
		1210M-SC	12.10	2.20	●	
		1220M-SC	12.20	2.22	●	
		1230M-SC	12.30	2.24	●	
		1240M-SC	12.40	2.26	●	





k8 tolerance

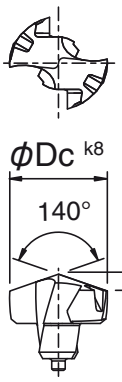
øDc	k8(mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 20.99	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the cutting diameter.

DC Inserts are sold in 1 piece boxes

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Insert	Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholder ➡K7~K9, K12~K14
			øDc	Lp	PR0315	
	DC	1250M-SC	12.50	2.27	●	SS14-DRC125M-○ SF16-DRC125M-○
		1260M-SC	12.60	2.29	●	
		1270M-SC	12.70	2.31	●	
		1280M-SC	12.80	2.33	●	
		1290M-SC	12.90	2.35	●	
	DC	1300M-SC	13.00	2.36	●	SS14-DRC130M-○ SF16-DRC130M-○
		1310M-SC	13.10	2.38	●	
		1320M-SC	13.20	2.40	●	
		1330M-SC	13.30	2.42	●	
		1340M-SC	13.40	2.44	●	
	DC	1350M-SC	13.50	2.46	●	SS14-DRC135M-○ SF16-DRC135M-○
		1360M-SC	13.60	2.47	●	
		1370M-SC	13.70	2.49	●	
		1380M-SC	13.80	2.51	●	
		1390M-SC	13.90	2.53	●	
	DC	1400M-SC	14.00	2.55	●	SS16-DRC140M-○ SF16-DRC140M-○
		1410M-SC	14.10	2.56	●	
		1420M-SC	14.20	2.58	●	
		1430M-SC	14.30	2.60	●	
		1440M-SC	14.40	2.62	●	
	DC	1450M-SC	14.50	2.64	●	SS16-DRC145M-○ SF16-DRC145M-○
		1460M-SC	14.60	2.66	●	
		1470M-SC	14.70	2.67	●	
		1480M-SC	14.80	2.69	●	
		1490M-SC	14.90	2.71	●	
	DC	1500M-SC	15.00	2.73	●	SS16-DRC150M-○ SF20-DRC150M-○
		1510M-SC	15.10	2.75	●	
		1520M-SC	15.20	2.76	●	
		1530M-SC	15.30	2.78	●	
		1540M-SC	15.40	2.80	●	
		1550M-SC	15.50	2.82	●	
		1560M-SC	15.60	2.84	●	
		1570M-SC	15.70	2.86	●	
		1580M-SC	15.80	2.87	●	
	DC	1600M-SC	16.00	2.91	●	SS18-DRC160M-○ SF20-DRC160M-○
		1610M-SC	16.10	2.93	●	
		1620M-SC	16.20	2.95	●	
		1630M-SC	16.30	2.96	●	
		1640M-SC	16.40	2.98	●	
		1650M-SC	16.50	3.00	●	
		1660M-SC	16.60	3.02	●	
		1670M-SC	16.70	3.04	●	
		1680M-SC	16.80	3.06	●	
		1690M-SC	16.90	3.07	●	
	DC	1700M-SC	17.00	3.09	●	SS18-DRC170M-○ SF20-DRC170M-○
		1710M-SC	17.10	3.11	●	
		1720M-SC	17.20	3.13	●	
		1730M-SC	17.30	3.15	●	
		1740M-SC	17.40	3.16	●	
		1750M-SC	17.50	3.18	●	
		1760M-SC	17.60	3.20	●	
		1770M-SC	17.70	3.22	●	
		1780M-SC	17.80	3.24	●	
		1790M-SC	17.90	3.26	●	
	DC	1800M-SC	18.00	3.27	●	SS20-DRC180M-○ SF25-DRC180M-○
		1810M-SC	18.10	3.29	●	
		1820M-SC	18.20	3.31	●	
		1830M-SC	18.30	3.33	●	
		1840M-SC	18.40	3.35	●	
		1850M-SC	18.50	3.36	●	
		1860M-SC	18.60	3.38	●	
		1870M-SC	18.70	3.40	●	
		1880M-SC	18.80	3.42	●	
		1890M-SC	18.90	3.44	●	



k8 tolerance

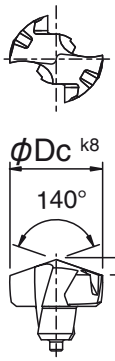
øDc	k8(mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 20.99	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the cutting diameter.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DC Inserts are sold in 1 piece boxes

MagicDrill® Insert for DRC

Insert		Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholder
				øDc	Lp	PR0315	K7~K9, K12~K14
		DC	1900M-SC	19.00	3.46	●	SS20-DRC190M-○ SF25-DRC190M-○
			1910M-SC	19.10	3.47	●	
			1920M-SC	19.20	3.49	●	
			1930M-SC	19.30	3.51	●	
			1940M-SC	19.40	3.53	●	
			1950M-SC	19.50	3.55	●	
			1960M-SC	19.60	3.56	●	
			1970M-SC	19.70	3.58	●	
			1980M-SC	19.80	3.60	●	
			1990M-SC	19.90	3.62	●	
		DC	2000M-SC	20.00	3.64	●	SS25-DRC200M-○ SF25-DRC200M-○
			2010M-SC	20.10	3.66	●	
			2020M-SC	20.20	3.67	●	
			2030M-SC	20.30	3.69	●	
			2040M-SC	20.40	3.71	●	
			2050M-SC	20.50	3.73	●	
			2060M-SC	20.60	3.75	●	
			2070M-SC	20.70	3.77	●	
			2080M-SC	20.80	3.78	●	
			2090M-SC	20.90	3.80	●	
			2099M-SC	20.99	3.82	●	

k8 tolerance

øDc	k8(mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 20.99	+0.033 0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the cutting diameter.

Recommended Cutting Conditions

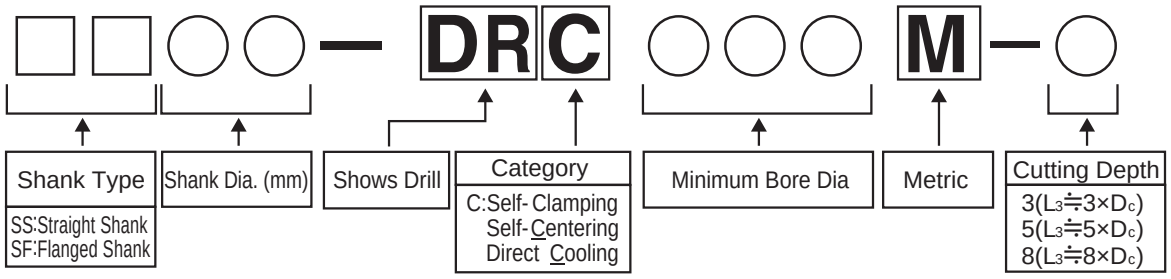
Workpiece Material	Hardness (HB)	Cutting Conditions: Cutting Speed Vc (m/min)	Spindle Revolution n (min-1) / f (mm/rev)	Cutting Dia øDc (mm): ø8	ø10	ø12	ø14	ø16	ø18	ø20	Remarks
Low Carbon Steel	125	120 - 180	n (min-1)	4,780 - 7,170	3,820 - 5,730	3,180 - 4,780	2,730 - 4,090	2,390 - 3,580	2,120 - 3,180	1,910 - 2,870	Coolant
			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	
Carbon Steel	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	
			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	
	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	
			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	
	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	
			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	
Alloy Steel	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	
			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	
	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	
			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	
	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	
			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	
	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	
			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	
Stainless Steel	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	
			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	
	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	
			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	
Gray Cast Iron	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	
			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	
	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	
			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	
Nodular Cast Iron	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	
			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	
	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	
			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	

• Internal coolant is recommended. In case of external coolant, cutting depth must be 3xD or less.
• The longer drilling depth gets (3D→5D→8D), the lower of recommended feed rate should be set for f.

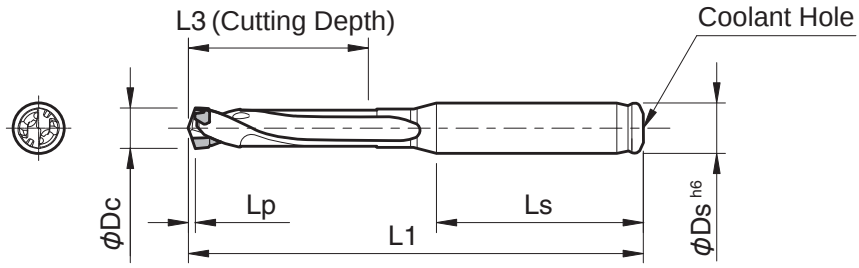
DC Inserts are sold in 1 piece boxes

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Description Identification System (Toolholder)



SS-DRC (Cutting Depth: 3×D)



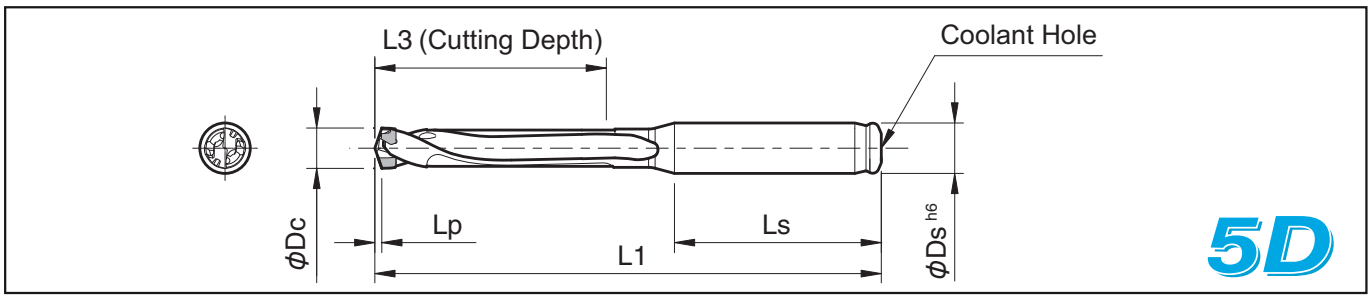
• For Lp indicates distance from drill point to corner edge, see ➡ K4~K6

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts	Applicable Inserts ➡K4~K6	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. øDc		øDs (h6)	L1	L3	Ls	Wrench ➡ K9		Holder	Insert
			min.	max.								
SS10-	DRC080M-3	●	7.94	8.49	10	79	25.5	40	WDRC8 (WDRC17)	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	WDRC10 (WDRC17)	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		WDRC12 (WDRC17)	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	WDRC14 (WDRC17)	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	49	WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-3	●	18.00	18.99	20	133	57.0	51		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	57		DC2000M-SC~DC2099M-SC	-	-

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SS-DRC (Cutting Depth: 5×D)



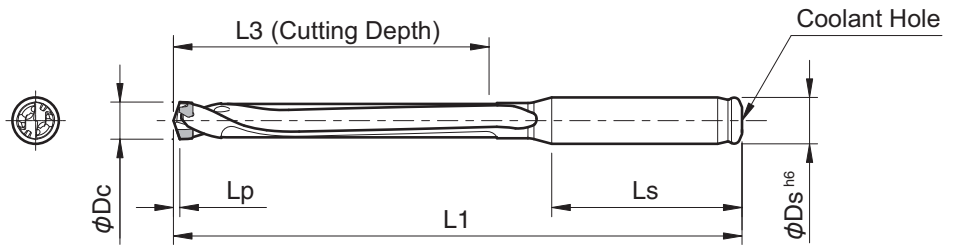
• For Lp indicates distance from drill point to corner edge, see K4~K6

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts	Applicable Inserts K4~K6	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. øDc		øDs (h6)	L1	L3	Ls	Wrench K9		Holder	Insert
			min.	max.								
SS10-	DRC080M-5	●	7.94	8.49	10	97	42.5	40	WDRC8 (WDRC17)	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	WDRC10 (WDRC17)	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		WDRC12 (WDRC17)	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	WDRC14 (WDRC17)	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	49	WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-5	●	18.00	18.99	20	173	95.0	51		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	57		DC2000M-SC~DC2099M-SC	-	-

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SS-DRC (Cutting Depth: 8×D)

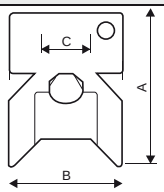
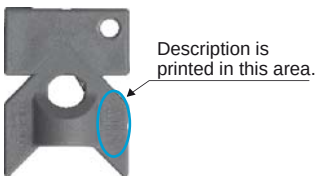
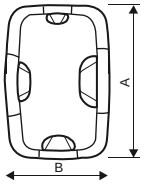


• For Lp indicates distance from drill point to corner edge, see K4~K6

Toolholder Dimensions

Description		Std.	Dimension (mm)						Spare Parts	Applicable Inserts K4~K6	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. øDc		øDs (h6)	L1	L3	Ls	Wrench K9		Holder	Insert
			min.	max.								
SS10-	DRC080M-8	●	7.94	8.49	10	122.5	68	40	WDRC8 (WDRC17)	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	WDRC10 (WDRC17)	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		WDRC12 (WDRC17)	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	WDRC14 (WDRC17)	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	49	WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-8	●	18.00	18.99	20	230.0	152	51		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	57		DC2000M-SC~DC2099M-SC	-	-

Wrench

Shape		Description	Dimension (mm)			Remarks
			A	B	C	
		WDRC8	43	33	ø10.2	 Description is printed in this area.
		WDRC10			ø12.2	
		WDRC12			ø14.2	
		WDRC14			ø17.2	
		WDRC17	77	52	-	• WDRC17(Multiple type wrench) has four insert entry points. If using an insert ranging from DC1700M-SC to DC2099-SC, use the entry point printed as “ø17.00~ø20.99”. • WDRC17 can be used instead of WDRC8~14 wrench.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

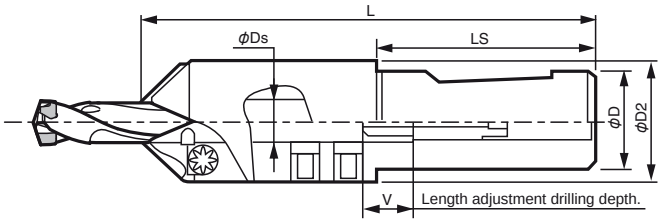
Chamfering attachment

● Drilling and chamfering simultaneously

By using the chamfering attachment, the SS-DRC type can perform drilling and chamfering in parallel.



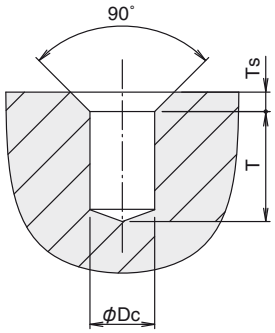
● Toolholder



Description	Std.	Applicable Drill Dia. øDs	Dimension (mm)					Applicable Inserts
			øD	øD2	L	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 type.
It cannot be used for Flanged Shank SF-DRC type.

● Drilling and chamfering depths

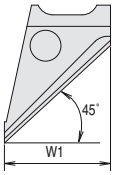


Cutting Dia. (mm)		Drilling depth (mm)						Chamfering dimension (mm)		Applicable Toolholders
øDc		T (3D Drill)		T (5D Drill)		T (8D Drill)		Ts		
min	max	min	max	min	max	min	max	Ts 100	Ts max	
ø7.94	ø8.49	11	19	21	37	47	63	2.5	5.0	**S20-CH10**
ø8.50	ø8.99	12	21	24	40	51	67			
ø9.00	ø9.49	12	23	27	43	56	72			
ø9.50	ø9.99	13	25	31	47	61	77			
ø10.00	ø10.49	13	26	28	49	60	81	3.5	7.0	**S32-CH12**
ø10.50	ø10.99	14	28	31	52	64	85			
ø11.00	ø11.49	14	30	34	55	69	90			
ø11.50	ø11.99	15	32	37	58	73	94			
ø12.00	ø12.49	15	30	41	56	79	94	4.0	8.0	**S32-CH14**
ø12.50	ø12.99	17	32	44	59	83	96			
ø13.00	ø13.49	19	34	47	62	88	103			
ø13.50	ø13.99	21	36	51	66	93	108			
ø14.00	ø14.49	19	37	50	68	94	112	4.0	8.0	**S32-CH16**
ø14.50	ø14.99	21	39	53	71	98	116			
ø15.00	ø15.99	25	43	59	77	107	125			
ø16.00	ø16.99	30	44	66	80	117	131	4.0	8.0	**S32-CH18**
ø17.00	ø17.99	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)

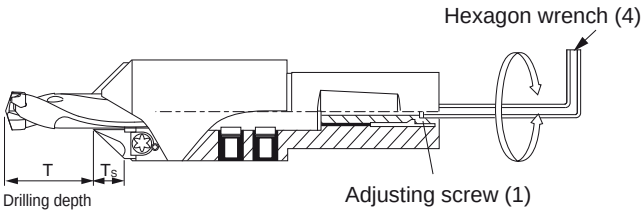
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable chamfering Insert

Insert			Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholders
				W1	T	PR0315	
			**CT08T2-45A**	8	2.83	●	**S20-CH10**
			CT12T3-45A	12	3.98	●	**S32-CH12 ~ S32-CH18**

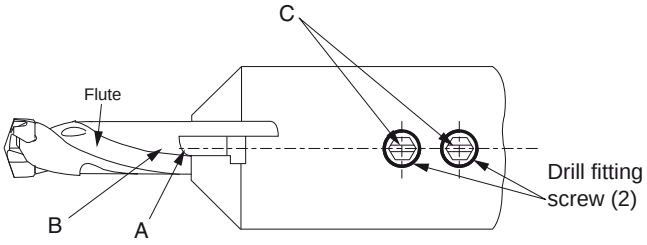
Method to use DRC chamfering attachment

Ⅰ. Drilling depth adjustment



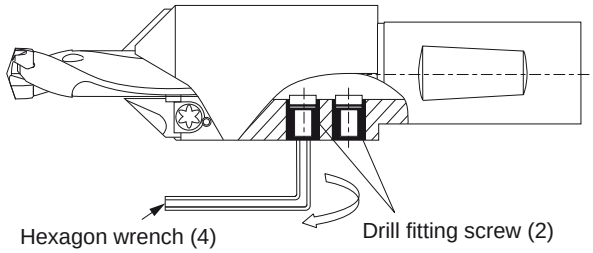
Insert drill into chamfering attachment.
Next, temporarily attach the chamfering insert A.
Turn the adjustment screw (1) with the hexagon wrench (4) to set the drilling depth T.

Ⅱ. Drill location check



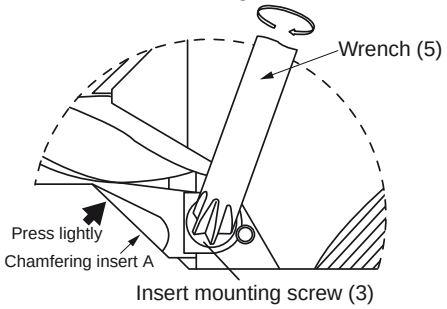
Rotate the drill so that the lower end of the chamfering insert A is aligned with the body clearance B of the drill.
Set it so that slot C and the drill fitting screws (2) are lined up as shown in the figure above.

Ⅲ. Fix the drill



Tighten the drill fitting screws (2) with the hexagon wrench (4).
(In the case of using a torque wrench, then please refer to the table below)

Ⅳ. Installation of the chamfering insert



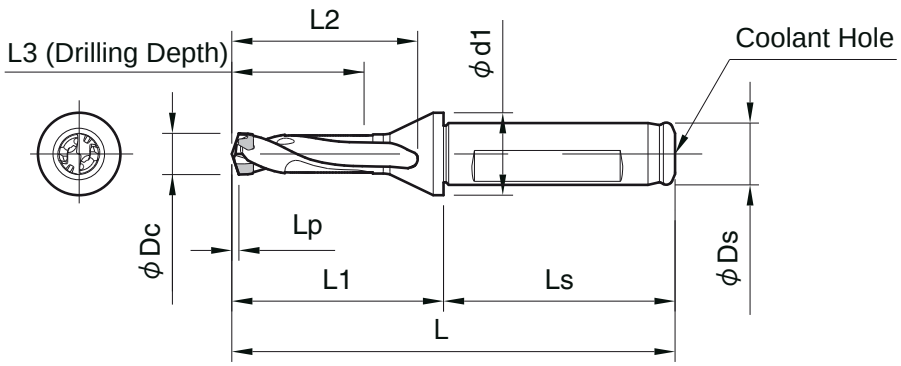
Press the chamfering insert A lightly into the drill and tighten the insert mounting screw (3) with wrench (5).

Chamfering attachment	Tightening Torque [Nm]	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		DT-15
S32-CH14	20	AJ-10×46	FS-14		LW-4	
S32-CH16	30		FS-16			
S32-CH18	45		FS-18		LW-5	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes

SF-DRC (Cutting Depth: 3XD)



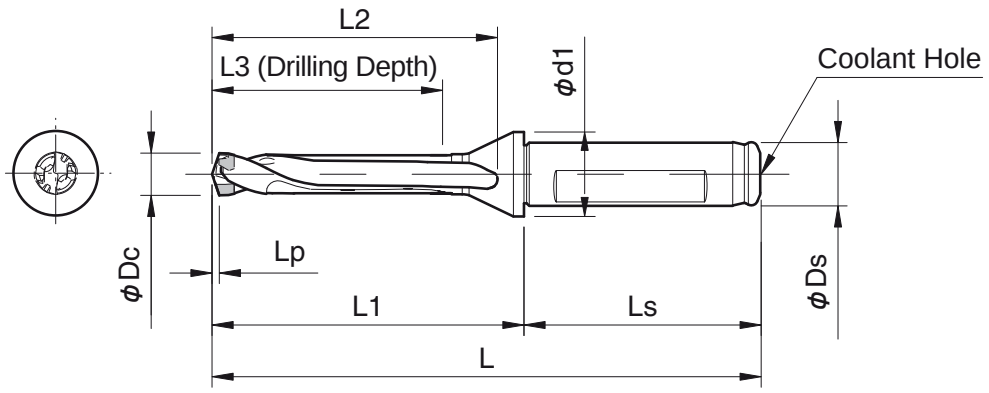
• For Lp indicates distance from drill point to corner edge, see K4~K6

Toolholder Dimensions

Description		Std.	Dimension (mm)									Spare Parts	Applicable Inserts
			Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1	Wrench	
			min.	max.								K9	K4~K6
SF12-	DRC080M-3	●	7.94	8.49	12	86	41	35	26	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-3	●	8.50	8.99		88	43	37	27	45			DC0850M-SC~DC0890M-SC
	DRC090M-3	●	9.00	9.49		90	45	39	29	45			DC0900M-SC~DC0940M-SC
	DRC095M-3	●	9.50	9.99		92	47	41	30	45			DC0950M-SC~DC0990M-SC
SF16-	DRC100M-3	●	10.00	10.49	16	97	49	43	32	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-3	●	10.50	10.99		99	51	45	33	48			DC1050M-SC~DC1090M-SC
	DRC110M-3	●	11.00	11.49		101	53	47	35	48			DC1100M-SC~DC1140M-SC
	DRC115M-3	●	11.50	11.99		103	55	49	36	48			DC1150M-SC~DC1190M-SC
	DRC120M-3	●	12.00	12.49		106	58	52	38	48		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-3	●	12.50	12.99		108	60	54	39	48			DC1250M-SC~DC1290M-SC
	DRC130M-3	●	13.00	13.49		110	62	56	41	48			DC1300M-SC~DC1340M-SC
	DRC135M-3	●	13.50	13.99		112	64	58	42	48			DC1350M-SC~DC1390M-SC
	DRC140M-3	●	14.00	14.49		114	66	60	44	48		WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-3	●	14.50	14.99		116	68	62	45	48			DC1450M-SC~DC1490M-SC
SF20-	DRC150M-3	●	15.00	15.99	20	122	72	66	48	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-3	●	16.00	16.99		126	76	70	51	50			DC1600M-SC~DC1690M-SC
	DRC170M-3	●	17.00	17.99		131	81	75	54	50		WDRC17	DC1700M-SC~DC1790M-SC
SF25-	DRC180M-3	●	18.00	18.99	25	141	85	79	57	56	32		DC1800M-SC~DC1890M-SC
	DRC190M-3	●	19.00	19.99		145	89	83	60	56			DC1900M-SC~DC1990M-SC
	DRC200M-3	●	20.00	20.99		149	93	87	63	56			DC2000M-SC~DC2099M-SC

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SF-DRC (Cutting Depth: 5XD)



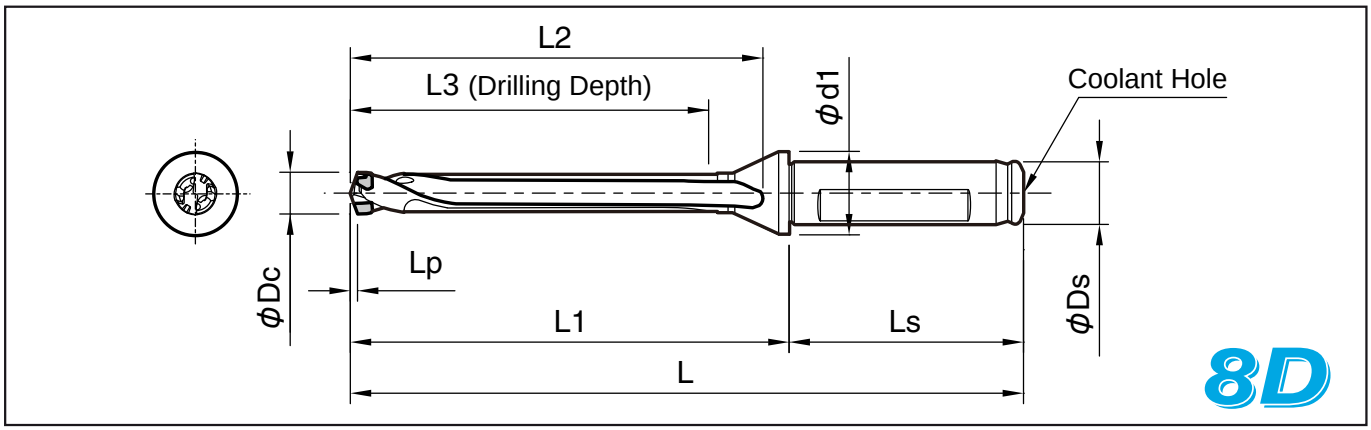
• For Lp indicates distance from drill point to corner edge, see K4~K6

Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1	Wrench	
			min.	max.								K9	K4~K6
SF12-	DRC080M-5	●	7.94	8.49	12	104	59	53	43	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-5	●	8.50	8.99		107	62	56	45	45			DC0850M-SC~DC0890M-SC
	DRC090M-5	●	9.00	9.49		110	65	59	48	45			DC0900M-SC~DC0940M-SC
	DRC095M-5	●	9.50	9.99		114	69	63	50	45			DC0950M-SC~DC0990M-SC
SF16-	DRC100M-5	●	10.00	10.49	16	120	72	66	53	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-5	●	10.50	10.99		123	75	69	55	48			DC1050M-SC~DC1090M-SC
	DRC110M-5	●	11.00	11.49		126	78	72	58	48			DC1100M-SC~DC1140M-SC
	DRC115M-5	●	11.50	11.99		129	81	75	60	48			DC1150M-SC~DC1190M-SC
	DRC120M-5	●	12.00	12.49		132	84	78	63	48		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-5	●	12.50	12.99		135	87	81	65	48			DC1250M-SC~DC1290M-SC
	DRC130M-5	●	13.00	13.49		138	90	84	68	48			DC1300M-SC~DC1340M-SC
	DRC135M-5	●	13.50	13.99		142	94	88	70	48			DC1350M-SC~DC1390M-SC
	DRC140M-5	●	14.00	14.49		145	97	91	73	48		WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-5	●	14.50	14.99		148	100	94	75	48			DC1450M-SC~DC1490M-SC
SF20-	DRC150M-5	●	15.00	15.99	20	156	106	100	80	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-5	●	16.00	16.99		162	112	106	85	50			DC1600M-SC~DC1690M-SC
	DRC170M-5	●	17.00	17.99		169	119	113	90	50		WDRC17	DC1700M-SC~DC1790M-SC
SF25-	DRC180M-5	●	18.00	18.99	25	181	125	119	95	56	32		DC1800M-SC~DC1890M-SC
	DRC190M-5	●	19.00	19.99		187	131	125	100	56			DC1900M-SC~DC1990M-SC
	DRC200M-5	●	20.00	20.99		193	137	131	105	56			DC2000M-SC~DC2099M-SC

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SF-DRC (Cutting Depth: 8XD)



• For Lp indicates distance from drill point to corner edge, see K4~K6

Toolholder Dimensions

Description		Std.	Dimension (mm)								Spare Parts	Applicable Inserts
			Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1	Wrench	
			min.	max.								K9	K4~K6
SF12-	DRC080M-8	●	7.94	8.49	12	129	84	79	68	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-8	●	8.50	8.99		134	89	83	72	45			DC0850M-SC~DC0890M-SC
	DRC090M-8	●	9.00	9.49		138	93	88	76	45			DC0900M-SC~DC0940M-SC
	DRC095M-8	●	9.50	9.99		144	99	93	80	45			DC0950M-SC~DC0990M-SC
SF16-	DRC100M-8	●	10.00	10.49	16	151	103	97	84	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-8	●	10.50	10.99		156	108	102	88	48			DC1050M-SC~DC1090M-SC
	DRC110M-8	●	11.00	11.49		160	112	107	92	48			DC1100M-SC~DC1140M-SC
	DRC115M-8	●	11.50	11.99		165	117	111	96	48			DC1150M-SC~DC1190M-SC
	DRC120M-8	●	12.00	12.49		169	121	116	100	48		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-8	●	12.50	12.99		174	126	120	104	48			DC1250M-SC~DC1290M-SC
	DRC130M-8	●	13.00	13.49		178	130	124	108	48			DC1300M-SC~DC1340M-SC
	DRC135M-8	●	13.50	13.99		184	136	130	112	48			DC1350M-SC~DC1390M-SC
	DRC140M-8	●	14.00	14.49		188	140	134	116	48		WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-8	●	14.50	14.99		193	145	139	120	48			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	50			DC1600M-SC~DC1690M-SC
	DRC170M-8	●	17.00	17.99		223	173	167	144	50		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	56			DC1900M-SC~DC1990M-SC
	DRC200M-8	●	20.00	20.99		256	200	194	168	56			DC2000M-SC~DC2099M-SC

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Method to change DRC type MagicDrill inserts

How to attach inserts



① Fix drill holder on arbor. For insert exchange, fix arbor on the machine of set on toolpresetter.
② Remove dust using air blow.



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.



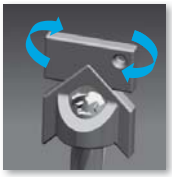
⑥ Make sure the wrench is aligned with the wrench slots on the insert.



(Improper alignment shown)



Slot for wrench



⑦ Turn the wrench in a slow counterclockwise direction.
⑧ Completed.

How to detach inserts



① Remove dust from insert using air blower.
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.

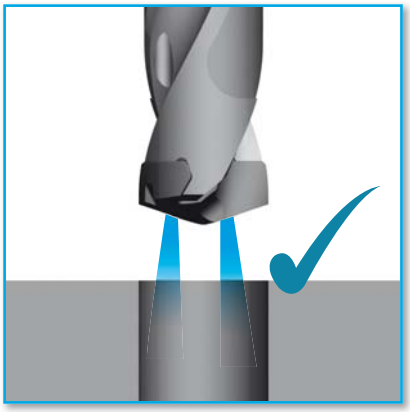


⑤ Once lock is released, insert can be turned by fingers.
(Use gloves to protect your hand from any danger.)

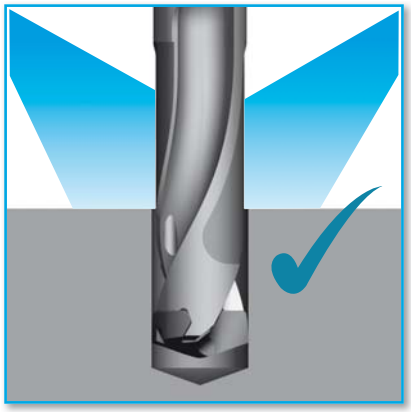


⑥ Remove insert.
(Use gloves to protect your hand from any danger.)

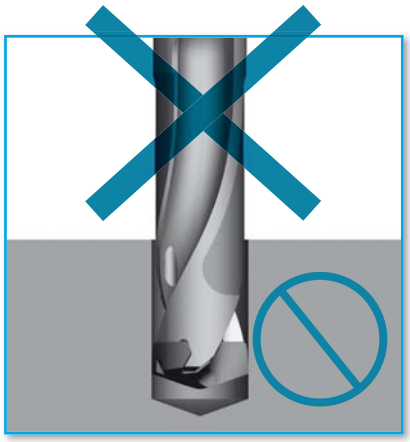
Coolant



① Internal coolant is recommended.



② In case of external coolant
Cutting depth must be 3xD or less.

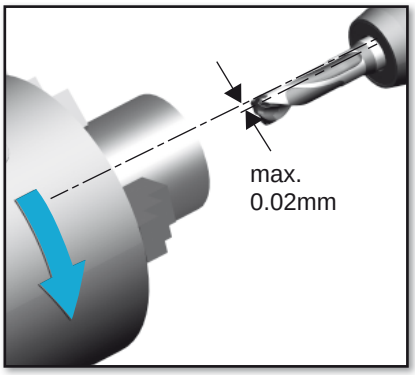


③ Dry cutting is not recommended.

Precautions for use

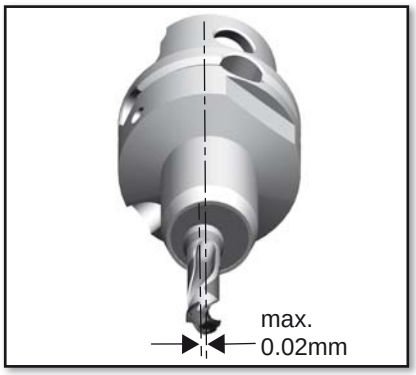
Core Deviation

1) If drill is stationary



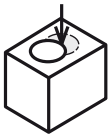
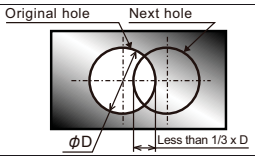
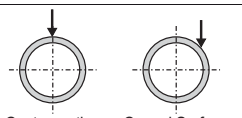
This is usable for boaring sleeve (screw clamp) and colletchuck, please be sure to set deviation amount under 0.02mm between workpiece and drill.

2) If drill is rotating



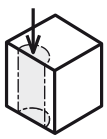
Make sure to use arbor that is not deformed.
Center of arbor deviation must be within 0.02mm.

Applicable workpiece

Application	Workpiece Shape	Caution for machining
Flat Surface		1. Due to good chip control, step machining is not necessary for soft steel like SS400. 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 they do not slip while machining.
Hole Expansion		1. If the overlap amount is less than 1/3 x D, machining is possible. 
Concave Surface		1. When machining concave holes, set the feed rates at half or less of 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

Application	Workpiece Shape
Slanted Surface	

Application	Workpiece Shape
Half Cylindrical	

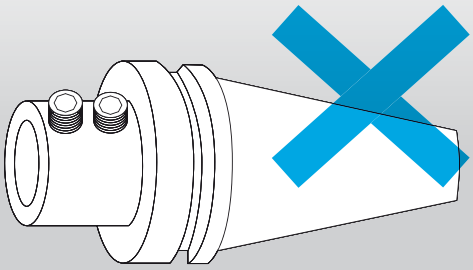
Application	Workpiece Shape
Cored Hole	

Cautions for installation on Machining Center

- For installation of DRC type MagicDrill, use Hydro Chuck, Power Chuck, Collet Chuck, etc.
  For side lock arbor, tool life is shortened due to drilling center deviation. Hole shape failure may occur.

Hydro Chuck
Collet Chuck
Power Chuck

Install MagicDrill to above chuck.

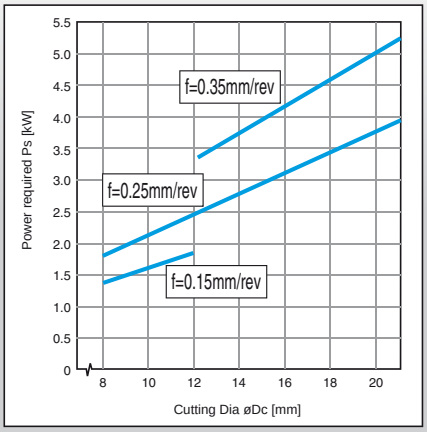


Example of side lock arbor

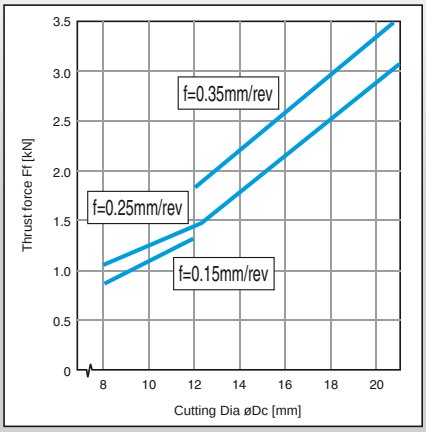
Reference charts

<Cutting Conditions>: Workpiece Heat treated steel (Hardness 240HB), Vc=80m/min, Wet

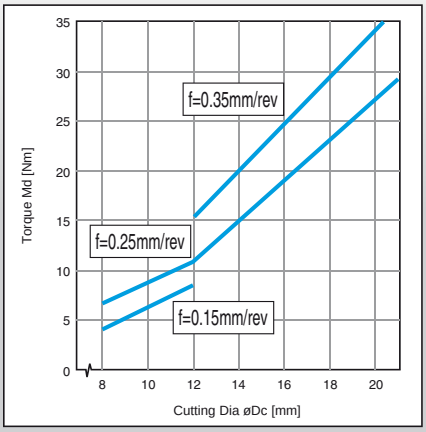
- Power required



- Thrust force



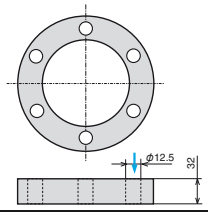
- Torque



Case Studies

C50 (S50C)

- Flange
- Vc=97m/min (n=2,490min-1)
- H=32mm
- f=0.3mm/rev (Vf=747mm/min)
- Wet (Internal Coolant)
- DC1250M-SC (PR0315)



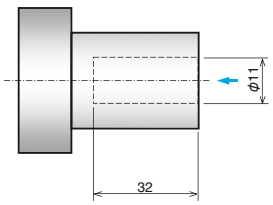
SS14-DRC120M-3	3,000holes/insert
Competitor A	1,800holes/drill

Compared to competitor's drill A, MagicDrill DRC type has reduced burr and reduced more than 10% of the power required. Tool life has also improved greatly.

(Evaluation by the user)

42CrMo4 (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	2,400holes/insert
Competitor B	2,000holes/drill

Compared to competitor's solid drill B, MagicDrill DRC type 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.

(Evaluation by the user)

Q&A

Q-1 Is re-grinding available?

A-1 We don't recommended it. Grinding of edge nose chisel is not possible.

Q-2 How large would the cutting hole be to the insert diameter (øDc)?

A-2 The machining hole with SCM 435, comparing to the insert diameter (øDc), will be about +0.020~+0.040mm larger.

DRX provides you stable and efficient drilling

New Technology: Twisted Coolant Holes

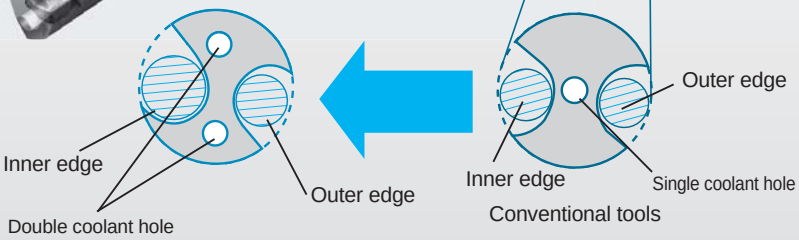
Twisted Coolant Hole technology design provides

Superior Chip Evacuation



The flute space of internal cutting edge side providing increased chip evacuation.

The coolant performance is 1.25 times



The special alloy provides tool holder rigidity and increased reliability.

Chip breaker design with new concept: The three chipbreaskers are now coming

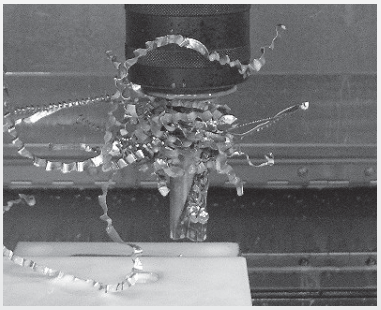
- Covers a variety of workpiece materials
- Sticky chip troubles of stainless steel or low carbon steel workpiece are solved.



GM Chipbreaker
Carbon Steel,Cast Iron General Purpose

GH Chipbreaker
for hard materials Edge strengthened type

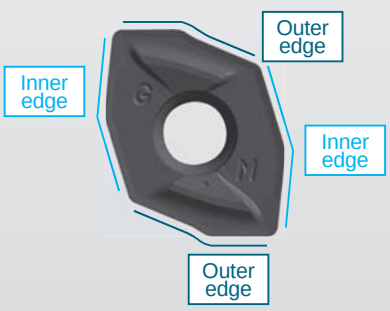
SM Chipbreaker
Stainless Steel, Low Carbon Steel Sharp cutting for deeper drilling

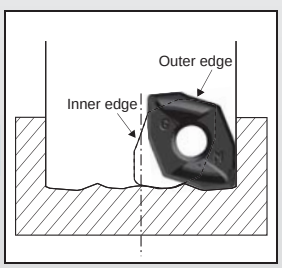


Long entangled chips (competitor A)

- Economical 4 edge type

2 inner pocket cutting edges and 2 outer pocket cutting edges





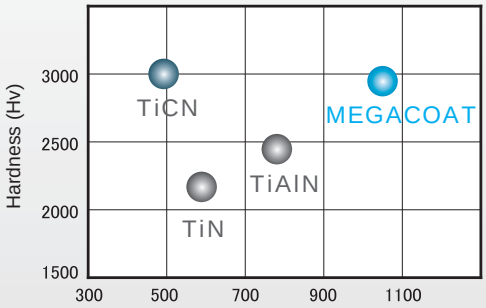
positioning of outer edge and inner edge



Chips by SM chipbreaker (SUS304)

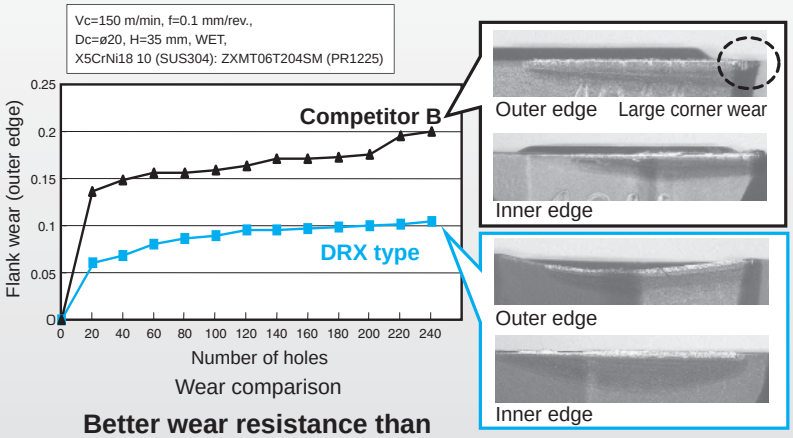
MEGACOAT

New Insert Grade: The three grades are coming
(PR1230: for Steel, PR1225: for Stainless Steel / Low Carbon Steel, PR1210: for Cast Iron)



MEGACOAT's High oxidation resistance

MEGACOAT is adopted to enable Longer Tool Life

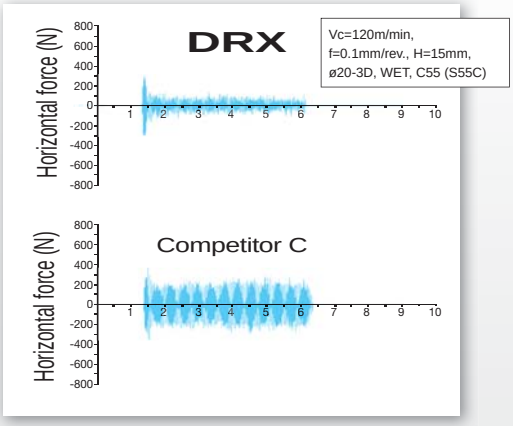


Wear comparison

Better wear resistance than competitor B Achieving long Tool Life

High Precision: Balanced System

Vibration comparison

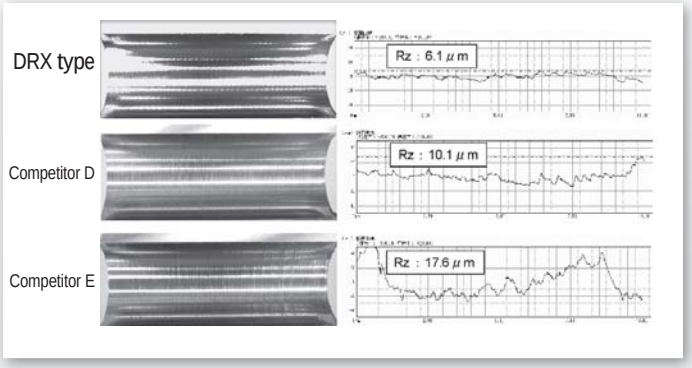


Less vibration due to well balanced at Drilling

Better finishing surface

Finished surface comparison

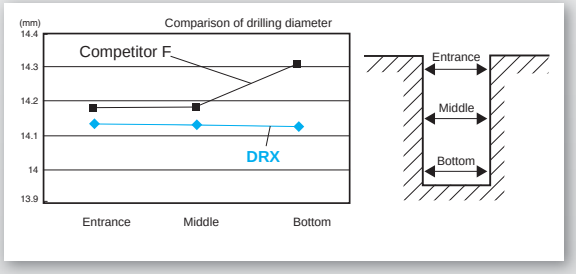
Vc=180m/min, f=0.15mm/rev., H=60mm (through hole), ø20-3D, WET, C45 (S45C), NC Lathe



Better finished surface than Competiror D and E

Possible to extend tool life of next process

Variation of drilling diameter



Vc=180m/min, f=0.08mm/rev., H=56mm (blind hole), ø14-4D, WET, C50

Comparing to competitor F, its excellent chip evacuation performance provides a maintained good balance and less variation in cutting dia. Drastically improved straight machining capability

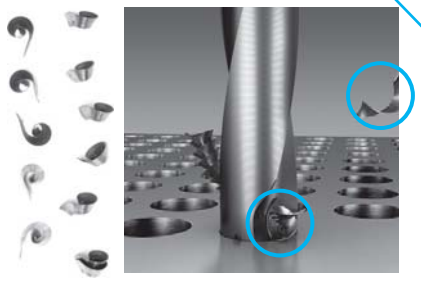
K

Drilling

Covers a variety of workpiece materials with new chipbreaker

New chipbreaker features

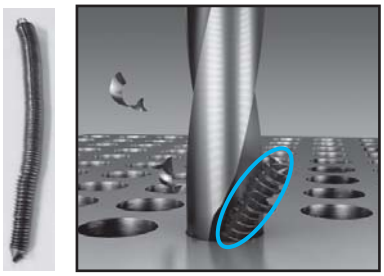
◆Wider chipbreaker (outer edge)



small chips for better evacuation



◆Flat chipbreaker (inner edge)



ideal continuous chips

◆Sigmoid cutting edge (outer edge)

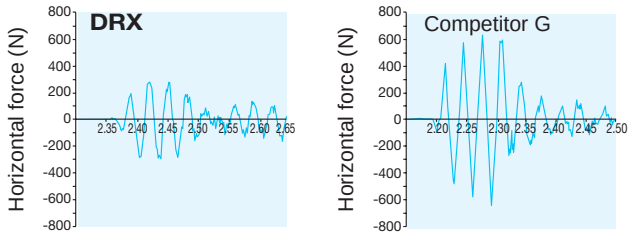


sigmoid outer cutting edge

↓

sharp cutting

Vc=120m/min, f=0.1mm/rev., H=15mm, ø20-3D, WET, C55 (S55C)



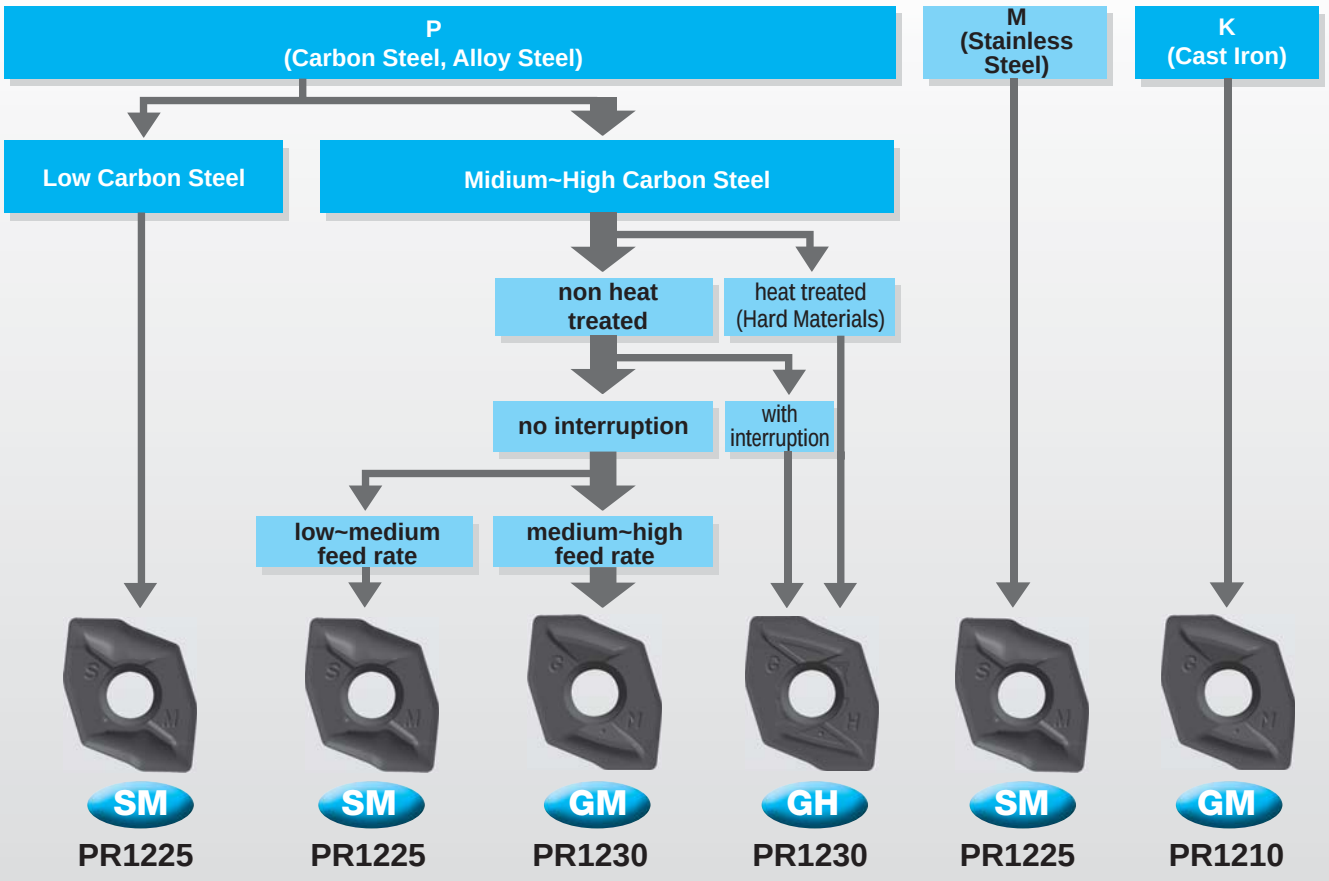
Cutting force comparison of outer edge at the start of drilling

Lowered impact force at the start

↓

Reduce sudden breakage at the start

Chipbreaker selection

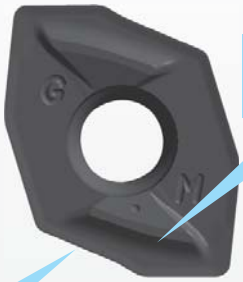


design developed through comprehensive technology

● 3 chipbreakers to cover various materials

◆ GM Chipbreaker…General Cutting

For Steel: PR1230 | For Cast Iron: PR1210



① Wider chipbreaker can cover variety of materials

② Achieved good balance of cutting edge strength and sharp cutting

for general cutting

Optimized cutting edge strength, sharpness and chip control

◆ GH Chipbreaker…Tough Edge

For hard materials, interrupted machining: PR1230



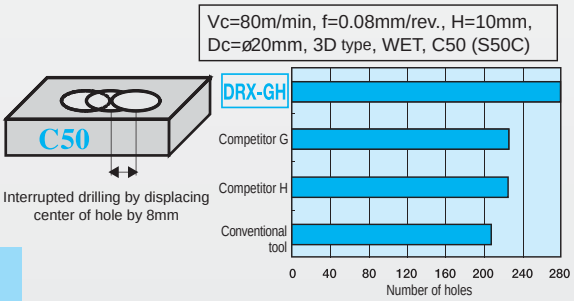
1st recommended chipbreaker for hard materials interrupted operation

Cutting edge strength oriented design of Chipbreaker

① Wider chipbreaker control breakage by pressed chips

② Cutting edge strength oriented design

• Chipping resistance comparison



Better chipping resistance than competitors

◆ SM Chipbreaker…Sharp Cutting, for Deeper Drilling

For Stainless Steel, Low Carbon Steel: PR1225



For deep drilling of difficult to control chips materials such as stainless steel and low carbon steel

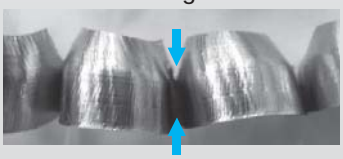
Sharp cutting by large rake angle
Stable chip control by newly designed chipbreaker and U-shaped cutting edge

② Sharp cutting by large rake angle

① U-shaped cutting edge
Breaks chips by growing cracks from both ends



Outstanding chip control achieved by splitting chips from the enter edges

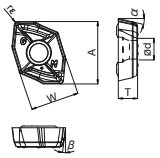
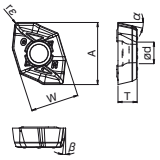
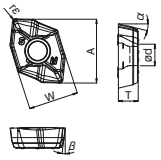


Chip breaking system of SM chipbreaker (Outer edge)



Applicable Insert
(for DRX type)

Classification of usage							Ref. Page for Toolholder
●: 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	Ref. Page for Toolholder
			A	T	ød	W	rε	α	β	PR1230	PR1225	PR1210	GW15	
		ZXMT 040203GM	6.2	2.60	2.4	5.1	0.3	13˚	10˚	●		●		
		05T203GM	7.3	2.74	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			●		●		
		ZXMT 040203GH	6.2	2.60	2.4	5.1	0.3	13˚	10˚	●				K24
		05T203GH	7.3	2.74	2.5	5.5	0.3		7˚	●				K25
		06T204GH	8.6	2.89	2.8	6.4	0.4			●				K26
		070305GH	10.2	3.24	3.0	8.0	0.5			●				K27
		09T306GH	12.2	4.03	3.6	9.6	0.6			●				K28
		11T306GH	14.5	4.06	4.6	11.6	0.6			●				K29
		140408GH	18.0	4.88	5.7	14.4	0.8			●				K30
		170608GH	22.1	6.58	6.8	17.7	0.8			●				
		ZXMT 040203SM	6.2	2.60	2.4	5.1	0.3	13˚	10˚		●		●	
		05T203SM	7.3	2.74	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				●		●	

Suitable Chipbreaker (ZXMT)

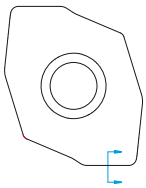
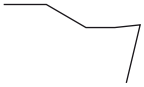
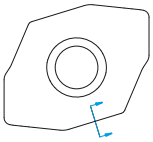
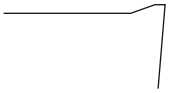
Workpiece Material	Insert	ZXMT type											
	Chipbreaker	GM				GH				SM			
	Cutting Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D
Low Carbon Steel		☆	☆	☆	☆					★	★	★	★
Carbon Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Alloy Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Mold Steel		☆	☆	☆	☆	★	★	★	★				
Stainless Steel										★	★	★	★
Cast Iron		★	★	★	★								
Non-ferrous Metals										★	★	★	★
Brass										★	★	★	★
Titanium Alloy										★	★	★	★

★ : 1st. Recommendation ☆: 2nd. Recommendation

Inserts are sold in 10 piece boxes

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

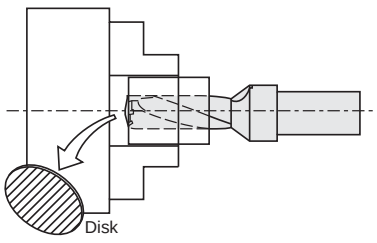
Advantages of the Chipbreaker

Chipbreaker			GM	GH	SM
Insert					
Advantages			1st. recommendation for carbon steel and alloy steel,1st. recommendation for cast iron.	1st. recommendation for interrupted machining 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 machining, GM Chipbreaker alternative	Sharp cutting, prevents chattering. For low to medium feed rates of steel.
Outer edge	 Wide chipbreaker	Cross-section			
		Chips from Outer edge			
Inner edge	 Flat chipbreaker	Cross-section			
		Chips from Inner edge			
Workpiece Materials			**C50 (S50C)**	**C50 (S50C)**	**X5CrNi18 10 (SUS304)**

Indication of tool life of MagicDrill

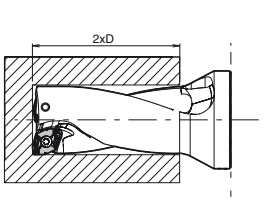
How to judge tool life	Indication of judging tool life
Generation status of tool mark involving with insert wearness	• When an insert is new, A holder is slightly bend external side during cutting. (It is designed that cutting diameter is slightly bigger during cutting.) Once cutting is finished, a holder will be back to normal size and smaller than cutting diameter. Tool mark will not be appeared on the finishing surface. (Although depends on workpiece and cutting condition, cutting power which generates external direction, slightly tool mark might be appeared.) • When an insert is at the end of tool life, Gradually external corner part is getting wear, cutting resistance which is generated in inside, a holder will be not bend, on the contrary it will be bend inside. Once cutting is finished, a holder will be back to normal. Pulling off a holder under this condition, external edge touches on finishing surface and tool mark will be on its finishing surface.
Tracing cutting diameter	When cutting diameter is measured, suddenly it shows small diameter. In this case, an insert can be judged the end of tool life.
Generating status of at the exit side	If insert wear progress. Burrs of penetrated hole entrance (Pulling out burrs) will be bigger and identified as the insert has reached at the end of tool life.
Variation of cutting noise	Light cutting noise at the beginning turns to brady noise which contains vibration noise.
Variation of vibration	As the end of tool life is getting closer, vibration is getting larger and cutting noise is getting change. However, same as vibration and cutting noise, it is difficult to identify for small cutting diameter type.

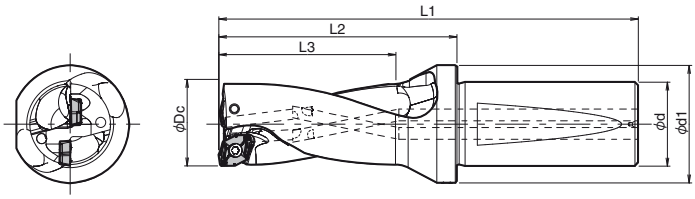
◆ Caution



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.

DRX (Cutting Depth: 2×D)





2D

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts K22
S20 -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	35	+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	42	+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		45	+0.8			
-DRX310M-2-09	●		31	144	85	62			+0.6			

- When offset machining, reduce feed rate to 0.08mm/rev. or less.
- See **K33** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page **K32**
For troubleshooting, see page **K31**

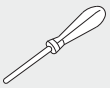
- Cutting tolerance (2D type)

Dc	Cutting tolerance (mm)
ø13.5~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 / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw 	Spare Parts: Wrench 	Applicable Inserts ➔ K22
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	55	+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		55	+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		60	+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		60	+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		65	+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 machining, reduce feed rate to 0.08mm/rev. or less.
• See **K33** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ➔ **K32**
For troubleshooting, see page ➔ **K31**

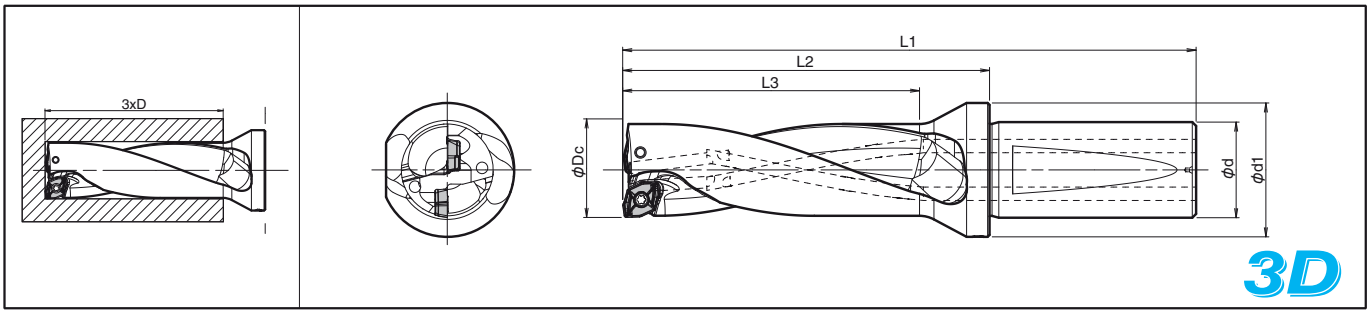
• Cutting tolerance (2D type)

Dc	Cutting tolerance (mm)
ø13.5~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 / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRX (Cutting Depth: 3×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts → K22
S20 -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	71	48			+0.7			
-DRX165M-3-05	●		16.5	127	73	49.5			+0.5			
-DRX170M-3-05	●		17	129	74	51			+0.4			
-DRX175M-3-05	●		17.5	130	76	52.5			+0.3			
-DRX180M-3-05	●		18	132	77	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	86	66	25	35	+1.2	SB-2570TR	DTM-8	ZXMT070305○○
-DRX225M-3-07	●		22.5	142	88	67.5			+1.0			
-DRX230M-3-07	●		23	144	89	69			+0.9			
-DRX235M-3-07	●		23.5	145	91	70.5			+0.8			
-DRX240M-3-07	●		24	147	92	72			+0.7			
-DRX245M-3-07	●		24.5	148	94	73.5			+0.5			
-DRX250M-3-07	●		25	150	95	75			+0.4			
-DRX255M-3-07	●		25.5	151	97	76.5			+0.3			
-DRX260M-3-07	●		26	153	98	78			+0.2			
S32 -DRX265M-3-09	●	2	26.5	161	102	79.5	32	42	+1.7	SB-3080TR	DTM-10	ZXMT09T306○○
-DRX270M-3-09	●		27	163	103	81			+1.6			
-DRX275M-3-09	●		27.5	164	105	82.5			+1.5			
-DRX280M-3-09	●		28	166	106	84			+1.3			
-DRX285M-3-09	●		28.5	167	108	85.5			+1.2			
-DRX290M-3-09	●		29	169	109	87			+1.1			
-DRX295M-3-09	●		29.5	170	111	88.5		45	+1.1			
-DRX300M-3-09	●		30	172	112	90			+0.8			
-DRX305M-3-09	●		30.5	173	114	91.5			+0.7			
-DRX310M-3-09	●		31	175	115	93			+0.6			
-DRX315M-3-09	●		31.5	176	117	94.5			+0.5			
S40 -DRX320M-3-11	●	2	32	201	132	96	40	55	+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 machining, reduce feed rate to 0.08mm/rev. or less.
• See **K33** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page **K32**
For troubleshooting, see page **K31**

• Cutting tolerance (3D type)

Dc	Cutting tolerance (mm)
ø13.5~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 / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K22
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench	
S40 -DRX390M-3-14	●		39	218	149	117			+2.8			
-DRX400M-3-14	●		40	221	152	120		55	+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		60	+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		60	+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		65	+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 machining, reduce feed rate to 0.08mm/rev. or less.
• See **K33** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ➡ **K32**
For troubleshooting, see page ➡ **K31**

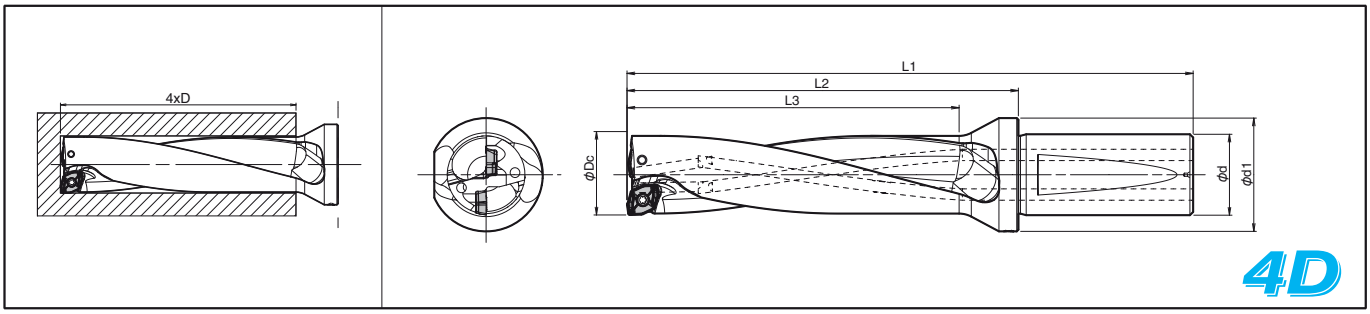
• Cutting tolerance (3D type)

Dc	Cutting tolerance (mm)
ø13.5~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 / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRX (Cutting Depth: 4×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ K22
S20 -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	87	64			+0.7			
-DRX165M-4-05	●		16.5	144	90	66			+0.5			
-DRX170M-4-05	●		17	146	91	68			+0.4			
-DRX175M-4-05	●		17.5	148	94	70			+0.3			
-DRX180M-4-05	●		18	150	95	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	108	88	25	35	+1.2	SB-2570TR	DTM-8	ZXMT070305○○
-DRX225M-4-07	●		22.5	165	111	90			+1.0			
-DRX230M-4-07	●		23	167	112	92			+0.9			
-DRX235M-4-07	●		23.5	169	115	94			+0.8			
-DRX240M-4-07	●		24	171	116	96			+0.7			
-DRX245M-4-07	●		24.5	173	119	98			+0.5			
-DRX250M-4-07	●		25	175	120	100			+0.4			
-DRX255M-4-07	●		25.5	177	123	102			+0.3			
-DRX260M-4-07	●		26	179	124	104			+0.2			
S32 -DRX270M-4-09	●	2	27	190	130	108	32	42	+1.6	SB-3080TR	DTM-10	ZXMT09T306○○
-DRX280M-4-09	●		28	194	134	112			+1.3			
-DRX290M-4-09	●		29	198	138	116			+1.1			
-DRX300M-4-09	●		30	202	142	120		45	+0.8			
-DRX310M-4-09	●		31	206	146	124			+0.6			
S40 -DRX320M-4-11	●	2	32	223	154	128	40	50	+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 machining, reduce feed rate to 0.08mm/rev. or less.
- See **K33** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ➔ **K32**
For troubleshooting, see page ➔ **K31**

- Cutting tolerance (4D type)

Dc	Cutting tolerance (mm)
ø13.5~ø26	+0.25 -0.10
ø27~ø38	+0.30 -0.15
ø39~ø60	+0.35 -0.20

* Figures above are numeric guidelines.
It may vary depending on machines / work materials / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K22
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench	
S40 -DRX390M-4-14	●	2	39	257	188	156	40	55	+2.8	SB-5090TR	DT-20	ZXMT140408 ○○
-DRX400M-4-14	●		40	261	192	160			+2.5			
-DRX410M-4-14	●		41	265	196	164			+2.3			
-DRX420M-4-14	●		42	269	200	168			+2.0			
-DRX430M-4-14	●		43	273	204	172		60	+1.8			
-DRX440M-4-14	●		44	277	208	176			+1.5			
-DRX450M-4-14	●		45	281	212	180			+1.3			
-DRX460M-4-14	●		46	285	216	184			+1.0			
-DRX470M-4-14	●		47	289	220	188			+0.8			
S50 -DRX480M-4-17	●	2	48	290	221	192	50	60	+3.8	SB-60120TR	DT-25	ZXMT170608 ○○
-DRX490M-4-17	●		49	294	225	196			+3.5			
-DRX500M-4-17	●		50	298	229	200			+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	●		54	314	245	216		65	+2.3			
-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			+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 machining, reduce feed rate to 0.08mm/rev. or less.
• See **K33** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ➡ **K32**
For troubleshooting, see page ➡ **K31**

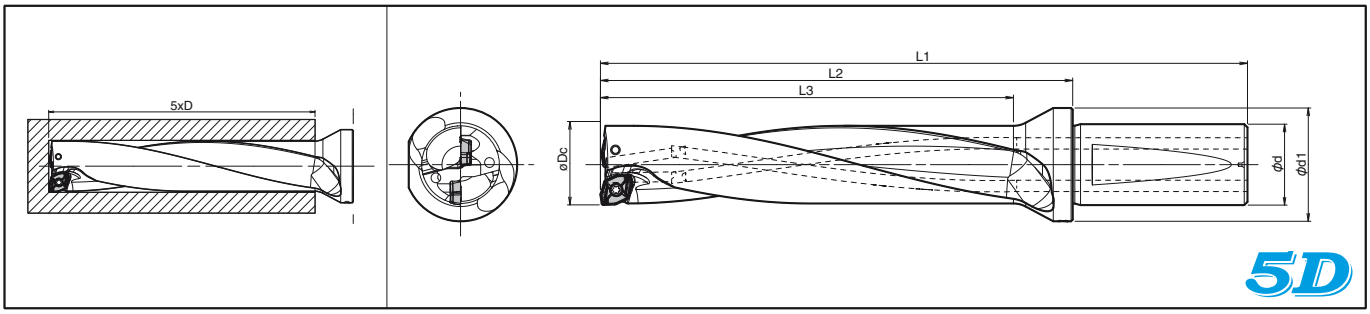
• Cutting tolerance (4D type)

Dc	Cutting tolerance (mm)
ø13.5~ø26	+0.25 -0.10
ø27~ø38	+0.30 -0.15
ø39~ø60	+0.35 -0.20

* Figures above are numeric guidelines.
It may vary depending on machines / work materials / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRX (Cutting Depth: 5×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔K22
S20 -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	103	80			+0.7			
-DRX170M-5-05	●	2	17	163	108	85	25	32	+0.4	SB-2045TR	DTM-6	ZXMT05T203○○
-DRX180M-5-05	●		18	168	113	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	130	110			+1.2			
-DRX230M-5-07	●		23	190	135	115			+0.9			
-DRX240M-5-07	●	2	24	195	140	120	25	32	+0.7	SB-2570TR	DTM-8	ZXMT070305○○
-DRX250M-5-07	●		25	200	145	125			+0.4			
-DRX260M-5-07	●		26	205	150	130			+0.2			
S32 -DRX270M-5-09	●		27	217	157	135			+1.6			
-DRX280M-5-09	●		28	222	162	140		42	+1.3			
-DRX290M-5-09	●	2	29	227	167	145	32		+1.1	SB-3080TR	DTM-10	ZXMT09T306○○
-DRX300M-5-09	●		30	232	172	150		45	+0.8			
-DRX310M-5-09	●		31	237	177	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		50	+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	40		+2.8			
-DRX400M-5-14	●		40	301	232	200		55	+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			+1.8	SB-5090TR	DT-20	ZXMT140408○○
-DRX440M-5-14	●		44	321	252	220			+1.5			
-DRX450M-5-14	●		45	326	257	225		60	+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		60	+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		65	+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 machining, reduce feed rate to 0.08mm/rev. or less.
• See **K33** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ➔ **K32**
For troubleshooting, see page ➔ **K31**

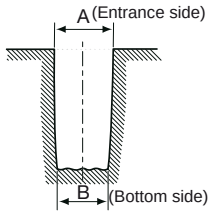
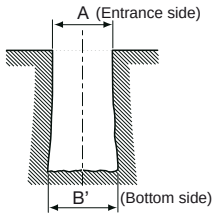
• Cutting tolerance (5D type)

Dc	Cutting tolerance (mm)	Dc	Cutting tolerance (mm)	Dc	Cutting tolerance (mm)
ø14~ø26	+0.30 -0.10	ø27~ø38	+0.35 -0.15	ø39~ø60	+0.40 -0.20

* Figures on the left are numeric guidelines. It may vary depending on machines / work materials / clamp status / cutting conditions.

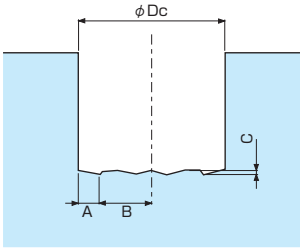
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Troubleshooting (DRX type)

Trouble condition	Condition		Cause	Countermeasures
Hole diameter becomes smaller (at hole bottom)		There is no problem for entrance, 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 ➡ **K32** for "Recommended Cutting Conditions"
Hole diameter becomes larger (at hole bottom)		There is no problem for entrance, 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 ➡ **K32** for "Recommended Cutting Conditions" ・Check the core height See page ➡ **K34~35**
Hole diameter is small (from the hole entrance)		Hole diameter is small from entrance. (At turning moment)	Inappropriate adjustment of hole diameter.	In case of using lathe machine, use X-axis and adjustment hole diameter. See page ➡ **K34**
			Core up for internal edge. (No core remains)	Adjust the core height. See page ➡ **K34~K35**

MagicDrill (DRX type) Hole Bottom Shape (mm)

øDc	A	B	C	øDc	A	B	C	øDc	A	B	C
13.5	2	4.8	0.5	24.5	3.2	9.1	0.8	39.0	5.8	13.7	1.5
14.0		5.0		25.0		9.3	0.9	40.0		14.2	
14.5		5.3		25.5		9.6		41.0		14.7	
15.0		5.5		26.0		9.8		42.0		15.2	
15.5		5.8	0.6	26.5	3.9	9.4	1.0	43.0		15.7	
16.0		6.0		27.0		9.6		44.0		16.2	
16.5		6.3		27.5		9.9		45.0		16.7	
17.0		6.5		28.0		10.1		46.0		17.2	
17.5		6.8		28.5		10.4		47.0		17.7	1.6
18.0		7.0	0.7	29.0		10.6		48.0	7.1	16.9	1.7
18.5	2.4	6.9	0.7	29.5		10.9		49.0		17.4	
19.0		7.1		30.0		11.1	1.1	50.0		17.9	
19.5		7.4		30.5		11.4		51.0		18.4	
20.0		7.6		31.0		11.6		52.0		18.9	
20.5		7.9		31.5		11.9	1.2	53.0		19.4	
21.0		8.1	0.8	32.0	4.7	11.3	1.1	54.0		19.9	
21.5		8.4		33.0		11.8		55.0		20.4	1.8
22.0	3.2	7.8	0.8	34.0		12.3		56.0		20.9	
22.5		8.1		35.0		12.8		57.0		21.4	1.9
23.0		8.3		36.0		13.3	1.2	58.0		21.9	2.0
23.5		8.6		37.0		13.8	1.3	59.0		22.4	
24.0		8.8		38.0		14.3		60.0		22.9	2.1



Common for 2XD, 3XD, 4XD, 5XD type

* Figures above are numeric guidelines. (Varies within ±0.1mm depending on work materials and cutting conditions)

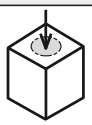
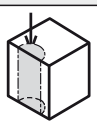
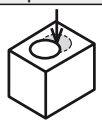
DRX type Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grade (Cutting Speed : m/min) MEGACOAT PR1230 GM GH	MEGACOAT PR1225 SM	MEGACOAT PR1210 GM	Carbide GW15 SM	Cutting Dia. øDc (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			ø13.5~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
					ø16~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
					ø19~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
					ø27~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			ø13.5~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
					ø16~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
					ø19~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
					ø27~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			ø13.5~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
					ø16~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
					ø19~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
					ø27~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
Die Steel	★ 80-150	☆ 80-150			ø13.5~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
					ø16~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
					ø19~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
					ø27~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	☆ 70-140	★ 70-140			ø13.5~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
					ø16~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
					ø19~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
					ø27~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		ø13.5~ø15	0.08~0.14	~	~	0.06~0.12	~	~	0.04~0.10	~	~
					ø16~ø18	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
					ø19~ø26	0.08~0.20	~	~	0.08~0.18	~	~	0.06~0.14	~	~
					ø27~ø60	0.08~0.20	~	~	0.08~0.18	~	~	0.06~0.14	~	~
Nodular Cast Iron			★ 80-120		ø13.5~ø15	0.08~0.12	~	~	0.06~0.10	~	~	0.04~0.08	~	~
					ø16~ø18	0.08~0.16	~	~	0.08~0.14	~	~	0.06~0.10	~	~
					ø19~ø26	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
					ø27~ø60	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
Non-ferrous Metals				★ 200-600	ø13.5~ø15	~	~	0.06~0.12	~	~	0.05~0.10	~	~	0.04~0.08
					ø16~ø18	~	~	0.08~0.14	~	~	0.06~0.12	~	~	0.05~0.10
					ø19~ø26	~	~	0.08~0.16	~	~	0.06~0.14	~	~	0.05~0.12
					ø27~ø60	~	~	0.08~0.20	~	~	0.08~0.16	~	~	0.07~0.14
Titanium Alloy				★ 40-70	ø13.5~ø15	~	~	0.05~0.08	~	~	0.04~0.07	~	~	0.04~0.06
					ø16~ø18	~	~	0.05~0.08	~	~	0.04~0.07	~	~	0.04~0.06
					ø19~ø26	~	~	0.06~0.10	~	~	0.06~0.08	~	~	0.05~0.07
					ø27~ø60	~	~	0.06~0.10	~	~	0.06~0.08	~	~	0.05~0.07

• Apply a sufficent amount of coolant.

★ : 1st. Recommendation ☆ : 2nd. Recommendation

Cutting Conditions by Application

Applications		Flat Surface	Slanted Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates
Workpiece Shape								
DRX type	Cutting Speed (m/min)	120	120	120	120	120	120	Not Available
	Feed Rate (mm/rev)	0.1	0.05	0.05	0.05	Concave part 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 machining pre-drilled surface

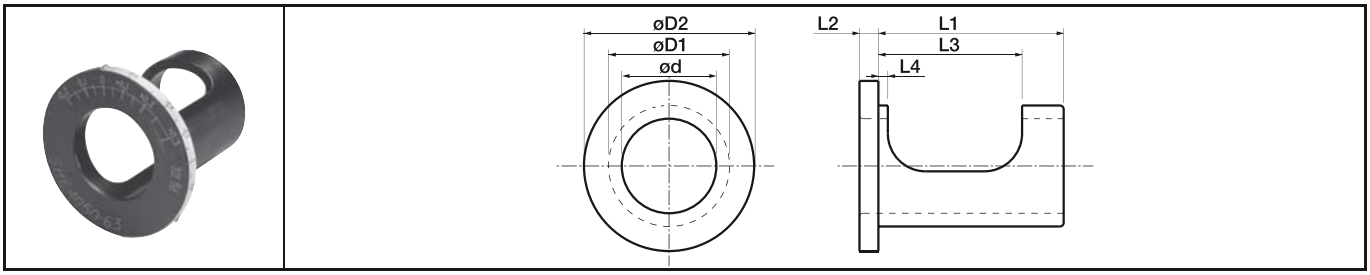
Drill type	2D~3D	4D	5D
Cutting width (Torus-shaped part)	1/10XD or less	less than corner radius	Not Recommended

◆ Max. Depth for Machining with Outer Coolant

When machining with outer coolant, Max. depth should be 1.5 times of the cutting diameter.

Adjustable Sleeve [DRX type / DRZ type for cutting dia. / center height adjustment]

SHE



Sleeve Dimensions

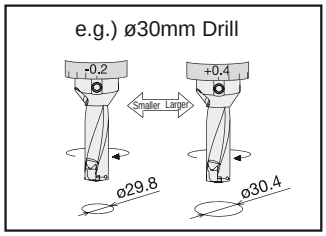
Description	Std.	Dimension (mm)							* Cutting Dia. Adjustable Range	Center Height Adjustable Range
		ød	øD1	øD2	L1	L2	L3	L4		
SHE 2025-43	●	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
2532-48	●	25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
3240-53	●	32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
4050-63	●	40	50	74	63	6	49	3.0	+0.6~-0.2	+0.2~-0.2

• Diameter Adjustment Range adjusts the cutting diameter.
• SHE type is for MagicDrill **DRX / DRZ**. It is not suitable for MagicDrill **DRS** type, because large correction amount is required.

● : Std. Stock
○ : Check Availability

1. Diameter Adjustment ~For Machining Center~

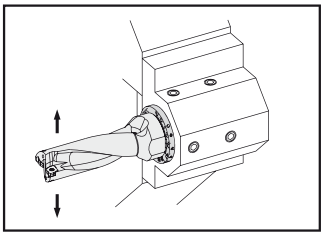
e.g.) ø30mm Drill



● Diameter Adjustment Range (mm)

Shank Dia.	Adjustment Range
ø20	+0.4~-0.2
ø25	
ø32	
ø40	+0.6~-0.2

2. Center Height Adjustment ~Relief trouble by height adjustment at lathes~



● Center Height Adjustment Range (mm)

Shank Dia.	Adjustment Range
ø20	+0.2~-0.15
ø25	
ø32	
ø40	+0.3~-0.2

◆ 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 center of the coolant plug of the drill. (Fig.1)
② When making the hole diameter bigger, 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 tignten 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)

Caution:
• Not applicable for Collet Chuck-type arbor
• Scale on the sleeve is the reference value.
Check the actual cutting diameter after adjusting.

DRX type

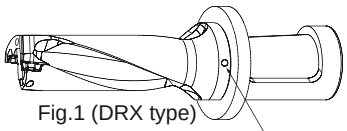


Fig.1 (DRX type)

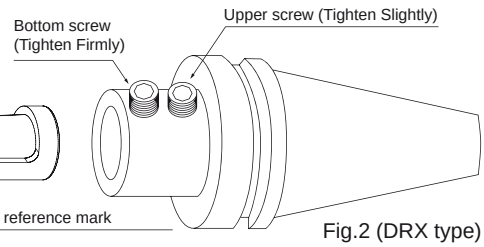


Fig.2 (DRX type)

DRZ type

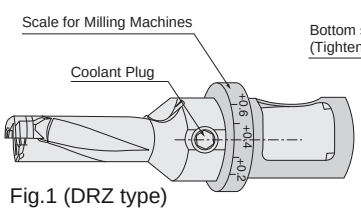


Fig.1 (DRZ type)

(Example of Adjusting the Hole Dia. +0.4mm)

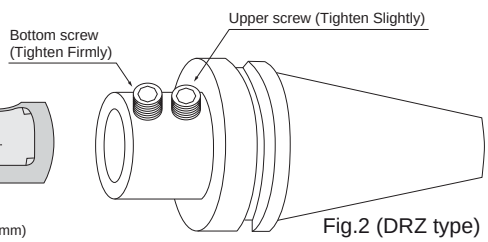


Fig.2 (DRZ type)

2. Center-Height Adjustment for Lathes

Most Lathe problem occur with Center Height Deviation.
The Center Height is appropriate if a core approximatately 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 ◆ Core diameter is more than 1mm

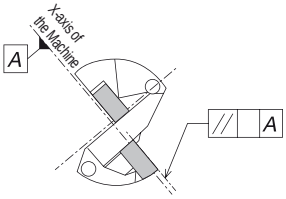


Fig.4

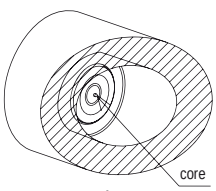


Fig.3

① Align the drill with the outer insert face parallel to the X-axis of the tool turret. (Fig.4)
② Align the scale (for the lathe) on the flange face of the sleeve to the center of the drill coolant plug.
③ When no core remains, rotate the sleeve to (+) direction to make the core larger, and when the core diameter is more than 1mm, 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 at the flange periphery and rotate the sleeve.
⑤ After Completing the adjustment, tighten the drill directly through the window on the sleeve.

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.
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 180° reverse position)
In the case of the lathe with two turrets, when installing the drill to the lower turret, the outer insert should be set so as to face the operator.
(It is also possible to use it by setting at 180° reverse position)

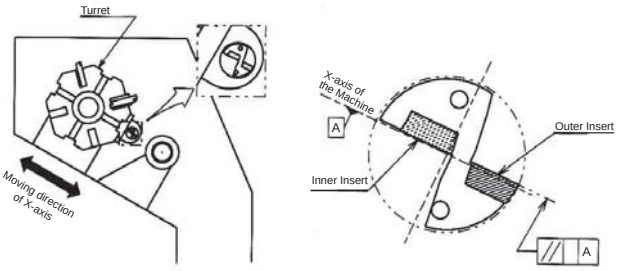


Fig.1 Installed to the Lathe

Cutting Diameter Adjustment

1. Cutting Diameter Adjustment
① The moving direction of the X-axis movement 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 Cutting Diameter
For the maximum limit of the cutting diameter, refer to “Max. Offset (Radial)” in the Toolholder Dimension 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.

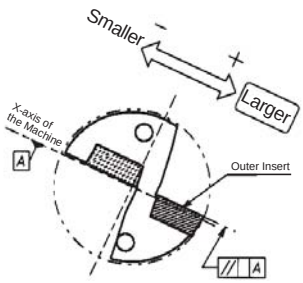


Fig.2 Outer insert Facing Up

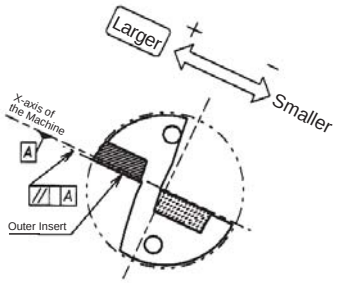


Fig.3 Outer insert Facing Down

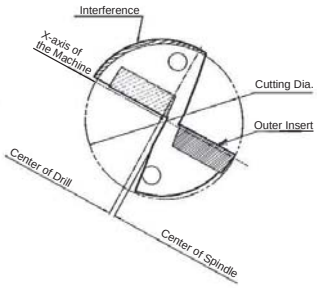


Fig.4 Excessive offset (For Smaller Hole Diameter)

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 machining, it is essential to check the Center Height carefully.

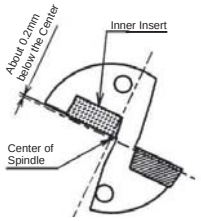


Fig.5 Front View of the Drill

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 condition, the core about 0.5mm in diameter, will remain after the machining.
In the following cases, it is necessary to adjust the Center Height.
・No core remains
・Core diameter is more than 1mm

* To test the Center Height, drill a shallow hole about 10mm in depth at low feed rate, less than 0.1mm/rev.

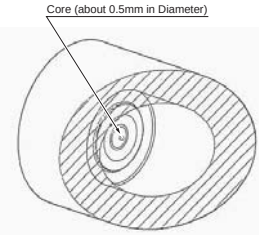


Fig.6 Center Core

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)

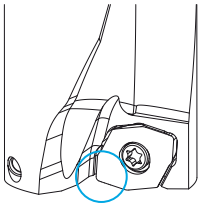


Fig.7 Insert breakage near the center of the drill

[How to Adjust]

① Install the drill rotated 180°.
Most problems will be solved by this method. (Fig.8)

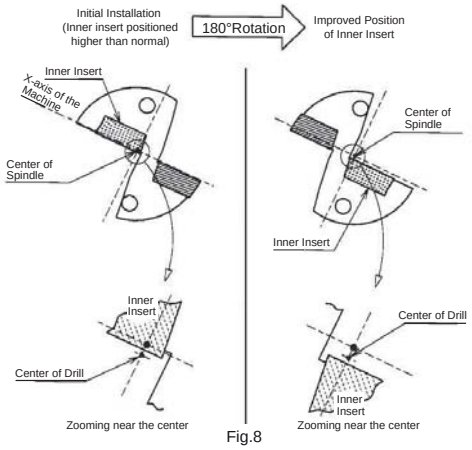


Fig.8

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 cutting diameter)
Caution: In case of installing the drill in the reverse direction (outer insert is positioned above), the cutting 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.

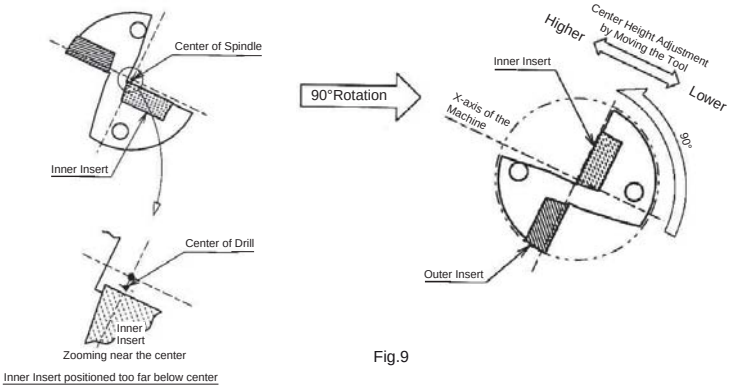


Fig.9

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 cutting diameter)
Caution: When installing the drill in the opposite direction (outer insert is positioned lower), the cutting 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.

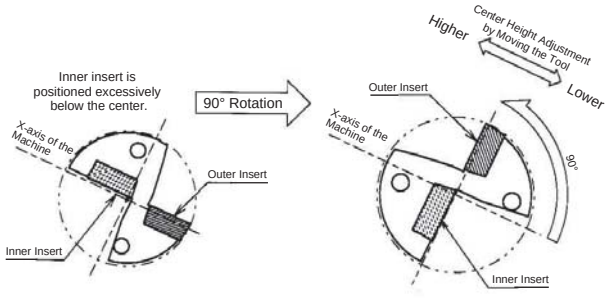
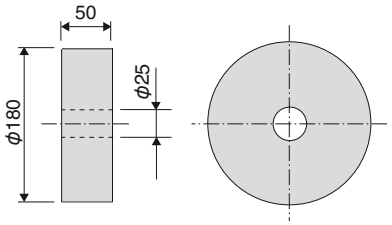


Fig.10

Case Studies

X40CrMoV51 (SKD62 (45HRC))

- Vc=60 m/min
- f=0.05 mm/rev
- H=50 mm (through hole)
- Wet (Internal Coolant)
- ZXMT070305GH (PR1230)
- S25-DRX250M-4-07



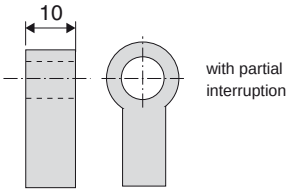
MagicDrill DRX	6 holes/edge
Competitor J	4 holes/edge (breakage)

150% of tool life

Results
- MagicDrill DRX has 1.5 times longer life than Competitor J
  Breakage is confirmed after machining 4 holes for Competitor J
  Interrupted machining is still possible after cutting 6 holes with MagicDrill DRX
- Finishing is not necessary because MagicDrill DRX provides a good finished surface (Evaluation by the user)

X10CrNiS18 9 (SUS303)

- Vc=75 m/min
- f=0.1 mm/rev
- H=10 mm (through hole)
- Wet (Internal Coolant)
- ZXMT06T204SM (PR1225)
- S25-DRX200M-3-06



MagicDrill DRX	1300 holes/edge
Competitor K	500 holes/edge

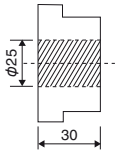
260% of tool life

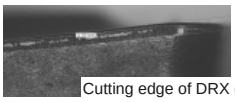
Results
- MagicDrill DRX had no sudden breakage that occurred for Competitor K and achieved stable machining with 2.6 times longer tool l life.

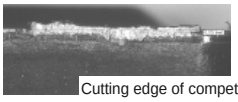
(Evaluation by the user)

SCM420HV (Cold Forging)

- Vc=118 m/min
- f=0.08 mm/rev (0.05 at the beginning)
- H=30 mm (through hole)
- Wet (Internal Coolant)
- ZXMT070305SM (PR1225)
- S25-DRX250M-3-07




Cutting edge of DRX (after 400 holes)


Cutting edge of competitors (after 400 holes)

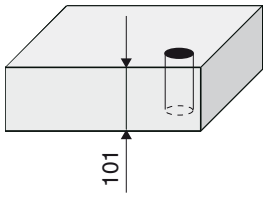
MagicDrill DRX	Less adhesion, continue to use even after 400 holes
Competitor L	Large adhesion (after 400 holes)

Results
- MagicDrill DRX had a good chip control and low adhesion for machining of the same number comparing to Competitor L.

(Evaluation by the user)

55NiCrMoV6 (SKT4 (42HRC))

- Vc=100 m/min
- f=0.07~0.08 mm/rev
- H=101 mm (through hole)
- Wet (External Coolant)
- ZXMT070305GM (PR1230)
- S25-DRX250M-4-07



Mold component ø25x101mm (through hole) 24 locations

MagicDrill DRX	Machining time : 28 min./pc
Conventional tool M	Machining time: 58 min./pc

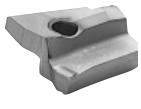
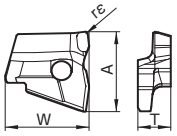
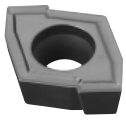
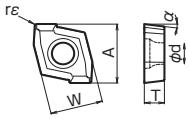
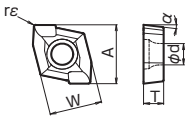
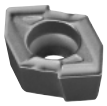
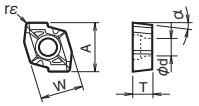
50% reduction

Results
- For deep hole machining (4xD), MagicDrill DRX had no chip stuck and enabled machining without step feeding (machining time was reduced in half) despite use of external coolant
- MagicDrill DRX has improved 3 times longer tool life than Conventional tool M

(Evaluation by the user)

Applicable Insert
(for DRS type / DRZ type)

Classification of usage			PR660	PR830	PR915	PR1025	PR930	PR905	PR510	KW10
● : 1st Recommendation ○ : 2nd Recommendation (Steel; non heat treated)	P	Carbon Steel / Alloy Steel	○	○		●				
		Mold Steel		●		○				
	M	Stainless Steel	○			●				
	K	Cast Iron						●	○	
	N	Non-ferrous Metals								●

Shape	Description		Dimension (mm) A	T	ød	W	rε	Angle (°) α	PR660	PR830	PR915	PR1025	PR930	PR905	PR510	KW10	Ref. Page for Toolholder
 	DS	100	8.8	3.5	-	9.0	0.2	-	●						●		K38
		105	9.3	3.7		9.7			●						●		
		110	9.8	3.9		10.0			●						●		
		115	10.2	4.1		10.3			●						●		
		120	10.8	4.3		10.9	0.25		●						●		
 	ZCMT	050203	5.9	2.38	2.3	5.0	0.3	7°	●	●	●	●	●	●		●	K40 ~ K47
		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			●	●	●		●			●	
 For Sharp Cutting / 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 resistance due to 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 (rε) than standard chipbreaker type and can reduce burrs.

Suitable Chipbreaker (ZCMT type)

Workpiece Material	Insert Size	ZCMT05									ZCMT06									ZCMT08					
	Chipbreaker	Standard			SP			SU			Standard			SP			SU			Standard			SP		
	Cutting 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 Alloy		☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★
Brass		★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆
Titanium Alloy		☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★

Workpiece Material	Insert Size	ZCMT10								ZCMT12								ZCMT15								ZCMT20		
	Chipbreaker	Standard				SP				Standard				SP				Standard				SP				Standard		
	Cutting 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 Alloy		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★	★
Brass		★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★
Titanium Alloy		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★	★

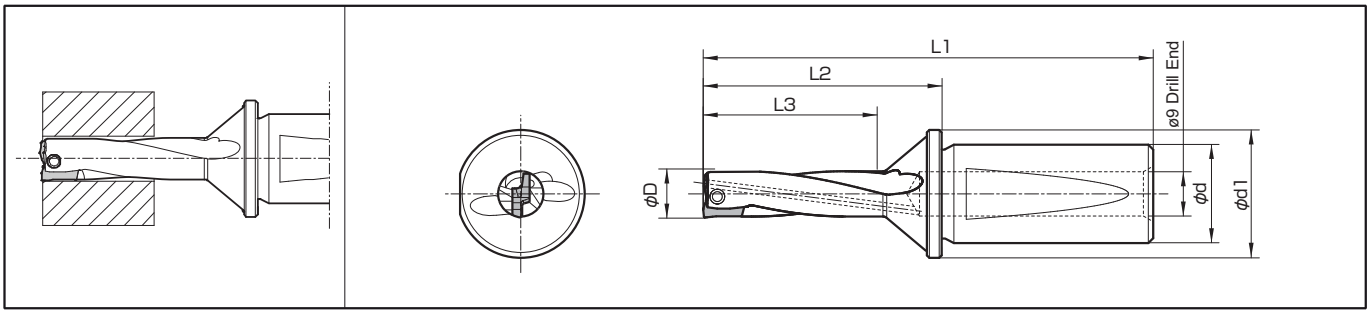
・Standard chipbreakers (without symbol) may function better with interrupted cutting.
・When machining aluminum, chips become long and difficult to be discharged at the depth over 2D.
・5D type is the same as 4D type.

★ : 1st. Recommendation ☆ : 2nd. Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes

DRS

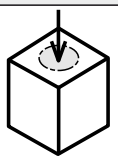
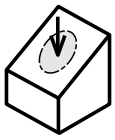
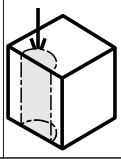
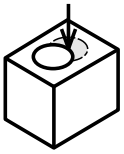
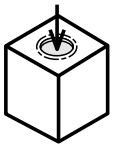
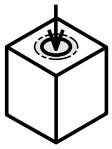
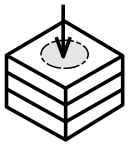


Toolholder Dimensions

Description	Std.	Number of Flutes	Dimension (mm) øD	L1	L2	L3	ød	ød1	Radial Direction Offset Applicable Range (mm)	Spare Parts: Clamp Screw	Wrench	Wrench	Applicable Insert ➔ K37
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				

Cutting Conditions by Application

(Workpiece: C50)

Applications		Flat Surface	Slanted Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates
Workpiece Shape								
DRS Type	Cutting speed (m/min)	80	80	Not recommended	Not recommended	80	Not recommended	Not Available
	Feed Rate (mm/rev)	0.08	0.04	Not recommended	Not recommended	Concave part 0.04 Continuous part 0.08	Not recommended	Not Available
Coolant (Internal)		Yes	Yes	–	–	Yes	–	Not Available

· When machining with outer coolant, Max. depth should be 1.5 times (1.5XD) of the cutting diameter (øD) because chip evacuation performance drops.

DRS type Recommended Cutting Conditions (Coolant)

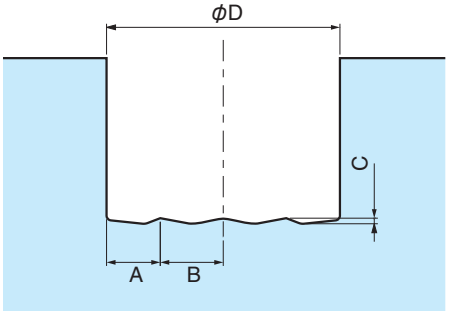
Workpiece Material	Recommended Insert Grade (Cutting Speed : m/min) PVD Coated Carbide PR660	PR510	Feed Rate (mm/rev)
Low Carbon Steel	★ 80~100		0.06
Carbon Steel	★ 80~100		0.08~0.1
Alloy Steel	★ 80		0.04~0.06
Mold Steel	★ 80		0.04~0.06
Stainless Steel (Austenitic related)	★ 70~80		0.05~0.06
Gray Cast Iron		★ 80~100	0.08~0.1

★ : 1st Recommendation

1. Apply a sufficent 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 cutting, increased the cutting speed to 120~150m/min.
   If this does not solve the problem, try peck feeding.
   [How to peck feed] ① Cut 1~2mm ② Return 0.1mm ③ Repeat ① and ②

DRS type Hole Bottom Shape (mm)

øD	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

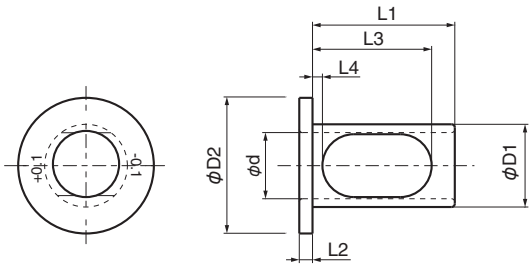


● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Adjustable Sleeve [DRS type MagicDrill Mini for cutting dia. adjustment]

SHEM





Sleeve Dimensions

Description	Std.	Dimension (mm)							*Dia. Adjustment Range
		ød	ØD1	ØD2	L1	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 cutting diameter.

How to use

・SHEM is designed for only MagicDrill Mini. (DRS-type)
・SHEM is for cutting diameter adjustment only. (up to +0.1mm or -0.1mm)
・SHEM is not for center height adjustment like conventional adjustable sleeve (SHE-type)
・Apply SHEM when adjusting the cutting diameter for pre-drilling before threading.

① Set the outer edge horizontally with 90° to making line on the sleeve. (Fig.1)
② To adjust to larger diameter, 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.
③ Tighten the bottom screw firmly which is directly touching the drill.
Slightly tighten the upper screw which is directly touching the sleeve.

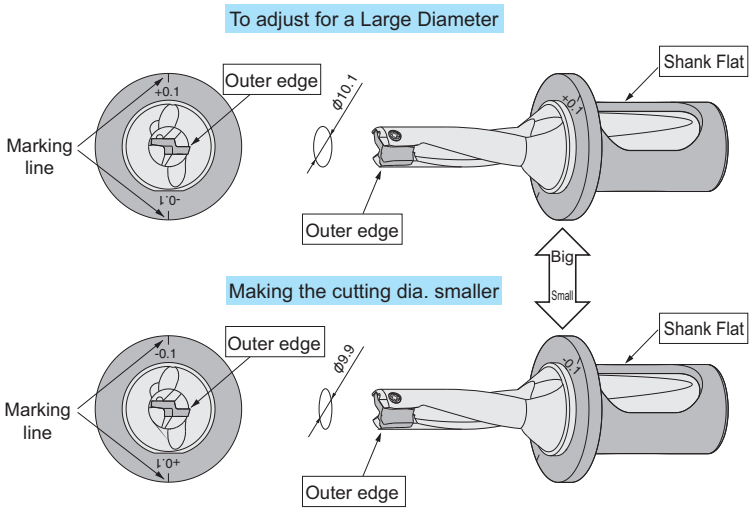


Fig.1 Diameter Adjustment Method (e.g.) ø10 Drill

Caution: Not for use with Collet Chuck type Arbor.

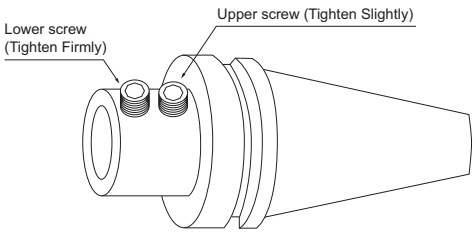
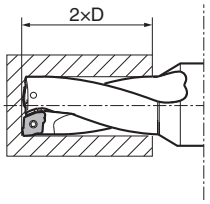
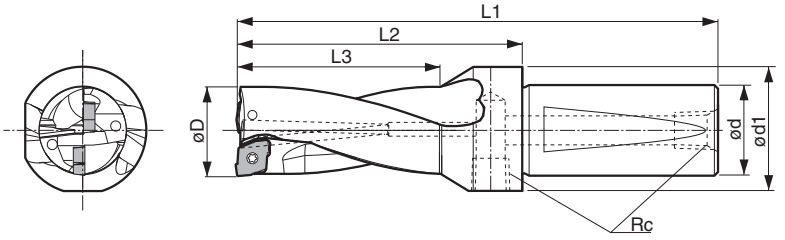


Fig.2

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ (Cutting Depth: 2×D)





2D

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Plug	Applicable Inserts ➡K37
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 machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ➡K49

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ➡ K37
			øD	L1	L2	L3	ød	ød1	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 machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ➡ K49

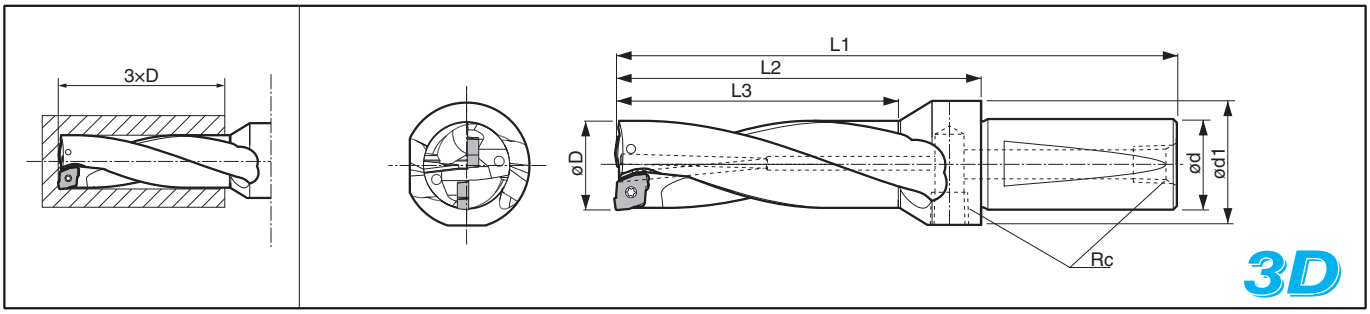
・Cutting tolerance (2D type)

Dc	Cutting tolerance (mm)
ø13~ø26.5	+0.20 -0.10
ø27~ø40	+0.25 -0.15
ø41~ø59	+0.30 -0.20

* Figures above are numeric guidelines.
It may vary depending on machines / work materials / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ (Cutting Depth: 3×D)



● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Plug	Applicable Inserts ➔K37
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 machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ➔K49

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➔K37
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 machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ➔K49

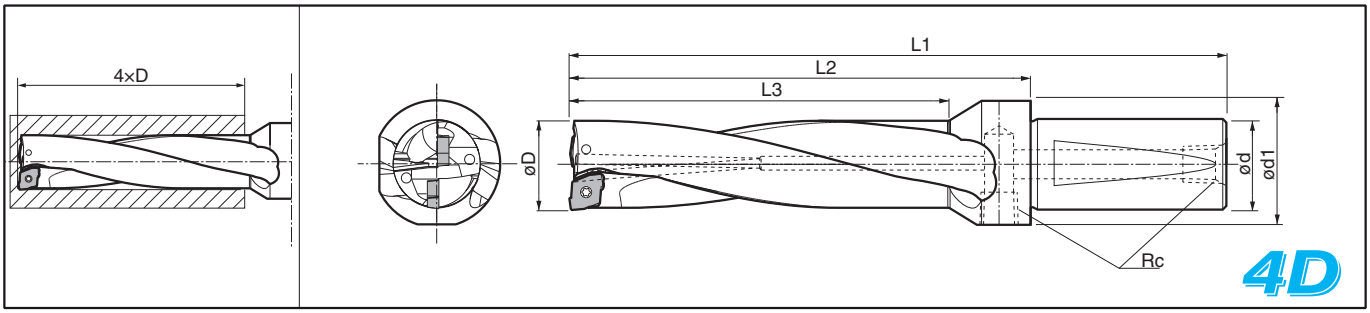
・Cutting tolerance (3D type)

D	Cutting tolerance (mm)
ø13~ø26.5	+0.20 -0.10
ø27~ø40	+0.25 -0.15
ø41~ø59	+0.30 -0.20

* Figures above are numeric guidelines.
It may vary depending on machines / work materials / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ (Cutting Depth: 4×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Spare Parts: Plug	Applicable Inserts ➔K37
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 machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ➔K49

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K37
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				+2.7				
-DRZ47188-15	●		47	292	223	188				+2.5				
-DRZ48192-15	●		48	296	227	192		60		+2.2				
-DRZ49196-15	●		49	300	231	196				+2.0				
-DRZ50200-15	●		50	301	232	200				+1.7				

・When offset machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ➡ K49

• Cutting tolerance (4D type)

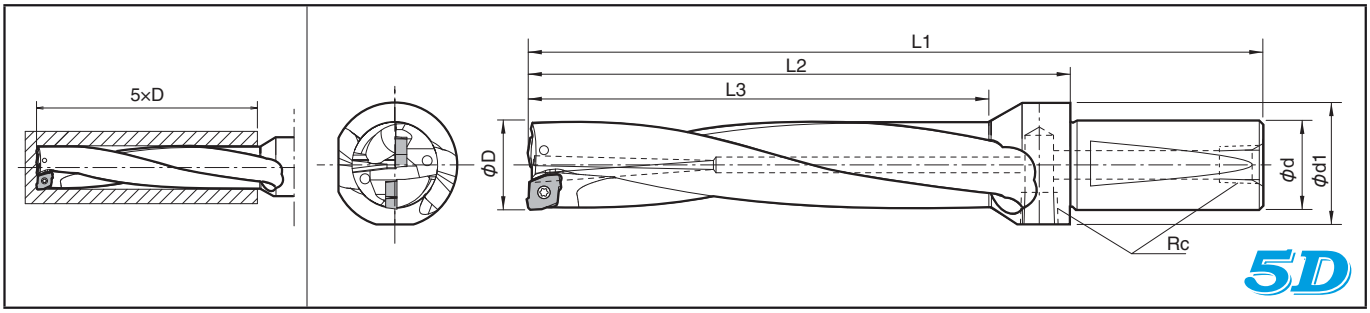
D	Cutting tolerance (mm)
ø13~ø26.5	+0.25 -0.10
ø27~ø40	+0.30 -0.15
ø41~ø50	+0.35 -0.20

* Figures above are numeric guidelines.
It may vary depending on machines / work materials / clamp status / cutting conditions.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MagicDrill® DRZ type

DRZ (Cutting Depth: 5×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K37
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 machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ➡ K49

• Cutting tolerance (5D type)

D	Cutting tolerance (mm)
ø27~ø40	+0.35 -0.15
ø41~ø50	+0.40 -0.20

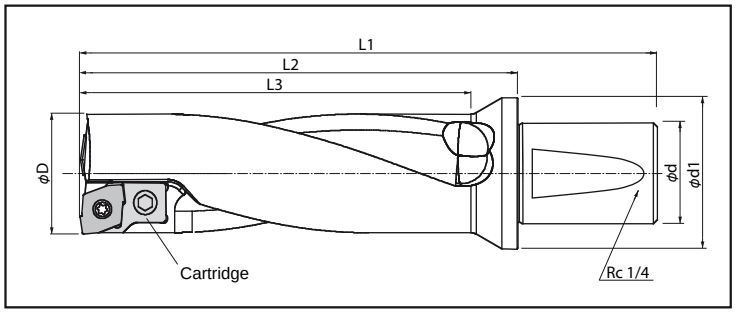
* Figures above are numeric guidelines.
It may vary depending on machines / work materials / clamp status / cutting conditions.

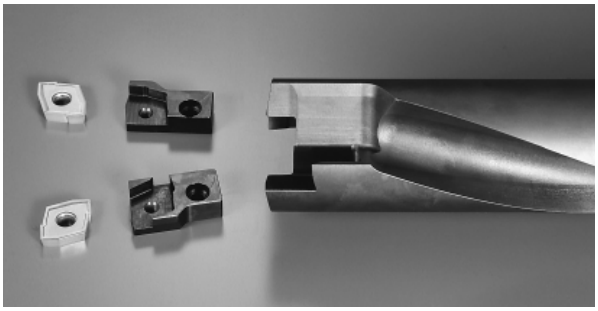
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MagicDrill for Large Dia (over 60mm)

- **MagicDrill for large diameters (over ø59) are available as Custom Orders. (Ask your regional sales staff for details such as cutting dia. / shank type, etc.)**
- **Cartridge-type drill (DRZ-CR type) for diameters over ø60mm.**

DRZ-CR type





Toolholder Dimensions

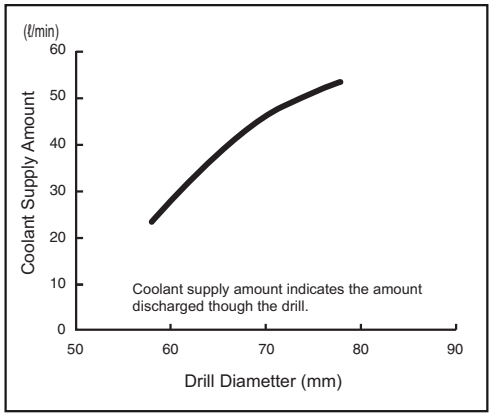
Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Cartridge for Outer Edge	Cartridge for Inner Edge	Clamp Screw	Wrench	Applicable Inserts K37
S50 -DRZ60180-20CR	○	2	60	286	217	195	50	75	+3.0	DR20CR-OUT (1 pc)	DR20CR-IN (1 pc)	SB-60120TR	DT-25	ZCMT200608
-DRZ65195-20CR	○	2	65	296	227	206			+1.5					
-DRZ70210-20CR	○	2	70	308	239	220			+0.2					
-DRZ75225-12CR	○	4	75	330	261	225	50	80	Offset N.A.	DR12CR-OUT (2 pc)	DR12CR-IN (2 pc)	SB-5085TR	DT-20	ZCMT12T306 ZCMT12T304SP
-DRZ80240-12CR	○	4	80	340	271	240								

For recommended cutting conditions, see page K49

Cartridge

Spare Parts: Cartridge for Outer Edge	Cartridge for Inner Edge	Cartridge Clamp Screw	Wrench
DR20CR-OUT	DR20CR-IN	HH6×12	LW-5
DR12CR-OUT	DR12CR-IN	HH4×12	LW-3

Drill diameter and Coolant



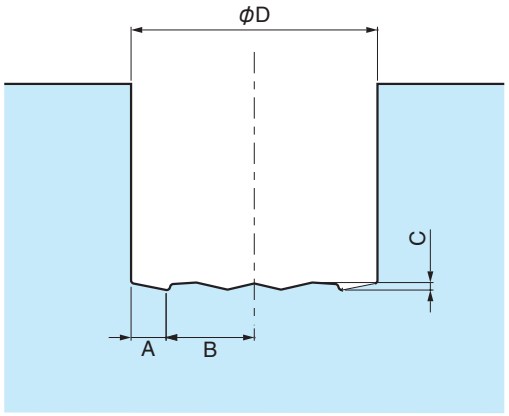
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ type Hole Bottom Shape (Available for 2xD, 3xD, 4xD, 5xD type) (mm)

øD	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	0.7
18.0		6.3	
18.5		6.6	
19.0		6.8	
19.5		7.1	
20.0		7.3	
20.5		7.6	0.8
21.0		7.8	

øD	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	
30.0		11.0	
30.5		11.3	
31.0		11.5	0.8
31.5		11.8	
32.0		12.0	
32.5		12.3	

øD	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	



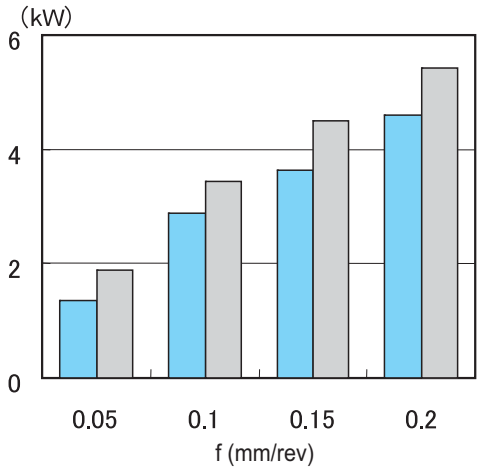
* Above amount is standard value
(Varies within ±0.1mm depending on workpiece materials and cutting conditions)

Required Power

■ ø20 Cutting Power Comparison

MagicDrill
Competitor A

Vc=100m/min, (n=1600min^{-1})
ϕ20 Drill
15CrMo5 Internal coolant supply



■ Case Study

Magic Drill Dia.		ø16	ø27		ø50	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 5.5 / 7.5 kW	
Cutting Conditions	Vc (m/min)	150	130	150	120	110	157
	f (mm/rev)	0.06	0.13		0.1	0.08	0.12
Workpiece Material		1.0040 - St42-2	1.7220 - 34CrMo4		1.7262 - 15CrMo5	1.0040 - St42-2	
Required Power (Load Meter values)		60%	80%	95%	100%	60%	100%
Remarks		-	-		With conventional drill, limited up to ø40	-	

Formula for calculating required power (approximate value) R33

Recommended Cutting Conditions

DRZ type Recommended Cutting Conditions (Coolant)

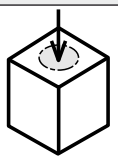
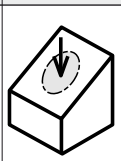
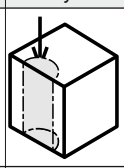
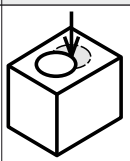
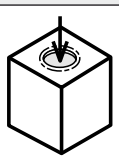
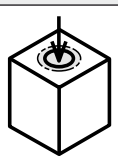
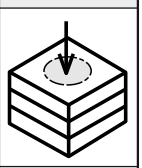
Workpiece Material	Recommended Insert Grade (Cutting Speed: m/min)							Cutting Diameter øD (mm)	Holder Type (Cutting Depth)			
	PVD Coated Carbide						Carbide		2D	3D	4D	5D
	PR660	PR830	PR915	PR1025	PR930	PR905	KW10		f (mm/rev)			
	Standard SP SU	Standard SP	Standard	Standard SP SU	Standard SP	Standard	Standard SP					
Low Carbon Steel	☆ 120~220	☆ 120~240	☆ 120~240	★ 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	☆ 120~180	☆ 120~180	★ 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	★ 100~160	☆ 100~160	☆ 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	★ 80~150	☆ 80~150	☆ 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	☆ 60~120	☆ 70~140	☆ 70~140	★ 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 Alloy	-	-	-	-	-	-	★ 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: C50)

Applications		Flat Surface	Slanted Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates
Workpiece Shape								
DRZ Type	Cutting speed (m/min)	120	120	120	120	120	120	Not Available
	Feeding (mm/rev)	0.1	0.05	0.05	0.05	Concave Part 0.05 Continuous Part 0.1	*0.05	Not Available
Coolant (Internal)		Yes	Yes	Yes	Yes	Yes	Yes	Not Available

* For ap, in case of cutting for prepared hole workpiece (Same as using likewise Boring Bar).

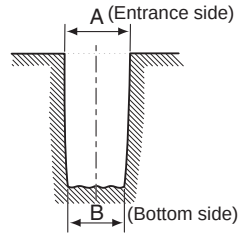
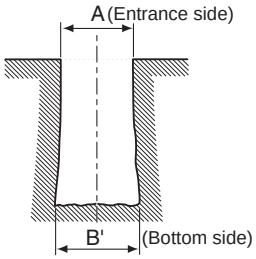
Drill type	2D~3D type	4D~5D type
ap	0.1×D or less	Not recommended

e.g.) In case of cutting using DRZ3090-10 (3×D type)
① For milling, prepared hole should be cut bigger than ø24 (ø30-0.1x30x2)
② For turning, ap should be set under ap = 3mm (0.1x30)

For ap in case of using outer coolant system

• In case of using outer coolant system, chip evacuation will be bad.
Therefore ap should be measured within 1.5times (1.5xD) of cutting diameter (øD).

Troubleshooting

Trouble condition	Condition		Cause	Countermeasures
Hole diameter becomes smaller (at hole bottom)		There is no problem for entrance, 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 ➡ **K38** or **K49** for "Recommended Cutting Conditions".
Hole diameter becomes larger (at hole bottom)		There is no problem for entrance, 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 ➡ **K38** or **K49** for "Recommended Cutting Conditions". • Check the core height See page ➡ **K34~K35**
Hole diameter is small (from the hole entrance)		Hole diameter is small from entrance. (At turning moment)	Inappropriate adjustment of hole diameter.	In case of using lathe machine, use X-axis and adjustment hole diameter. See page ➡ **K34**
			Core up for internal edge. (No core remains)	Adjust the core height. See page ➡ **K34~K35**

Indication of tool life of MagicDrill

How to judge tool life	Indication of judging tool life
Generation status of tool mark involving with insert wearness	• When an insert is new, A holder is slightly bend external side during cutting. (It is designed that cutting diameter is slightly bigger during cutting.) Once cutting is finished, a holder will be back to normal size and smaller than cutting diameter. Tool mark will not be appeared on the finishing surface. (Although depends on workpiece and cutting condition, cutting power which generates external direction, slightly tool mark might be appeared.) • When an insert is at the end of tool life, Gradually external corner part is getting wear, cutting resistance which is generated in inside, a holder will be not bend, on the contrary it will be bend inside. Once cutting is finished, a holder will be back to normal. Pulling off a holder under this condition, external edge touches on finishing surface and tool mark will be on its finishing surface.
Tracing cutting diameter	When cutting diameter is measured, suddenly it shows small diameter. In this case, an insert can be judged the end of tool life.
Generating status of at the exit side	If insert wear progress. Burrs of penetrated hole entrance (Pulling out burrs) will be bigger and identified as the insert has reached at the end of tool life.
Variation of cutting noise	DRX / DRZ Type → Light cutting noise at the beginning turns to brady noise which contains vibration noise. DRS Type → Light cutting noise at the beginning turns to whir noise. Although, it is difficult to recognize DRX / DRZ type's smaller cutting diameter or DRS type's variation of cutting noise because of main motor noise or projection of coolant.
Variation of vibration	As the end of tool life is getting closer, vibration is getting larger and cutting noise is getting change. However, same as vibration and cutting noise, it is difficult to identify for small cutting diameter type.

L

Solid End Mill

Carbide substrate

L1~L48

Guide for tool selection L5~L9

Solid End Mill Identification System / How to read icon L8

General Use L10~L24

Automatic lathe L10
Square L12
Ball L21
Roughing L23

Hard materials L25~L34

Square L25
High Feed (with special coner-R shape) L32
Roughing L33
Radius / Short / Rough Copying L34

Difficult-to-Cut Materials L35~L38

Square L35
Ball L38

Aluminum / Non-ferrous Metals L39~L43

Square (with wiper edge) L39
Roughing L42

Technical Information L44~L48

Recommended Cutting Condition - Slotting L44
How to use 6PDRS (High Feed with special coner-R shape) L47
Troubleshooting L48
Cutting Data L48



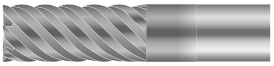


Solid End Mill Series

- Kyocera's solid end mill series has wide product lineup from roughing to finishing as well as items for difficult-to-cut Materials and hard materials.

New PVD technology, MEGACOAT

MEGACOAT Hard-A new coating for hard materials.

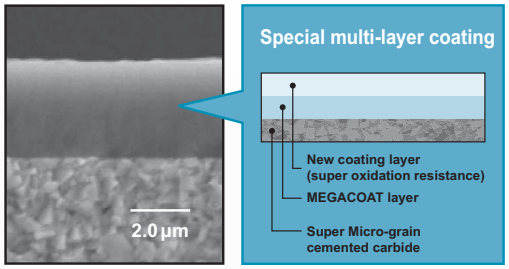


Achieves longer tool life and stable machining of hard materials with a special multi-layer coating.

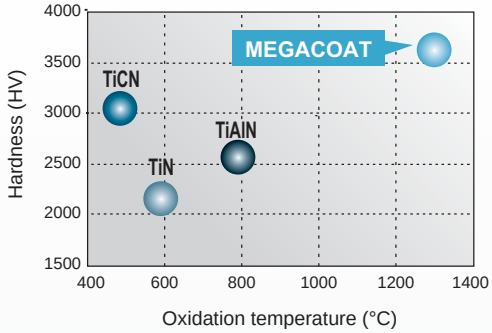
MEGACOAT

Excellent wear resistance and heat resistance

- MEGACOAT Hard structure

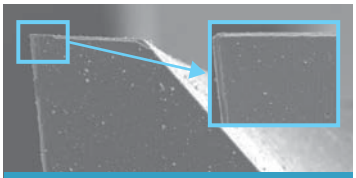


Achieves super hardness to control abrasion of the edge coating



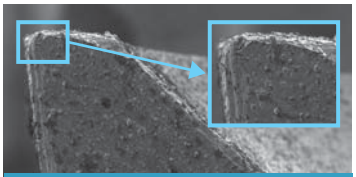
Smooth cutting edge quality with a unique coating technology

- Smooth surface quality



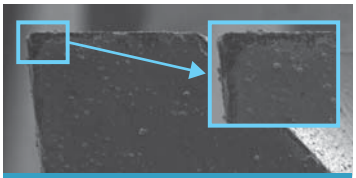
Kyocera MEGACOAT Hard

Smooth and sharp to the tip of the cutting edge.
Longer tool life and improved surface finish.



Competitor A

Coating surface is rough and there is much cutter abrasion.
The cutter edge is rounded.



Competitor B

Major abrasion of cutter and exposed material is noticeable.

- Smooth endmill surface reduces welding and allows stable machining

For high precision finishing, MEGACOAT



MEGACOAT achieves high precision finishing and a sharp cutting edge.

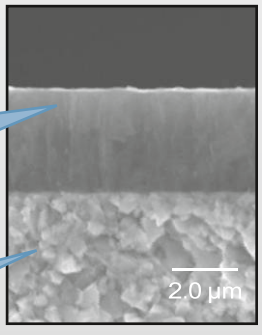
MEGACOAT

- Wear resistance / Heat resistance

MEGACOAT
Nitride solid solution of high melting point metal
High hardness and oxidation resistant
Smooth surface

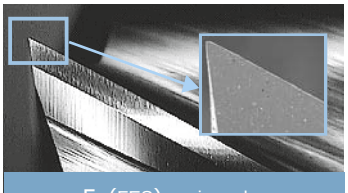
- Fracture resistance / Stable machining

Super Micro-grain cemented carbide



High-quality and sharp edge

- Smooth surface quality



F (FES) series edge

New product introduction

HFS type

End mill for finishing of hard materials



(4,5,6,7HFSS) (4,5,6,7,8HFSM)

MEGACOAT is applied



with Corner land



HFS cross section



FES cross section

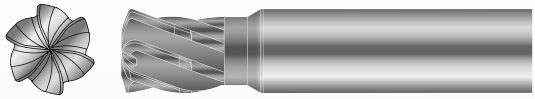
For finishing of hard materials

- End mill for hard materials that achieves longer tool life and stable machining.
- Applicable for hard materials up to 67HRC.
- Achieves high feed rate machining for cutting of hard materials.
- Compared to the FES type, the core diameter was increased by 30%, for higher rigidity.
  Negative rake angle and stronger cutting edge design with corner land.

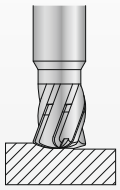
➔ L25, L26

PDR type

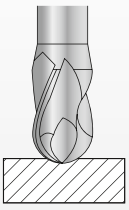
High efficiency radius end mill for hard materials



(6PDRS)



PDR type



General Purpose Ball-Nosed End Mill

For high efficiency machining of hard materials

- Improved productivity with 6 edge design and high feed rate.
- Special corner-R shape with the large contact area on the bottom surface achieves large machining allowance and high efficiency machining.
- Applicable for hard materials up to 67HRC.

➔ L32

DEK type, DER type

End mill for high feed rate machining of difficult-to-cut materials



(5DEKM, 5DERM)

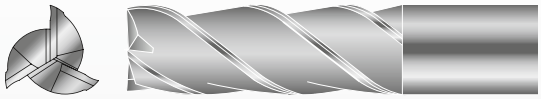
For high efficiency machining of difficult-to-cut materials

- Achieves high feed rate machining with 5 edge design
- Achieves high efficiency machining for difficult-to-cut materials, such as stainless steel and heat-resistant alloys.
- Applicable for slotting with a cutting depth up to 0.8D.
- Unequally partitioned flute design prevents vibration and reduces cutting force.
- Able to accommodate work from roughing to finishing with a single tool.

➔ L37

NES type

End mill for finishing of aluminum & non-ferrous materials



with wiper edge (3NESM)

For finishing of aluminum

- A wiper is attached at the lower edge for improving bottom surface finish.
- Chattering is controlled with cutting edge slots at varied intervals, and finishing of lateral surfaces is improved.
- A special core shape facilitates improved chip evacuation, while assuring rigidity.
- Able to accommodate work from roughing to finishing with a single tool.

➔ L39

General Use End Mill

End mill for difficult-to-cut materials, cast iron, and steel machining

➡ L10~L24

Finishing — F Series

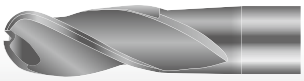
MEGACOAT is applied



(FES)

For finishing. Beautiful surface finish is achieved by high quality cutting edges and MEGACOAT that has excellent wear resistance and heat resistance.

Semi-Finishing — U Series



(3UEBS)

For semi-finishing. High efficiency machining products such as the 3-edge square type and ball-nose end mill have been added to the lineup.



Roughing — R Series



(RDS)

Applicable for machining of wide variety of steel such as stainless steel, cast iron, and etc. The sine curve shaped cutting edge reduces cutting resistance and controls chatter.



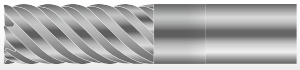
End mill applicable for hard materials

End mill developed primarily for machining of hard materials. Also suitable for steel machining.

➡ L25~L34

Finishing — H Series

MEGACOAT is applied



(HFS)

Applicable for finishing of hard materials. MEGACOAT Hard is adopted. Achieves stable machining of hardened materials.

Semi-Finishing — P, U Series



(UGS)

For stable and high efficiency machining of hard materials.



(PGS)

Good chip evacuation and high rigidity. Short, Medium and Long are available.



(6PDRS)

High efficiency radius. Achieves large machining allowance and high efficiency machining with special corner radius shape.

Roughing — R Series



(3 / 4RFRS)

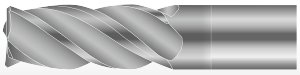
For rough copying / profiling. Strong cutting edge suitable for machining of hard materials and titanium alloys.

End mill for difficult-to-cut materials

End mill designed for difficult-to-cut materials, such as stainless steel, inconel and titanium.

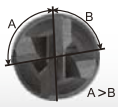
➡ L35~L38

Semi-Finishing — Y Series



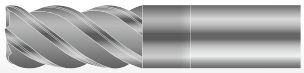
(4YECM, 4YERM, 4YEKM)

Wide enough unequally partitioned flute design reduces vibration and achives high efficiency machining. 5 kinds of edges such as sharp edge, chamfered, land, radius and ball-nose are available.



4YECM varied interval flute

High Feed Rate — D Series



(5DEKM, 5DERM)

5 edge unequally partitioned design. Achieves machining of difficult-to-cut materials, such as stainless steel and heat-resistant alloy at high feed rates.

End mill for aluminum & non-ferrous materials

End mills available for finishing, semi finishing and roughing of aluminum & non-ferrous materials.

➡ L39~L43

Finishing — N Series



(3NESM)

A wiper is attached at the lower edge for improving bottom surface finish. Chattering is controlled with cutting edge slots at varied intervals, and finishing of lateral surfaces is improved.

Semi-Finishing — N Series



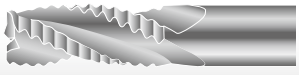
(2 NFSM)



(3 NFSM)

Achieves good chip evacuation with special rake face shape and 45° helix angle.

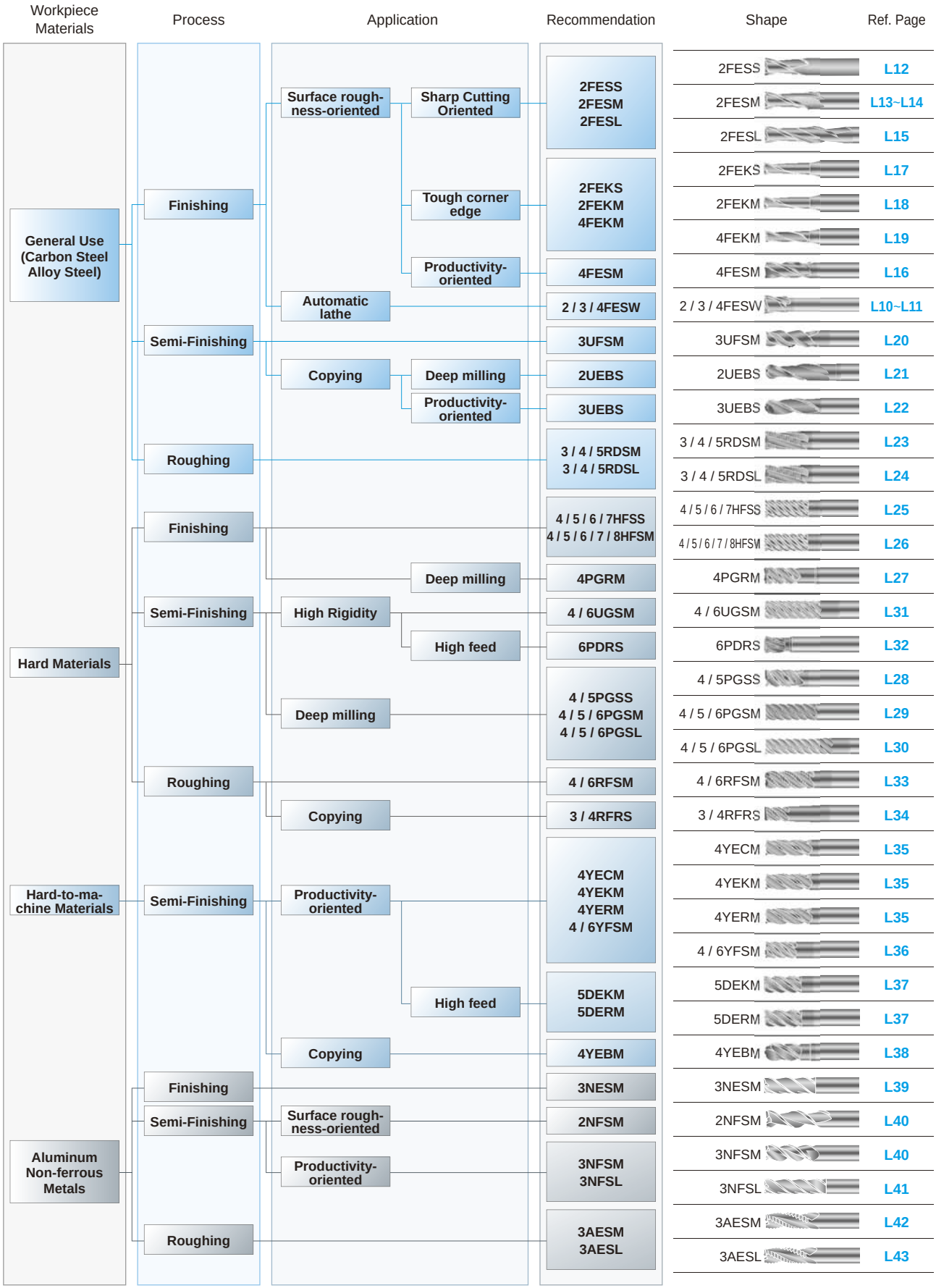
Roughing — A Series



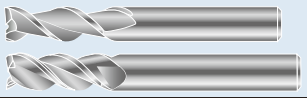
(3AESM)

For roughing of Aluminum / Non-ferrous Metal. Achieves high efficiency machining with a large chip evacuation space.

Application and selection



Application and selection of type distinctions

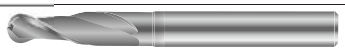
Type	Number of Flutes	Applications	Shape	Description	Outside Dia. øDc (mm)	Page
Square	2 / 3 / 4	For automatic lathe / General use / Finishing		2FESW 3FESW 4FESW	ø3~ø12	L10~11
	2	General use / Finishing (Short)		2FESS	ø1~ø16	L12
	2	General use / Finishing (Medium)		2FESM	ø0.2~ø16	L13~14
	2	General use / Finishing (Long)		2FESL	ø1~ø16	L15
	4	General use / Finishing		4FESM	ø1~ø16	L16
	2	General use / Finishing / Tough corner edge (Short)		2FEKS	ø3~ø16	L17
	2	General use / Finishing / Tough corner edge (Medium)		2FEKM	ø3~ø16	L18
	4	General use / Finishing / Tough corner edge		4FEKM	ø3~ø16	L19
	3	Semi Finishing		3UFSM	ø1~ø20	L20
	3 / 4 / 5	General use / Roughing / Medium		3RDSM 4RDSM 5RDSM	ø4~ø25	L23
	3 / 4 / 5	General use / Roughing / Long		3RDSL 4RDSL 5RDSL	ø6~ø25	L24
	4 / 5 / 6 / 7	Finishing of Hard Material / Short		4HFSS 5HFSS 6HFSS 7HFSS	ø1~ø12	L25
	4 / 5 / 6 / 7 / 8	Finishing of Hard Material / Medium		4HFSM 5HFSM 6HFSM 7HFSM 8HFSM	ø1~ø25	L26
	4 / 5	Deep Slotting and Semi-Finishing of Hard Materials		4PGSS 5PGSS	ø3~ø25	L28
	4 / 5 / 6	Semi-Finishing of Hard Material / Medium		4PGSM 5PGSM 6PGSM	ø6~ø25	L29
	4 / 5 / 6	Semi-Finishing of Hard Materials / Long		4PGSL 5PGSL 6PGSL	ø6~ø25	L30
	4 / 6	Semi-Finishing and high efficiency machining of Hard Material		4UGSM 6UGSM	ø3~ø16	L31
	4 / 6	Roughing of Hard Materials		4RFSM 6RFSM	ø6~ø25	L33
	4	Semi-Finishing of Difficult-to-Cut Materials		4YECM	ø4~ø25	L35
	4	Semi-Finishing of Difficult-to-Cut Materials		4YEKM	ø4~ø25	L35
	4 / 6	Semi-Finishing of Difficult-to-Cut Materials		4YFSM 6YFSM	ø4~ø20	L36
	5	Semi-Finishing of Difficult-to-Cut Materials		5DEKM	ø4~ø25	L37
	3	Finishing of Aluminum		3NESM	ø3~ø20	L39
	2 / 3	Semi-Finishing of Aluminum		2NFSM 3NFSM	ø1~ø20 ø3~ø20	L40
	3	Semi-Finishing of Aluminum / Long		3NFSL	ø3~ø20	L41
	3	Roughing of Aluminum / Medium		3AESM	ø6~ø25	L42
	3	Roughing of Aluminum / Long		3AESL	ø6~ø25	L43

Workpiece materials										Page
	Steel		Hardened							
Steel for General Structure Carbon Steel P ~750N/mm²	Less than 30HRC P ~30HRC	Less than 40HRC P 30~40HRC	Less than 55HRC H ~55HRC	Less than 68HRC H ~68HRC	Stainless Steel M Stainless steel	Titanium Alloy S Titanium Alloy	Heat-resistant alloy S Heat-resistant Alloy	Cast Iron K Cast Iron	Aluminum / Non-ferrous Metals N Aluminum & Non Ferrous Material	
○	○	○	○		○			○	○	L10~11
◎	◎	○	○		◎			○	○	L12
○	○	○	○		○			○	○	L13~14
◎	◎	○	○		◎			○	○	L15
○	○	○	○		○			○	○	L16
◎	◎	○	○		◎			○	○	L17
○	○	○	○		○			○	○	L18
◎	◎	○	○		◎			○	○	L19
	○	○	○		○	○		○	○	L20
◎	◎	◎			○			◎		L23
○	○	○			○			○		L24
○	○	○	○	◎						L25
○	○	○	○	◎						L26
		○	◎	○				○		L28
		○	◎	○				○		L29
		○	◎	○				○		L30
			◎	◎						L31
		◎	◎	○	○	◎	○	◎		L33
	○	○			○	○	○	◎		L35
	◎	◎			◎	○	○	◎		L35
○	○	○			○	○	○	○		L36
◎	◎	◎			◎	◎	◎	◎		L37
									○	L39
									◎	L40
									○	L41
									◎	L42
									○	L43

◎: 1st Recommendation ○: 2nd Recommendation

Guide for tool selection

Application and selection of type distinctions

Type	Number of Flutes	Applications	Shape	Description	Outside Dia. øDc (mm)	Page
Radius	4	Deep Slotting and Finishing of Hard Materials		4PGRM	ø3~ø20	L27
	6	Semi-Finishing of Hard Materials		6PDRS	ø6~ø12	L32
	3 / 4	Rough Copying of Hard Material (Radius / Short)		3RFRS 4RFRS	ø4~ø12	L34
	4	Semi-Finishing of Difficult-to-Cut Materials		4YERM	ø4~ø25	L35
	5	Semi-Finishing and high feed machining of Difficult-to-Cut Material		5DERM	ø4~ø25	L37
Ball	2	Copying (Ball-nose End Mill with 2 Flutes)		2UEBS	ø1~ø20	L21
	3	Copying (Ball-nose End Mill with 3 Flutes)		3UEBS	ø3~ø12	L22
	4	Semi-Finishing for Difficult-to-Cut Material (Ball-nose end mill with 4 flutes)		4YEBM	ø5~ø20	L38

Solid End Mill Series

Solid End Mill Identification System

2 F E S M 020 - 060 - 04 XXXXXXXX

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Number of Flutes	② Name	③ Helix Angle	④ Application	⑤ Length of edge	⑥ Outside Dia.	⑦ Length of edge	⑧ Shank Dia.	⑨ Others
2 3 4 5 6 7 8	F : Finishing U : Semi-Finishing Y : Difficult-to-Cut Material D : Difficult-to-Cut Material H : Finishing of Hardened Material P : Hardened Material R : Roughing A : Roughing for Aluminum N : Aluminum	D : 20-29° E : 30-39° F : 40-49° G : 50-59°	S : Square B : Ball R : Radius K : Tough corner edge (Corner land) C : with Corner Chamfering	S : Short M : Medium L : Long W : Automatic lathe	020 ↓ 2.0mm	060 ↓ 6.0mm	04 ↓ 4.0mm	Corner R, Corner Chamfering width, etc.

How to read icon

Coated Carbide

- MEGACOAT Hard — MEGACOAT Hard
- MEGACOAT — MEGACOAT
- TiAlN — TiAlN Coated Carbide
- AlTiN — AlTiN Coated Carbide
- Uncoated — Non-coating

Shank Diameter Tolerance

- h5 Shank Dia. — Shank Diameter Tolerance is h5.

Corner Radius Tolerance

- 0~-0.02 mm R — Corner Radius Tolerance is 0 to -0.02mm.

Corner Form

- Radius R — Radius
- Sharp — Corner Sharp Edge
- Land — With Corner land
- C — With Corner Chamfering

Ball-nose Radius Tolerance

- 0~-0.02 mm R — The R tolerance of ball end mill is 0 to -0.02mm.

Helix Angle

- 30° — Helix Angle 30°

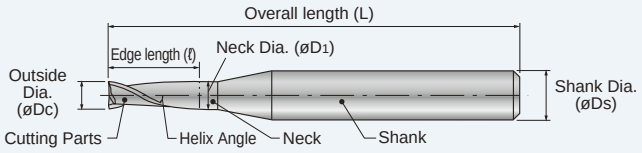
Workpiece materials										Page
Steel for General Structure Carbon Steel SS400, S45C, etc.	Steel: Less than 30HRC SCM, SKS, etc.	Steel: Less than 40HRC NAK, SKD, etc.	Hardened: Less than 55HRC SKD, SKT, etc.	Hardened: Less than 68HRC SKD, SKH, etc.	Stainless Steel	Titanium Alloy	Heat-resistant alloy	Cast Iron	Aluminum / Non-ferrous Metal	
P ~750N/mm²	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	
		○	○	○				○		L27
◎	◎	◎	◎	◎						L32
		○	○	○	○	◎		○		L34
	◎	◎			◎	○	○	◎		L35
◎	◎	◎			◎	◎	◎	◎		L37
◎	◎	◎						◎		L21
◎	◎				○				○	L22
	◎	○			◎	◎	○	○		L38

◎: 1st Recommendation ○: 2nd Recommendation

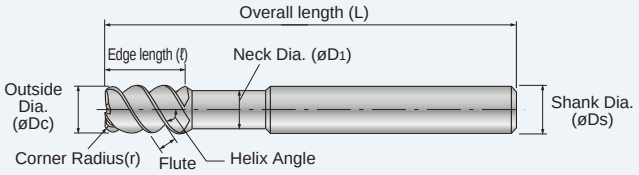
Name of parts and shapes for Solid End Mill

Name of parts

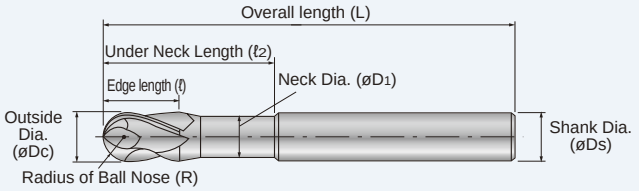
●Square Type



●Radius Type

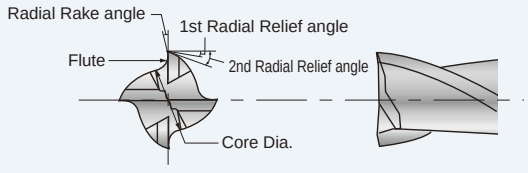


●Ball-nosed Type



Cutting parts shape

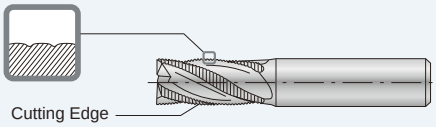
●Edge Shape



* Square 4 flutes

- Core Diameter Ratio (%)=(Core Diameter / Outside Diameter)×100

●Cutting Edge Shape



●With Corner land

- Tough Corner edge (with Corner land)



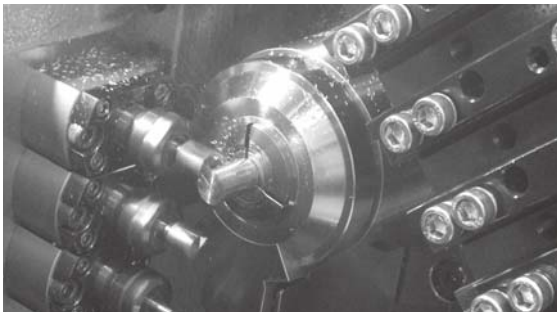
2FESW, 3FESW, 4FESW

Number of Flutes: 2, 3, 4

For automatic lathe
Finishing / General use



(2FESW)



2 3 4

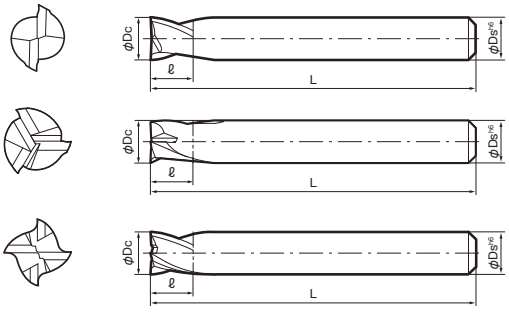
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ P ~30HRC ★ P 30~40HRC P H ~55HRC ★ M Stainless steel K Cast Iron N Aluminum & Non Ferrous Material

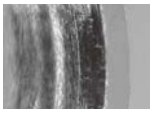
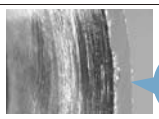
MEGACOAT Sharp h6 Shank Dia. 35°



Sharp Cutting Edge Reduced Burrs

- Applicable to the Swiss-type automatic lathe.
- Achieves high precision machining by reducing burr formation with new PVD Coated Carbide “MEGACOAT” and sharp edge.
- Easy to use total length of 35mm and 45mm are available.

Workpiece Material: Kovar

2FES (ø3•2 flutes) ◯Smooth surface of shoulder wall		Machine Components Facing •Vc=20m/min (n=2150min^{-1}) •fz=0.023mm/t (Vf=100mm/min)
Competitor C (ø3•2 flutes) ×Large burrs	 Large burrs	

Comparison with competitor's endmill after 600 passes

Lineup

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Number of Flutes Z
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
2FESW050-050-05A	●	5	0 -0.020	5	5	35	2
2FESW060-060-05A	●	6	0 -0.020	6	5	35	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

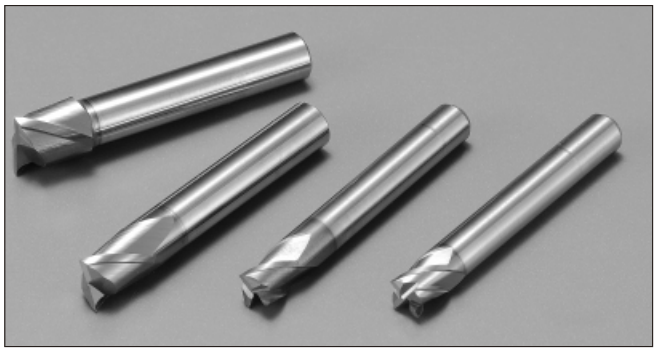
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

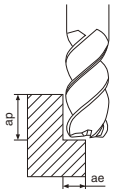
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Number of Flutes Z
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
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

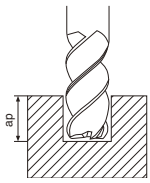


Recommended Cutting Conditions

Shouldering



Shouldering



Slotting

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø14
2FESW										
Carbon Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,300
		Feed Rate (mm/min)	660	640	640	640	520	450	410	350
Alloy Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600
		Feed Rate (mm/min)	420	430	430	430	350	300	270	230
Pre-hardened Steel 30~45HRC	1Dc×0.2Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600
		Feed Rate (mm/min)	420	430	430	430	350	300	270	230
Stainless Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,400
		Feed Rate (mm/min)	320	320	320	320	260	230	210	180
3FESW										
Carbon Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,300
		Feed Rate (mm/min)	810	800	800	800	650	560	510	450
Alloy Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600
		Feed Rate (mm/min)	530	530	530	530	430	370	340	290
Pre-hardened Steel 30~45HRC	1Dc×0.2Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600
		Feed Rate (mm/min)	530	530	530	530	430	370	340	290
Stainless Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,400
		Feed Rate (mm/min)	400	400	400	400	320	280	260	230
4FESW										
Carbon Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,300
		Feed Rate (mm/min)	960	960	960	960	780	680	620	550
Alloy Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600
		Feed Rate (mm/min)	640	640	640	640	520	450	410	350
Pre-hardened Steel 30~45HRC	1Dc×0.2Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600
		Feed Rate (mm/min)	640	640	640	640	520	450	410	350
Stainless Steel	1Dc×0.2Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,400
		Feed Rate (mm/min)	480	480	480	480	390	340	310	280

* Machining with coolant is recommended for stainless steel.

Please refer to page L44 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

2FESS

Number of Flutes: 2

General use / Finishing (Short)



2

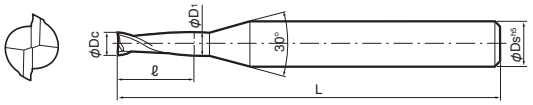
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC | H ~55HRC | M Stainless steel ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Sharp | h5 Shank Dia. | 30°



Lineup

(Unit: mm)

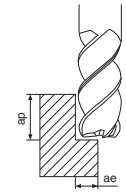
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
2FESS010-015-04	●	1.0	0 -0.015	1.5	1.1	4	45	2
2FESS015-023-04	●	1.5	0 -0.015	2.3	1.6	4	45	2
2FESS020-030-04	●	2.0	0 -0.015	3.0	2.1	4	45	2
2FESS025-037-04	●	2.5	0 -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

(Unit: mm)

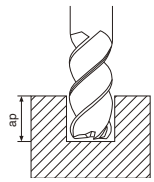
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
2FESS055-082-06	●	5.5	0 -0.015	8.2	5.7	6	50	2
2FESS060-090-06	●	6.0	0 -0.020	9.0	-	6	50	2
2FESS080-120-08	●	8.0	-0.005 -0.025	12.0	-	8	60	2
2FESS100-150-10	●	10.0	-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

● This product has attained excellent wear resistance by utilizing the new PVD Coated Carbide technology, “MEGACOAT”. It has also achieved fracture resistance and stability of machining with its super micro grain carbide. Smooth endmill surface reduces welding and allows stable machining. Achieves high precision machining with coating and sharp cutting edge.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø0.5	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Carbon Steel	1.2Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	32,000	25,500	13,200	6,600	4,500	3,300	2,200	1,700
	1.2Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	210	225	230	375	415	420	410	410
Alloy Steel	1.2Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
	1.2Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	180	195	220	285	315	310	310	310
Pre-hardened Steel 30~45HRC	1.2Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	22,500	12,700	7,200	4,200	3,000	2,200	1,500	1,100
	1.2Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	50	55	80	100	105	105	110	110
Stainless Steel	1.2Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
	1.2Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	60	95	95	110	115	115	115	115

* Machining with coolant is recommended for stainless steel.

Please refer to page L44 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

2FESM

Number of Flutes: 2

General use / Finishing (Medium)



2

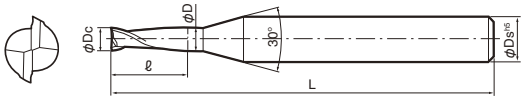
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC | H ~55HRC | M Stainless steel ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Sharp | h5 Shank Dia. | 30°



Lineup

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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
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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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
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

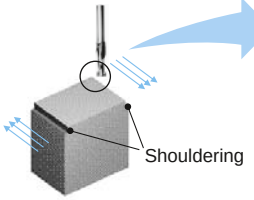
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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
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

Sharp Cutting Edge Reduced Burrs

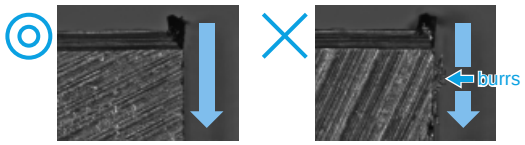
X10CrNiS18 9 (SUS304)

Block
・Vc=70m/min
(n=2,230min^{-1})
・ap×ae=5.0mm×1.0mm
・fz=0.03mm/t
(Vf=134mm/min)

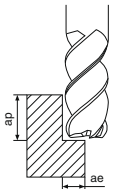


Upper workpiece area

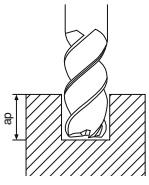
2FESM100-220-10 | Competitor Coating D



Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø0.5	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Carbon Steel	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min^{-1})	32,000	25,500	13,200	6,600	4,500	3,300	2,200	1,700
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	210	225	230	375	415	420	410	410
Alloy Steel	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	180	195	220	285	315	310	310	310
Pre-hardened Steel 30~45HRC	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min^{-1})	22,500	12,700	7,200	4,200	3,000	2,200	1,500	1,100
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	50	55	80	100	105	105	110	110
Stainless Steel	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	60	95	95	110	115	115	115	115

* Machining with coolant is recommended for stainless steel.

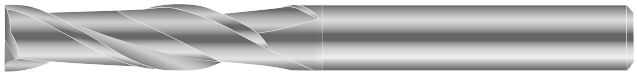
Please refer to page L44 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

2FESL

Number of Flutes: 2

General use / Finishing (Long)



2

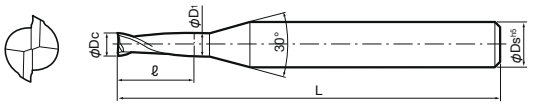
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ P ~30HRC ★ P 30~40HRC H ~55HRC ★ M Stainless steel K Cast Iron N Aluminum & Non Ferrous Material

MEGACOAT Sharp h5 Shank Dia. 30°



Lineup

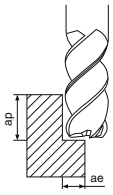
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Carbon Steel	2.5Dc×0.05Dc (Dc<ø3) 2.5Dc×0.1Dc (Dc≧ø3)	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	2.5Dc×0.05Dc (Dc<ø3) 2.5Dc×0.1Dc (Dc≧ø3)	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
Pre-hardened Steel 30~45HRC	2.5Dc×0.05Dc (Dc<ø3) 2.5Dc×0.1Dc (Dc≧ø3)	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	2.5Dc×0.05Dc (Dc<ø3) 2.5Dc×0.1Dc (Dc≧ø3)	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

* Machining with coolant is recommended for stainless steel.

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4FESM

Number of Flutes: 4

General use / Finishing (Medium)



4

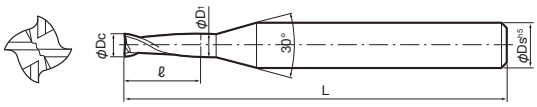
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC | H ~55HRC | M Stainless steel ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Sharp | h5 Shank Dia. | 30°



Lineup

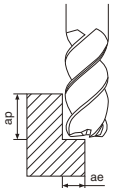
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Shank Dia. øDs	Overall length L	Number of Flutes Z
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
4FESM080-190-08	●	8.0	-0.005 -0.025	19.0	-	8	60	4
4FESM100-220-10	●	10.0	-0.005 -0.025	22.0	-	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

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Carbon Steel	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	25,500	13,000	6,600	4,400	3,300	2,200	1,700
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	335	345	580	620	625	630	600
Alloy Steel	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	22,000	11,000	5,600	3,700	2,800	1,900	1,400
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	290	290	395	455	455	470	460
Pre-hardened Steel 30~45HRC	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	12,000	7,200	4,200	3,000	2,200	1,500	1,100
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	105	125	150	160	160	165	140
Stainless Steel	1.5Dc×0.05Dc (Dc<ø3)	Spindle Revolution (min⁻¹)	22,000	11,000	5,600	3,700	2,800	1,900	1,400
	1.5Dc×0.1Dc (Dc≧ø3)	Feed Rate (mm/min)	130	145	165	165	170	175	155

* Machining with coolant is recommended for stainless steel.

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Number of Flutes: 2

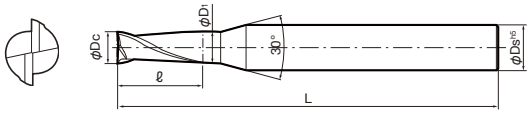
General use / Finishing
Tough corner edge (Short)



Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC | H ~55HRC | M Stainless steel ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Land | h5 Shank Dia. | 30°



2

MEGACOAT is applied

Super Micro-grain carbide

Lineup

(Unit: mm)

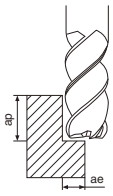
Description	Std.	Outside Dia. øDc	Outside Dia. toler-ance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
2FEKS030-045-06	●	3.0	0 -0.015	4.5	3.15	6.5	6	50	2
2FEKS035-052-06	●	3.5	0 -0.015	5.2	3.68	7.2	6	50	2
2FEKS040-060-06	●	4.0	0 -0.015	6.0	4.2	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

(Unit: mm)

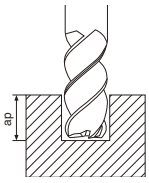
Description	Std.	Outside Dia. øDc	Outside Dia. toler-ance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
2FEKS080-120-08	●	8.0	-0.005 -0.025	12.0	-	-	8	60	2
2FEKS100-150-10	●	10.0	-0.005 -0.025	15.0	-	-	10	70	2
2FEKS120-180-12	●	12.0	-0.010 -0.030	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

● Corner lands improve the cutting edge strength.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø4	ø6	ø8	ø10	ø12	ø16
Carbon Steel	1.2Dc×0.1Dc	Spindle Revolution (min^{-1})	9,300	7,000	4,600	3,500	3,000	2,700	2,200
		Feed Rate (mm/min)	450	450	470	470	470	470	440
Alloy Steel	1.2Dc×0.1Dc	Spindle Revolution (min^{-1})	8,800	6,600	4,400	3,300	2,600	2,200	1,800
		Feed Rate (mm/min)	370	370	380	380	380	380	360
Pre-hardened Steel 30~45HRC	1.2Dc×0.1Dc	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
Stainless Steel	1.2Dc×0.1Dc	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

* Machining with coolant is recommended for stainless steel.

For Slotting, see page L44.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

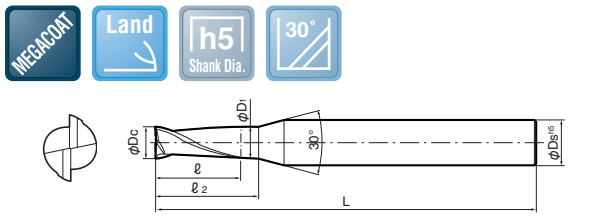
Number of Flutes: 2

General use / Finishing
Tough corner edge (Medium)



Recommended Material ★ 1st Recommendation





2

MEGACOAT is applied

Super Micro-grain carbide

Lineup

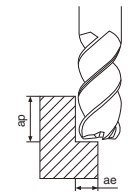
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

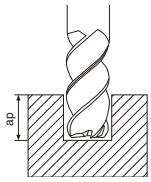
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø4	ø6	ø8	ø10	ø12	ø16
Carbon Steel	1.5Dc×0.1Dc	Spindle Revolution (min-1)	9,300	7,000	4,600	3,500	3,000	2,700	2,200
		Feed Rate (mm/min)	450	450	470	470	470	470	440
Alloy Steel	1.5Dc×0.1Dc	Spindle Revolution (min-1)	8,800	6,600	4,400	3,300	2,600	2,200	1,800
		Feed Rate (mm/min)	370	370	380	380	380	380	360
Pre-hardened Steel 30~45HRC	1.5Dc×0.1Dc	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
Stainless Steel	1.5Dc×0.1Dc	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

* Machining with coolant is recommended for stainless steel.

Please refer to page L44 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Number of Flutes: 4

General use / Finishing
Tough corner edge (Medium)



4

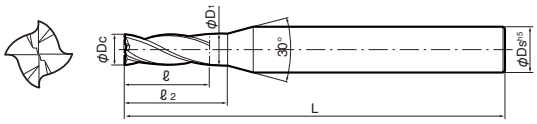
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC | H ~55HRC | M Stainless steel ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Land | h5 Shank Dia. | 30°



Lineup

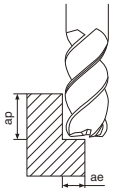
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
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

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
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



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø4	ø6	ø8	ø10	ø12	ø16
Carbon Steel	1.5Dc×0.1Dc	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	1.5Dc×0.1Dc	Spindle Revolution (min⁻¹)	8,800	6,600	4,400	3,300	2,600	2,200	2,000
		Feed Rate (mm/min)	500	550	620	630	630	630	610
Pre-hardened Steel 30~45HRC	1.5Dc×0.1Dc	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	1.5Dc×0.1Dc	Spindle Revolution (min⁻¹)	8,000	6,000	4,000	3,000	2,300	2,000	1,500
		Feed Rate (mm/min)	190	200	200	200	210	210	210

* Machining with coolant is recommended for stainless steel.

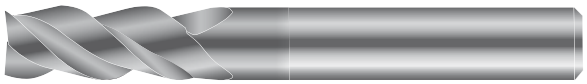
Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3UFSM

Number of Flutes: 3

General use / Semi-Finishing

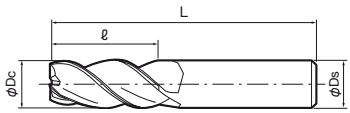




Recommended Material ★ 1st Recommendation







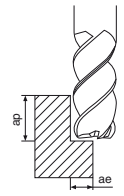
Lineup

(Unit: mm)

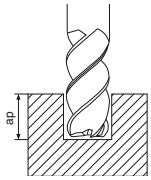
Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
3UFSM010-030-04	●	1	-0.014 -0.028	3	4	50	3
3UFSM015-030-04	●	1.5	-0.014 -0.028	3	4	50	3
3UFSM020-030-04	●	2	-0.014 -0.028	3	4	50	3
3UFSM025-040-04	●	2.5	-0.014 -0.028	4	4	50	3
3UFSM030-080-06	●	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 work materials.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
Carbon Steel Cast Iron	1.0Dc×0.1Dc	Spindle Revolution (min^{-1})	16,000	10,600	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
		Feed Rate (mm/min)	330	330	390	420	430	450	480	480	510	530
Alloy Steel (~30HRC)	1.0Dc×0.1Dc	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)	240	290	290	310	330	330	340	340	340	340
Pre-hardened Steel Stainless Steel (30~40HRC)	1.0Dc×0.1Dc	Spindle Revolution (min^{-1})	8,000	5,300	4,000	3,200	2,700	2,000	1,600	1,300	1,000	800
		Feed Rate (mm/min)	140	140	140	170	180	180	190	190	190	190
Titanium Alloy Heat-resistant Alloy (40~50HRC)	1.0Dc×0.1Dc	Spindle Revolution (min^{-1})	4,000	2,700	2,000	1,600	1,300	1,000	800	700	500	400
		Feed Rate (mm/min)	40	50	60	60	70	70	70	70	80	80
Aluminum Alloy	1.0Dc×0.1Dc	Spindle Revolution (min^{-1})	32,000	21,000	16,000	12,800	10,600	8,000	6,400	5,300	4,000	3,200
		Feed Rate (mm/min)	670	700	760	820	860	880	1,000	1,100	1,100	1,250

* Machining with coolant is recommended for stainless steel.

For Slotting, see page L44

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

2UEBS

Number of Flutes: 2

Copying (Ball-nose end mill with 2 flutes)

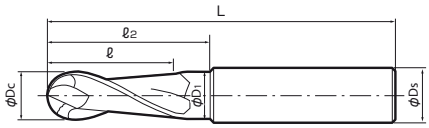


2

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC ★ | K Cast Iron ★

TiAlN | h6 Shank Dia. | ±0.01 mm R | 30°



Lineup

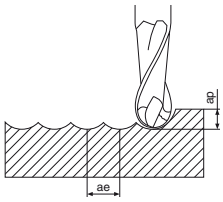
(Unit: mm)

Description	Std.	Radius of Ball Nose	Outside Dia.	Outside Dia. tolerance	Edge Length	Neck Dia.	Under Neck Length	Shank Dia.	Total length	Number of Flutes
		R	øDc		ℓ	øD1	ℓ2	øDs	L	Z
2UEBS010-030-04	●	R0.5	1	-0.014 -0.028	3	-	-	4	50	2
2UEBS020-030-04	●	R1	2	-0.014 -0.028	3	-	-	4	50	2
2UEBS030-095-06	●	R1.5	3	-0.014 -0.028	9.5	-	-	6	58	2
2UEBS040-120-06	●	R2	4	-0.020 -0.038	12	-	-	6	76	2
2UEBS050-140-06	●	R2.5	5	-0.020 -0.038	14	-	-	6	76	2
2UEBS060-160-06	●	R3	6	-0.020 -0.038	16	5.5	40	6	100	2
2UEBS080-200-08	●	R4	8	-0.025 -0.047	20	7.5	40	8	100	2
2UEBS100-220-10	●	R5	10	-0.025 -0.047	22	9.5	35	10	100	2
2UEBS120-250-12	●	R6	12	-0.032 -0.059	25	11.5	50	12	125	2
2UEBS160-320-16	●	R8	16	-0.032 -0.059	32	15.5	60	16	150	2
2UEBS200-380-20	●	R10	20	-0.040 -0.073	38	19.5	60	20	150	2

* Actual ball-nose radius will be half of actual measurement of outer diameter.

● Ball-nose end mill with two flutes.

Recommended Cutting Conditions



Copying

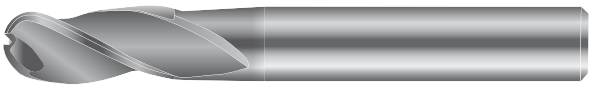
Workpiece Materials		Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø4	ø6	ø8	ø10	ø12	ø16	ø20
Steel	< 42HRC	0.3Dc×0.7Dc	Spindle Revolution (min^{-1})	9,600	6,400	4,800	3,800	3,200	2,400	1,900
			Feed Rate (mm/min)	380	420	380	380	340	300	310
	42~48HRC	0.3Dc×0.7Dc	Spindle Revolution (min^{-1})	8,000	5,300	4,000	3,200	2,700	2,000	1,600
			Feed Rate (mm/min)	300	330	300	290	270	240	240
	48~52HRC	0.3Dc×0.7Dc	Spindle Revolution (min^{-1})	6,400	4,200	3,200	2,500	2,100	1,600	1,300
			Feed Rate (mm/min)	190	210	190	190	170	150	150
Cast Iron	< 180HB	0.3Dc×0.7Dc	Spindle Revolution (min^{-1})	12,700	8,500	6,400	5,100	4,200	3,200	2,500
			Feed Rate (mm/min)	760	850	760	750	690	610	610
	> 180HB	0.3Dc×0.7Dc	Spindle Revolution (min^{-1})	11,100	7,400	5,600	4,500	3,700	2,800	2,200
			Feed Rate (mm/min)	540	590	540	530	480	420	430

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3UEBS

Number of Flutes: 3

Copying (Ball-nose end mill with 3 flutes)



3

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | M Stainless steel | N Aluminum & Non Ferrous Material

TiAlN | h6 Shank Dia. | ±0.01 mm R↘ | 30°



Lineup

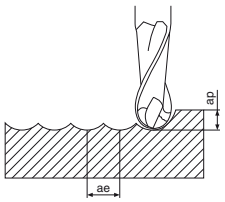
(Unit: mm)

Description	Std.	Radius of Ball Nose	External	Mill Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		R	øDc		ℓ	øDs	L	Z
3UEBS030-070-06	●	R1.5	3	-0.014 -0.028	7	6	57	3
3UEBS040-080-06	●	R2	4	-0.020 -0.038	8	6	57	3
3UEBS050-100-06	●	R2.5	5	-0.020 -0.038	10	6	57	3
3UEBS060-100-06	●	R3	6	-0.020 -0.038	10	6	57	3
3UEBS080-160-08	●	R4	8	-0.025 -0.047	16	8	63	3
3UEBS100-190-10	●	R5	10	-0.025 -0.047	19	10	72	3
3UEBS120-220-12	●	R6	12	-0.032 -0.059	22	12	83	3

* Actual ball-nose radius will be half of actual measurement of outer diameter.

● Ball-nose end mill with well-balanced three flutes. Also applicable for difficult-to-cut materials.

Recommended Cutting Conditions



Copying

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12
Carbon Steel < 20HRC	0.2Dc×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×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
Pre-hardened Steel 30~45HRC	0.1Dc×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	0.05.0Dc×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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3RDSM, 4RDSM, 5RDSM

Number of Flutes: 3, 4, 5

General use / Roughing (Medium)

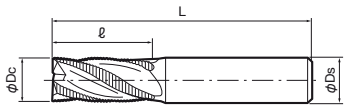


3 4 5

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel | K Cast Iron ★

TiAlN | h6 Shank Dia. | 20° | Cutting shape



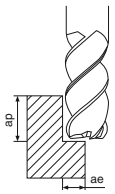
Lineup

(Unit: mm)

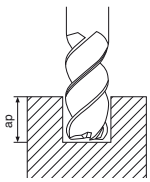
Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
3RDSM040-110-06	●	4	-0.030 -0.105	11	6	55	3
3RDSM050-130-06	●	5	-0.030 -0.105	13	6	57	3
3RDSM060-130-06	●	6	-0.030 -0.105	13	6	57	3
3RDSM080-160-08	●	8	-0.040 -0.130	16	8	63	3
4RDSM100-220-10	●	10	-0.040 -0.130	22	10	72	4
4RDSM120-260-12	●	12	-0.050 -0.160	26	12	83	4
4RDSM160-320-16	●	16	-0.050 -0.160	32	16	92	4
4RDSM200-380-20	●	20	-0.065 -0.195	38	20	104	4
5RDSM250-450-25	●	25	-0.065 -0.195	45	25	121	5

● Three, four and five flutes types are available for roughing. The sine curve shaped cutting edge reduces cutting resistance.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Steel	< 22HRC	1.5Dc×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	1,100	1,120	1,200	1,200	1,340
	22~32HRC	1.5Dc×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
	32~40HRC	1.5Dc×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
	40~45HRC	1Dc×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
	45~50HRC	1Dc×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
Cast Iron		1.5Dc×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

For Slotting, see page L45

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3RDSL, 4RDSL, 5RDSL

Number of Flutes: 3, 4, 5

General use / Roughing (Long)

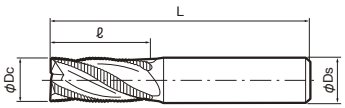


3 4 5

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel | K Cast Iron ★

TiAlN | h6 Shank Dia. | 20° | Cutting shape

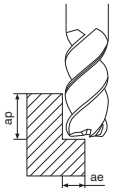


Lineup

(Unit: mm)

Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
3RDSL060-240-06	●	6	-0.030 -0.105	24	6	76	3
3RDSL080-280-08	●	8	-0.040 -0.130	28	8	76	3
4RDSL100-340-10	●	10	-0.040 -0.130	34	10	89	4
4RDSL120-450-12	●	12	-0.050 -0.160	45	12	100	4
4RDSL160-560-16	●	16	-0.050 -0.160	56	16	125	4
4RDSL200-600-20	●	20	-0.065 -0.195	60	20	125	4
5RDSL250-800-25	●	25	-0.065 -0.195	80	25	150	5

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Steel	< 22HRC	2.5Dc×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×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	2.5Dc×0.4Dc	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	2.5Dc×0.4Dc	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×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
Cast Iron		2.5Dc×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

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4HFSS, 5HFSS, 6HFSS, 7HFSS

Number of Flutes: 4, 5, 6, 7

Finishing of Hard Materials



4 5 6 7

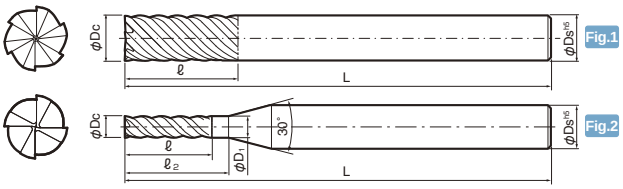
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC ★ | H ~55HRC ★ | H ~68HRC ★

MEGACOAT Hard | Land | h5 Shank Dia. | 45°



Lineup

(Unit: mm)

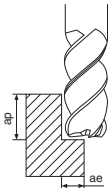
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
4HFSS010-040-06 Fig.2	●	1	0 -0.015	4	1.05	4.8	6	60	4
4HFSS020-060-06 Fig.2	●	2	0 -0.015	6	2.10	7.2	6	60	4
4HFSS030-080-06 Fig.2	●	3	0 -0.015	8	3.15	9.6	6	60	4
4HFSS040-100-06 Fig.2	●	4	0 -0.015	10	4.2	12.0	6	60	4
4HFSS050-120-06 Fig.2	●	5	0 -0.015	12	5.2	14.4	6	60	4
5HFSS040-100-06 Fig.2	●	4	0 -0.015	10	4.2	12.0	6	60	5
6HFSS060-140-06 Fig.1	●	6	0 -0.020	14	–	–	6	60	6

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
6HFSS080-180-08 Fig.1	●	8	-0.005 -0.025	18	-	-	8	70	6
6HFSS100-220-10 Fig.1	●	10	-0.005 -0.025	22	-	-	10	80	6
6HFSS120-260-12 Fig.1	●	12	-0.010 -0.030	26	-	-	12	90	6
6HFSS060-140-06 Fig.1	●	6	0 -0.020	14	-	-	6	60	7
7HFSS080-180-08 Fig.1	●	8	-0.005 -0.025	18	-	-	8	70	7
7HFSS100-220-10 Fig.1	●	10	-0.005 -0.025	22	-	-	10	80	7
7HFSS120-260-12 Fig.1	●	12	-0.010 -0.030	26	-	-	12	90	7

- “MEGACOAT Hard”, new PVD Coated Carbide for hardened materials is adopted. Achieves high rigidity by ensuring a large core diameter. End mill for hardened materials that achieves longer tool life and stable machining. Also cutting edge strength and chip evacuation are improved with a negative rake angle.

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Tool Steel (< 40HRC) Pre-hardened steel	1.5Dc×0.05D (D<ø3) 1.5Dc×0.1Dc (ø3≦D)	Spindle Revolution (min⁻¹)	20,700	20,000	11,100	7,400	5,600	3,700	2,800
		Feed Rate (mm/min)	910	1,750	2,000	2,900	2,930	2,930	2,720
Tool Steel Heat Treated Steel (40~45HRC) Pre-hardened steel	1.5Dc×0.05D (D<ø3) 1.5Dc×0.1Dc (ø3≦D)	Spindle Revolution (min⁻¹)	20,700	20,000	9,900	6,600	5,000	3,300	2,500
		Feed Rate (mm/min)	910	1,750	1,800	2,630	2,650	2,650	2,400
Hardened 45~55HRC	1.5Dc×0.05D	Spindle Revolution (min⁻¹)	20,700	16,000	8,000	5,300	4,000	2,700	2,000
		Feed Rate (mm/min)	910	1,400	1,400	2,100	2,100	2,100	1,900
Hardened 55~60HRC	1.5Dc×0.02Dc	Spindle Revolution (min⁻¹)	20,700	12,000	6,000	4,000	3,000	2,000	1,500
		Feed Rate (mm/min)	640	730	740	1,100	1,100	1,100	1,050
Hardened 60~65HRC	1.5Dc×0.02Dc	Spindle Revolution (min⁻¹)	20,700	11,100	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	550	600	600	880	880	880	910
Hardened 65~70HRC	1.5Dc×0.02Dc	Spindle Revolution (min⁻¹)	15,900	8,000	4,000	2,700	2,000	1,330	1,000
		Feed Rate (mm/min)	370	370	370	560	560	550	550

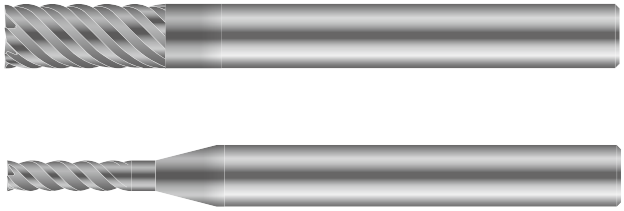
Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4HFSM, 5HFSM, 6HFSM, 7HFSM, 8HFSM

Number of Flutes: 4, 5, 6, 7, 8

Finishing of Hard Materials



4 5 6 7 8

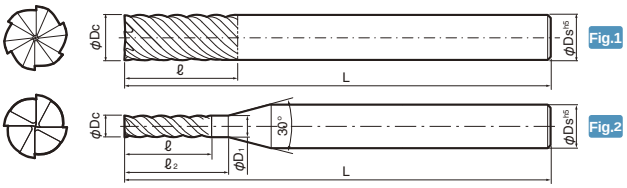
MEGACOAT is applied

Super Micro-grain carbide

Recommended Material ★ 1st Recommendation

P	P	P	H	H
~750N/mm²	~30HRC	30~40HRC	~55HRC	~68HRC

MEGACOAT Hard | Land | h5 Shank Dia. | 45°



Lineup

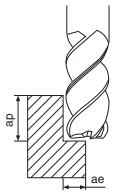
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
4HFSM010-050-06 Fig.2	●	1	0 -0.015	5	1.05	6	6	60	4
4HFSM020-090-06 Fig.2	●	2	0 -0.015	9	2.10	10.8	6	60	4
4HFSM030-120-06 Fig.2	●	3	0 -0.015	12	3.15	14.4	6	60	4
4HFSM040-140-06 Fig.2	●	4	0 -0.015	14	4.2	16.8	6	60	4
4HFSM050-170-06 Fig.2	●	5	0 -0.015	17	5.2	20.4	6	60	4
5HFSM040-140-06 Fig.2	●	4	0 -0.015	14	4.2	16.8	6	60	5
6HFSM060-170-06 Fig.1	●	6	0 -0.020	17	-	-	6	60	6
6HFSM080-230-08 Fig.1	●	8	-0.005 -0.025	23	-	-	8	70	6
6HFSM100-280-10 Fig.1	●	10	-0.005 -0.025	28	-	-	10	80	6
6HFSM120-330-12 Fig.1	●	12	-0.010 -0.030	33	-	-	12	90	6

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Number of Flutes Z
6HFSM140-370-16 Fig.2	●	14	-0.010 -0.030	37	14.2	44.4	16	105	6
6HFSM150-420-16 Fig.2	●	15	-0.010 -0.030	42	15.2	50.4	16	105	6
6HFSM160-420-16 Fig.1	●	16	-0.010 -0.030	42	-	-	16	105	6
6HFSM200-480-20 Fig.1	●	20	-0.010 -0.030	48	-	-	20	110	6
7HFSM060-170-06 Fig.1	●	6	0 -0.020	17	-	-	6	60	7
7HFSM080-230-08 Fig.1	●	8	-0.005 -0.025	23	-	-	8	70	7
7HFSM100-280-10 Fig.1	●	10	-0.005 -0.025	28	-	-	10	80	7
7HFSM120-330-12 Fig.1	●	12	-0.010 -0.030	33	-	-	12	90	7
6HFSM160-420-16 Fig.1	●	16	-0.010 -0.030	42	-	-	16	105	7
8HFSM250-530-25 Fig.1	●	25	-0.010 -0.030	53	-	-	25	125	8

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Tool Steel (< 40HRC) Pre-hardened steel	1.5Dc×0.05D (D<ø3) 1.5Dc×0.1Dc (ø3≦D)	Spindle Revolution (min⁻¹)	20,700	20,000	11,100	7,400	5,600	3,700	2,800
		Feed Rate (mm/min)	910	1,750	2,000	2,900	2,930	2,930	2,720
Tool Steel Heat Treated Steel (40~45HRC) Pre-hardened steel	1.5Dc×0.05D (D<ø3) 1.5Dc×0.1Dc (ø3≦D)	Spindle Revolution (min⁻¹)	20,700	20,000	9,900	6,600	5,000	3,300	2,500
		Feed Rate (mm/min)	910	1,750	1,800	2,630	2,650	2,650	2,400
Hardened 45~55HRC	1.5Dc×0.05D	Spindle Revolution (min⁻¹)	20,700	16,000	8,000	5,300	4,000	2,700	2,000
		Feed Rate (mm/min)	910	1,400	1,400	2,100	2,100	2,100	1,900
Hardened 55~60HRC	1.5Dc×0.02Dc	Spindle Revolution (min⁻¹)	20,700	12,000	6,000	4,000	3,000	2,000	1,500
		Feed Rate (mm/min)	640	730	740	1,100	1,100	1,100	1,050
Hardened 60~65HRC	1.5Dc×0.02Dc	Spindle Revolution (min⁻¹)	20,700	11,100	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	550	600	600	880	880	880	910
Hardened 65~70HRC	1.5Dc×0.02Dc	Spindle Revolution (min⁻¹)	15,900	8,000	4,000	2,700	2,000	1,330	1,000
		Feed Rate (mm/min)	370	370	370	560	560	550	550

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Number of Flutes: 4

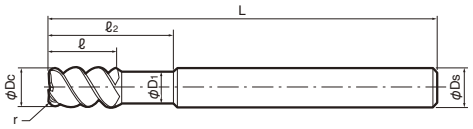
Deep Slotting and Finishing of Hard Materials (Radius)

Recommended Material ★ 1st Recommendation

P 30～40HRC ★H ～55HRC ★H ～68HRC K Cast Iron



TiAlN Radius R↘ h6 Shank Dia. ±0.02 mm R↘ 50°



Lineup

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Spec of Corners r
4PGRM030-045-06-R025	●	3	-0.014 -0.028	4.5	2.7	9	6	57	R 0.25
4PGRM030-045-06-R050	●	3	-0.014 -0.028	4.5	2.7	9	6	57	R 0.5
4PGRM040-060-06-R025	●	4	-0.020 -0.038	6	3.7	12	6	57	R 0.25
4PGRM040-060-06-R050	●	4	-0.020 -0.038	6	3.7	12	6	57	R 0.5
4PGRM050-075-06-R025	●	5	-0.020 -0.038	7.5	4.6	15	6	76	R 0.25
4PGRM050-075-06-R050	●	5	-0.020 -0.038	7.5	4.6	15	6	76	R 0.5
4PGRM060-090-06-R025	●	6	-0.020 -0.038	9	5.5	18	6	76	R 0.25
4PGRM060-090-06-R050	●	6	-0.020 -0.038	9	5.5	18	6	76	R 0.5
4PGRM060-090-06-R075	●	6	-0.020 -0.038	9	5.5	18	6	76	R 0.75
4PGRM060-090-06-R100	●	6	-0.020 -0.038	9	5.5	18	6	76	R 1.0
4PGRM080-120-08-R050	●	8	-0.025 -0.047	12	7.4	24	8	100	R 0.5
4PGRM080-120-08-R100	●	8	-0.025 -0.047	12	7.4	24	8	100	R 1.0
4PGRM080-120-08-R150	●	8	-0.025 -0.047	12	7.4	24	8	100	R 1.5

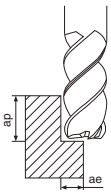
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Neck Dia. øD1	Under Neck Length ℓ2	Shank Dia. øDs	Overall length L	Spec of Corners r
4PGRM080-120-08-R200	●	8	-0.025 -0.047	12	7.4	24	8	100	R 2.0
4PGRM100-150-10-R050	●	10	-0.025 -0.047	15	9.2	30	10	100	R 0.5
4PGRM100-150-10-R100	●	10	-0.025 -0.047	15	9.2	30	10	100	R 1.0
4PGRM100-150-10-R150	●	10	-0.025 -0.047	15	9.2	30	10	100	R 1.5
4PGRM100-150-10-R200	●	10	-0.025 -0.047	15	9.2	30	10	100	R 2.0
4PGRM120-180-12-R050	●	12	-0.032 -0.059	18	11	36	12	125	R 0.5
4PGRM120-180-12-R100	●	12	-0.032 -0.059	18	11	36	12	125	R 1.0
4PGRM120-180-12-R150	●	12	-0.032 -0.059	18	11	36	12	125	R 1.5
4PGRM120-180-12-R200	●	12	-0.032 -0.059	18	11	36	12	125	R 2.0
4PGRM160-240-16-R050	●	16	-0.032 -0.059	24	15	48	16	125	R 0.5
4PGRM160-240-16-R150	●	16	-0.032 -0.059	24	15	48	16	125	R 1.5
4PGRM200-300-20-R050	●	20	-0.040 -0.073	30	19	60	20	150	R 0.5
4PGRM200-300-20-R200	●	20	-0.040 -0.073	30	19	60	20	150	R 2.0

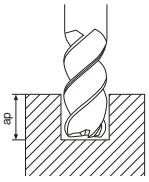
Number of Flutes Z=4

- Radius type with 4 flutes. The diameter of the neck portion (øD1) is thinner than the cutting diameter (øDc), it is suitable for deep slotting. Due to the corner R on the cutting edge, it is applicable for finishing of sloped workpiece.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm) Roughing	Depth of Cut (ap×ae) (mm) Finishing	Outside Dia. (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20
Steel	< 30HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min-1)	21,200	10,600	8,000	6,400	5,300	4,000	3,200
				Feed Rate (mm/min)	2,400	2,400	2,400	2,400	2,400	2,400	2,400
	30~ 40HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min-1)	19,100	9,600	7,200	5,700	4,800	3,600	2,900
				Feed Rate (mm/min)	1,900	1,900	1,900	1,950	1,950	2,010	1,950
	40~ 45HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min-1)	17,000	8,500	6,400	5,100	4,200	3,200	2,500
				Feed Rate (mm/min)	1,400	1,400	1,400	1,430	1,400	1,400	1,330
	45~ 50HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min-1)	12,700	6,400	4,800	3,800	3,200	2,400	1,900
				Feed Rate (mm/min)	820	820	860	860	890	860	840
	50~ 55HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min-1)	8,500	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	350	350	380	410	380	380	380
	> 55HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min-1)	7,400	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	250	250	250	270	270	280	270

Please refer to page L46 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4PGSS, 5PGSS

Number of Flutes: 4, 5

Deep Slotting and Semi-Finishing of Hard Materials

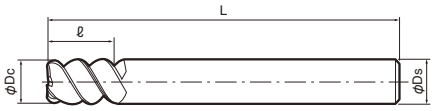


4 5

Recommended Material ★ 1st Recommendation

P 30～40HRC ★ H ～55HRC H ～68HRC K Cast Iron

TiAlN h6 Shank Dia. 50°



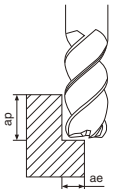
Lineup

(Unit: mm)

Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
4PGSS030-045-06	●	3	-0.014 -0.028	4.5	6	57	4
4PGSS040-060-06	●	4	-0.020 -0.038	6	6	57	4
4PGSS050-075-06	●	5	-0.020 -0.038	7.5	6	76	4
4PGSS060-090-06	●	6	-0.020 -0.038	9	6	76	4
4PGSS080-120-08	●	8	-0.025 -0.047	12	8	100	4
4PGSS100-150-10	●	10	-0.025 -0.047	15	10	100	4
4PGSS120-180-12	●	12	-0.032 -0.059	18	12	125	4
4PGSS160-240-16	●	16	-0.032 -0.059	24	16	125	4
4PGSS200-300-20	●	20	-0.040 -0.073	30	20	150	4
5PGSS250-380-25	●	25	-0.040 -0.073	38	25	150	5

● Web thickness ratio is 60% between the cutting edge and 1Dc and 80% for the rest. Good chip evacuation and high rigidity.

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)		Outside Dia. (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20	ø25
		Roughing	Finishing									
Steel	< 30HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	21,200	10,600	8,000	6,400	5,300	4,000	3,200	2,500
				Feed Rate (mm/min)	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,500
	30~ 40HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	19,100	9,600	7,200	5,700	4,800	3,600	2,900	2,300
				Feed Rate (mm/min)	1,900	1,900	1,900	1,900	1,900	2,000	2,000	2,100
	40~ 45HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	17,000	8,500	6,400	5,100	4,200	3,200	2,500	2,000
				Feed Rate (mm/min)	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,700
	45~ 50HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	12,700	6,400	4,800	3,800	3,200	2,400	1,900	1,500
				Feed Rate (mm/min)	850	850	860	860	870	870	870	1,000
	50~ 55HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	8,500	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	400	400	400	410	410	410	410	450
	> 55HRC	1Dc×0.2Dc	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	7,400	3,700	2,800	2,200	1,900	1,400	1,100	900
				Feed Rate (mm/min)	250	250	250	260	260	280	280	310

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4PGSM, 5PGSM, 6PGSM

Number of Flutes: 4, 5, 6

Semi-Finishing of Hard Materials (Medium)

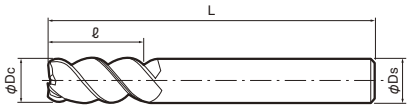


4 5 6

Recommended Material ★ 1st Recommendation

P 30～40HRC ★H ～55HRC H ～68HRC K Cast Iron

TiAlN h6 Shank Dia. 50°



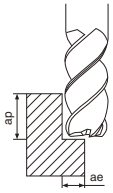
Lineup

(Unit: mm)

Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
4PGSM060-150-06	●	6	-0.020 -0.038	15	6	76	4
4PGSM080-200-08	●	8	-0.025 -0.047	20	8	100	4
5PGSM100-250-10	●	10	-0.025 -0.047	25	10	100	5
6PGSM120-300-12	●	12	-0.032 -0.059	30	12	125	6
6PGSM160-400-16	●	16	-0.032 -0.059	40	16	125	6
6PGSM200-500-20	●	20	-0.040 -0.073	50	20	150	6
6PGSM250-630-25	●	25	-0.040 -0.073	63	25	150	6

● Four, five and six flutes types are available for semi-finishing of hardened materials. Web thickness ratio is 60% between the cutting edge and 1Dc and 80% for the rest. Good chip evacuation and high rigidity.

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)		Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
		Roughing	Finishing								
Steel	< 30HRC	1Dc×0.2Dc	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	10,700	8,000	6,400	5,300	4,000	3,200	2,500
				Feed Rate (mm/min)	2,240	2,240	2,870	3,500	3,580	3,440	3,060
	30~40HRC	1Dc×0.2Dc	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
				Feed Rate (mm/min)	1,710	1,720	2,440	2,870	3,010	2,920	2,610
	40~45HRC	1Dc×0.2Dc	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,000
				Feed Rate (mm/min)	1,360	1,400	1,780	2,040	2,000	2,000	2,080
	45~50HRC	1Dc×0.2Dc	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
				Feed Rate (mm/min)	760	860	1,050	1,340	1,290	1,260	1,260
	50~55HRC	1Dc×0.2Dc	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	340	380	510	570	570	570	550
	> 55HRC	1Dc×0.2Dc	2.5Dc×0.1Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
				Feed Rate (mm/min)	220	220	330	390	420	400	380

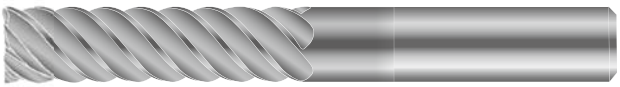
Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4PGSL, 5PGSL, 6PGSL

Number of Flutes: 4, 5, 6

Semi-Finishing of Hard Materials (Long)

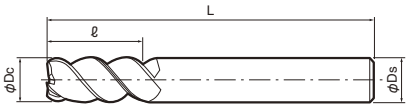


4 5 6

Recommended Material ★ 1st Recommendation

P 30～40HRC ★ H ～55HRC H ～68HRC K Cast Iron

TiAlN h6 Shank Dia. 50°



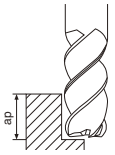
Lineup

(Unit: mm)

Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
4PGSL060-210-06	●	6	-0.020 -0.038	21	6	76	4
4PGSL080-280-08	●	8	-0.025 -0.047	28	8	100	4
5PGSL100-350-10	●	10	-0.025 -0.047	35	10	100	5
6PGSL120-420-12	●	12	-0.032 -0.059	42	12	125	6
6PGSL160-560-16	●	16	-0.032 -0.059	56	16	125	6
6PGSL200-700-20	●	20	-0.040 -0.073	70	20	150	6
6PGSL250-880-25	●	25	-0.040 -0.073	88	25	150	6

● Web thickness ratio is 60% between the cutting edge and 1Dc and 80% for the rest. Good chip evacuation and high rigidity. Best suitable for high-speed shouldering.

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)		Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
		Roughing	Finishing								
Steel	< 30HRC	1Dc×0.2Dc	3.5Dc×0.1Dc	Spindle Revolution (min^{-1})	10,700	8,000	6,400	5,300	4,000	3,200	2,500
				Feed Rate (mm/min)	2,230	2,230	2,870	3,500	3,580	3,440	3,060
	30~40HRC	1Dc×0.2Dc	3.5Dc×0.1Dc	Spindle Revolution (min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
				Feed Rate (mm/min)	1,810	1,820	2,440	2,870	3,010	2,920	2,610
	40~45HRC	1Dc×0.2Dc	3.5Dc×0.1Dc	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,000
				Feed Rate (mm/min)	1,360	1,400	1,780	2,040	2,080	2,080	2,080
	45~50HRC	1Dc×0.2Dc	3.5Dc×0.1Dc	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
				Feed Rate (mm/min)	760	860	1,050	1,340	1,290	1,280	1,280
	50~55HRC	1Dc×0.2Dc	3.5Dc×0.1Dc	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,000
				Feed Rate (mm/min)	340	380	510	570	570	570	550
	> 55HRC	1Dc×0.2Dc	3.5Dc×0.1Dc	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
				Feed Rate (mm/min)	220	220	330	390	420	400	380

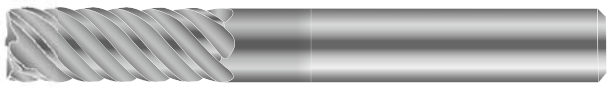
Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4UGSM, 6UGSM

Number of Flutes: 4, 6

Semi-Finishing of Hard Materials

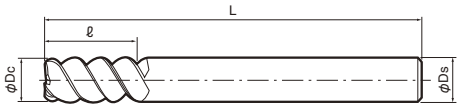




Recommended Material ★ 1st Recommendation







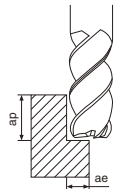
Lineup

(Unit: mm)

Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
4UGSM030-080-06	●	3	-0.014 -0.028	8	6	50	4
4UGSM040-120-06	●	4	-0.020 -0.038	12	6	57	4
4UGSM050-130-06	●	5	-0.020 -0.038	13	6	57	4
6UGSM060-150-06	●	6	-0.020 -0.038	15	6	60	6
6UGSM080-200-08	●	8	-0.025 -0.047	20	8	75	6
6UGSM100-250-10	●	10	-0.025 -0.047	25	10	80	6
6UGSM120-300-12	●	12	-0.032 -0.059	30	12	100	6
6UGSM160-400-16	●	16	-0.032 -0.059	40	16	110	6

● In order to achieve stable machining of hard materials, negative type rake angle is adopted. Also, for attaining high efficiency, we provide six flutes type for dia. over 6mm.

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø4	ø6	ø8	ø10	ø12	ø16
Steel	45~55HRC	1Dc×0.05Dc	Spindle Revolution (min^{-1})	11,900	8,000	6,000	4,800	4,000	3,000
			Feed Rate (mm/min)	810	1,200	1,200	1,000	980	900
	55~60HRC	1Dc×0.05Dc	Spindle Revolution (min^{-1})	8,000	5,300	4,000	3,200	2,700	2,000
			Feed Rate (mm/min)	510	760	740	610	610	540
	60~65HRC	1Dc×0.2Dc	Spindle Revolution (min^{-1})	5,200	3,500	2,600	2,100	1,700	1,300
			Feed Rate (mm/min)	290	480	450	390	370	330
	65~70HRC	1Dc×0.2Dc	Spindle Revolution (min^{-1})	2,800	1,900	1,400	1,100	900	700
			Feed Rate (mm/min)	150	250	230	200	200	170

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

6PDRS

Number of Flutes: 6

Semi-Finishing of Hard Materials

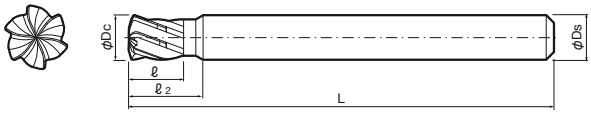


6

Recommended Material ★ 1st Recommendation

P	P	P	H	H
~750N/mm²	~30HRC	30~40HRC	~55HRC	~68HRC

AlTiN | Radius R | h6 Shank Dia. | 20°

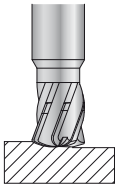


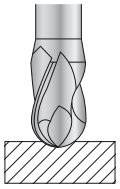
Lineup

(Unit: mm)

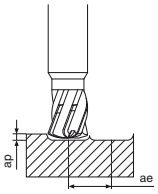
Description	Std.	Outside Dia.	Outside Dia. tolerance	Under Neck Length	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ2	ℓ	øDs	L	Z
6PDRS060-045-06	●	6	-0.020 -0.038	9	4.5	6	57	6
6PDRS080-060-08	●	8	-0.025 -0.047	12	6	8	63	6
6PDRS100-075-10	●	10	-0.025 -0.047	15	7.5	10	72	6
6PDRS120-090-12	●	12	-0.032 -0.059	18	9	12	83	6

- Increased rigidity with large core diameter. 6 edge design enables high feed rate cutting. Achieves large machining allowance and high efficiency machining with special corner-R shape. Ramping and arc machining are possible.


PDR type


General Purpose Ball-Nosed End Mill

Recommended Cutting Conditions



Copying

Workpiece		Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12
Pre-hardened Steel (AISI P20, C)	52HRC	ø6 :0.32mm×0.55Dc ø8 :0.42mm×0.55Dc ø10:0.53mm×0.55Dc ø12:0.63mm×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
SNCM439 (AISI 4340, C)	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

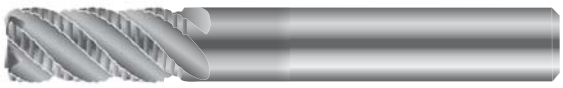
For ramping and arc machining, please refer to page L47.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4RFSM, 6RFSM

Number of Flutes: 4, 6

Roughing of Hard Materials

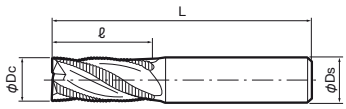




Recommended Material ★ 1st Recommendation







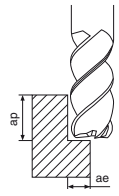
Lineup

(Unit: mm)

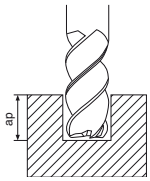
Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
4RFSM060-130-06	●	6	-0.030 -0.105	13	6	57	4
4RFSM080-160-08	●	8	-0.040 -0.130	16	8	63	4
4RFSM100-220-10	●	10	-0.040 -0.130	22	10	72	4
4RFSM120-260-12	●	12	-0.050 -0.160	26	12	83	4
4RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	4
4RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	4
6RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	6
6RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	6
6RFSM250-450-25	●	25	-0.065 -0.195	45	25	121	6

- Due to the strong cutting edge with large flat surface, it is suitable for machining of hardened materials and titanium alloy. Four flute type and 6 flute type are available.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16		ø20		ø25
								4 Flute	6 Flute	4 Flute	6 Flute	
Steel	35~45HRC	1.5Dc×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
	45~55HRC	1.5Dc×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
	55~60HRC	1.5Dc×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
Titanium Alloy	< 40HRC	1.5Dc×0.33Dc	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
	> 40HRC	1.5Dc×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
Inconel		1Dc×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

Please refer to page L46 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3RFRS, 4RFRS

Number of Flutes: 3, 4

Rough Copying (Radius / Short)

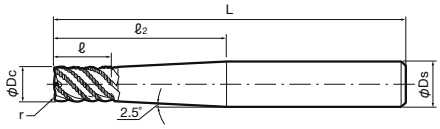
Recommended Material ★ 1st Recommendation

P 30～40HRC ★H ～55HRC ★H ～68HRC M Stainless steel ★S Titanium Alloy K Cast Iron



3 4

TiAlN Radius R↘ h6 Shank Dia. ±0.05 mm R↘ 45° Cutting shape



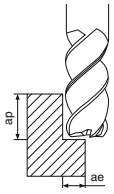
Lineup

(Unit:mm)

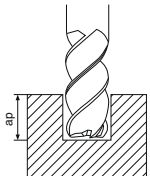
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Edge Length ℓ	Shank Dia. øDs	Total length L	Spec of Corners r	Under Neck Length ℓ2	Number of Flutes Z
3RFRS040-040-06-R075	●	4	-0.030 -0.105	4	6	75	R 0.75	27.5	3
3RFRS050-050-06-R075	●	5	-0.030 -0.105	5	6	75	R 0.75	17	3
4RFRS060-060-10-R075	●	6	-0.030 -0.105	6	10	100	R 0.75	52.5	4
4RFRS080-080-10-R075	●	8	-0.040 -0.130	8	10	100	R 0.75	31.5	4
4RFRS100-100-12-R075	●	10	-0.040 -0.130	10	12	125	R 0.75	33.5	4
4RFRS120-120-16-R100	●	12	-0.050 -0.160	12	16	125	R 1.0	58.5	4

● For rough copying. It is available for roughing and semi finishing, but especially suitable for rough copying of mold. Shank diameter is larger than the cutting diameter and it is highly rigid. Due to the strong cutting edge with large flat surface, it is suitable for hardened materials and titanium alloy. It can provide the good surface roughness of 2.5 to 4.9Ra (μm).

Recommended Cutting Conditions



Shouldering



Grooving

Shouldering

Workpiece Materials		Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø4	ø5	ø6	ø8	ø10	ø12
Steel	< 30HRC	0.8Dc×0.5Dc	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800
			Feed Rate (mm/min)	860	860	1,150	1,150	1,150	1,150
	30~40HRC	0.8Dc×0.4Dc	Spindle Revolution (min^{-1})	9,600	7,600	6,400	4,800	3,800	3,200
			Feed Rate (mm/min)	430	460	640	610	610	570
	40~50HRC	0.8Dc×0.4Dc	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100
			Feed Rate (mm/min)	190	230	320	320	320	340
	50~60HRC	0.8Dc×0.25Dc	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600
			Feed Rate (mm/min)	100	100	130	140	150	160
	60~70HRC	0.8Dc×0.2Dc	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100
			Feed Rate (mm/min)	60	60	70	70	80	90

Please refer to page L46 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

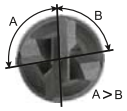
4YECM, 4YERM, 4YEKM

Number of Flutes: 4

Semi-Finishing of Difficult-to-Cut Material (Medium)



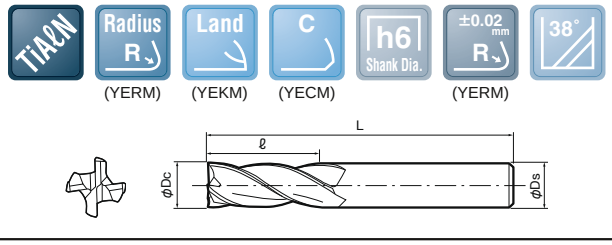




4YECM varied interval flute

Recommended Material ★ 1st Recommendation





Lineup

(Unit:mm)

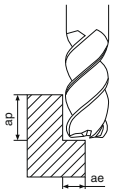
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Spec of Corners	Number of Flutes Z
4YECM040-120-06-C04	●	4	-0.020 -0.038	12	6	55	C 0.4	4
4YECM050-130-06-C04	●	5	-0.020 -0.038	13	6	57	C 0.4	4
4YECM060-130-06-C04	●	6	-0.020 -0.038	13	6	57	C 0.4	4
4YECM080-160-08-C04	●	8	-0.025 -0.047	16	8	63	C 0.4	4
4YECM090-190-10-C05	●	9	-0.025 -0.047	19	10	72	C 0.5	4
4YECM100-220-10-C05	●	10	-0.025 -0.047	22	10	72	C 0.5	4
4YECM120-260-12-C05	●	12	-0.032 -0.059	26	12	83	C 0.5	4
4YECM160-320-16-C05	●	16	-0.032 -0.059	32	16	92	C 0.5	4
4YECM200-380-20-C05	●	20	-0.040 -0.073	38	20	104	C 0.5	4
4YECM250-450-25-C05	●	25	-0.040 -0.073	45	25	121	C 0.5	4
4YERM040-120-06-R020	●	4	-0.020 -0.038	12	6	55	R 0.2	4
4YERM050-130-06-R020	●	5	-0.020 -0.038	13	6	57	R 0.2	4
4YERM060-130-06-R020	●	6	-0.020 -0.038	13	6	57	R 0.2	4
4YERM080-160-08-R020	●	8	-0.025 -0.047	16	8	63	R 0.2	4
4YERM090-190-10-R020	●	9	-0.025 -0.047	19	10	72	R 0.2	4

(Unit:mm)

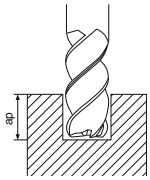
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Spec of Corners	Number of Flutes Z
4YERM100-220-10-R030	●	10	-0.025 -0.047	22	10	72	R 0.3	4
4YERM120-260-12-R030	●	12	-0.032 -0.059	26	12	83	R 0.3	4
4YERM160-320-16-R030	●	16	-0.032 -0.059	32	16	92	R 0.3	4
4YERM200-380-20-R030	●	20	-0.040 -0.073	38	20	104	R 0.3	4
4YERM250-450-25-R030	●	25	-0.040 -0.073	45	25	121	R 0.3	4
4YEKM040-120-06	●	4	-0.020 -0.038	12	6	55	-	4
4YEKM050-130-06	●	5	-0.020 -0.038	13	6	57	-	4
4YEKM060-130-06	●	6	-0.020 -0.038	13	6	57	-	4
4YEKM080-160-08	●	8	-0.025 -0.047	16	8	63	-	4
4YEKM090-190-10	●	9	-0.025 -0.047	19	10	72	-	4
4YEKM100-220-10	●	10	-0.025 -0.047	22	10	72	-	4
4YEKM120-260-12	●	12	-0.032 -0.059	26	12	83	-	4
4YEKM160-320-16	●	16	-0.032 -0.059	32	16	92	-	4
4YEKM200-380-20	●	20	-0.040 -0.073	38	20	104	-	4
4YEKM250-450-25	●	25	-0.040 -0.073	45	25	121	-	4

● Unequally partitioned flute design prevents vibration and reduces cutting force at slotting. This has led to the high speed and high feed machining. We provide three types of edge shape for different application; Radius, Corner Land and Corner Chamfered type.

Recommended Cutting Conditions



Shouldering



Grooving

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Stainless Steel	1Dc×0.5Dc	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300	1,000
		Feed Rate (mm/min)	640	610	670	640	600	550	450	390	300
Heat-resistant Alloy	1Dc×0.2Dc	Spindle Revolution (min^{-1})	2,400	1,900	1,600	1,200	1,000	800	600	500	400
		Feed Rate (mm/min)	100	100	110	130	120	120	120	110	80
Soft Steel	1Dc×0.5Dc	Spindle Revolution (min^{-1})	13,100	10,500	8,800	6,600	5,300	4,400	3,300	2,600	2,100
		Feed Rate (mm/min)	1,310	1,260	1,400	1,580	1,260	1,230	990	950	840
Titanium Alloy	1Dc×0.5Dc	Spindle Revolution (min^{-1})	4,400	3,500	2,900	2,200	1,800	1,500	1,100	900	700
		Feed Rate (mm/min)	210	210	230	260	220	220	200	210	200
Gray Cast Iron	1Dc×0.5Dc	Spindle Revolution (min^{-1})	10,700	8,600	7,200	5,400	4,300	3,600	2,700	2,200	1,700
		Feed Rate (mm/min)	1,070	1,070	1,150	1,290	1,030	1,000	810	770	690

* Machining with coolant is recommended for stainless steel.

4YEKM is not recommended for Slotting.
Please refer to page L45 for Slotting with 4YECM / 4YERM.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

4YFSM, 6YFSM

Number of Flutes: 4, 6

Semi-Finishing of Difficult-to-Cut Material

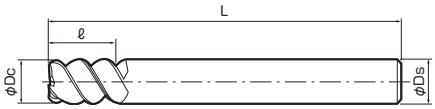


4 6

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel ★ | S Titanium Alloy ★ | S Heat-resistant Alloy ★ | K Cast Iron ★

TiAlN | Sharp | h6 Shank Dia. | 45°



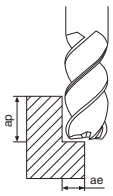
Lineup

(Unit: mm)

Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
4YFSM040-130-06	●	4	-0.020 -0.038	13	6	50	4
4YFSM050-130-06	●	5	-0.020 -0.038	13	6	50	4
6YFSM060-130-06	●	6	-0.020 -0.038	13	6	50	6
6YFSM080-190-08	●	8	-0.025 -0.047	19	8	63	6
6YFSM100-220-10	●	10	-0.025 -0.047	22	10	76	6
6YFSM120-260-12	●	12	-0.032 -0.059	26	12	76	6
6YFSM160-320-16	●	16	-0.032 -0.059	32	16	89	6
6YFSM200-380-20	●	20	-0.040 -0.073	38	20	104	6

● Multi-Edge Type with web thickness ratio of 60% having superior chip evacuation. It has positive type rake angle and suitable for semi-finishing of difficult-to-cut materials such as stainless steel and inconel.

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
Carbon Steel < 20HRC	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	10,000	8,000	6,600	5,000	4,000	3,300	2,500	2,000
		Feed Rate (mm/min)	800	800	1,340	1,340	1,340	1,350	1,490	1,610
Alloy Steel < 30HRC	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
		Feed Rate (mm/min)	570	570	960	960	960	960	1,080	1,150
Pre-hardened Steel 30~45HRC	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	6,000	4,800	4,000	3,000	2,400	2,000	1,500	1,200
		Feed Rate (mm/min)	360	360	620	660	660	660	740	790
Stainless Steel	1.5Dc×0.1Dc	Spindle Revolution (min^{-1})	5,200	4,100	3,500	2,600	2,100	1,700	1,300	1,000
		Feed Rate (mm/min)	270	280	520	540	550	550	620	650
Heat-resistant Alloy	1Dc×0.05Dc	Spindle Revolution (min^{-1})	3,600	2,900	2,400	1,800	1,400	1,200	900	700
		Feed Rate (mm/min)	160	170	340	360	360	360	410	410
Titanium Alloy	1Dc×0.05Dc	Spindle Revolution (min^{-1})	3,600	2,900	2,400	1,800	1,400	1,200	900	700
		Feed Rate (mm/min)	160	170	340	360	360	360	410	410

* Machining with coolant is recommended for stainless steel.

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

5DERM, 5DEKM

Number of Flutes: 5

Semi-Finishing of Difficult-to-Cut Material (High Feed Rate)

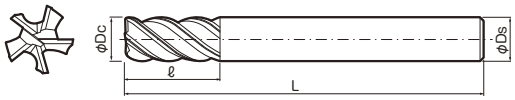


5

Recommended Material ★ 1st Recommendation

P ~750N/mm² ★ | P ~30HRC ★ | P 30~40HRC ★ | M Stainless steel ★ | S Titanium Alloy ★ | S Heat-resistant Alloy ★ | K Cast Iron ★

ACTIN | Radius R | Land | h6 Shank Dia. | 38°



Lineup

(Unit: mm)

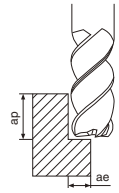
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Spec of Corners	Number of Flutes Z
5DERM040-120-06-R025	●	4	-0.020 -0.038	12	6	55	0.25	5
5DERM050-130-06-R025	●	5	-0.020 -0.038	13	6	57	0.25	5
5DERM060-130-06-R040	●	6	-0.020 -0.038	13	6	57	0.4	5
5DERM080-160-08-R050	●	8	-0.025 -0.047	16	8	63	0.5	5
5DERM090-190-10-R050	●	9	-0.025 -0.047	19	10	72	0.5	5
5DERM100-220-10-R050	●	10	-0.025 -0.047	22	10	72	0.5	5
5DERM120-260-12-R075	●	12	-0.032 -0.059	26	12	83	0.75	5
5DERM160-320-16-R075	●	16	-0.032 -0.059	32	16	92	0.75	5
5DERM200-380-20-R075	●	20	-0.040 -0.073	38	20	104	0.75	5
5DERM250-450-25-R075	●	25	-0.040 -0.073	45	25	121	0.75	5

(Unit: mm)

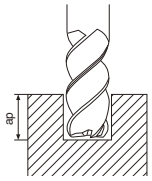
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Number of Flutes Z
5DEKM040-120-06	●	4	-0.020 -0.038	12	6	55	5
5DEKM050-130-06	●	5	-0.020 -0.038	13	6	57	5
5DEKM060-130-06	●	6	-0.020 -0.038	13	6	57	5
5DEKM080-160-08	●	8	-0.025 -0.047	16	8	63	5
5DEKM090-190-10	●	9	-0.025 -0.047	19	10	72	5
5DEKM100-220-10	●	10	-0.025 -0.047	22	10	72	5
5DEKM120-260-12	●	12	-0.032 -0.059	26	12	83	5
5DEKM160-320-16	●	16	-0.032 -0.059	32	16	92	5
5DEKM200-380-20	●	20	-0.040 -0.073	38	20	104	5
5DEKM250-450-25	●	25	-0.040 -0.073	45	25	121	5

- High feed rate machining is possible with 5 edge design. Unequally partitioned flute design prevents vibration. 5DERM type is applicable for slotting with a cutting depth up to 0.8D.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Medium and high carbon steel > 0.3%C	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	16,000	12,700	10,600	8,000	6,400	5,300	4,000	3,200	2,500
		Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900	1,600	1,600	1,400
Alloy Steel Alloy tool Steel < 330HB, < 35HRC	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	14,300	11,500	9,600	7,200	5,700	4,800	3,600	2,900	2,300
		Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700	1,400	1,300	1,100
Alloy Steel Alloy tool Steel 340~450HB, 36~48HRC	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	13,000	10,000	8,500	6,400	5,100	4,200	3,200	2,500	2,000
		Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300	1,100	1,000	1,000
Austenitic Stainless Steel	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	9,200	7,300	6,100	4,600	3,700	3,100	2,300	1,800	1,500
		Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100	920	820	730
Austenitic Stainless Steel	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300	1,000
		Feed Rate (mm/min)	640	760	640	640	640	640	560	510	410
Gray Cast Iron	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	14,000	11,000	9,000	6,800	5,400	4,500	3,400	2,700	2,200
		Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800	1,700	1,600	1,400
Nodular Cast Iron, CGI and Malleable Cast Iron	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	10,000	8,300	6,900	5,200	4,100	3,500	2,600	2,100	1,700
		Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000	910	830	830
Heat-resistant Alloy	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	3,200	2,500	2,100	1,600	1,300	1,100	800	640	510
		Feed Rate (mm/min)	160	130	210	240	190	210	200	190	180
Titanium Alloy	5DERM: 1.5Dc×0.5Dc 5DEKM: 1.5Dc×0.25Dc	Spindle Revolution (min⁻¹)	4,800	3,800	3,200	2,400	1,900	1,600	1,200	960	760
		Feed Rate (mm/min)	480	380	480	480	380	400	360	380	340

Please refer to page L45 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Number of Flutes: 4

Semi-Finishing of Difficult-to-Cut Material (Ball-nose end mill with 4 flutes)

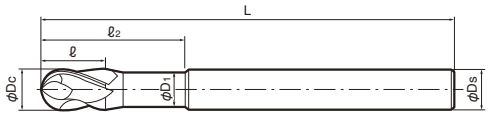




Recommended Material ★ 1st Recommendation







Lineup

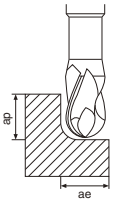
(Unit: mm)

Description	Std.	*Radius of Ball Nose	Outside Dia.	Outside Dia. tolerance	Edge Length	Neck Dia.	Under Neck Length	Shank Dia.	Total length	Number of Flutes
		R	øDc		ℓ	øD1	ℓ2	øDs	L	Z
4YEBM050-090-06	●	R2.5	5	-0.020 -0.038	9	4.5	15	6	57	4
4YEBM060-100-06	●	R3	6	-0.020 -0.038	10	5.5	15	6	57	4
4YEBM080-120-08	●	R4	8	-0.025 -0.047	12	7.4	20	8	63	4
4YEBM100-140-10	●	R5	10	-0.025 -0.047	14	9.2	25	10	72	4
4YEBM120-160-12	●	R6	12	-0.032 -0.059	16	11	30	12	83	4
4YEBM160-220-16	●	R8	16	-0.032 -0.059	22	15	38	16	92	4
4YEBM200-260-20	●	R10	20	-0.040 -0.073	26	19	50	20	104	4

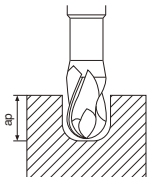
* Actual ball-nose radius will be half of actual measurement of outer diameter.

● Ball-nose end mill for semi-finishing of Difficult-to-Cut materials.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø5	ø6	ø8	ø10	ø12	ø16	ø20
Stainless Steel	1Dc×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
Heat-resistant Alloy	1Dc×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
Soft Steels	1Dc×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
Titanium Alloy	1Dc×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
Gray Cast Iron	1Dc×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

* Machining with coolant is recommended for stainless steel.

Please refer to page L45 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3NESM

Number of Flutes: 3

Finishing of Aluminum

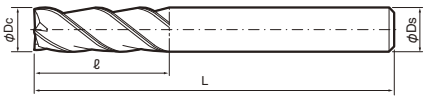


3

Recommended Material ★ 1st Recommendation

N Aluminum & Non Ferrous Material

Uncoated | Sharp | h6 Shank Dia. | 38°



Lineup

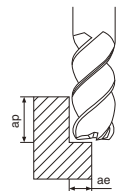
(Unit: mm)

Description	Std.	Outside Dia.	Outside Dia. tolerance	Edge Length	Shank Dia.	Total length	Number of Flutes
		øDc		ℓ	øDs	L	Z
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

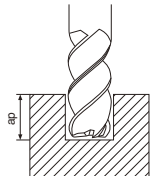
* Outside dia. of over 6mm (øDc) has margin.

- A wiper is attached at the lower edge for improving bottom surface finish.
  Chattering is controlled with cutting edge slots at varied intervals, and finishing of lateral surfaces is improved.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20
Aluminum Alloy	1.5Dc×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

Please refer to page L46 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Number of Flutes: 2, 3

Semi-Finishing of Aluminum (Medium)

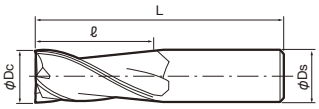


2 3

Recommended Material ★ 1st Recommendation

N Aluminum & Non Ferrous Material

Uncoated | Sharp | h6 Shank Dia. | 45°



Lineup

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Number of Flutes Z
2NFSM010-040-04	●	1	-0.014 -0.028	4	4	38	2
2NFSM015-060-04	●	1.5	-0.014 -0.028	6	4	38	2
2NFSM020-080-04	●	2	-0.014 -0.028	8	4	38	2
2NFSM025-080-04	●	2.5	-0.014 -0.028	8	4	38	2
2NFSM030-080-06	●	3	-0.014 -0.028	8	6	50	2
2NFSM040-080-06	●	4	-0.020 -0.038	8	6	50	2
2NFSM050-140-06	●	5	-0.020 -0.038	14	6	50	2
2NFSM060-160-06	●	6	0 -0.008	16	6	50	2
2NFSM080-200-08	●	8	0 -0.009	20	8	63	2
2NFSM100-220-10	●	10	0 -0.009	22	10	76	2
2NFSM120-250-12	●	12	0 -0.011	25	12	76	2

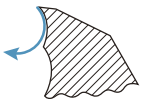
(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Length of edge ℓ	Shank Dia. øDs	Overall length L	Number of Flutes Z
2NFSM160-320-16	●	16	0 -0.011	32	16	89	2
2NFSM200-380-20	●	20	0 -0.013	38	20	104	2
3NFSM030-120-06	●	3	-0.014 -0.028	12	6	50	3
3NFSM040-120-06	●	4	-0.020 -0.038	12	6	50	3
3NFSM050-140-06	●	5	-0.020 -0.038	14	6	50	3
3NFSM060-160-06	●	6	0 -0.008	16	6	50	3
3NFSM080-200-08	●	8	0 -0.009	20	8	63	3
3NFSM100-220-10	●	10	0 -0.009	22	10	76	3
3NFSM120-250-12	●	12	0 -0.011	25	12	76	3
3NFSM160-320-16	●	16	0 -0.011	32	16	89	3
3NFSM200-380-20	●	20	0 -0.013	38	20	104	3

* Outside dia. of over 6mm (øDc) has margin.

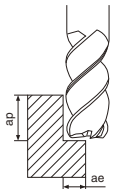
- Sharp cutting oriented for Aluminum machining. 45° helix angle achieves good chip evacuation.

A convex shape in the slot improves chip evacuation.

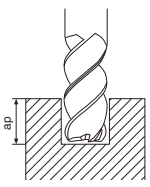


NFSM type rake angle

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

2 Flute

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20
Aluminum Alloy	1Dc×0.5Dc	Spindle Revolution (min^{-1})	26,500	13,300	10,000	8,000	6,600	5,000	4,000
		Feed Rate (mm/min)	690	950	950	1,130	1,260	1,000	880
High-silicon Aluminum	1Dc×0.5Dc	Spindle Revolution (min^{-1})	19,100	9,600	7,200	5,700	4,800	3,600	2,900
		Feed Rate (mm/min)	420	500	500	600	670	770	570

3 Flute

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20
Aluminum Alloy	1Dc×0.5Dc	Spindle Revolution (min^{-1})	26,500	13,300	10,000	8,000	6,600	5,000	4,000
		Feed Rate (mm/min)	1,040	1,400	1,400	1,700	1,890	1,490	1,310
High-silicon Aluminum	1Dc×0.5Dc	Spindle Revolution (min^{-1})	19,100	9,600	7,200	5,700	4,800	3,600	2,900
		Feed Rate (mm/min)	630	750	750	890	1,000	1,160	860

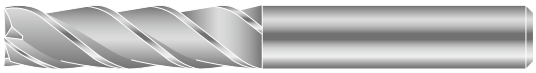
Please refer to page L46 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3NFSL

Number of Flutes: 3

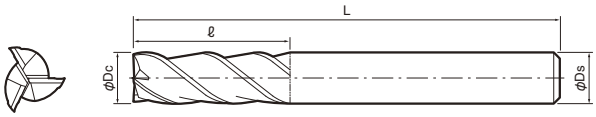
Semi-Finishing of Aluminum (Long)



Recommended Material ★ 1st Recommendation

N Aluminum & Non Ferrous Material

Uncoated | Sharp | h6 Shank Dia. | 45°



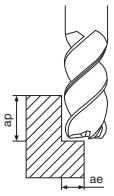
Lineup

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Edge Length ℓ	Shank Dia. øDs	Total length L	Number of Flutes Z
3NFSL030-190-06	●	3	-0.014 -0.028	19	6	63	3
3NFSL040-190-06	●	4	-0.020 -0.038	19	6	63	3
3NFSL050-200-06	●	5	-0.020 -0.038	20	6	63	3
3NFSL060-280-06	●	6	0 -0.008	28	6	76	3
3NFSL080-300-08	●	8	0 -0.009	30	8	76	3
3NFSL100-340-10	●	10	0 -0.009	34	10	89	3
3NFSL120-450-12	●	12	0 -0.011	45	12	100	3
3NFSL160-560-16	●	16	0 -0.011	56	16	125	3
3NFSL200-600-20	●	20	0 -0.013	60	20	125	3

* Outside dia. of over 6mm (øDc) has margin.

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Aluminum Alloy	2.5Dc×0.5Dc	Spindle Revolution (min^{-1})	18,500	9,300	7,000	5,600	4,600	3,500	2,800
		Feed Rate (mm/min)	730	980	980	1,200	1,320	1,040	920
High-silicon Aluminum	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	13,400	6,700	5,000	4,000	3,400	2,500	2,000
		Feed Rate (mm/min)	440	530	530	620	700	810	600

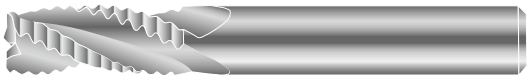
Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3AESM

Number of Flutes: 3

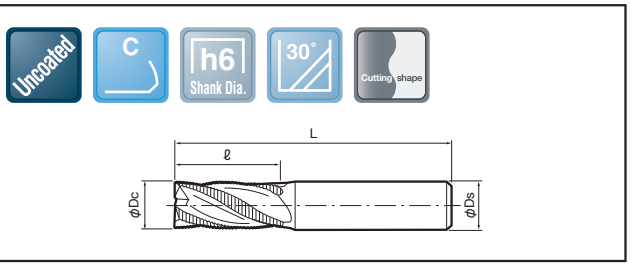
Roughing of Aluminum





Recommended Material ★ 1st Recommendation





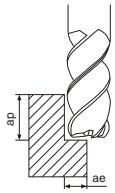
Lineup

(Unit: mm)

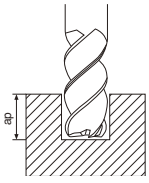
Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Edge Length ℓ	Shank Dia. øDs	Total length L	Spec of Corners C	Number of Flutes Z
3AESM060-130-06	●	6	-0.030 -0.105	13	6	57	0.6	3
3AESM080-160-08	●	8	-0.040 -0.130	16	8	63	0.6	3
3AESM100-220-10	●	10	-0.040 -0.130	22	10	72	0.6	3
3AESM120-260-12	●	12	-0.050 -0.160	26	12	83	1	3
3AESM160-320-16	●	16	-0.050 -0.160	32	16	92	1	3
3AESM200-380-20	●	20	-0.065 -0.195	38	20	104	1	3
3AESM250-450-25	●	25	-0.065 -0.195	45	25	121	1	3

● Three flutes type for roughing of Aluminum / Non-ferrous Metal. With Corner Chamfering.

Recommended Cutting Conditions



Shouldering



Slotting

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Aluminum Alloy	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	33,200	24,900	19,900	16,600	12,400	10,000	8,000
		Feed Rate (mm/min)	5,370	5,150	5,080	4,980	4,890	4,840	4,780
High-silicon Aluminum	1.5Dc×0.5Dc	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,500
		Feed Rate (mm/min)	1,430	1,390	1,360	1,320	1,300	1,290	1,280

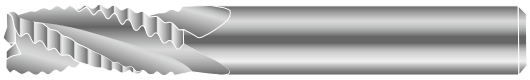
Please refer to page L46 about Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

3AESL

Number of Flutes: 3

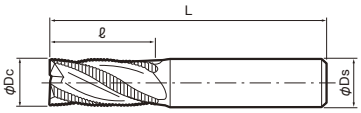
Roughing of Aluminum (Long)



Recommended Material ★ 1st Recommendation

N Aluminum & Non Ferrous Material

Uncoated | C | h6 Shank Dia. | 30° | Cutting shape

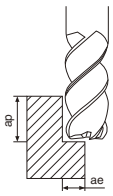


Lineup

(Unit: mm)

Description	Std.	Outside Dia. øDc	Outside Dia. tolerance	Edge Length ℓ	Shank Dia. øDs	Total length L	Spec of Corners C	Number of Flutes Z
3AESL060-240-06	●	6	-0.030 -0.105	24	6	76	0.6	3
3AESL080-280-08	●	8	-0.040 -0.130	28	8	76	0.6	3
3AESL100-340-10	●	10	-0.040 -0.130	34	10	89	0.6	3
3AESL120-450-12	●	12	-0.050 -0.160	45	12	100	1	3
3AESL160-560-16	●	16	-0.050 -0.160	56	16	125	1	3
3AESL200-600-20	●	20	-0.065 -0.195	60	20	125	1	3
3AESL250-800-25	●	25	-0.065 -0.195	80	25	150	1	3

Recommended Cutting Conditions



Shouldering

Shouldering

Workpiece Materials	Depth of Cut (ap×ae) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Aluminum Alloy	2.5Dc×0.5Dc	Spindle Revolution (min^{-1})	23,000	17,500	14,000	11,600	8,700	7,000	5,600
		Feed Rate (mm/min)	3,760	3,600	3,560	3,490	3,420	3,390	3,350
High-silicon Aluminum	2.5Dc×0.5Dc	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,800
		Feed Rate (mm/min)	1,000	970	950	920	910	900	900

Not Recommended for Slotting.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions for Slotting (1)

Workpiece Materials	Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø0.5	ø1	ø2	ø4	ø6	ø8	ø12	ø16
2FESS 2FESM (L12~L14)										
Carbon Steel	0.1Dc (Dc＜ø1) 0.3Dc (ø1≦Dc＜ø3) 0.5Dc (Dc≧ø3)	Spindle Revolution (min^{-1})	19,000	15,300	8,000	4,000	2,700	2,000	1,300	1,000
		Feed Rate (mm/min)	130	135	140	225	250	250	245	245
Alloy Steel	0.1Dc (Dc＜ø1) 0.3Dc (ø1≦Dc＜ø3) 0.5Dc (Dc≧ø3)	Spindle Revolution (min^{-1})	16,000	13,000	6,600	3,400	2,200	1,700	1,200	900
		Feed Rate (mm/min)	105	115	130	170	190	185	185	185
Pre-hardened Steel 30~45HRC	0.1Dc (Dc＜ø1) 0.3Dc (ø1≦Dc＜ø3) 0.5Dc (Dc≧ø3)	Spindle Revolution (min^{-1})	13,500	7,600	4,300	2,500	1,800	1,300	900	700
		Feed Rate (mm/min)	30	35	50	60	63	63	65	65
Stainless Steel	0.1Dc (Dc＜ø1) 0.3Dc (ø1≦Dc＜ø3) 0.5Dc (Dc≧ø3)	Spindle Revolution (min^{-1})	16,000	13,000	6,600	3,400	2,200	1,700	1,200	900
		Feed Rate (mm/min)	35	60	60	65	70	70	70	70

Workpiece Materials	Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø14	ø16	ø20	ø25
2FEKS 2FEKM (L17~L18)														
Carbon Steel	0.5Dc	Spindle Revolution (min^{-1})	-	7,500	6,000	5,000	4,400	3,300	2,700	2,300	2,100	1,900	-	-
		Feed Rate (mm/min)		240	260	310	340	340	340	340	330	320		
Alloy Steel	0.5Dc	Spindle Revolution (min^{-1})		7,200	5,400	4,300	3,600	2,700	2,200	1,800	1,600	1,500		
		Feed Rate (mm/min)		270	270	270	270	270	270	270	270	270		
Pre-hardened Steel 30~45HRC	0.5Dc	Spindle Revolution (min^{-1})		5,300	4,000	3,200	2,600	2,000	1,600	1,300	1,100	1,000		
		Feed Rate (mm/min)		120	120	120	120	120	120	120	120	120		
Stainless Steel	0.5Dc	Spindle Revolution (min^{-1})		5,300	4,000	3,200	2,600	2,000	1,600	1,300	1,100	1,000		
		Feed Rate (mm/min)		80	90	90	100	100	100	90	90	90		
2FESW (L10~L11)														
Carbon Steel	0.2Dc	Spindle Revolution (min^{-1})	-	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,300	-	-	-
		Feed Rate (mm/min)		660	640	640	640	520	450	410	350			
Alloy Steel	0.2Dc	Spindle Revolution (min^{-1})		7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600			
		Feed Rate (mm/min)		420	430	430	430	350	300	270	230			
Pre-hardened Steel 30~45HRC	0.2Dc	Spindle Revolution (min^{-1})		7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600			
		Feed Rate (mm/min)		420	430	430	430	350	300	270	230			
Stainless Steel	0.2Dc	Spindle Revolution (min^{-1})		6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,400			
		Feed Rate (mm/min)		320	320	320	320	260	230	210	180			
3FESW (L10～L11)														
Carbon Steel	0.2Dc	Spindle Revolution (min^{-1})	-	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,300	-	-	-
		Feed Rate (mm/min)		810	800	800	800	650	560	510	450			
Alloy Steel	0.2Dc	Spindle Revolution (min^{-1})		7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600			
		Feed Rate (mm/min)		530	530	530	530	430	370	340	290			
Pre-hardened Steel 30~45HRC	0.2Dc	Spindle Revolution (min^{-1})		7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600			
		Feed Rate (mm/min)		530	530	530	530	430	370	340	290			
Stainless Steel	0.2Dc	Spindle Revolution (min^{-1})		6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,400			
		Feed Rate (mm/min)		400	400	400	400	320	280	260	230			
4FESW (L10～L11)														
Carbon Steel	0.2Dc	Spindle Revolution (min^{-1})	-	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,300	-	-	-
		Feed Rate (mm/min)		960	960	960	960	780	680	620	550			
Alloy Steel	0.2Dc	Spindle Revolution (min^{-1})		7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600			
		Feed Rate (mm/min)		640	640	640	640	520	450	410	350			
Pre-hardened Steel 30~45HRC	0.2Dc	Spindle Revolution (min^{-1})		7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,600			
		Feed Rate (mm/min)		640	640	640	640	520	450	410	350			
Stainless Steel	0.2Dc	Spindle Revolution (min^{-1})		6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,400			
		Feed Rate (mm/min)		480	480	480	480	390	340	310	280			

Workpiece Materials		Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø14	ø16	ø20	ø25
3UFSM (L20)															
Steel	< 42HRC	0.25Dc	Spindle Revolution (min^{-1})	19,000	12,700	9,500	7,600	6,400	4,800	3,800	3,200	-	2,400	1,900	-
			Feed Rate (mm/min)	570	495	513	456	480	461	456	432		360	285	
	42~48HRC	0.25Dc	Spindle Revolution (min^{-1})	16,000	10,600	8,000	6,400	5,300	4,000	3,200	2,700		2,000	1,600	
			Feed Rate (mm/min)	384	331	346	307	318	307	307	292		240	240	
	48~52HRC	0.25Dc	Spindle Revolution (min^{-1})	12,700	8,500	6,400	5,100	4,300	3,200	2,500	2,100		1,600	1,300	
			Feed Rate (mm/min)	274	239	249	220	232	221	216	204		173	176	
Cast Iron	< 180HB	0.5Dc	Spindle Revolution (min^{-1})	25,500	17,000	13,000	10,200	8,500	6,400	5,100	4,200		3,200	2,500	
			Feed Rate (mm/min)	765	663	702	612	638	614	612	567		480	375	
	> 180HB	0.5Dc	Spindle Revolution (min^{-1})	22,300	15,000	11,000	8,900	7,400	5,600	4,500	3,700		2,800	2,200	
			Feed Rate (mm/min)	669	585	594	534	555	538	540	500		420	330	
Stainless Steel		0.25Dc	Spindle Revolution (min^{-1})	16,000	10,600	8,000	6,400	5,300	4,000	3,200	2,700		2,000	1,600	
			Feed Rate (mm/min)	389	389	389	432	464	464	443	400		300	250	
Titanium Alloy		0.25Dc	Spindle Revolution (min^{-1})	16,000	10,600	8,000	6,400	5,300	4,000	3,200	2,700		2,000	1,600	
			Feed Rate (mm/min)	382	382	382	424	456	456	435	392		300	250	

Recommended Cutting Conditions for Slotting (2)

Workpiece Materials		Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20	ø25
3RDSM 4RDSM 5RDSM (L23)														
Steel	< 22HRC	0.75Dc	Spindle Revolution (min^{-1})	-	-	13,900	11,100	9,300	6,900	5,600	4,600	3,500	2,800	2,200
			Feed Rate (mm/min)			750	770	800	800	1,000	1,030	1,040	1,050	1,110
	22~32HRC	0.75Dc	Spindle Revolution (min^{-1})			11,900	9,500	7,900	5,900	4,800	4,000	3,000	2,400	1,900
			Feed Rate (mm/min)			540	540	550	550	740	740	740	760	860
	32~40HRC	0.6Dc	Spindle Revolution (min^{-1})			8,000	6,400	5,300	4,000	3,200	2,600	2,000	1,600	1,300
			Feed Rate (mm/min)			240	250	260	260	340	340	330	330	330
	40~45HRC	0.5Dc	Spindle Revolution (min^{-1})			6,400	5,100	4,300	3,200	2,600	2,200	1,600	1,300	1,000
			Feed Rate (mm/min)			150	170	180	180	240	230	230	220	220
	45~50HRC	0.4Dc	Spindle Revolution (min^{-1})			5,700	4,500	3,800	2,900	2,300	1,900	1,400	1,100	900
			Feed Rate (mm/min)			140	140	140	140	170	160	160	150	150
Cast Iron		1Dc	Spindle Revolution (min^{-1})			11,900	9,500	7,900	5,900	4,800	4,000	3,000	2,400	1,900
			Feed Rate (mm/min)			640	660	700	700	900	900	900	910	1,140
4YECM 4YERM (L35)														
Stainless Steel		1Dc	Spindle Revolution (min^{-1})	-	-	7,200	5,700	4,800	3,600	2,900	2,400	1,800	1,400	1,100
			Feed Rate (mm/min)			700	700	760	720	690	620	500	430	340
Heat-resistant Alloy		0.3Dc	Spindle Revolution (min^{-1})			2,000	1,600	1,300	1,000	800	700	500	400	300
			Feed Rate (mm/min)			80	80	90	110	100	100	100	90	70
Soft Steel		1Dc	Spindle Revolution (min^{-1})			11,900	9,600	8,000	6,000	4,800	4,000	3,000	2,400	1,900
			Feed Rate (mm/min)			1,150	1,150	1,300	1,400	1,100	1,100	900	900	800
Titanium Alloy		1Dc	Spindle Revolution (min^{-1})			4,000	3,200	2,700	2,000	1,600	1,300	1,000	800	600
			Feed Rate (mm/min)			190	190	210	240	200	200	180	180	180
Gray Cast Iron		1Dc	Spindle Revolution (min^{-1})			9,600	7,600	6,400	4,800	3,800	3,200	2,400	1,900	1,500
			Feed Rate (mm/min)			950	950	1,020	1,150	920	900	720	690	610

Workpiece Materials	Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø14	ø16	ø20	ø25
4YEBM (L38)														
Stainless Steel SUS304	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	
Heat-resistant Alloy	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	
Soft Steel	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	
Titanium Alloy	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	
Gray Cast Iron	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	

Workpiece Materials	Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20	ø25
5DERM 5DEKM (L37)											
Medium and high carbon steel > 0.3%C	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	16,000	12,700	10,600	8,000	6,400	5,300	4,000	3,200	2,500
		Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900	1,600	1,600	1,400
Alloy steel and alloy tool steel < 330HB, < 35HRC	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800	3,600	2,900	2,300
		Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700	1,400	1,300	1,100
Alloy steel and alloy tool steel 340~450HB, 36~48HRC	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	13,000	10,000	8,500	6,400	5,100	4,200	3,200	2,500	2,000
		Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300	1,100	1,000	1,000
Austenitic Stainless Steel	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	9,200	7,300	6,100	4,600	3,700	3,100	2,300	1,800	1,500
		Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100	920	820	730
Austenitic Stainless Steel	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300	1,000
		Feed Rate (mm/min)	640	760	640	640	640	640	560	510	410
Gray Cast Iron	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	14,000	11,000	9,000	6,800	5,400	4,500	3,400	2,700	2,200
		Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800	1,700	1,600	1,400
Nodular Cast Iron CGI and malleable cast iron	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	10,000	8,300	6,900	5,200	4,100	3,500	2,600	2,100	1,700
		Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000	910	830	830
Heat-resistant Alloy	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100	800	640	510
		Feed Rate (mm/min)	160	130	210	240	190	210	200	190	180
Titanium Alloy	5DERM: 0.8Dc 5DEKM: 0.25Dc	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600	1,200	960	760
		Feed Rate (mm/min)	480	380	480	480	380	400	360	380	340

Recommended Cutting Conditions for Slotting (3)

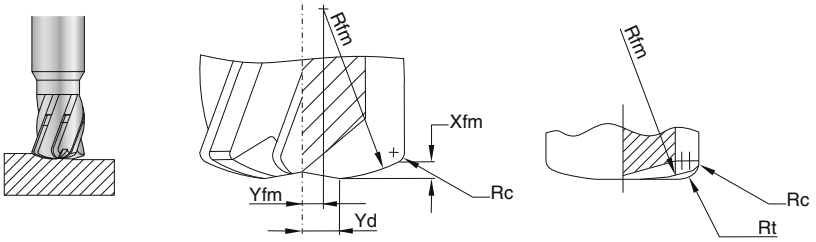
Workpiece Materials		Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20	ø25
4PGRM (L27)														
Steel	< 30HRC	0.5Dc	Spindle Revolution (min^{-1})	-	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300	-
			Feed Rate (mm/min)		900	900	900	900	900	920	930	960	920	
	30~40HRC	0.5Dc	Spindle Revolution (min^{-1})		7,600	5,700	4,500	3,800	2,900	2,300	1,900	1,400	1,100	
			Feed Rate (mm/min)		770	770	770	770	770	780	780	800	780	
	40~45HRC	0.5Dc	Spindle Revolution (min^{-1})		6,800	5,100	4,100	3,400	2,500	2,000	1,700	1,300	1,000	
			Feed Rate (mm/min)		570	570	570	570	570	570	560	560	530	
	45~50HRC	0.5Dc	Spindle Revolution (min^{-1})		5,100	3,800	3,100	2,500	1,900	1,500	1,300	1,000	800	
			Feed Rate (mm/min)		320	320	320	320	340	340	360	340	340	
	50~55HRC	0.5Dc	Spindle Revolution (min^{-1})		3,400	2,500	2,000	1,700	1,300	1,000	800	600	500	
			Feed Rate (mm/min)		150	150	150	150	150	160	150	150	150	
	> 55HRC	0.25Dc	Spindle Revolution (min^{-1})		3,000	2,200	1,800	1,500	1,100	900	700	600	400	
			Feed Rate (mm/min)		100	100	100	100	100	110	110	110	110	
3RFRS 4RFRS (L34)														
Steel	< 30HRC	0.8Dc	Spindle Revolution (min^{-1})	-	-	11,500	9,200	7,600	5,700	4,600	3,800	-	-	-
			Feed Rate (mm/min)			690	690	920	920	920	920			
	30~40HRC	0.8Dc	Spindle Revolution (min^{-1})			7,600	6,100	5,100	3,800	3,100	2,500			
			Feed Rate (mm/min)			340	370	490	490	490	460			
	40~50 HRC	0.5Dc	Spindle Revolution (min^{-1})			5,100	4,100	3,400	2,500	2,000	1,700			
			Feed Rate (mm/min)			150	180	260	260	260	270			
	50~60HRC	0.3Dc	Spindle Revolution (min^{-1})			3,800	3,100	2,500	1,900	1,500	1,300			
			Feed Rate (mm/min)			80	80	100	120	120	130			
	60~70HRC	0.25Dc	Spindle Revolution (min^{-1})			2,500	2,000	1,700	1,300	1,000	800			
			Feed Rate (mm/min)			50	50	60	60	60	70			

Workpiece Materials		Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø6	ø8	ø10	ø12	ø16		ø20		ø25
								4 Flute	6 Flute	4 Flute	6 Flute	
4RFSM 6RFSM (L33)												
Steel	35~45HRC	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	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	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
Titanium Alloy	< 40HRC	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	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
Inconel		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

Workpiece Materials	Depth of Cut (ap) (mm)	Outside Dia. (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20	ø25
3NESM (L39)										
Aluminum Alloy	1Dc	Spindle Revolution (min^{-1})	26,500	13,000	9,800	8,000	6,600	5,000	4,000	-
		Feed Rate (mm/min)	1,900	1,900	1,900	1,900	1,900	1,900	1,900	
2NFSM (L40)										
Aluminum Alloy	1Dc	Spindle Revolution (min^{-1})	21,200	10,600	8,000	6,400	5,300	4,000	3,200	2,500
		Feed Rate (mm/min)	550	750	750	900	1,010	800	700	660
High-silicon Aluminum	1Dc	Spindle Revolution (min^{-1})	15,900	7,900	5,900	4,800	4,000	3,000	2,400	1,900
		Feed Rate (mm/min)	350	420	420	500	560	640	480	420
3NFSM (L40)										
Aluminum Alloy	1Dc	Spindle Revolution (min^{-1})	21,200	10,600	8,000	6,400	5,300	4,000	3,200	2,500
		Feed Rate (mm/min)	830	1,100	1,100	1,360	1,510	1,290	1,050	920
High-silicon Aluminum	1Dc	Spindle Revolution (min^{-1})	15,900	7,900	5,900	4,800	4,000	3,000	2,400	1,900
		Feed Rate (mm/min)	520	630	630	740	830	960	710	630
3AESM (L42)										
Aluminum Alloy	1Dc	Spindle Revolution (min^{-1})	39,800	19,900	14,900	11,900	10,000	7,500	6,000	4,800
		Feed Rate (mm/min)	3,700	3,230	3,090	3,050	2,990	2,930	2,900	2,870
High-silicon Aluminum	1Dc	Spindle Revolution (min^{-1})	12,700	6,400	4,800	3,800	3,200	2,400	1,900	1,500
		Feed Rate (mm/min)	920	860	830	810	790	780	770	770

Ramping / Arc Machining

Details of 6PDRS cutting edge shape



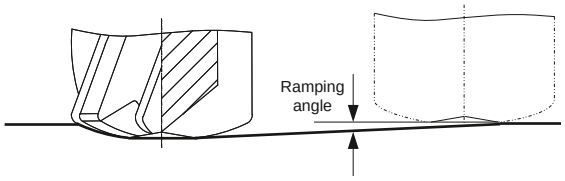
Xfm : Max. Depth of Cut
Yfm : Distance between center line of tool and center line of Rfm
Yd : Distance between center line of tool and start position of cutting edge
Rfm : Radius of tool tip
Rc : Corner R
Rt : Virtual radius in program

Description	Outside Dia.	Max. Depth of Cut (mm)	Radius of tool tip	Corner R	Distance between center line of tool and center line of Rfm	Distance between center line of tool and start position of cutting edge	Virtual radius in program
	øDc	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

- We do not recommend machining with a cut amount exceeding the Xfm value.

About Ramping

During ramping, please reduce the table feed rate with the ratio of the chart on the right.



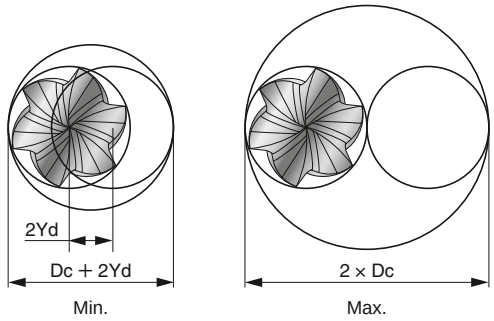
Ramping angle	1°	2°	3°	4°	5°
Feed rate when ramping	100%	70%	50%	30%	10%

*** Please refer to page L32 for standard cutting conditions.**

- During pocket machining, set the recess angle at 0.5 degrees.
- We do not recommend vertical milling.

About Arc Machining

Please use the range of the chart on the right, for one pass of machining hole diameter.



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

Troubleshooting

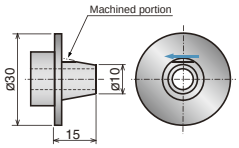
Trouble \ Countermeasures		Cutting Conditions: Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: fz (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: ap (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutting Conditions: reduce ae (cutting width)	Cutting Conditions: change tool path	Cutting Conditions: Down cut	Cutting Conditions: Coolant: Wet	Cutting Conditions: Coolant: Dry	Tool geometry: Relief Angle (Larger ↑ Smaller ↓)	Tool geometry: Rake Angle (Larger ↑ Smaller ↓)	Tool geometry: Helix Angle (Larger ↑ Smaller ↓)	Tool geometry: Number of Flutes (More ↑ Less ↓)	Tool geometry: Change to short type (edge length)	Tool geometry: Change to roughing end mill *2	Tool geometry: Change to radius type	Tool geometry: Change to sharp edge type	Tool geometry: Change to tool with corner land	Installation: Work material installation method	Installation: Adjustment for overhang length of tools	Installation: Insert Runout Check
Tools	Wear Increase	●↓	●↑ *1		●		●	●		●↑	●↑		●↑								
	Chipping		●↓	●↓	●	●			●	●↓	●↓					●		●	●		●
	Burning	●↓	●↓	●↓	●		●	●		●↑											
	Breakage		●↓	●↓	●									●						●	
Machining	Chattering	●↓	●↑ *1	●↓	●	●						●↓	●↓	●	●				●	●	
	Poor surface finish	●↑	●↓		●		●	●				●↑							●	●	●
	Burr generation		●↓			●	●	●			●↑										
	Inclination of slot		●↓	●↓								●↓	●↑							●	●
	Poor flatness / parallelism		●↓	●↓	●			●											●	●	●
	Poor dimensional precision		●↓	●↓	●	●								●			●		●	●	●
	Poor cutting quality	●↑			●						●↑	●↑	●↓		●		●				
	Chip biting / clogging		●↓	●↓	●	●		●					●↓								

*1) The lower feed rate may be suitable.
*2) When roughing was done with an insert without wave profile peripheral cutting edge.

Case Studies

9SMnPb28 (SUM24L)

- **OA Parts**
- **Vc = 88m/min (n=3,500min^{-1})**
- **ap=0.5mm**
- **fz=0.23mm/t (Vf=3200 mm/min)**
- **Wet**
- **4FESM080-190-08**



MEGACOAT	230pcs/edge
Competitor Coating E	100pcs/edge

- In addition to that Kyocera processed 2.3 times more workpices than Competitor E, there was no edge fracturing and the cutting surface was finished finely.

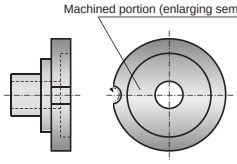

MEGACOAT
(Tool life: 230 pcs/edge)

Competitor Coating E
(Tool life: 100 pcs/edge)

(Evaluation by the user)

20Cr4 (SCr420)

- **Automotive Parts**
- **Vc = 40m/min (n=3,200min^{-1})**
- **ap=0.1mm**
- **fz=0.01mm/t (Vf=70 mm/min)**
- **Wet**
- **2FESM040-110-06**



MEGACOAT	700pcs /edge
Competitor Coating F	350pcs/edge

- Kyocera processed twice as many workpieces compared to Competitor F.
- Competitor F is limited to 350 workpieces due to excessive wear. Kyocera prevented chipping thereby enabling long-life and stabilized machining.


MEGACOAT
(Tool life: 700 pcs/edge)

Competitor Coating F
(Tool life: 350 pcs/edge)

(Evaluation by the user)

Milling

M1~M142

Milling Series M2~M8

Product Lineup M4

Milling Indexable Inserts M9~M21

Milling Inserts Identification System M9

Milling Inserts M10



Corner Angle 45° M22~M34

MOF45 M22

MOFX45 Easy edge adjustment M24

MSE45 M26

MSE45-SF Easy edge adjustment M28

MSD45 M31

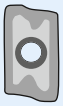
MSO45-S / MSO45 / MSO45-09 M32



Corner Angle 15° M35~M39

MSRS M35

MSP15 / MSE15 M39



Corner Angle 0° M40~M77

MTE90-SF Easy edge adjustment M40

MTE90 / MTP90 M41

MSO90 / MSO90-S / MSO90-09 M42

MEC M44

MECX M52

MECH / MECH-BT50 / MECH-SK40 / MECH-SK50 M55

MSR / MSR-BT50 M61

MHD Plus Mill M67



Endmill for Shouldering M78~M85

DMC / DMC-H / DMC-SX M78

MEAL Endmill for Aluminum Machining M80

MTPS / MTES M81

MEA / MEB M82



Multi-Function Machining Endmill M86~M93

MEY Ultra Drill Mill M86

MEZ-G M90



Slot Mill (Slotting) M94~M119

MSTA Slot width 1.6, 2.2, 3, 4 mm fixed M96

MSTB Slot width 6 - 13 mm Semi-Adjustable M100

MSTC Slot width 14 - 23.3 mm Full-Adjustable M105



Ball-Nose Endmill / Radius Series (Face Mill + Endmill) M120~M131

MRF / MRFW **Magic Ball** M120

MRP / MRP-S **Radius Mill** M122

MHD-R **Radius Plus Mill** M129

Other Applications M132~M140

MGI **Grooving Endmill for M/C** M132

MCSE **Chamfering Endmill** M134

MEF **Bolt Countersink Endmill** M136

METS **T-Slot Mill** M138

MVG **Ring Grooving Endmill for M/C** M140

Milling Series

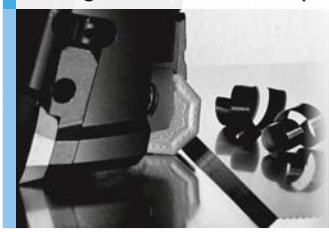
Octagonal MOF Mill



Octagonal
MOF Mill
Edge strengthened type GT Chipbreaker is now coming!!

See M22

Octagonal MOFX Mill (Top Clamp)



1.Good finished surface (With locator type insert runout easy adjustment feature)
2.Economical 8-Corner (Octagon shape) Insert
3.Low resistance with double-positive type high rake cutter
4.SH Chipbreakers (General Use / Low Resistance) and GT Chipbreakers (Tough Edge) are lined up

See M24

High-efficiency Multi-Edge design New MSE45



High-efficiency Multi-Edge design
New **MSE45**

See M26

Easy Edge Adjustment MSE45-SF



Easy Edge Adjustment
MSE45-SF
For MSE45-SF type, Wiper Inserts are lined up

See M28

Easy Edge Adjustment MTE90-SF



Easy Edge Adjustment
MTE90-SF

See M40

Right Angle 4-Corner New MSO90



Right Angle 4-Corner
New **MSO90**

See M42

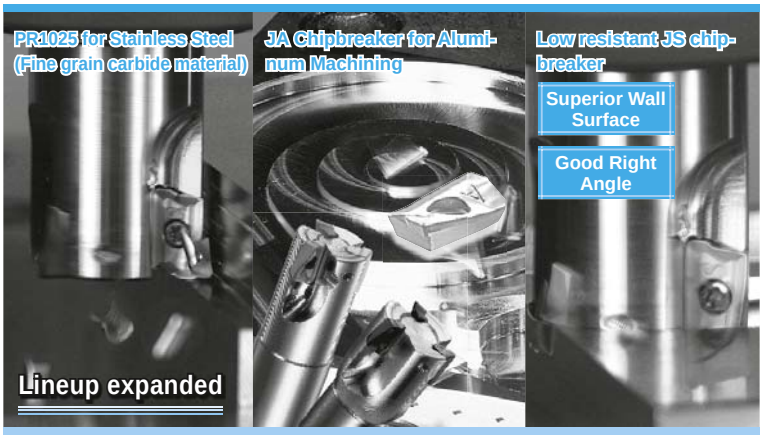
High Efficiency Endmill MECX



High efficiency machining on turning mill and small machining center is achieved

See M52

High Efficiency Endmill MEC



High efficiency Multi-Edge types are lined up for Face Mill type
Lineup of Insert / Corner-R is expanded
JA Chipbreaker and KPD001 (PCD) for Aluminum machining are now coming

See M44

Helical Endmill MECH



High efficiency machining is achieved with large ap
MECH solves problems with heavy cutting

See M55

Cutter for Heavy Cutting MSR

BT50 Arbor Integral Type



Low Cutting Force Type Insert

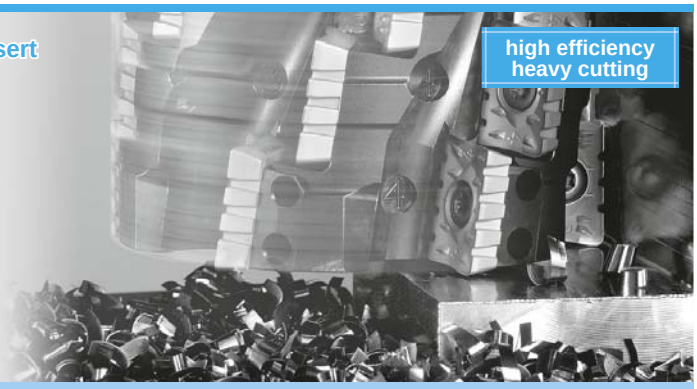


PR830
(For Steel)



PR905
(For Cast Iron)





Nicked Insert reduces / disperses resistance at cutting and enables high feed by restraining vibration
Improve chip evacuation by special chipbreaker
Enables heavy milling and deep cutting, and also drastically improves machining efficiency

See M61

Face Mill for Heavy Cutting MSRS



Roughing is completed with 1 pass. MSRS type changes heavy cutting! (Max. ap 12 mm)

See M35



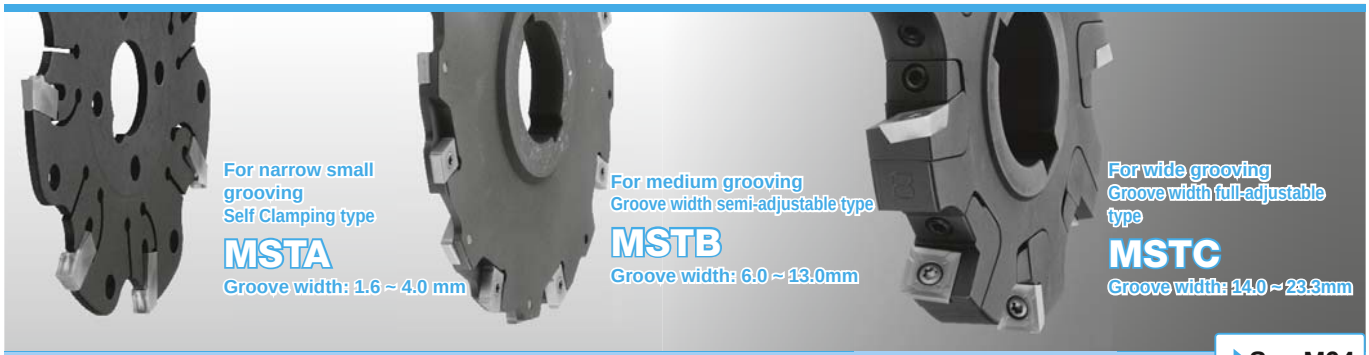
Conventional tools

Chip evacuation per unit time is increased drastically



MSRS type

Slot Mill MST



For narrow small grooving
Self Clamping type
MSTA
Groove width: 1.6 ~ 4.0 mm

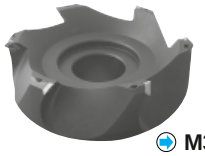
For medium grooving
Groove width semi-adjustable type
MSTB
Groove width: 6.0 ~ 13.0mm

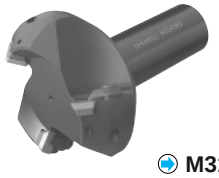
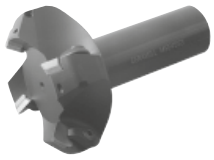
For wide grooving
Groove width full-adjustable type
MSTC
Groove width: 14.0 ~ 23.3mm

Full range of 1.6 mm to 23.3 mm is supported with 3 types

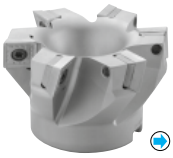
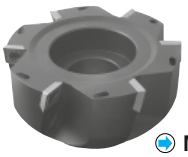
See M94

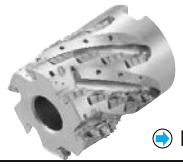
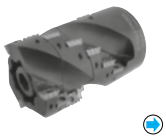
Corner Angle 45° / Corner Angle 15° type

Corner Angle	Shape \ Application	Facing	Chamfering
45°	**MOF45-R**  M22	●Octagonal Insert Economical with 8 edge insert (Octagonal) ●Insert sizes are available in 05 and 07 types ●Easy edge change ●Silver Coated ●Insert max. external dia. matches cutter external dia.	
45°	**MOFX45-R**  M24	●Wedge clamp system is adopted ●Excellent surface roughness by easy edge height adjustment ●High cost performance provided by 8 edge insert ●Cutter designed with high axial rake angle and double positive angle on chipbreaker provide low ●Offering SH chipbreaker (for general purpose / low cutting force) and GT chipbreaker (Tough edge)	
45°	**MSE45-R** (Standard / Multi-Edge)  M26	●The Insert is fixed by top clamp ●Silver Coated ●Standard Edge type and Multi-Edge type	
45°	**MSE45-SF** (Easy Edge Adjustment)  M28	●A simplified adjusting mechanism eases the task of correcting cutting edge fluctuation ●Silver Coated	
45°	**MSD45-R**  M31	●Low cutting force ●For Small Machines and M/C ●For thin workpiece milling of Steel / Cast Iron, Anti-Vibration	
45°	**MSO45-09**  M34	●Cost reduction with screw clamp system and 09 size insert ●Screw Clamping	
45°	**MSO45-R**  M32	●Use insert with 13.494mm internal circumference ●Insert max. external dia. matches cutter external dia.	
15°	**MSRS-R**  M35	●For Heavy Milling ●Max. ap 12mm ●Chip evacuation per unit time is increased drastically	
15°	**MSP15-R**  M39	●Facing ●Medium to Roughing of Steel / Cast Iron	

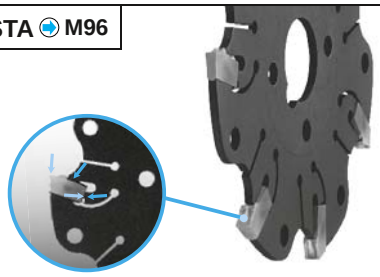
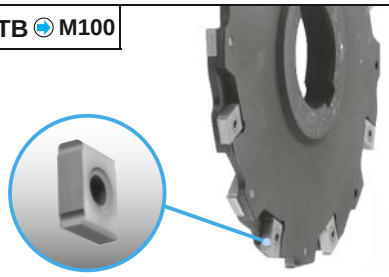
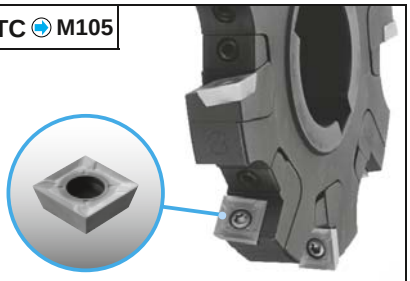
Corner Angle	Shape \ Application	Facing	Chamfering
45°	**MSD45**  M31	●Low cutting force ●For Small Machines and M/C ●For thin workpiece milling of Steel / Cast Iron, Anti-Vibration	
45°	**MSE45**  M26	●Low cutting force ●For Small Machines and M/C ●For thin workpiece milling of Steel / Cast Iron, Anti-Vibration	
45°	**MSO45-S-09**  M34	●Cost reduction with screw clamp system and 09 size insert ●Smaller insert for MSO45 series	
45°	**MSO45-S**  M32	●High Efficiency Machining of Stainless Steel ●Stronger Edge with Insert Thickness 3.97 mm	
15°	**MSP15**  M39	●Facing ●Medium to Roughing of Steel / Cast Iron	
15°	**MSE15**  M39	●Low cutting force ●For thin workpiece milling of Steel / Cast Iron, Anti-Vibration	

Corner Angle 0° type

Corner Angle	Shape \ Application	Facing	Shouldering	Slotting
0°	**MEC**  M44	●The twisted cutting edge improves cutting performance ●Smooth Surface of Shoulder Wall ●High squareness ●The silver coating prevents chip wear on the tool body ●With Air Hole		
0°	**MECX**  M52	●Efficient machining due to small diameter cutter that holds multiple inserts ●Recommended for small machines: low resistance and high strength design ●The silver coating prevents chip wear on the tool body ●With Air Hole		
0°	**MSO90**  M42	●Highly efficient multiple insert design ●Safe design with shim ●Easy edge change ●Slim design offers weight savings		
0°	**MSO90-09**  M42	●Low Cutting Force ●Cost reduction with screw clamp system and 09 size insert		
0°	**MTE90-SF** (Easy Edge Adjustment)  M40	●A simplified adjusting mechanism eases the task of correcting cutting edge fluctuation ●Silver Coated		
0°	**MTE90**  M41	●Low Cutting Force ●Shouldering of Cast Iron, Non-ferrous Metals		

Corner Angle	Shape \ Application	Facing	Shouldering	Slotting
0° (Long Cutting Edge)	**MECH** **MECH-W**  M56	●Notched insert promotes higher productivity ●Large depth of cut provides high efficiency machining ●MECH is the best solution for problems with heavy milling		
0° (Long Cutting Edge)	**MECH-R**  M57	●MECH Shell Mill type		
0° (Long Cutting Edge)	**MECH-BT50** **MECH-SK**  M57	●Highly rigid Arbor integrated for MECH		
0° (Long Cutting Edge)	**MSR-R**  M62	●Low resistance and restrained chattering with Notched Insert		
0° (Long Cutting Edge)	**MSR-BT50**  M63	●Highly rigid BT50 Arbor integrated for MSR		
0° (Long Cutting Edge)	**MHD FMA-SA**  M72	●Long Cutting Edge :74.7~106.2mm ●For roughing of mold / jig machining ●Low resistance ●Adjustable Edge Length (separate-type)		
0° (Long Cutting Edge)	**MHD-BT50-SA**  M72			

Slot Mill MST type

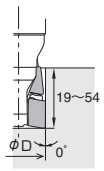
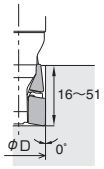
MSTA M96	MSTB M100	MSTC M105
		
●Self-clamping system ●Remove insert with dedicated wrench	●Easy screw on tangential clamped insert	●Adjustable slotting width due to unique cam adjustment structure

Corner Angle 0° type

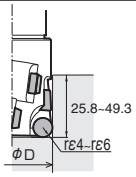
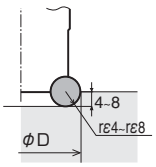
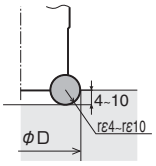
Corner Angle	Shape \ Application	Facing	Shouldering	Slotting	Deep Slotting
0°	**MSO90-S**  M43	●Screw clamping & 4 edge insert reduces cost ●Good Chip Evacuation ●Low Cutting Force			
0°	**MTE90**  M41	●Low Cutting Force ●For Shouldering of Cast Iron, Non-ferrous Metals			
0°	**MTP90**  M41	●Medium to Roughing of Steel / Cast Iron ●For Small Machines and M/C			
0°	**MHD-SA**  M67	●Plus Mill (Separate type) ●Roughing of Molds ●Low Cutting Force ●With the addition of front piece, cutting edge length can be extended to 53.8mm or more			
0° (Long Cutting Edge)	**MHD-SB**  M67				
0° (Long Cutting Edge)	**MHD-C**  M67	●Integral Arbor Type ●Roughing of Molds ●Low Cutting Force			

Corner Angle	Shape \ Application	Facing	Shouldering	Slotting
0°	**MEC** **MEC-W**  M44	●Good squareness ●Low Cutting Resistance ●The silver coating prevents chip wear on the tool body ●With Air Hole (Over ø16)		
0°	**MECX** **MECX-W**  M52	●Good squareness ●Small size Insert with Multi-Edge specification ●Low Cutting Resistance ●The silver coating prevents chip wear on the tool body ●With Air Hole		
0°	**MEA** **MEA-W**  M82	●Low Cutting Force, Good Chip Evacuation ●High-Efficiency Machining of Steel and Cast Iron ●Notched inserts prevent chattering		
0°	**MEB** **MEB-W**  M82	●Low Cutting Force, Good Chip Evacuation ●High-Efficiency Machining of Steel and Cast Iron ●Notched inserts prevent chattering		
0°	**DMC**  M78	●For Small Milling Machine, M/C		
0°	**DMC-SX**  M78	●For Small Milling Machine, M/C		
0°	**DMC-H**  M78	●High Rake Type ●For Small Milling Machine, M/C		
0°	**MTPS / MTES**  M81	●For Small Dia., Low Cutting Force type		
0°	**MEAL**  M80	●For Aluminum Alloy ●With Air Hole		

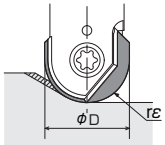
Multi-Function Machining Endmill

Application / Shape	Facing	Shouldering	Slotting	Deep Slotting	Pocketing	Drilling	Corner Angle and Max ap	Cutting Dia. øD
MEY **MEY-W**  M86	●Ultra Drill Mill ●Multi-function Machining (Drilling / Ramping / Shouldering / Grooving) ●High-Efficiency Mold Machining ●Low Cutting Force, Good Chip Evacuation		●Full 2-Flute Structure and High Stability ●Good Chip Control when Ramping		●Cutting diameters which is larger than the shank diameters enables wall shouldering. ●The silver coating prevents chip wear on the tool body			ø10 ø25 ø50 ø16 ø50
MEZ-G **MEZ-GW**  M90	●Silver Drill Mill ●Multi-function Machining ●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

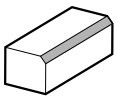
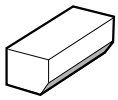
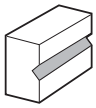
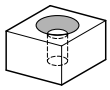
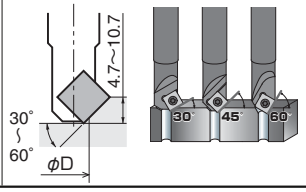
Radius Series (Face Mill + Emdmill)

Application / Shape	Radius Milling / Profiling	Pocketing	Facing	Corner Angle and Max ap	Cutting Dia. øD
MHD-RSA  M129	●Radius type of Plus Mill (Separate type can be linked to conventional Plus Mill by changing front piece) ●High-Efficiency Mold Machining ●Helical Milling / Ramping				ø32 ø50 ø63 ø80 ø100 ø125 ø160 ø200 ø32 ø50
MRP-S **MRP-W**  M123	●For Mold Machining ●Recommended for various types of Machining (Contouring, Helical Milling, Ramping, etc.) ●Firm Insert Seat by New Ratchet Design				ø12 ø63 ø12 ø63
MRP  M124					ø50 ø125 ø50 ø125

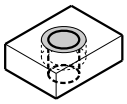
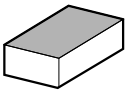
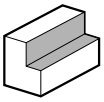
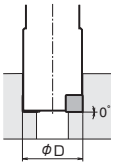
Ball-Nose Endmill

Application / Shape	Contouring / Profiling	Pocketing	Corner Angle and Max ap	Cutting Dia. øD
MRF  M120	●For High Quality Mold Finishing ●High R-Accuracy (Insert's R-Accuracy: Under ±0.01mm) ●The bushing ensures insert installation accuracy			ø10 ø25 ø50 ø80 ø8 ø25
MRFW  M120	●High Quality Mold Finishing ●High R-Accuracy (Insert's R-Accuracy: Under ±0.01mm) ●The bushing ensures insert installation accuracy ●Superior to anti vibration, and stable machining is possible with long over hand length without no chattering			ø8 ø12

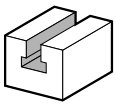
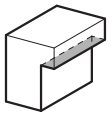
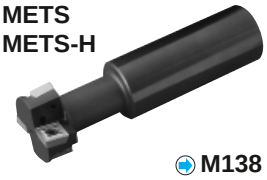
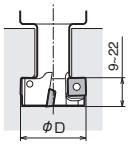
Chamfering

Application / Shape	Chamfering	Back Chamfering	V Shape Sloting	Countersinking	Corner Angle and Max ap	Cutting Dia. øD
						ø10 ø25 ø50
MCSE **MCSE-W**  **M134**	●For 30°, 45°, 60° Chamfering ●Economical S-type Insert (4 Edges) ●Back chamfering is possible					ø4 ø36

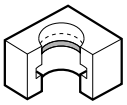
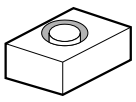
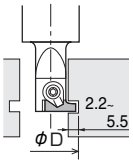
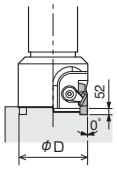
Bolt Countersinking

Application / Shape	Bolt Countersinking	Facing	Shouldering	Corner Angle and Max ap	Cutting Dia. øD
					ø10 ø25 ø50 ø80
MEF **MEF-W**  **M136**	●Countersink for Hexagon Socket Bolt (M6~M30) ●Economical S-type Insert (4 Edges)				ø11 ø48

T-Slotting

Application / Shape	T-Slotting	Back side milling	Corner Angle and Max ap	Cutting Dia. øD
				ø10 ø25 ø50 ø80
METS **METS-H**  **M138**	●T-Slotting ●Recommended for High Feed Machining with 2 Flute Design ●Economical S-type Insert (4 Edges)			ø21 ø50

Grooving

Application / Shape	Internal Grooving	Ring Grooving	Corner Angle and Max ap	Cutting Dia. øD
				ø10 ø25 ø50 ø80
MGI  **M132**	●Edge Width 1.0~4.0mm ●Grooving for M/C			ø14 ø40
MVG  **M140**		●Cutting Dia. ø30~ø75 ●Edge Width: 4.0~4.9mm ●O-Ring Groov-ing (G Series)		ø30 ø75

Milling Inserts Identification System

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

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

①Shape

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

②Relief Angle

Symbol	Tolerance (mm)		
	Corner Height	Thickness	IC 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.

③Tolerance

Symbol	Shape
W	No chipbreaker, with hole
T	1 edge chipbreaker, with hole
F	2 edge chipbreakers, without hole
N	No Chipbreaker, Without Hole
R	1 edge chipbreaker, without hole
M	1 edge chipbreaker, with hole
A	No chipbreaker, with hole

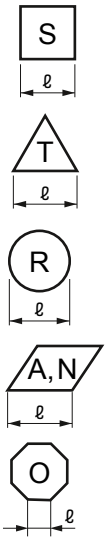
④Hole / Chipbreaker Symbol

Symbol	Shape
F	Sharp Edge
E	R-honed
T	Chamfer
S	Chamfer + R-honed

⑨Edge Preparation

S	E	K	N	12	03	A	F	T	N	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪

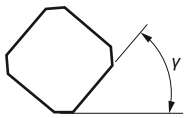
⑤Edge Length



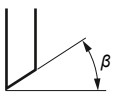
⑥Thickness	
Symbol	Thickness
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35



⑦Approach Angle	
A	45°
D	60°
E	75°
F	85°
H	87°
P	90°
X	65°



⑧Relief 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°

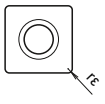


⑩Tool Hand	
Symbol	Hand
R	Right
L	Left
N	Without Hand

⑪Manufacturer's Option
• Chipbreaker, etc.

In case of indicating corner-R(rε) at ⑦ and ⑧

⑦⑧Corner-R(rε)	
04	0.4 Corner-R(rε)
08	0.8 〃
12	1.2 〃
16	1.6 〃
20	2.0 〃



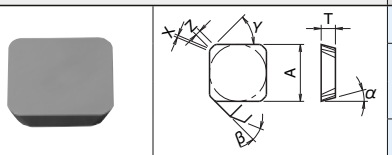
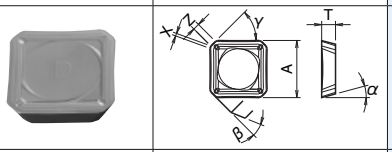
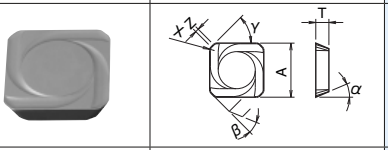
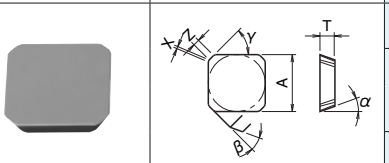
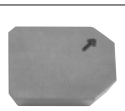
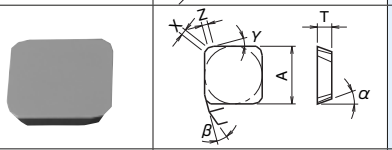
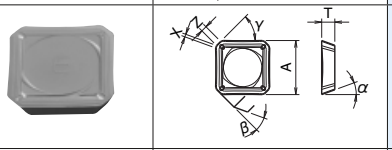
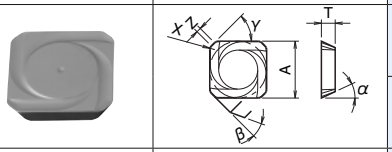
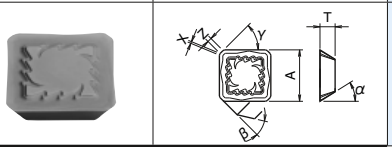
M

Milling

Milling Inserts

Classification of usage
★ : Roughing / 1st Choice
☆ : Roughing / 2nd Choice
■ : Finishing / 1st Choice
□ : Finishing / 2nd Choice
(In case hardness is under 45HRC)

		Cermet			PVD Coated Carbide							Carbide		
		TN60	TN100M	TC60	PR630	PR730	PR830		PR1025	PR660	PR905	PW30	KW10	
P	Carbon Steel / Alloy Steel		■			☆ ★			☆					
	Mold Steel		■			☆ ★			☆					
M	Stainless Steel								★	☆				
K	Gray Cast Iron										★		☆	
	Nodular Cast Iron										★			
N	Non-ferrous Metals												★	
S	Heat-resistant alloy								★	☆				
	Titanium Alloy										★		☆	
H	Hard Materials					□	□							

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	X	Z	rε	Angle (°) α	β	γ	Cermet TN60	TN100M	TC60	PVD Coated Carbide PR630	PR730	PR830		PR1025	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
	SDCN 1203AUTN	12.70	3.18	0.5	1.2	-	15°	23°	45°		●											
	SDKN 1203AUTN 1203AUFN	12.70	3.18	0.5	1.2	-	15°	23°	45°		●		●	●				●	●	●	●	M31
	SDKN 1504AUTN	15.875	4.76	0.5	1.2	-	15°	23°	45°		●		●	●						●		-
	SDKR 1203AUEN-S	12.70	3.18	0.5	1.7	-	15°	23°	45°		●			●				●	●			M31
	SDMR 1203AUER-H	12.70	3.18	R1.0	0.8	-	15°	23°	45°				●	●								
	SEEN 1203AFTN	12.70	3.18	0.5	1.4	-	20°	25°	45°		●									●		
	SEKN 1203AFTN 1203AFFN	12.70	3.18	0.5	1.4	-	20°	25°	45°		●		●	●	●		●	●	●		●	M27 M28
	SEKN 1204AFTN	12.70	4.76	0.5	1.4	-	20°	25°	45°		●			●								-
 1-Edge / With Wiper Edge	SEEN 1203AFTR-W 1203AFFR-W	12.70	3.18	-	3.5	B=14.56	20°	25°	45°		●										●	M28
	SEKN 1203EFTR	12.70	3.18	1.2	1.4	-	20°	25°	15°		●		●	●								M39
	SEKR 1203AFEN-S	12.70	3.18	0.5	1.7	-	20°	25°	45°		●			●	●		●	●	●			M27 M28
	SEMR 1203AFER-H	12.70	3.18	R1.0	1.0	-	20°	25°	45°				●	●	●							
	SEMR 1204AFER-H	12.70	4.76	R1.0	1.0	-	20°	25°	45°				●	●								-
	SOKR 13T3AXEN-J	13.494	3.97	0.5	1.1	-	27°	32°	45°		●			●				●	●		●	M32

Cutting Range	Chipbreaker		Features
Finishing-Roughing	S		S Chipbreaker for general use cutter. Low resistant cutting is possible with 13° chipbreaker rake angle. Recommended for various ap with 3-step chipbreaker design. Ground wiper edge promotes good surface finish.
Medium-Roughing	H		H Chipbreaker for general use cutter. Smooth chip evacuation due to the chipbreaker's smooth rake face. 20% less cutting force than no-chipbreaker type due to 25° rake angled chipbreaker.
Finishing-Roughing	J		Chipbreaker specific to MSO Cutter. Cutting force's great reduction with 15° chipbreaker's rake angle and 27° positive angle. Back force remains low even increasing the feed rate. Larger & stronger type insert with thickness 3.97mm and IC 13.494mm, and suitable for hard-to-machine materials like stainless steel.

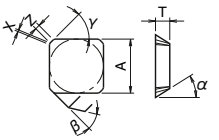
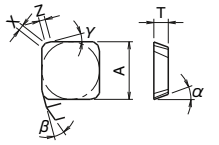
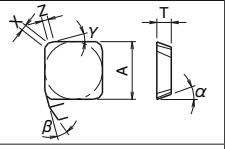
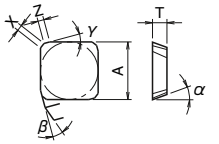
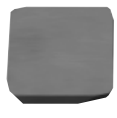
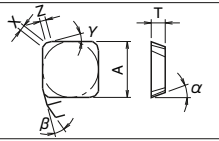
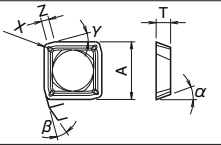
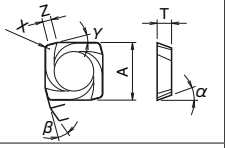
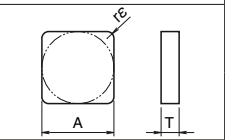
SEEN-W type Inserts are sold in 5 piece boxes.

Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Milling Inserts

Classification of usage																		
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■			★												
		Mold Steel	■			★												
	M	Stainless Steel											★					
	K	Gray Cast Iron												★		☆		
		Nodular Cast Iron												★				
	N	Non-ferrous Metals														★		
	S	Heat-resistant alloy											★					
		Titanium Alloy												★		☆		
	H	Hard Materials				□												

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle (°)			Cermet			PVD Coated Carbide								Carbide		Ref. Page for Toolholder
			A	T	X	Z	rε	α	β	γ	TN60	TN100M	TC60	PR630	PR730	PR830		PR1025	PR660	PR905	PW30	KW10	
		**SOKN 13T3AXTN** **13T3AXFN**	13.494	3.97	0.5	1.1	-	27°	32°	45°		●		●	●				●	●		●	**M32**
		**SPCN 1203EDTR**	12.70	3.18	R1.0	2.0	-	11°	15°	15°		●											**M39**
		SPKN 1203EDTR			R1.0 1.0	2.0						●		●	●				●	● ●		●	
		1203EDTL			R1.0	2.0						●											-
		1203EDFR			1.0	1.6																●	**M39**
		1203EDFL																				●	-
		SPKN 1504EDTR **1504EDFR**	15.875	4.76	1.0	2.2						●		●	●					●	●	● ●	-
		**SPEN 1203EESR**	12.70	3.18	1.0	1.4	-	11°	20°	15°										●			-
		**SPCN 1203XPTR**	12.70	3.18	R1.0	2.0	-	11°	11°	25°		●											-
		SPKN 1203XPTR			R1.0 1.0	2.0						●		●	●					● ●		●	
		1203XPTL			R1.0	2.0						●											
		1203XPFR			1.0	2.0																●	
		SPKN 1504XETR	15.875	4.76	1.0	2.0	-	11°	20°	25°		●		●								●	
		**SPCN 1904EETR1**	19.05	4.76	0.7	1.2	-	11°	20°	15°		●											-
		**SPKR 1203EDER-S**	12.70	3.18	R1.0	2.0	-	11°	15°	15°		●			●					●			**M39**
		**SPMR 1203EDER-H**	12.70	3.18	R1.0	2.0	-	11°	15°	15°					●	●							
		**SPMN 120308** **120312**	12.70	3.18	-	-	0.8 1.2	11°	-			● ●	●										-
		SPMN 120408 **120412**	12.70	4.76	-	-	0.8 1.2	11°	-	-										● ●			
		SPGN 090304 **090308**	9.525	3.18	-	-	0.4 0.8	11°	-	-												● ●	
		SPGN 120304 **120308**	12.70	3.18	-	-	0.4 0.8	11°	-	-												● ●	
		SPUN 090308	9.525	3.18	-	-	0.8	11°	-	-											●		-
		120308	12.70	3.18	-	-	0.8	11°	-	-											●		-
		**SNMN 120408** **120412**	12.70	4.76	-	-	0.8 1.2	-	-	-										● ●			-

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

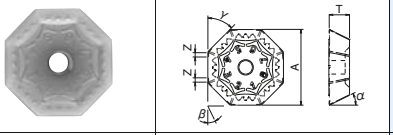
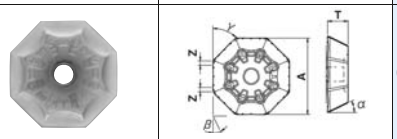
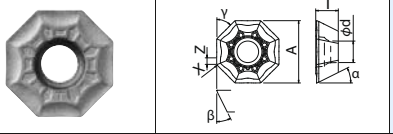
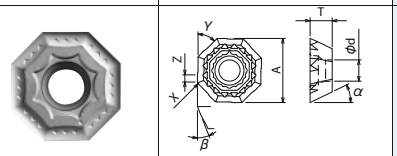
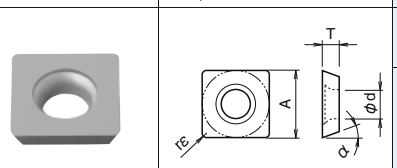
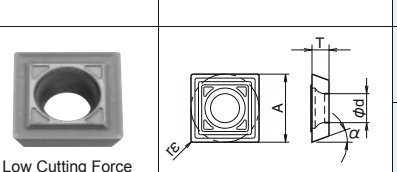
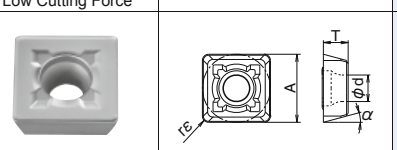
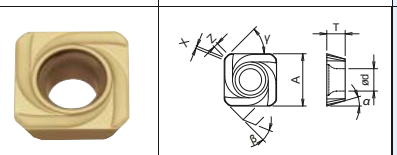
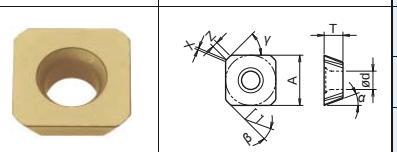
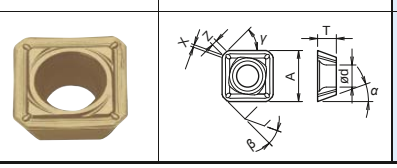
Inserts are sold in 10 piece boxes.

Milling Inserts

| Classification of usage | | |

Milling Inserts (with Hole)

Classification of usage			
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice ● : Copying / 1st Choice ○ : Copying / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■ ☆ ★
		Mold Steel	■ ☆ ★
	M	Stainless Steel	★ ☆
	K	Gray Cast Iron	★ ☆
		Nodular Cast Iron	★
	N	Non-ferrous Metals	★
	S	Heat-resistant alloy	★ ☆
		Titanium Alloy	★ ☆
	H	Hard Materials	□ □

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	ød	W	rε	Angle (°) α	β	γ	Cermet TN100M	TC60	PVD Coated Carbide PR630	PR730	PR830	PR1025	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
	OFMR 070405EN-SH	17.98	4.94	-	-	Z= 1.2	26°	26°	45°					●	●		●			M25
	OFMR 070408EN-GT	17.85	5.14	-	-	Z= 1.1								●			●			
	OFMT 050405EN-GT	13.35	4.83	4.6	X= R0.5	Z= 1.4	26°	26°	45°					●			●			M22
	070408EN-GT	17.85	5.12	5.9	X= R0.8	Z= 1.2								●			●			
	OFMT 050405ER-SH	13.47	4.76	4.4	X= R0.5	Z= 1.7	26°	22°	45°					●	●		●			M22
	070405EN-SH	17.98	4.87	5.8		-		26°						●	●		●			
	SDKW 09T204TN 09T204FN	9.525	2.78	3.4	-	0.4	15°	-	-	●			●						●	M135
	SEKW 120304TN 120304FN	12.70	3.18	5.5	-	0.4	20°	-	-	●		●	●						●	
	120308TN 120308FN	12.70	3.18	5.5	-	0.8	20°	-	-	●		●	●						●	
Low Cutting Force 	SDMT 09T204C	9.525	2.78	3.4	-	0.4	15°	-	-	●			●						●	
	SEMT 120304C	12.70	3.18	5.5	-	0.4	20°	-	-				●						●	
	SDMT 060304E-K	6.35	3.18	2.8	-	0.4	15°	-	-				●			●	●		●	M138
	080308E-K	8.00	3.18	3.4	-	0.8							●			●	●		●	
	120408E-K	12.70	4.76	4.4	-	0.8							●			●	●		●	
	SDMT 1204AESR-H	12.70	4.76	5.5	X= R1	Z= 0.8	15°	20°	45°				●							-
	SDKW 1204AESN	12.70	4.76	5.5	X= R1	Z= 1.5	15°	20°	45°				●							-
	SDKW 1204AETN																●			
	SEKW 1204AFTN	12.70	4.76	5.5	0.5	1.7	20°	25°	45°	●			●			●	●			-
	SEKT 1204AFEN-S	12.70	4.76	5.5	X= 0.5	Z= 1.7	20°	25°	45°				●			●				-

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Milling Indexable Inserts

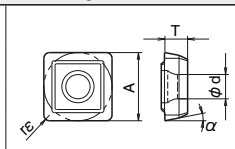
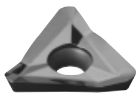
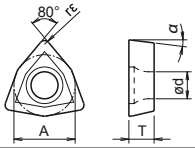
Milling Inserts (with Hole)

| Classification of usage | | |

Milling Inserts (with Hole)

Classification of usage
★ : Roughing / 1st Choice
☆ : Roughing / 2nd Choice
■ : Finishing / 1st Choice
□ : Finishing / 2nd Choice
● : Copying / 1st Choice
○ : Copying / 2nd Choice
(In case hardness is under 45HRC)

		Cermet		PVD Coated Carbide								Carbide		
		TN100M	TC60	PR630	PR730	PR830	PR1230		PR1025	PR660	PR905	PW30	GW25	Ref. Page for Toolholder
P	Carbon Steel / Alloy Steel													
	Mold Steel													
M	Stainless Steel													
K	Gray Cast Iron										★			
	Nodular Cast Iron										★			
N	Non-ferrous Metals												★	
S	Heat-resistant alloy													
	Titanium Alloy										★		☆	
H	Hard Materials													

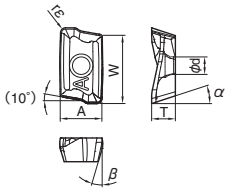
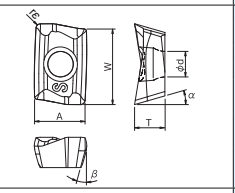
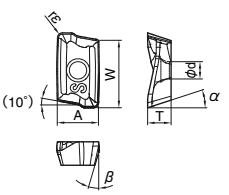
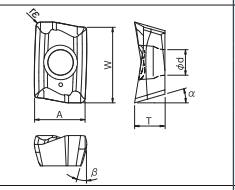
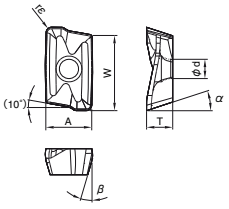
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	ød	W	rε	Angle (°) α	β	γ	Ref. Page for Toolholder
	**SPMT 060204E-Z**	6.35	2.38	2.5	-	0.4	11°	-	-	M136
	**SPMT 060208E-Z**					0.8				
	SPMT 090304E-Z	9.525	3.18	3.4	-	0.4	11°	-	-	
	SPMT 090308E-Z					0.8				
	**TEMT 250624-AQ**	15.875	6.35	5.5	23.0	2.4	20°	-	-	**M80**
	**WCMT 050308**	7.94	3.18	3.2	-	0.8	7°	-	-	-
	**WCMT 06T308**	9.525	3.97	3.7						

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Milling Inserts (with Hole)

Classification of usage			TN100M	TC60	PR630	PR730	PR830	PR1225	PR1210	PR1025	PR660	PR905	PW30	GW25
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice ● : Copying / 1st Choice ○ : Copying / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel					★			☆				
		Mold Steel					★			☆				
	M	Stainless Steel					☆			★				
	K	Gray Cast Iron										★		
		Nodular Cast Iron										★		
	N	Non-ferrous Metals												★
	S	Heat-resistant alloy								★				
		Titanium Alloy										★		☆
	H	Hard Materials					□							

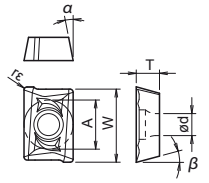
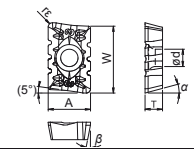
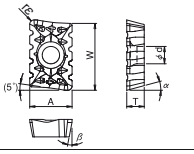
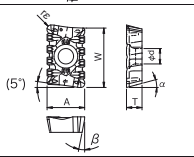
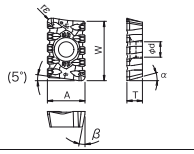
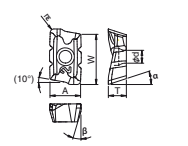
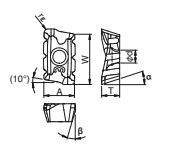
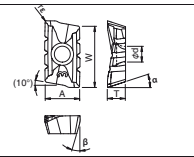
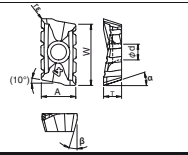
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	ød	W	rε	Angle (°) α	β	γ	TN100M	TC60	PR630	PR730	PR830	PR1225	PR1210	PR1025	PR660	PR905	PW30	GW25	Ref. Page for Toolholder
  Non-ferrous Metals	BDGT 11T302FR-JA	6.7	3.80	2.8	11.0	0.2	18°	13°	-												●	
	BDGT 11T304FR-JA					0.4															●	
	BDGT 11T308FR-JA					0.8															●	
	BDGT 170404FR-JA	9.6	4.90	4.4	17.0	0.4	18°	13°	-												●	M47
	BDGT 170408FR-JA					0.8															●	
	BDGT 170420FR-JA					2.0															●	
	BDGT 170431FR-JA					3.1															●	
 	BDMT 070302ER-JS	4.6	2.6	2.3	6.7	0.2	16°	15°						●	○		●		●			M52 M53
	BDMT 070304ER-JS					0.4								●	○		●		●			
	BDMT 070308ER-JS					0.8								●	○		●		●			
  Stainless Steel Low Cutting Force	BDMT 110302ER-JS	6.3	3.00	2.8	11.0	0.2	18°	15°	-					●	○		●					M47
	BDMT 110304ER-JS					0.4								●	○		●					
	BDMT 110308ER-JS					0.8								●	○		●					
	BDMT 11T302ER-JS	6.7	3.80	2.8	11.0	0.2	18°	13°	-					●	○		●					
	BDMT 11T304ER-JS					0.4								●	○		●					
	BDMT 11T308ER-JS					0.8								●	○		●					
	BDMT 170404ER-JS	9.6	4.90	4.4	17.0	0.4	18°	13°	-					●	○		●					
	BDMT 170408ER-JS					0.8								●	○		●					
 	BDMT 070302ER-JT	4.6	2.6	2.3	6.7	0.2	16°	15°						●	○		●		●			M52 M53
	BDMT 070304ER-JT					0.4								●	○		●		●			
	BDMT 070308ER-JT					0.8								●	○		●		●			
 	BDMT 110302ER-JT	6.3	3.00	2.8	11.0	0.2	18°	15°	-					●	○	○			●			M47
	BDMT 110304ER-JT					0.4								●	○	○			●			
	BDMT 110308ER-JT					0.8								●	○	○			●			
	BDMT 11T302ER-JT	6.7	3.80	2.8	11.0	0.2	18°	13°	-					●	○	○			●			
	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	4.90	4.4	17.0	0.4	18°	13°	-					●	○	○			●			
	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								●	○	○			●			

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

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 ● : Copying / 1st Choice ○ : Copying / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■			☆	★											
		Mold Steel	■			☆	★											
	M	Stainless Steel											★					
	K	Gray Cast Iron												★		☆		
		Nodular Cast Iron												★				
	N	Non-ferrous Metals														★		
	S	Heat-resistant alloy											★					
		Titanium Alloy												★		☆		
	H	Hard Materials				□	□											

Insert Handed Insert shows Right-hand		Description	Dimension (mm)					Angle (°)			Cermet		PVD Coated Carbide									Carbide		Ref. Page for Toolholder
			A	T	ød	W X	rε Z	α	β	γ	TN100M	TC60	PR630	PR730	PR830	PR930	PR1225	PR1230	PR1210	PR660	PR905	PW30	KW10	
		**APKT 1003PDER-V** **100308PDER-V**	6.72	3.18	2.8	10.0	0.4 0.8	11°	15°	-	●		● ●	●	● ● ● ●	●				● ●	●		-
		APKT 1604PDER-V	9.525	4.76	4.4	16.0	0.8			-	●		●	●	●					●	●		-
 3-Notched		**APMT 250608ER-NB3** **250616ER-NB3** **250640ER-NB3**	15.875	6.35	6.5	25	0.8 1.6 4.0	15°	11°	-					● ● ●			○ ○ ○	○ ○ ○	● ● ●	● ● ●			M61
		APMT 250616EL-NB3					1.6								●					●	●			-
 4-Notched		**APMT 250608ER-NB4** **250616ER-NB4** **250640ER-NB4**	15.875	6.35	6.5	25	0.8 1.6 4.0	15°	11°	-					● ● ●			○ ○ ○	○ ○ ○	● ● ●	● ● ●			M61
		APMT 250616EL-NB4					1.6								●					●	●			-
 Low resistance 3-Notched		**APMT 250616ER-NB3P**	15.875	6.35	6.5	25	1.6	15°	11°	-					●			○	○	●	●			M61
 Low resistance 4-Notched		**APMT 250616ER-NB4P**	15.875	6.35	6.5	25	1.6	15°	11°	-					●			○	○	●	●			
 2-Notched		**BDMT 11T308ER-N2**	6.7	3.80	2.8	11.0	0.8	18°	13°	-					●		○				●			
 3-Notched		**BDMT 11T308ER-N3**	6.7	3.80	2.8	11.0	0.8	18°	13°	-					●		○				●			M56
 3-Notched		**BDMT 170408ER-N3**	9.6	4.90	4.4	17.0	0.8	18°	13°	-					●		○				●			M57
 4-Notched		**BDMT 170408ER-N4**	9.6	4.90	4.4	17.0	0.8	18°	13°	-					●		○				●			

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

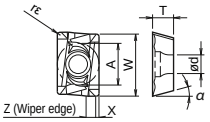
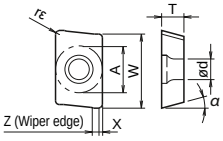
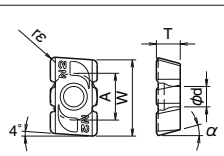
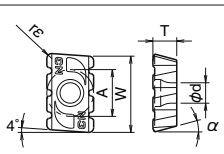
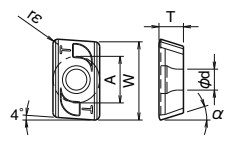
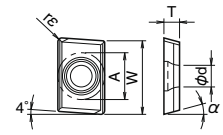
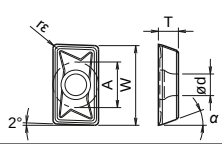
Inserts are sold in 10 piece boxes.

Milling Inserts (with Hole)

| Classification of usage | | |

Milling Inserts (with Hole)

Classification of usage																		
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice ● : Copying / 1st Choice ○ : Copying / 2nd Choice (In case hardness is under 45HRC)	P	Carbon Steel / Alloy Steel	■			☆	★											
		Mold Steel	■			☆	★											
	M	Stainless Steel				☆	☆						★					
	K	Gray Cast Iron												★		☆		
		Nodular Cast Iron												★				
	N	Non-ferrous Metals														★		
	S	Heat-resistant alloy											★					
		Titanium Alloy												★		☆		
	H	Hard Materials				□												

Insert (Handed Insert shows Right-hand)		Description	Dimension (mm) A	T	ød	W	rε	Angle (°) α	β	γ	Cermet TN100M	TC60	PVD Coated Carbide PR630	PR730	PR830	PR915		PR1025	PR660	PR905	Carbide PW30	KW10	Ref. Page for Toolholder
		NDKT 090304ER-V	6.35	3.18	2.8	W=9.5 X=0.25	rε=0.4 Z=1.25	15°	-	-	●		●	●				●	●	●		●	M67 M68 M69 M82 M129 M130
		NDKT 090308ER-V				W=9.5 X=0.65	rε=0.8 Z=0.85							●					●	●			
		NDKT 150408ER-V	10.0	4.76	4.4	W=15.9 X=0.6	rε=0.8 Z=1.4	15°	-	-	●		●	●				●	●	●		●	M82
		NDKT 150408TR-V				W=15.9 X=0.6	rε=0.8 Z=1.4							●					●				
		NDKW 090304ER	6.35	3.18	2.8	W=9.5 X=0.25	rε=0.4 Z=1.25	15°	-	-	●			●					●	●		●	M67 M68 M69 M82 M129 M130
		NDKW 150408ER	10.0	4.76	4.4	W=15.9 X=0.6	rε=0.8 Z=1.4	15°	-	-	●			●					●	●		●	M82
 2-Notched		NDMM 12T308ER-N2	7.79	3.97	3.4	12.7	0.8	15°	-	-	●			●	●				●	●		●	M67 M68 M69 M72 M73 M74 M129 M130
 3-Notched		NDMM 12T308ER-N3	7.79	3.97	3.4	12.7	0.8	15°	-	-	●			●	●				●	●		●	
		NDMM 12T308ER-T	7.58	3.97	3.4	12.7	0.8	15°	-	-	●			●	●				●	●		●	
		NDMM 090204ER-SP	6.35	2.38	2.8	9.5	0.4	15°	-	-	●		●	●									M78
		NDMM 120204ER-SP	7.94	2.38	3.4	12.7	0.4	15°	-	-	●		●	●									
		120208ER-SP					0.8				●		●	●									
		NDMM 150304ER-SP	9.525	3.18	4.4	15.0	0.4	15°	-	-	●		●	●									M78 M79
		150308ER-SP					0.8				●		●	●									
		NDMT 080208ER-D	5.086	2.38	2.2	8.5	0.8	15°	-	-	●			●					●	●		●	M91
		10T208ER-D	6.276	2.78	2.8	10.2					●			●					●	●		●	
		NEMT 120308ER-D	7.669	3.18	3.4	12.7	0.8	20°	-	-	●			●					●	●		●	
		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°	-	-	●			●					●	●		●	
		10T208ER-DH	6.276	2.78	2.8	10.2					●			●					●	●		●	
		NEMT 120308ER-DH	7.669	3.18	3.4	12.7	0.8	20°	-	-	●			●					●	●		●	
		16T308ER-DH	9.254	3.97	4.4	16.2					●			●					●	●		●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

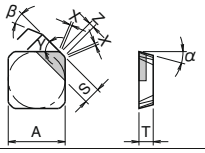
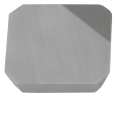
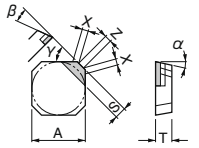
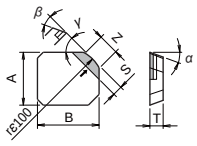
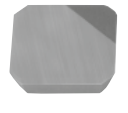
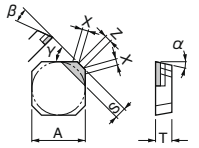
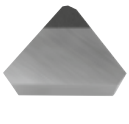
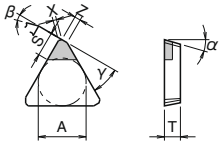
Inserts are sold in 10 piece boxes.

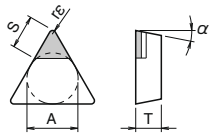
Milling Inserts (with Hole)

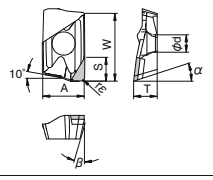
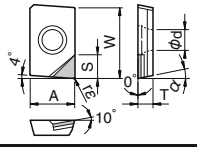
| Classification of usage | | |

Milling Inserts (CBN & 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 alloy											
		Titanium Alloy							□		■		
	H	Hard Materials			■								

Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	X	Z	S	B	Angle (º) α	β	γ	CBN KBN510	KBN525			PCD KPD001	KPD010	KPD230		Ref. Page for Toolholder
 	**SDKN 1203AUFN** **1203AUFN-NE**	12.70	3.18	0.5	1.2	3.6 3.1	- -	15°	23°	45°					● ●	● ●			**M31**
 	**SEEN 1203AFFN** **1203AFFN-NE**	12.70	3.18	0.5	1.4	3.5 3.0	- -	20°	25°	45°					● ●	● ●			**M27** **M28**
 Wiper Insert 	**SEEN 1203AFFR-W**	12.50	3.18	-	3.5	1.7	14.56	20°	25°	45°					●				**M28**
 	**SOKN 13T3AXFN-NE**	13.494	3.97	0.4	1.1	3.0	-	27°	32°	45°							●		**M33**
 	**TEEN 1603PTFR** **1603PTFR-NE**	9.525	3.18	0.6	1.4	4.7 4.1	- -	20°	22°	30°					● ●	● ●			**M81**
	TEKN 2204PTFR **2204PTFR-NE**	12.70	4.76	0.7	1.8	4.8 4.2	- -	20°	22°	30°					● ●	● ●			**M41**

Insert	Description	Dimension (mm) A	T	rε	S			Angle (º) α			CBN KBN510	KBN525			PCD KPD001	KPD010	KPD230		Ref. Page for Toolholder
 	**TPGN 110304T00815** **110308T00815**	6.35	3.18	0.4 0.8	3.8 3.5			11°			● ●	● ●							**M81**
	TPGN 110302 **110304** **110308**			0.2 0.4 0.8	3.9 3.7 3.4										● ● ●	● ● ●			
	TPGN 110302NE **110304NE** **110308NE**			0.2 0.4 0.8	3.4 3.2 2.9										● ● ●				

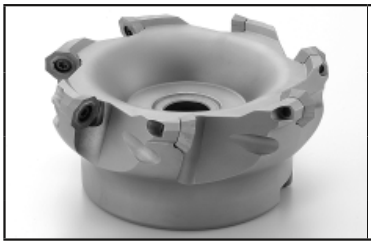
Insert (Handed Insert shows Right-hand)	Description	Dimension (mm) A	T	ød	W	rε	S	Angle (º) α	β	CBN KBN510	KBN525			PCD KPD001	KPD010	KPD230	Ref. Page for Toolholder
 	**BDMT 11T302FR** **11T304FR**	6.7	3.80	2.8	11.0	0.2 0.4	3.6	18°	13°					● ●		● ●	**M47**
	BDMT 170402FR **170404FR**	9.6	4.90	4.4	17.0	0.2 0.4	4.4	18°	13°					● ●		● ●	
 	**NDCW 150302FRX** **150302FRX-NE**	9.525	3.18	4.4	15.0	0.2	5.7 5.1	15°						● ●	● ●		**M79**

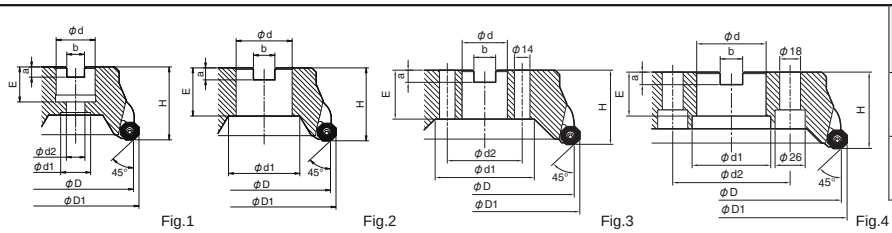
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

CBN & PCD Inserts are sold in 1 piece boxes.

Facing | Chamfering

MOF45 Face Mill (05 type 07 type)





Rake Angle (°)	
A.R.	R.R.
+15°	+5°

Toolholder Dimensions

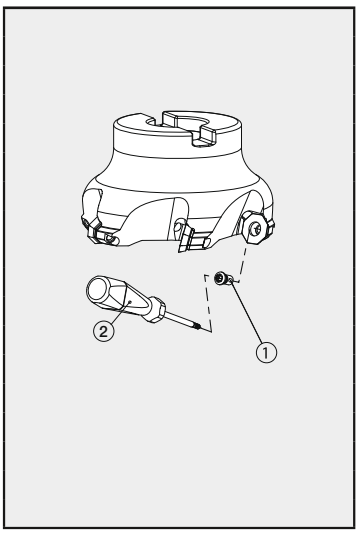
Description			Std.	No. of Insert	Dimension (mm)										Drawing	Weight (kg)	Applicable Inserts ➡ M13
					øD	øD1	ød	ød1	ød2	H	E	a	b	S			
Metric	MOF	45040R-05-3T-M	●	3	40	49	16	13.5	8.5	40	19	5.6	8.4	-	Fig.1	0.3	OFMT05 Type
		45050R-05-4T-M	●	4	50	59	22	17	11		21	6.3	10.4			0.4	
		45063R-05-5T-M	●	5	63	72										0.6	
		45080R-05-6T-M	●	6	80	89	27	20	13	50	24	7	12.4			1.1	
		45100R-05-7T-M	●	7	100	109	32	45	-		32	8	14.4		Fig.2	1.8	
		45125R-05-8T-M	●	8	125	134	40	32	22	63	30	9	16.4		Fig.1	3.7	
		45160R-05-10T-M	●	10	160	169	40	88	66.7						Fig.3	5.1	
		45200R-05-12T-M	●	12	200	209	60	68	101.6		38	14	25.7		Fig.4	8.0	
	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	
		45125R-07-8T-M	●	8	125	137	40	32	22	63	30	9	16.4		Fig.1	3.7	
		45160R-07-10T-M	●	10	160	172		88	66.7						Fig.3	5.1	
		45200R-07-12T-M	●	12	200	212	60	68	101.6		38	14	25.7		Fig.4	8.0	
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	
		45125R-05-8T	○	8	125	134	38.1	55		63	38	10	15.9			3.7	
		45160R-05-10T	○	10	160	169	50.8	88				11	19.1			5.1	
		45200R-05-12T	○	12	200	209	47.625	68	101.6			14	25.4		Fig.4	8.0	
	MOF	45080R-05-5T	○	5	80	92	25.4	20	13	50	26	6	9.5	-	Fig.1	1.2	OFMT07 Type
		45100R-07-6T	○	6	100	112	31.75	45	-		32	8	12.7		Fig.2	1.8	
		45125R-07-8T	○	8	125	137	38.1	55		63	38	10	15.9			3.7	
		45160R-07-10T	○	10	160	172	50.8	88				11	19.1			5.1	
		45200R-07-12T	○	12	200	212	47.625	68	101.6			14	25.4		Fig.4	8.0	

Spare Parts

Description		① Clamp Screw	② Wrench	Arbor clamp screw
MOF	45040R-05-3T-M	SB-4082TPR	DTP-15	HH8X25
	45050R-05-4T-M			HH10X30M
	45063R-05-5T-M			
	45080R-05-6T-M			HH12X35M
	45100R-05-7T-M			-
	45125R-05-8T-M			
	45160R-05-10T-M			
	45200R-05-12T-M			
MOF	45063R-07-4T-M	SB-50120TRS	DTP-15	HH10X30S
	45080R-07-5T-M			HH12X35M
	45100R-07-6T-M			-
	45125R-07-8T-M			
	45160R-07-10T-M			
	45200R-07-12T-M			
MOF	45080R-05-6T	SB-4082TPR	DTP-15	HH12X35M
	45100R-05-7T			-
	45125R-05-8T			
	45160R-05-10T			
	45200R-05-12T			
MOF	45080R-07-5T	SB-50120TRS	DTP-15	HH12X35M
	45100R-07-6T			-
	45125R-07-8T			
	45160R-07-10T			
	45200R-07-12T			

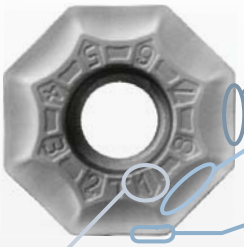
Max. ap and usable edges

Usable edges	Max. ap (mm)	
	OFMT05 type	OFMT07 type
4 edges	7mm	10mm
8 edges	2.5mm	4mm



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

General purpose “SH Chipbreaker”, Tough Edge type “GT Chipbreaker”



① **High Fracture Resistance** **Large land is applied**

② **Low cutting force chip breaker**
Great effect on high feed ratio range

③ **With Wiper Edge**
Having best angle of full profile edge, surface finish is greatly improved

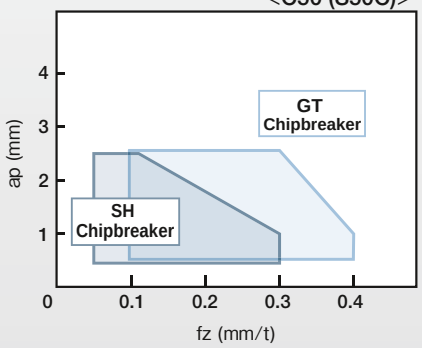
④ **With corner identification mark**

	OFMT05 type	OFMT07 type
GT Chipbreaker (Tough Edge type)		
SH Chipbreaker (General Purpose)		

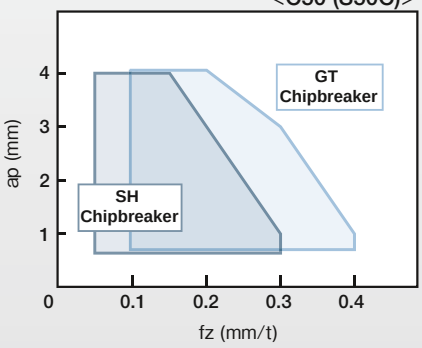
Note 1) OFMT07 type insets cannot be used for MOFX type cutters (See **M25**).

Chipbreaker applicable range

● 05 types <C50 (S50C)>



● 07 types <C50 (S50C)>

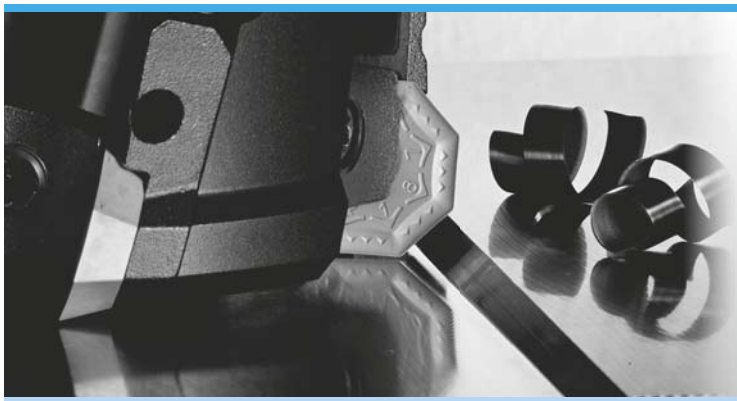


◆Recommended Cutting Conditions (MOF / MOFX)

Workpiece Material	GT Chipbreaker (Tough Edge type)			SH Chipbreaker (General purpose type)			
	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min) PVD Coated Carbide		fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min) PVD Coated Carbide		
		PR830	**PR905**		**PR830**	**PR1025**	**PR905**
Stainless Steel	-	-	-	0.08~**0.12**~0.25	-	★ 120~**150**~200	-
Carbon Steel	0.10~**0.25**~0.40	★ 120~**150**~200	-	0.10~**0.15**~0.30	★ 120~**150**~200	☆ 100~**120**~180	-
Alloy Steel	0.10~**0.25**~0.35	★ 100~**150**~180	-	0.10~**0.15**~0.30	★ 100~**150**~180	-	-
Mold Steel	0.10~**0.20**~0.35	★ 80~**120**~150	-	0.08~**0.12**~0.25	★ 80~**120**~150	-	-
Gray Cast Iron	0.10~**0.25**~0.40	-	★ 100~**150**~200	0.10~**0.15**~0.30	-	-	★ 100~**150**~200
Nodular Cast Iron	0.10~**0.20**~0.35	-	★ 80~**100**~120	0.08~**0.12**~0.25	-	-	★ 80~**100**~120

★: 1st Recommendation ☆: 2nd Recommendation

Octagonal MOFX Mill





SH Chipbreaker



GT Chipbreaker

Wedge clamp system

Good surface finish (Easy edge height adjustment system)

High cost performance provided by 8 edged insert

Cutter designed with high axial rake angle and double positive angle on chipbreaker provide low cutting force

Offering SH chipbreaker (for general purpose / low cutting force) and GT chipbreaker (Tough edge)

Features of chip breaker

● SH Chipbreaker
- ·Low Cutting Force
- ·For general purpose / Finishing

● GT Chipbreaker
- ·Tough Edge type
- ·For Heavy Interrupted / High Feed Machining

①Good Chip Control
Good curled chips created by large rake angle

①High fracture resistance
Wide land design

■ Edge identification mark
Insert can be used without waste by using in numeric order

■ Chipbreaker Symbol
"T" shows GT Chipbreaker

■ Designed wiper edges on both sides of corner
Universal insert. Available for both hand cutter

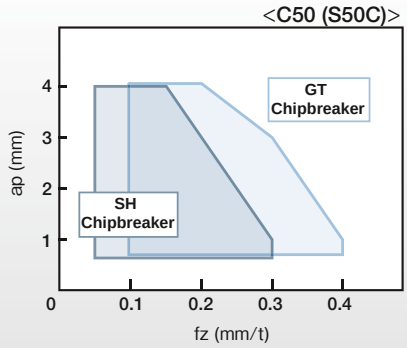
②Low cutting force design
Low cutting force design with actual rake angle over 20°

③Improved surface finish
Optimized angle of wiper edge

②Low cutting force
5° rake angle, Best use for high feed machining

③Improved surface finish
Optimized angle of wiper edge

Chipbreaker applicable range



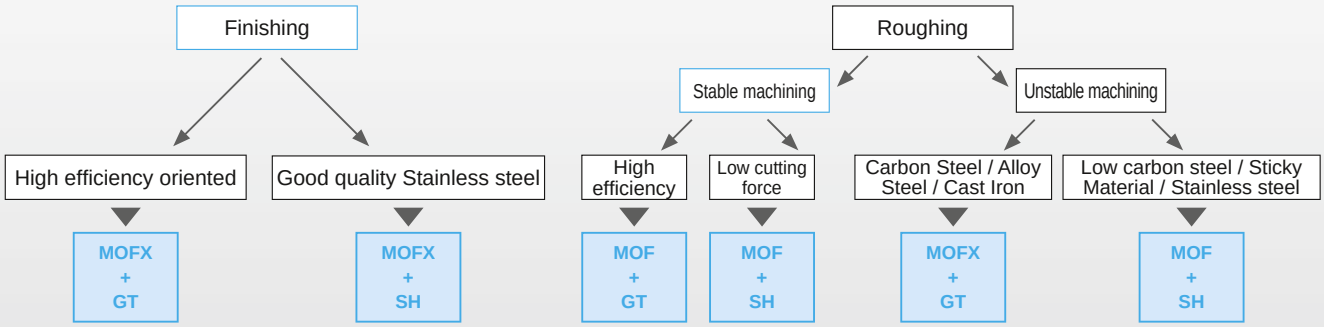
Max D.O.C. and usable edges

Usable edges	Max. ap (mm)
	OFMR07 types
4 edges	10mm
8 edges	4mm

Outlines of MOFX / MOF Mill

【MOFX】
High durability of cutter body due to the cartridge design.
Best for finishing due to easy edge height adjustment.

【MOF】(See **M22**)
Excellent chips evacuation when roughing sticky material such as low carbon steel and stainless steel.

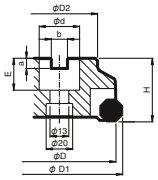


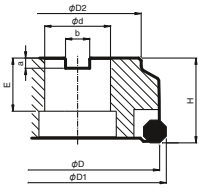
MOFX is suitable for more precious machining and unstable machining.

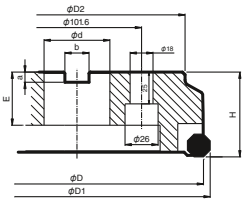
MOFX45 Face Mill

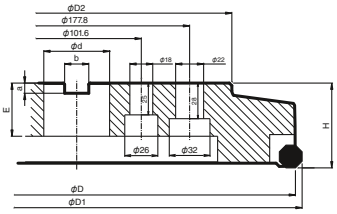


Rake Angle (°)	A.R.	+15°
	R.R.	+5°


Fig.1


Fig.2

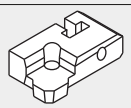
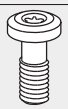
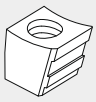
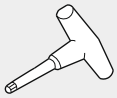

Fig.3


Fig.4

Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm) øD	øD1	øD2	ød	ød1	ød2	a	b	E	H	Drawing	Weight (kg)	Applicable Inserts M13
Metric	MOFX 45080R07-5T-MSF	●	5	80	91	70	27	20	14	7	12.4	22	50	Fig.1	1.4	OFMR07 Type
	45100R07-6T-MSF	●	6	100	111	80	32	-	-	8	14.4	30		Fig.2	2.1	
	45125R07-8T-MSF	●	8	125	136	100	40			9	16.4		63		3.9	
	45160R07-10T-MSF	●	10	160	171	120				10					6	
	45200R07-12T-MSF	●	12	200	211	140	60			15	25.4	38		Fig.3	7.4	
	45250R07-16T-MSF	●	16	250	261	180									12.6	
	45315R07-20T-MSF	○	20	315	326	240								Fig.4	20.7	
Bore Dia. Inch spec	MOFX 45080R-07-5T-SF	○	5	80	91	70	25.4	20	14	6	9.5	26	50	Fig.1	1.4	OFMR07 Type
	45100R-07-6T-SF	○	6	100	111	80	31.75	-	-	8	12.7	32		Fig.2	2.1	
	45125R-07-8T-SF	○	8	125	136	100	38.1			10	15.9	38	63		3.9	
	45160R-07-10T-SF	○	10	160	171	120	50.8			11	19.0				5.8	
	45200R-07-12T-SF	○	12	200	211	130	47.625			14	25.4			Fig.3	7.6	
	45250R-07-16T-SF	○	16	250	261	180									12.9	
	45315R-07-20T-SF	○	20	315	326	240								Fig.4	20.7	

Spare Parts

Cartridge	Cartridge Screw	Wedge	Wedge Screw	Adjustment Screw	Wrench (for Wedge)	Wrench (for Cartridge)
						
LOF07R	SH-50150TR	WOF07R	W8×21	AJ-412	TH-4	TTC-20

Applicable Inserts

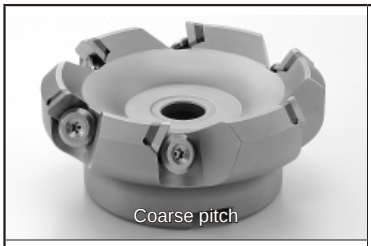
Description	Applicable Inserts M13	
		
MOFX45...-SF	OFMR 070405EN-SH	OFMR 070408EN-GT

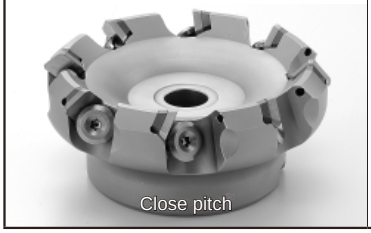
For recommended cutting conditions, see page M23

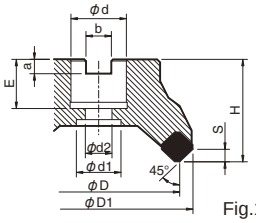
Note 1) OFMR0704○○EN-GT / SH is no hand type. It can be also used for L-hand (L) type cutter (special order item).
Note 2) Inserts for MOFX type cutter cannot be used for MOF type cutters (See **M22**).

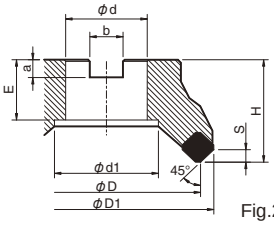
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

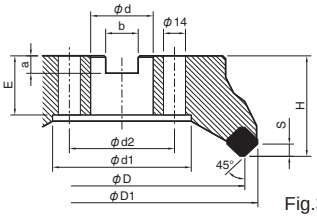
MSE45 Face Mill (Coarse pitch / Close pitch)

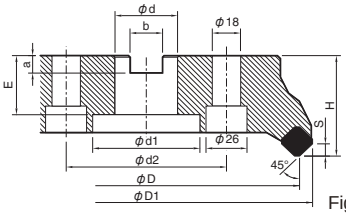





Fig.1


Fig.2


Fig.3


Fig.4

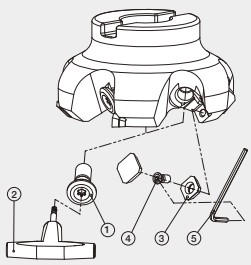
Toolholder Dimensions

Description			Std.	No. of Insert	Dimension (mm)										Rake Angle (°)		Drawing	Weight (kg)
					øD	øD1	ød	ød1	ød2	H	E	a	b	S	A.R.	R.R.		
Metric	Coarse pitch	MSE 45040R-3T-M	●	3	40	53	16	11.5	8.5	45	20	5.6	8.4	6	+20°	-5.0°	Fig.1	0.4
		45050R-4T-M	●	4	50	63	22	17	11	48	21	6.3	10.4			-5.0°		0.5
		45063R-5T-M	●	5	63	76				40						-10°		0.6
		45080R-6T-M	●	6	80	93	27	20	13	50	24	7	12.4			-8.5°		1.1
		45100R-6T-M	●	6	100	113	32	46	-		32	8	14.4			-7.5°	Fig.2	1.8
		45125R-7T-M	●	7	125	138	40	32	22	63	30	9	16.4			-6.5°	Fig.1	3.4
		45160R-8T-M	●	8	160	173		88	66.7							-5.5°	Fig.3	5.2
		45200R-10T-M	●	10	200	213	60	68	101.6		32	14	25.7			-5.0°	Fig.4	8.6
	Close pitch	MSE 45040R-4T-M	●	4	40	53	16	11.5	8.5	45	20	5.6	8.4	6	+20°	-5.0°	Fig.1	0.4
		45050R-5T-M	●	5	50	63	22	17	11	48	21	6.3	10.4			-5.0°		0.5
		45063R-6T-M	●	6	63	76				40						-10°		0.6
		45080R-7T-M	●	7	80	93	27	20	13	50	24	7	12.4			-8.5°		1.1
		45100R-8T-M	●	8	100	113	32	46	-		32	8	14.4			-7.5°	Fig.2	1.7
		45125R-9T-M	●	9	125	138	40	32	22	63	30	9	16.4			-6.5°	Fig.1	3.3
		45160R-10T-M	●	10	160	173		88	66.7							-5.5°	Fig.3	5.1
		45200R-13T-M	●	13	200	213	60	68	101.6		32	14	25.7			-5.0°	Fig.4	7.4
Bore Dia. Inch spec	Coarse pitch	MSE 45080R-6T	○	6	80	93	25.4	20	13	50	26	6	9.5	6	+20°	-8.5°	Fig.1	1.1
		45100R-6T	○	6	100	113	31.75	46	-		32	8	12.7			-7.5°	Fig.2	1.8
		45125R-7T	○	7	125	138	38.1	55		63	38	10	15.9			-6.5°		3.4
		45160R-8T	○	8	160	173	50.8	88				11	19.1			-5.5°		5.2
		45200R-10T	○	10	200	213	47.625	68	101.6			14	25.4			-5.0°	Fig.4	8.6
	Close pitch	MSE 45080R-7T	○	7	80	93	25.4	20	13	50	26	6	9.5	6	+20°	-8.5°	Fig.1	1.1
		45100R-8T	○	8	100	113	31.75	46	-		32	8	12.7			-7.5°	Fig.2	1.7
		45125R-9T	○	9	125	138	38.1	55		63	38	10	15.9			-6.5°		3.3
		45160R-10T	○	10	160	173	50.8	88				11	19.1			-5.5°		5.1
		45200R-13T	○	13	200	213	47.625	68	101.6			14	25.4			-5.0°	Fig.4	7.4

Spare Parts

Description	① Clamp Screw	② Wrench	③ Shim	④ Clamp Screw	⑤ Wrench
MSE 45040R-○T-M 45050R-○T-M	CP8X15TL (L-hand screw)	TTC-25	MSE-4245S	SP4X9	LW-2 (for Clamp Screw)
MSE 45080R-○T ~ 45200R-○○T	CP8X23TL (L-hand screw)				
MSE 45063R-○T-M ~ 45200R-○○T-M					

・Mounting bolt(SP8X35) is included for MSE45040R-○T-M.
・Mounting bolt(HH10X30S) is included for MSE45050R-○T-M and MSE45063R-○T-M.
・Mounting bolt(HH12X35M) is included for MSE45080R-○T and MSE45080R-○T-M.

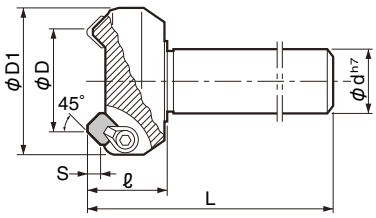


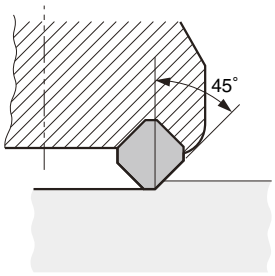
Clamp Screw ① has L-hand thread.
Therefore turn the wrench to the right to remove the insert.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSE45 Endmill (High Rake)



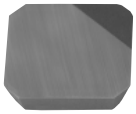




Toolholder Dimensions

Description		Std.	Number of Flutes	Dimension (mm)						Rake Angle (°)		Spare Parts				
				øD	øD1	ød	L	ℓ	S	A.R.	R.R.	Clamp Set	Wrench	Shim	Clamp Screw	
MSE	**4550**	●	3	50	73	32	120	40	6	+20°	-3°	CPS-6M	LW-3	MSE-4245	SP3X8	
	4563	●	4	63	86											
	4580-32	●	4	80	103											

Applicable Inserts

Toolholder	Applicable Inserts ➔ M10			Applicable Inserts ➔ M21
				
MSE45○○-○○ **MSE45○○○R-○T** **MSE45○○○R-○T-M**	SEMR 1203AFER-H	SEKR 1203AFEN-S	SEEN 1203AFTN SEKN 1203AFTN 1203AFFN	SEEN 1203AFFN 1203AFFN-NE (PCD)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min)												
		Cermet			PVD Coated Carbide						Carbide		PCD	
		TN60	TN100M	TC60	PR630	PR730	PR830	PR660	PR1025	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	★ 100~200		☆ 80~120			
Carbon Steel	~0.30	☆ 150~220	★ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	★ 120~200	☆ 100~180	☆ 100~180		☆ 80~150			
Alloy Steel	~0.30	☆ 120~200	★ 100~180	☆ 100~180	☆ 100~180	☆ 100~180	★ 100~180	☆ 80~150			☆ 80~150			
Mold Steel	~0.25	☆ 120~200	★ 100~180	☆ 80~150	☆ 80~150	☆ 80~150	★ 80~150	☆ 60~130			☆ 80~150			
Cast Iron	~0.30									★ 100~200		☆ 80~150		
Non-ferrous Metals	~0.20											★ 100~300	★ 300~800	☆ 300~800

★: 1st Recommendation ☆: 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSE45-SF Face Mill (Adjustable insert height)



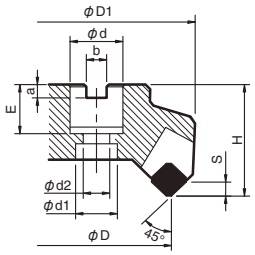


Fig.1

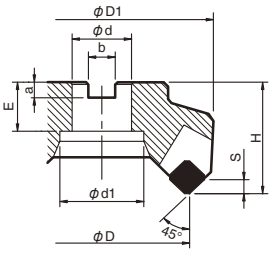


Fig.2

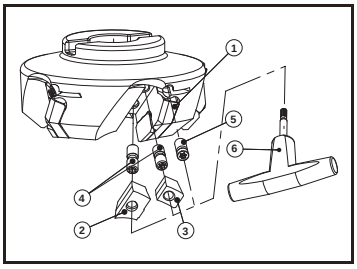
Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)										Rake Angle (°)		Drawing	Weight (kg)
				øD	øD1	ød	ød1	ød2	H	E	a	b	S	A.R.	R.R.		
Metric	MSE 45063R-4T-M-SF	●	4	63	85	22	17	11	50	21	6.3	10.4	6	+20°	-10°	Fig1	1.2
	45080R-5T-M-SF	●	5	80	101	27	38	-		24	7	12.4			-8.5°	Fig2	1.5
	45100R-6T-M-SF	●	6	100	119	32	45			32	8	14.4			-7.5°		2.2
	45125R-7T-M-SF	●	7	125	143	40	55		63	30	9	16.4			-6.5°		4.0
Bore Dia. Inch spec	MSE 45080R-5T-SF	○	5	80	101	25.4	38	-	50	26	6	9.5	6	+20°	-8.5°	Fig2	1.5
	45100R-6T-SF	○	6	100	119	31.75	45			32	8	12.7			-7.5°		2.2
	45125R-7T-SF	○	7	125	143	38.1	55		63	38	10	15.9			-6.5°		4.0

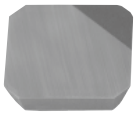
Spare Parts

Description	① Cartridge	② Clamp	③ Clamp	④ Clamp Screw	⑤ Adjustment Screw	⑥ Wrench
						
MSE 45○○R-○T-M-SF MSE 45○○R-○T-SF	LSE-445SR	C43R (for Insert)	C44R (for Cartridge)	W6X17	SV-60136TR	TTC-20

・Mounting bolt(HH10X30S) is included for MSE45063R-4T-M-SF.



Applicable Inserts

Description	Applicable Inserts ➔ M10				Applicable Inserts ➔ M21	
				 Wiper		 Wiper
MSE45...-SF	SEMR 1203AFER-H	SEKR 1203AFEN-S	SEEN 1203AFTN SEKN 1203AFTN 1203AFFN	SEEN 1203AFTR-W 1203AFFR-W	SEEN 1203AFFN 1203AFFN-NE (PCD)	SEEN 1203AFFR-W (PCD)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min)												
		Cermet			PVD Coated Carbide						Carbide		PCD	
		TN60	TN100M	TC60	PR630	PR730	PR830	PR660	PR1025	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	★ 100~200		☆ 80~120			
Carbon Steel	~0.30	☆ 150~220	★ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	★ 120~200	☆ 100~180	☆ 100~180		☆ 80~150			
Alloy Steel	~0.30	☆ 120~200	★ 100~180	☆ 100~180	☆ 100~180	☆ 100~180	★ 100~180	☆ 80~150			☆ 80~150			
Mold Steel	~0.25	☆ 120~200	★ 100~180	☆ 80~150	☆ 80~150	☆ 80~150	★ 80~150	☆ 60~130			☆ 80~150			
Cast Iron	~0.30									★ 100~200		☆ 80~150		
Non-ferrous Metals	~0.20											★ 100~300	★ 300~800	☆ 300~800

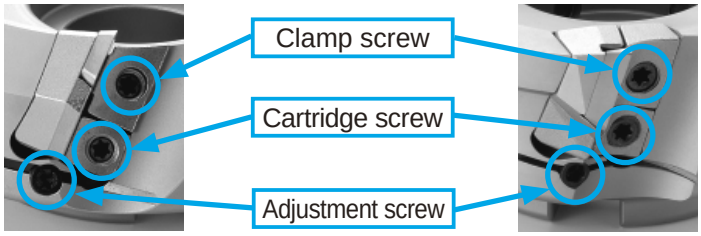
★: 1st Recommendation ☆: 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

How to adjust cutting edge height

● Screw names:

MSE45-SF



MTE90-SF

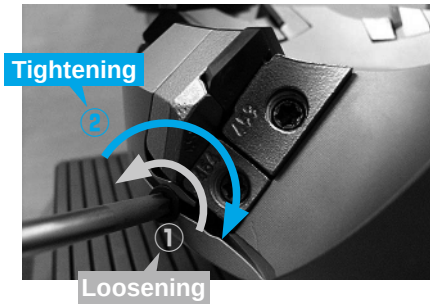
● Adjustable height for the cutting edge

・For model MSE45-SF: approx. 20μm
・For model MTE90-SF: approx. 50μm
(The difference in adjustable heights varies because of the difference in corner angles.)

*For the explanations below, refer to the screw names indicated above. Milling Cutter shown here is model MSE45-SF.

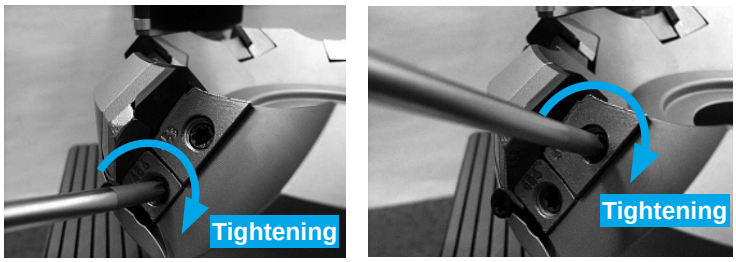
1) Partial adjustment of the adjustment screw

① Loosen the edge adjustment screw
② Tighten as much as the edge adjustment screw is tensioned



2) Partial tightening of the clamp screw and cartridge screw

① Partial tighten the cartridge screw.[Note)] ② Partial tighten the cartridge screw.[Note)]

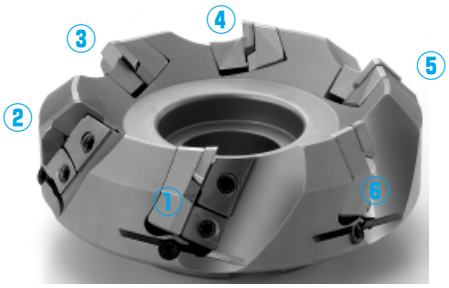


*Perform work with all inserts attached in their correct positions.
Note) Partial tightening: Tighten the adjustment screw only partially, so that further adjustment is still possible.

3) Measuring the cutting edge fluctuation



Example: Measuring the front cutting edge fluctuation



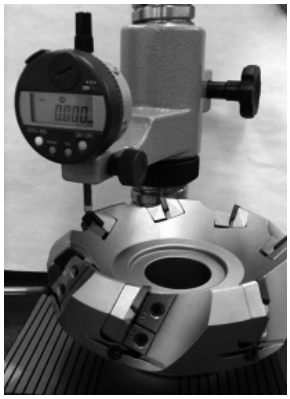
No.	Measurement results	Results	Edge fluctuation
①	0.263mm		-6μm
②	0.258mm		-11μm
③	0.254mm		-15μm
④	0.269mm	Max.	0μm
⑤	0.261mm		-8μm
⑥	0.250mm	Min.	-19μm

Current fluctuation: 19μm
(Number ① ~ ⑥ are not indicated on Milling Cutter)

*With each of these screws partial tightened: cartridge screw, clamp screw, adjustment screw, measure the cutting edge fluctuation.

4) Correcting the fluctuation

Based on the measurement results, correct the fluctuation.

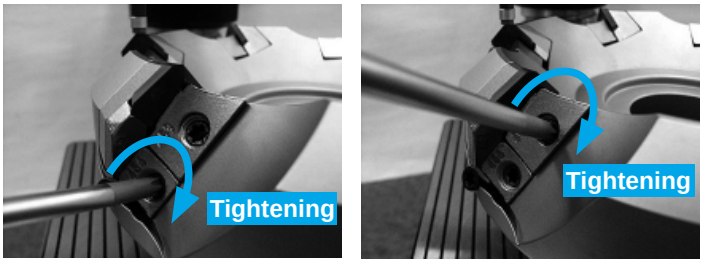




Using the measured amount of fluctuation, adjust so that the fluctuation is corrected at the highest corner of the cutting edge, then fully tighten the adjusting screw.

5) Firm tightening of the cartridge and insert

① Fully tighten the cartridge screw ② Fully tighten the clamp screw



Easy Edge Adjustment MSE45-SF

The usage of SEEN wiper insert

The features of the wiper insert

By inserting one wiper insert to the cutter which has been attached standard insert, surface roughness can be improved. The edge geometry of wiper insert is arc style and over hang is slightly prominent to axis direction when cutter is installed. Having finish by only wiper insert bottom of workpiece, good surface finish can be realized.

Recommended Cutting Conditions

1) Vc, fz···within recommended cutting conditions
2) ap≦0.5mm

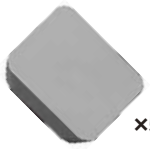
How to attach wiper insert

1) Insert only one wiper insert against standard insert.
2) As wiper insert is one edge use, please attach insert arrow "↓" that faces to workpiece cutting surface.
3) Control overhang amount for wiper insert using MSE45-SF type. So you can obtain much more stable surface roughness.

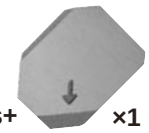
How to set up amount of over hang for wiper edge

1) Please adjust wiper insert overhang within 0.03 to 0.1mm from the largest overhang standard insert. If overhang is larger than this, life of insert should be lower.
2) It is recommended having wiper insert overhang about 0.05mm.

For example, when finishing Aluminum with ø125···



×5 Edges+



×1 Edge

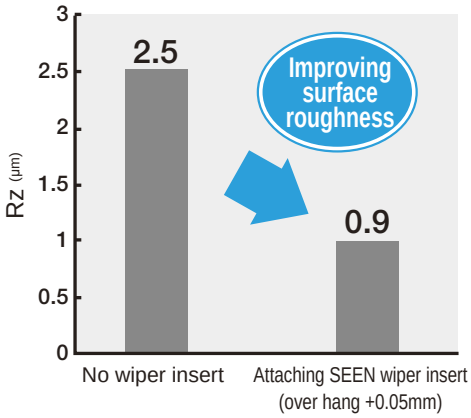
KW10

KPD001
Arrow sied is wiper edge

Low cost and good cutting surface

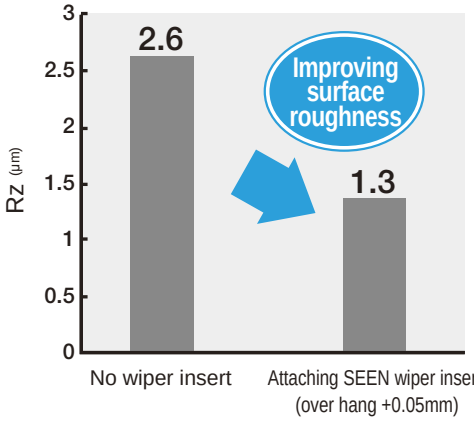
Case Studies

In case of Aluminum (AlMg 2.5) (A5052)



Cutting Conditions
·MSE45100R-6T-SF
·Vc=300m/min
·ap=0.2mm
·fz=0.2mm/t
·Wet
·No wiper insert
SEKN1203AFFN(KW10)
6 Edges
·With wiper insert
SEKN1203AFFN(KW10)
5 Edges
SEEN1203AFFR-W(KPD001)
1 Edge

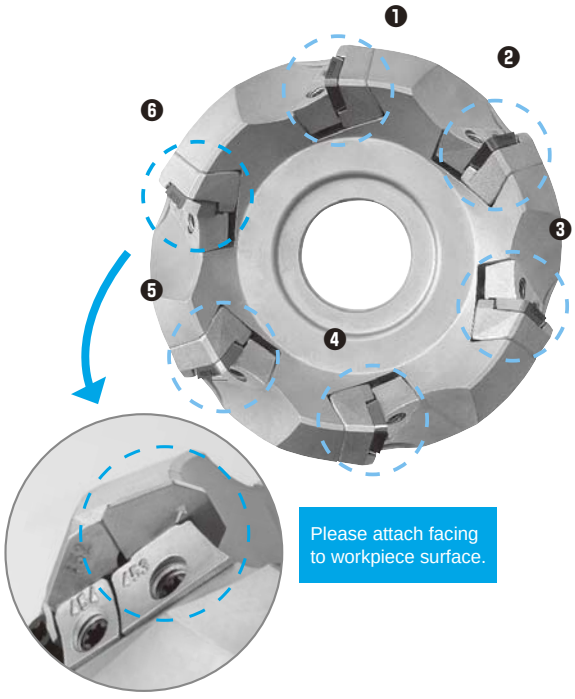
In case of C50 (S50C)



Cutting Conditions
·MSE45100R-6T-SF
·Vc=200m/min
·ap=0.2mm
·fz=0.1mm/t
·Dry
·No wiper insert
SEKN1203AFTN(TN100M)
6 Edges
·With wiper insert
SEKN1203AFTN(TN100M)
5 Edges
SEEN1203AFTR-W(TN100M)
1 Edge

Example of attaching wiper insert

NO.	Insert	Edge deviation
①	Standard	-6µm
②	Standard	-11µm
③	Standard	-15µm
④	Standard	0µm
⑤	Standard	-8µm
⑥	Wiper insert	+0.03~+0.1mm



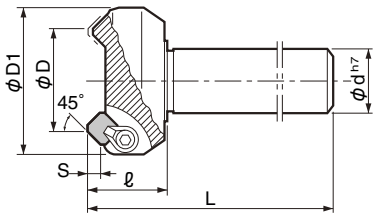
Please attach facing to workpiece surface.

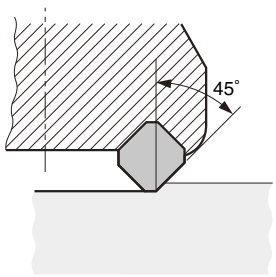
M

Milling

MSD45 Endmill







● Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)						Rake Angle (°)		Spare Parts				
				øD	øD1	ød	L	ℓ	S	A.R.	R.R.	Clamp Set	Wrench	Shim	Clamp Screw	
MSD	4550	●	3	50	73	32	120	40	6.5	+16°	-3°	CPS-6M	LW-3	MSD-42	SP3X8	
	4563	●	3	63	87											
	4580-32	●	4	80	104											

MSD45 Face Mill



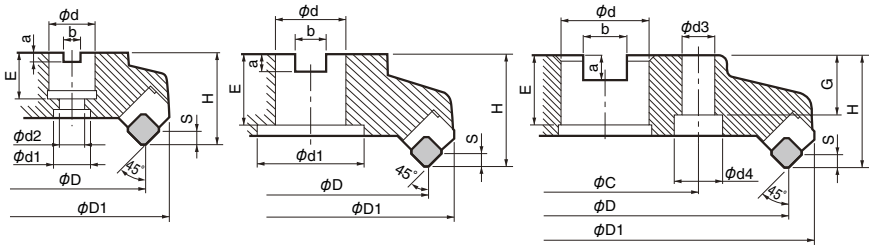


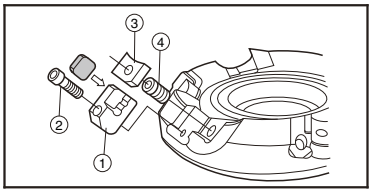
Fig.1 Fig.2 Fig.3

● Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)														Rake Angle (°)		Drawing	Weight (kg)
				øD	øD1	ød	ød1	ød2	ød3	ød4	øC	H	E	G	a	b	S	A.R.	R.R.		
MSD	4580R	○	4	80	106	25.40	20	14	-	-	-	50	26	-	6	9.5	6.5	+15°	-3°	Fig.1	1.9
	45100R	○	5	100	126	31.75	48	-				60	32		8	12.7				Fig.2	2.9
	45125R	○	6	125	151	38.10	58						38		10	15.9					4.1
	45160R	○	8	160	186	50.80	68								11	19.0					6.1
	45200R	○	10	200	226	47.625	-		18	26	101.6			38	14	25.4				Fig.3	9.3

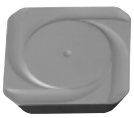
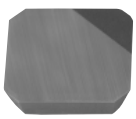
● Spare Parts

Description	① Cartridge	② Clamp Screw	③ Clamp	④ Clamp Screw	Wrench
MSD 45...R	LSD-445R	HH4X16	C20R	TH8X15	TH-4



・Mounting bolt(HH12X30) is included for MSD4580R

● Applicable Inserts

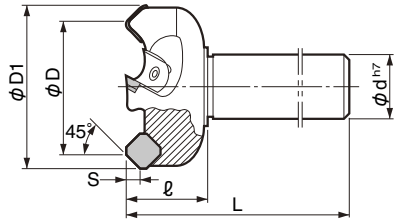
Toolholder	Applicable Inserts ➔ M10			Applicable Inserts ➔ M21
				
MSD 45...	SDMR 1203AUER-H	SDKR 1203AUEN-S	SDCN 1203AUTN SDKN 1203AUTN 1203AUFN	SDKN 1203AUFN 1203AUFN-NE (PCD)

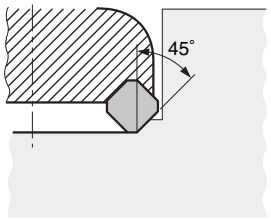
For recommended cutting conditions, see page ➔ M141

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSO45-S Endmill (High Rake)







Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Rake Angle (°)		Spare Parts				
			øD	øD1	ød	L	ℓ	S	A.R.	R.R.	Shim	Clamp Screw	Clamp	Clamp Screw	Wrench
MSO 4550-S	●	4	50	66	32	120	40	7.1	+27°	-8°	MSO-4T245	SP3X6	CH-20R	TH8X15	TH-4
4563-S	●	5	63	79											
4580-S	●	5	80	96											

MSO45-R (High Rake)



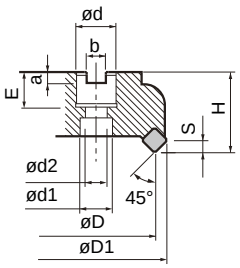


Fig.1

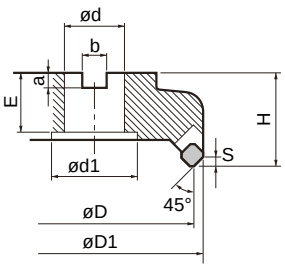


Fig.2

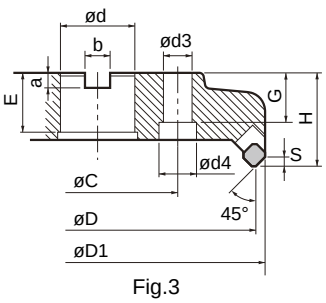


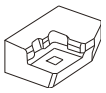
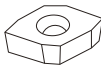
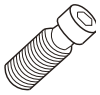
Fig.3

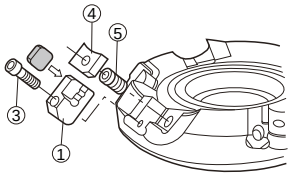
Toolholder Dimension

Description	Std.	No. of Insert	Dimension (mm)														Rake Angle (°)		Drawing	Weight (kg)
			øD	øD1	ød	ød1	ød2	ød3	ød4	øC	H	E	G	a	b	S	A.R.	R.R.		
MSO 45100R	○	5	100	114.8	31.75	48	-	-	-	-	60	32	-	8	12.7	7.1	+27°	-8°	Fig.2	2.5
45125R	○	6	125	140.0	38.10	58						38		10	15.9					3.7
45160R	○	8	160	174.5	50.80	68								11	19.0					5.4
45200R	○	10	200	214.5	47.625	-		18	26	101.6			32	14	25.4				Fig.3	8.4
MSO 4550R-13E-4T	●	4	50	65.9	22	18	12	-	-	-	40	20	-	6.3	10.4	7.1	+27°	-8°	Fig.1	0.4
4563R-13E-5T	●	5	63	78.9							45			6.3	10.4					1.0
4580R-13E-5T	●	5	80	95.9	27	20	14				50	22		7.2	12.4					1.3
MSO 45100R-E	●	5	100	114.8	32	48	-				60	28	-	8	14.4	7.1	+27°	-8°	Fig.2	2.5
45125R-E	●	6	125	140.0	40	58						30		9	16.4					3.7
45160R-E	●	8	160	174.5										10	16.4					5.4
45200R-E	●	10	200	214.5	60	62		18	26	101.6		38	32	15	25.4				Fig.3	8.4

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Spare Parts

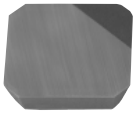
Description	① Cartridge	② Shim	③ Clamp Screw	④ Clamp	⑤ Clamp Screw	Wrench
			 HH SP			
MSO 45100R 45125R 45160R 45200R	LSO-445R	-	HH4X16	CH-20R	TH8X15	TH-4
MSO 4550R-13E-4T 4563R-13E-5T 4580R-13E-5T	-	MSO-4T245	SP3X6			
MSO 45100R-E 45125R-E 45160R-E 45200R-E	LSO-445R	-	HH4X16			



This figure indicates cartridge type.

- Mounting Bolt (HH10X25) is included for MSO4550R-13E-4T and MSO4563R-13E-5T.
- Mounting Bolt (HH12X30) is included for MSO4580R-13E-5T.

Applicable Inserts

Toolholder	Applicable Inserts ➔ M10, M11		Applicable Inserts ➔ M21
			
MSO 45...	SOKR 13T3AXEN-J	SOKN 13T3AXTN 13T3AXFN	SOKN 13T3AXFN-NE (PCD)

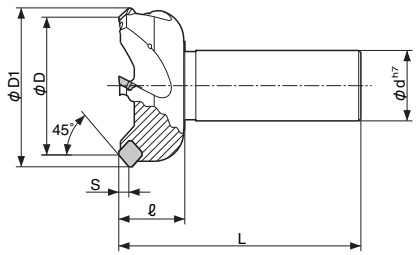
Recommended Cutting Conditions

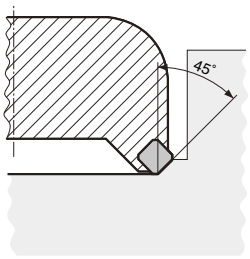
Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min)														
		Cermet			PVD Coated Carbide							Carbide		PCD		
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	KPD230		
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200				★ 100~200						
Carbon Steel	~0.3		★ 120~200	☆ 120~200	☆ 120~200	★ 120~200				☆ 100~180						
Alloy Steel	~0.3		★ 100~180	☆ 100~180	☆ 100~180	★ 100~180				☆ 80~150						
Mold Steel	~0.25		★ 100~180	☆ 100~180	☆ 80~150	★ 80~150				☆ 60~130						
Cast Iron	~0.3										★ 100~200		☆ 80~150			
Non-ferrous Metals	~0.2												★ 100~300	★ 300~800		

★ : 1st Recommendation ☆ : 2nd Recommendation

MSO45-S-09 Endmill (High Rake)



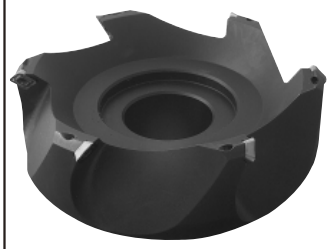




● Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)						Rake Angle (°)		Spare Parts				
				øD	øD1	ød	L	ℓ	S	A.R.	R.R.	Clamp Screw	Wrench			
MSO	4550-S32-09	●	3	50	60	32	110	30	4.2	+27°	-8°	SB-3060TR	DT-10			
	4563-S32-09	●	4	63	73											
	4580-S32-09	●	4	80	90											

MSO45-09 Face Mill (High Rake)



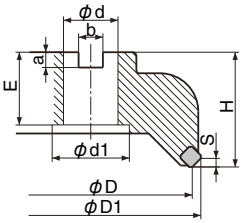
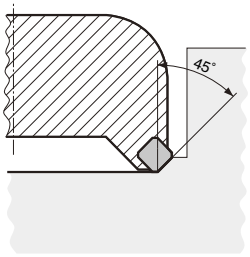


Fig.1

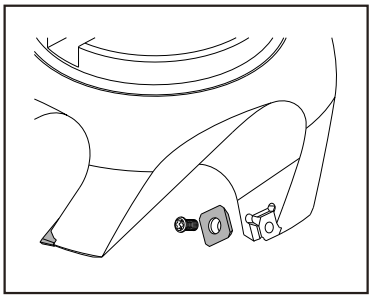


● Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)												Rake Angle (°)		Drawing	Weight (kg)
				øD	øD1	ød	ød1	H	E	a	b	S						A.R.	R.R.		
MSO	45100R-09	○	5	100	109.7	31.75	48	60	32	8	12.7	4.2						+27°	-8°	Fig.1	1.9
	45125R-09	○	6	125	134.7	38.10	58		38	10	15.9										2.8
	45160R-09	○	8	160	169.6	50.80	68			11	19.0										4.6

● Spare Parts

Description		Clamp Screw	Wrench			
MSO	45100R-09	SB-3060TR	DT-10			
	45125R-09					
	45160R-09					



● Applicable Inserts

Toolholder	Applicable Inserts ➔ M14	
		
MSO 45...-09	SOMT 0903AXEN-J	SOMW 0903AXTN 0903AXFN

For recommended cutting conditions, see page ➔ M141

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Face Mill for Heavy Milling MSRS

Facing



Roughing is processed in one pass.
MSRS type changes heavy cutting! (Max. ap is 12 mm)



Conventional tools

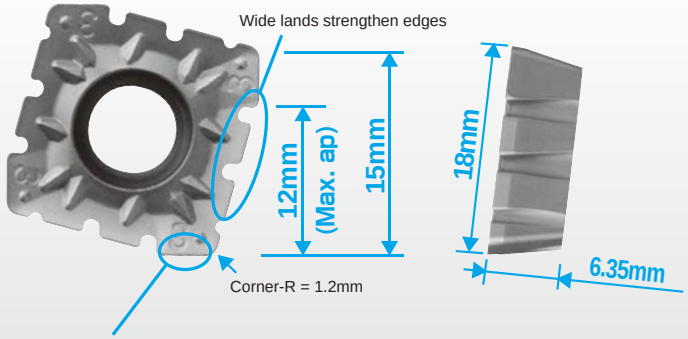
The amount of chip evacuation per unit time is increased considerably.



MSRS type

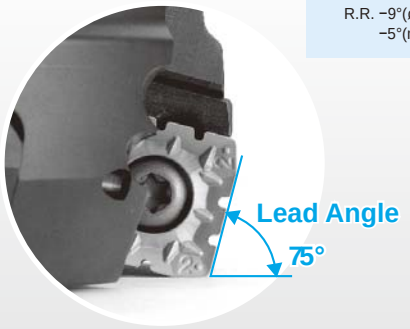
Large depth of cut and high feed rate achieve high efficiency machining.

● Recommended ap: 5~10mm



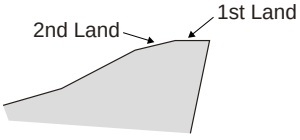
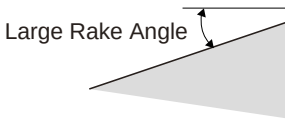
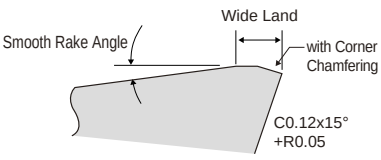
Large wiper edges achieve high feed rate.

Inserts are strengthened with 6.35mm width.



A.R. +9°
R.R. −9°(ø80)
−5°(more than ø100)

● Selection of chipbreaker

	Low Cutting Force Oriented	General Purpose	Edge Strength Oriented
Type	 **NB2P** (4 Notches) **NB3P** (5 Notches)	 **NB2** (2 Notches) **NB3** (3 Notches)	 **NB2T** (2 Notches) **NB3T** (3 Notches)
Application	Ideal when using long arbor type or for machining of thin-plate workpieces	General purpose type with well balance of strength and resistance	Ideal for interrupted cutting and high load cutting Ideal when feed rate is increased or work-piece 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.



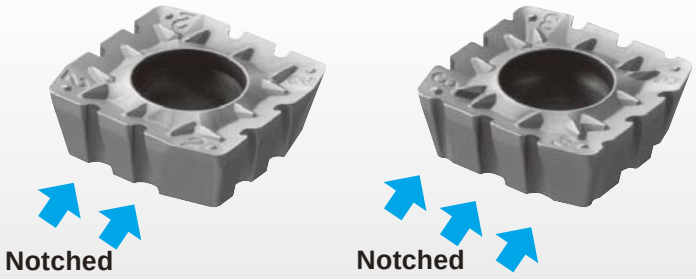
● About insert no. of NB2P (4 Notches) and NB3P (5 Notches)
In order to adjust applicable inserts on marked numbers on tool holders,
"2+" is marked for NB2P (4 Notches) and "3+" is marked on NB3P (5 Notches).

Face Mill for Heavy Milling MSRS

Facing

Notched insert reduces cutting force, chattering and enables efficient machining

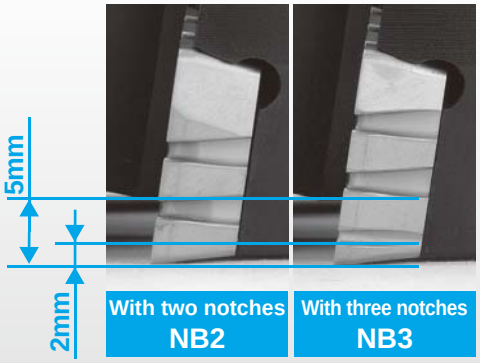
Notched Insert



NB2 NB3

Notch effect

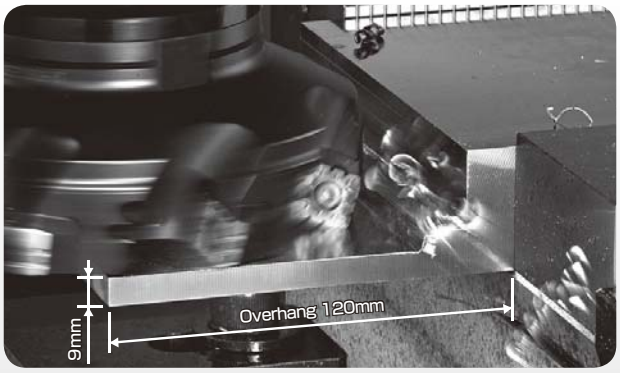
The effects of the notch can be seen at more than 5mm of vertical ap
(effects for NB3 appears from at least 2mm or more)



With two notches NB2 | With three notches NB3

Design to suppress chattering with low cutting force

Possible to machine thin-plate workpieces (low rigidity material such as can manufacturing equipment)

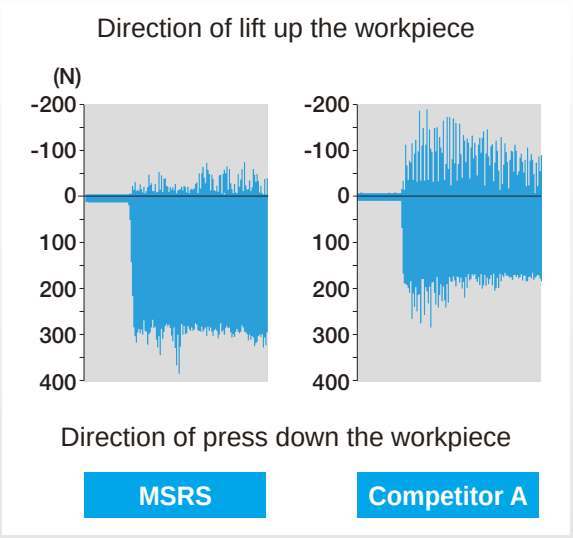


MSRS15160R-8T

Workpiece Material: C50 (S50C)
Vc=200m/min (n=398min^{-1})
fz=0.15mm/t(Vf=477mm/min), ap×ae=6×100mm
(Machining of overhang from 15mm to 9mm)

Comparison of cutting force (radial force)

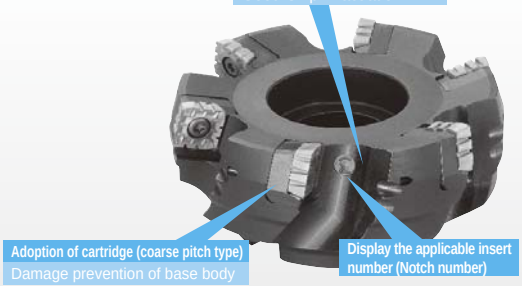
MSRS Type suppresses chattering since less force to lift workpiece is needed during machining.



Features of Toolholder

Coarse pitch type

Design of large chip pocket
Good Chip Evacuation

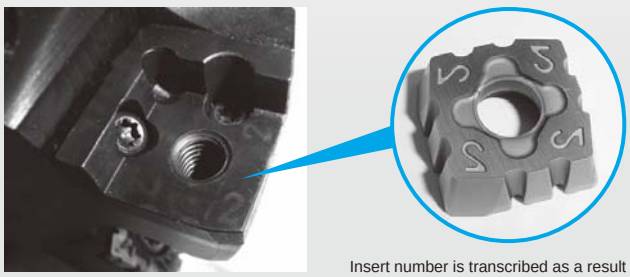


Close pitch type

Higher productivity due to close 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.

MSRS Face Mill

MSRS



(The photograph shows the coarse pitch type)

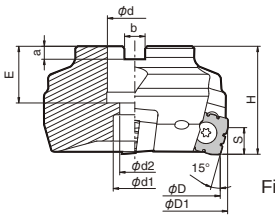


Fig.1

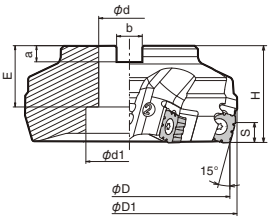


Fig.2

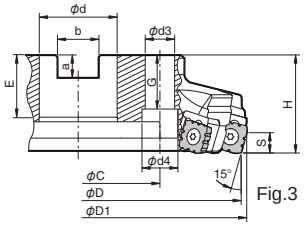


Fig.3

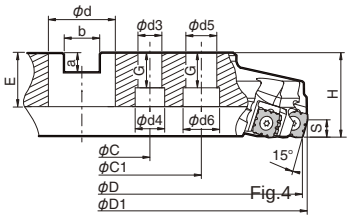


Fig.4

Rake Angle (°)		
Description	A.R.	R.R.
MSRS15080R-···	+9°	-9°
MSRS15100R-··· ~ MSRS15315R-···	+9°	-5°

Toolholder Dimensions (Bore ød: Metric)

	Description		Std.	No. of Insert	Dimension (mm)																	Drawing	Weight (kg)
					øD	øD1	ød	ød1	ød2	H	E	a	b	S	ød3	ød4	ød5	ød6	øC	øC1	G		
Coarse pitch type	MSRS	15080R-4T-M	●	4	80	87	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-4T-M	●	4	100	107	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		68							14	20	-	-	66.7	-	28	Fig.3	5.0
		15200R-10T-M	●	10	200	207	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											22	32		177.8		Fig.4	17.0
Close pitch type	MSRS	15080R-6T-M	●	6	80	87	27	20	13	50	24	7	12.4	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-6T-M	●	6	100	107	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		68							14	20	-	-	66.7	-	28	Fig.3	4.9
		15200R-12T-M	●	12	200	207	60	-	-		38	15	25.7		18	26	-	-	101.6	-	32		7.6
		15250R-14T-M	●	14	250	257																	11.9
		15315R-16T-M	○	16	315	322											22	32		177.8		Fig.4	17.0

・Mounting bolts (HH12X35) are included in MSRS15080R-○T-M.
・Cartridge is included in the coarse pitch type, but no Cartridge in the multi-edges type.

Toolholder Dimensions (Bore ød: Inch)

	Description		Std.	No. of Insert	Dimension (mm)																	Drawing	Weight (kg)
					øD	øD1	ød	ød1	ød2	H	E	a	b	S	ød3	ød4	ød5	ød6	øC	øC1	G		
Coarse pitch type	MSRS	15080R-4T	○	4	80	87	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-4T	○	4	100	107	31.75	42	-		32	8	12.7									Fig.2	2.0
		15125R-6T	○	6	125	132	38.1	54		60	38	10	15.9										3.6
		15160R-8T	○	8	160	167	50.8	68				11	19.0										5.0
		15200R-10T	○	10	200	207	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											22	32		177.8	25	Fig.4	17.0
Close pitch type	MSRS	15080R-6T	○	6	80	87	25.4	20	13	50	26	6	9.5	12	-	-	-	-	-	-	-	Fig.1	1.3
		15100R-6T	○	6	100	107	31.75	42	-		32	8	12.7									Fig.2	1.9
		15125R-8T	○	8	125	132	38.1	54		60	38	10	15.9										3.5
		15160R-10T	○	10	160	167	50.8	68				11	19.0										4.9
		15200R-12T	○	12	200	207	47.625	-	-			14	25.4		18	26	-	-	101.6	-	32	Fig.3	7.6
		15250R-14T	○	14	250	257																	11.9
		15315R-16T	○	16	315	322											22	32		177.8	25	Fig.4	17.0

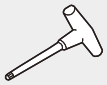
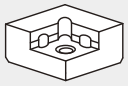
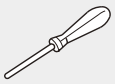
・Mounting bolts (HH12X35) are included in MSRS15080R-○T.
・Cartridge is included in the coarse pitch type, but no Cartridge in the multi-edges type.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSRS Face Mill

Facing

Spare Parts

Description		Spare Parts						
		Clamp Screw	Wrench	Cartridge	Clamp Screw	Wrench	Anti-seize Compound	Arbor Clamp Screw
								
Coarse pitch type	**MSRS 15080R-○○(M)**	SB-60120TR	TT-25L	MAP-1806	SB-40140TR	DT-15	MP-1	HH12×35
	MSRS 15100R-○○(M) ≀ **15315R-○○(M)**	for Insert Clamp Tightening Torque 7.5Nm		for Shim Clamp Tightening Torque 3.5Nm				-
Close pitch type	**MSRS 15080R-○○(M)**	SB-60120TR	TT-25L	-	-	-	MP-1	HH12×35
	MSRS 15100R-○○(M) ≀ **15315R-○○(M)**	for Insert Clamp Tightening Torque 7.5Nm						-

 Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

Recommended Cutting Conditions

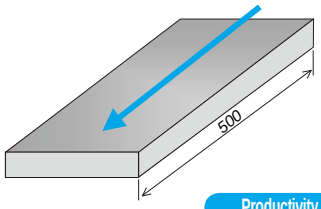
Workpiece Material	fz (mm/t)			Recommended Insert Grade (Cutting Speed Vc : m/min) PVD Coated Carbide		
	NB2P+NB3P	NB2+NB3	NB2T+NB3T	**PR660**	**PR830**	**PR905**
Carbon Steel	0.15	0.2	0.3	☆ 150~200	★ 180~220	-
Alloy Steel	0.15	0.2	0.3	☆ 150~200	★ 180~220	-
Mold Steel	0.1	0.15	0.2	☆ 120~180	★ 150~200	-
Gray Cast Iron	0.2	0.25	0.35	-	☆ 180~220	★ 150~250
Nodular Cast Iron	0.15	0.2	0.3	-	☆ 180~220	★ 180~220

★: 1st Recommendation
☆: 2nd Recommendation

Case Studies—Improved productivity / Shortened Machining Time—

St42-2 (SS400)

Plate
- Vc=150m/min (n=382min^{-1})
- ap×ae=10×125mm
- fz=0.2mm/t (Vf=458mm/min)
- Dry · 6 flutes
- MSRS15125R-6T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3 (PR830)



Productivity improved by 4.4 times!

MSRS Chip Evacuation Rate 572cc/min.

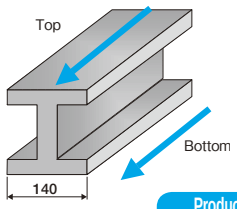
Competitor's Cutter A 129cc/min.

[Competitor's Cutter A]
ø125, 6 flutes
Vc=150m/min (n=382min^{-1})
ap×ae=3×125mm
fz=0.15mm/t (Vf=344mm/min)

[User's Comments]
Because conditions can be raised drastically, very effective for time crunch.
Productivity improved by 4.4 times.
(Evaluation by the user)

C50 (S50C)

Rail
- Vc=150m/min (n=300min^{-1})
- ap×ae=6×140m
- fz=0.2mm/t (Vf=480mm/min)
- Dry · 8 flutes
- MSRS15160R-8T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3 (PR830)



Productivity improved by 4.7 times!

MSRS Chip Evacuation Rate 403cc/min.

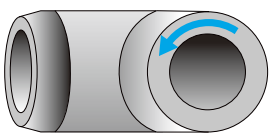
Competitor's Cutter B 84cc/min.

[Competitor's Cutter B]
Machining with 2mm×3 passes
Vc=150m/min (n=300min^{-1})
ap×ae=2×140mm
fz=0.125mm/t (Vf=300mm/min)

[User's Comments]
MSRS can complete machining with 1 pass for what needed to be machined with 3 passes usually. Still machining sound of MSRS was quiet. Productivity improved by 4.7 times.
(Evaluation by the user)

C12A (Cast Iron)

Industrial Machine Components
- Vc=100m/min (n=200min^{-1})
- ap×ae=10×114mm
- fz=0.4mm/t (Vf=635mm/min)
- Dry · 8 flutes
- MSRS15160R-8T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3 (PR830)



Productivity improved by 2.5 times!

MSRS Chip Evacuation Rate 724cc/min.

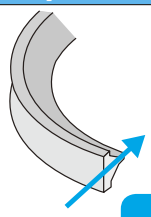
Competitor's Cutter C 290cc/min.

[Competitor's Cutter C]
6 inches, 8 flutes
Vc=250m/min (n=522min^{-1})
ap×ae=2.5×114mm
fz=0.25mm/t (Vf=1016mm/min)

[User's Comments]
Before ap could not be increased due to high resistance, but MSRS can increase ap without increasing load on the main spindle. Productivity improved by 2.5 times.
(Evaluation by the user)

C45 (S45C)

Gear
- Vc=200m/min (n=255min^{-1})
- ap×ae=10×200mm
- fz=0.17mm/t (Vf=600mm/min)
- Dry · 14 flutes
- MSRS15250R-14T
- SPMT1806EDER-NB2
- SPMT1806EDER-NB3 (PR830)



Productivity improved by 2.6 times!

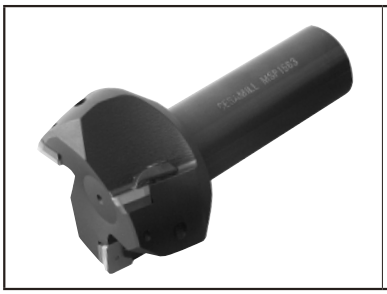
MSRS Chip Evacuation Rate 1200cc/min.

Competitor's Cutter D 459cc/min.

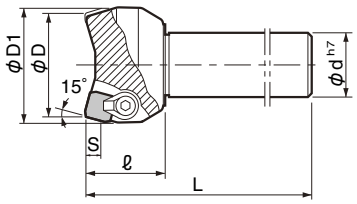
[Competitor's Cutter D]
ø250, 12 flutes
Vc=120m/min (n=153min^{-1})
ap×ae=5×200mm
fz=0.25mm/t (Vf=459mm/min)

[User's Comments]
Cutting sound is quiet even when cutting width is less than 80 % of cutter dia.
Productivity improved by 2.6 times.
(Evaluation by the user)

MSP15 Endmill　MSE15 Endmill (High Rake)







Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)						Rake Angle (°)		Spare Parts				
				øD	øD1	ød	L	ℓ	S	A.R.	R.R.	Clamp Set	Wrench	Shim	Clamp Screw	
MSP	1550	●	3	50	57	32	120	40	9	+10°	-2°	CPS-6M	LW-3	MSP-42	SP3X8	
	1563	●	3	63	70											
MSE	1550	●	3	50	57	32	120	40	8.5	+20°	+3°	CPS-6M	LW-3	MSE-4215	SP3X8	
	1563	●	3	63	71						+6°					
	1580-32	●	4	80	87											

MSP15 Face Mill



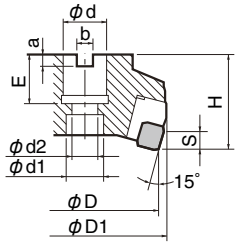


Fig.1

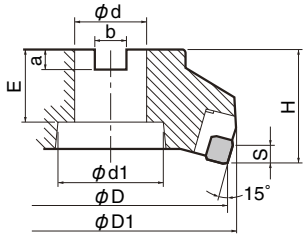


Fig.2

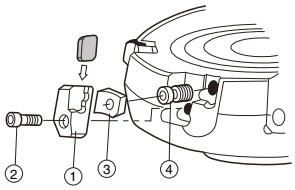
Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)												Rake Angle (°)		Drawing	Weight (kg)
				øD	øD1	ød	ød1	ød2	H	E	a	b	S				A.R.	R.R.		
MSP	1580R	○	4	80	89	25.40	20	14	50	26	6	9.5	9.5				+8°	0°	Fig.1	1.2
	15100R	○	5	100	109	31.75	48	-	60	32	8	12.7							Fig.2	2.5
	15125R	○	6	125	134	38.10	58			38	10	15.9								3.4

部品

Description		① Cartridge	② Clamp Screw	③ Clamp	④ Clamp Screw	Wrench
MSP	1580R	LSP-415R	HH4X16	C25R	TH8X15	TH-4
	15100R					
	15125R					

・Mounting bolts (HH12X30) are included in MSP1580R



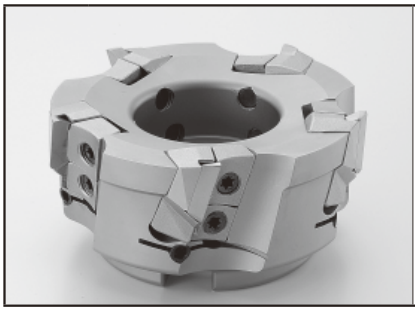
Applicable Inserts

Toolholder	Applicable Inserts M11			Applicable Inserts M10
				
MSP 15...	SPMR 1203EDER-H	SPKR 1203EDER-S	SPCN 1203EDTR SPKN 1203EDTR 1203EDFR	-
MSE 15...	-	-	-	SEKN 1203EFTR

● : Std. Item　○ : Check Availability
R : Std. Item (R-hand Only)　L : Std. Item (L-hand Only)

For recommended cutting conditions, see page M141

MTE90-SF Face Mill (Adjustable insert height)



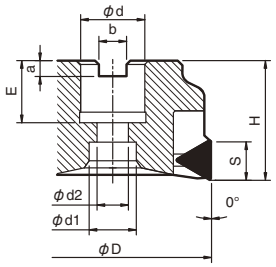


Fig.1

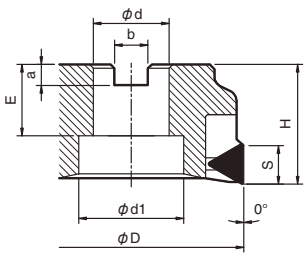


Fig.2

Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)									Rake Angle (°)		Drawing	Weight (kg)
				øD	ød	ød1	ød2	H	E	a	b	S	A.R.	R.R.		
Metric	MTE 90080R-4T-M-SF	●	4	80	27	20	13	50	24	7	12.4	17	+17°	+3°	Fig.1	1.0
	90100R-5T-M-SF	●	5	100	32	45	-		32	8	14.4			+4°	Fig.2	1.5
	90125R-6T-M-SF	●	6	125	40	55		63	30	9	16.4			+5°		3.0
Bore Dia. Inch spec	MTE 90080R-4T-SF	○	4	80	25.4	20	13	50	26	6	9.5	17	+17°	+3°	Fig.1	1.0
	90100R-5T-SF	○	5	100	31.75	45	-		32	8	12.7			+4°	Fig.2	1.5
	90125R-6T-SF	○	6	125	38.1	55		63	38	10	15.9			+5°		3.0

Spare Parts

Description	① Cartridge	② Clamp	③ Clamp	④ Clamp Screw	⑤ Adjustment Screw	⑥ Wrench	⑦ Wrench
							
MTE 90○○R-○T-M-SF	LTE490SR	C91R (for Insert)	C92R (for Cartridge)	W8X16	SV-60136R	TTC-25	LW-4 (For adjustment screw)
MTE 90○○R-○T-SF							

・Mounting bolts (HH12X35M) are included in MTE90080R-4T-SF and MTE90080R-4T-M-SF

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min)												
		Cermet			PVD Coated Carbide						Carbide		PCD	
		TN60	TN100M	TC60	PR630	PR730	PR830	PR660	PR1025	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.20		☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	★ 100~200		☆ 80~120			
Carbon Steel	~0.25	☆ 150~220	★ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	★ 120~200	☆ 100~180	☆ 100~180		☆ 80~150			
Alloy Steel	~0.25	☆ 120~200	★ 100~180	☆ 100~180	☆ 100~180	☆ 100~180	★ 100~180	☆ 100~150			☆ 80~150			
Mold Steel	~0.20	☆ 120~200	★ 100~180	☆ 100~180	☆ 80~150	☆ 80~150	★ 80~150	☆ 80~130			☆ 80~150			
Cast Iron	~0.25									★ 100~200		☆ 80~150		
Non-ferrous Metals	~0.20											★ 100~300	★ 300~800	☆ 300~800

★: 1st Recommendation ☆: 2nd Recommendation

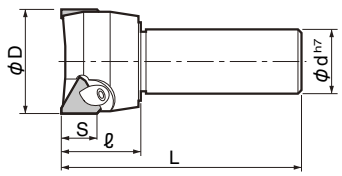
How to Adjust Cutting Edge height

For adjustment method of edge height, see page ➔ **M29**.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

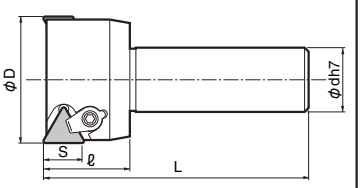
MTE90 Endmill (High Rake)





MTP90 Endmill





Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm) øD	ød	L	ℓ	S	Rake Angle (°) A.R.	R.R.	Spare Parts: Clamp	Clamp	Clamp Screw	Wrench	Shim	Clamp Screw
MTE	9050	●	3	50	32	120	40	17	+13°	+3°	-	CP-8TE	W8X18	LW-4	MTE-42	SP3X8
	9063	●	3	63						+5°						
	9080-32	●	4	80					+16°	+6°						
MTP	9050	●	3	50	32	130	43	18	+8°	0°	CP-8W	-			KPT-42	
	9063	●	3	63												

MTE90 Face Mill (High Rake)



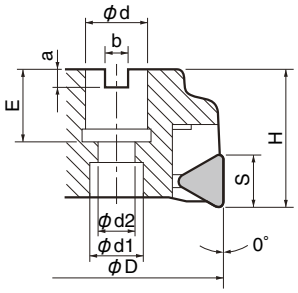


Fig.1

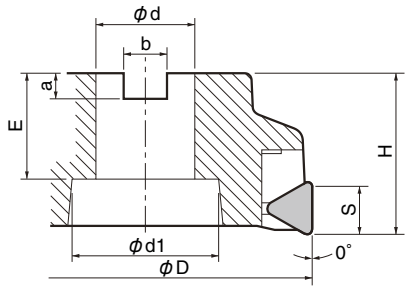


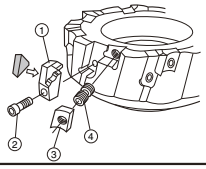
Fig.2

Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	Rake Angle (°) A.R.	R.R.	Drawing	Weight (kg)
MTE	9080R	○	4	80	25.40	20	14	50	26	6	9.5	17	+16°	+6°	Fig.1	1.3
	90100R	○	5	100	31.75	26	18	60	32	8	12.7					2.3
	90125R	○	6	125	38.10	58	-		38	10	15.9				Fig.2	3.2
	90160R	○	8	160	50.80	68				11	19.0					5.3

Spare Parts

Description	① Cartridge	② Clamp Screw	③ Clamp	④ Clamp Screw	Wrench
MTE 90...R	LTE-490R	HH4X16	C17R	W8X18	TH-4



Applicable Inserts

Toolholder	Applicable Inserts → M12			Applicable Inserts → M21
MTE 90...	TEMR 2204PTER-H	TEKR 2204PTER-S	TEEN 2204PTTR TEKN 2204PTTR 2204PTFR	TEKN 2204PTFR 2204PTFR-NE (PCD)
MTP 90...	TPMR 2204PDER-H	TPKR 2204PDER-S	TPKN 2204PDTR 2204PDFR	-

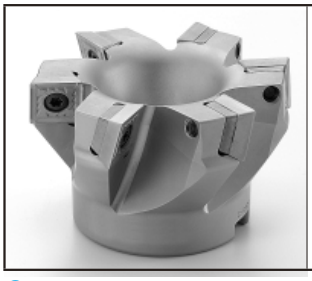
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

For recommended cutting conditions, see page → M40

Right Angle 4-Corner MSO90

Shouldering | Slotting | Facing

MSO90 Face Mill (Coarse pitch / Close pitch)



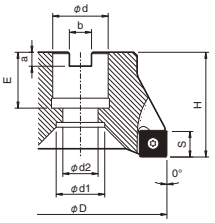


Fig.1

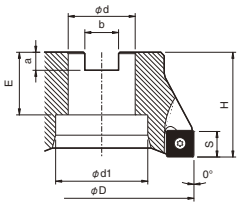


Fig.2

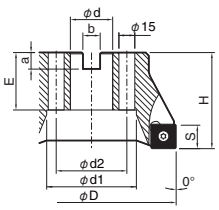


Fig.3

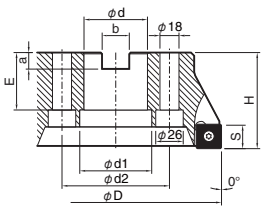


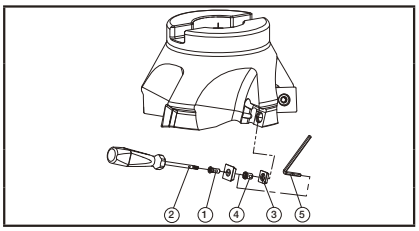
Fig.4

Toolholder Dimensions

Description			Std.	No. of Insert	Dimension (mm)									Rake Angle (°)		Drawing	Weight (kg)
					øD	ød	ød1	ød2	H	E	a	b	S	A.R.	R.R.		
Metric	Coarse pitch	MSO 90063R-15-4T-M	●	4	63	22	17	11	50	21	6.3	10.4	13	+15°	-9.5°	Fig.1	0.6
		90080R-15-4T-M	●	4	80	27	20	14		24	7	12.4			-9°		0.8
		90100R-15-5T-M	●	5	100	32	48	-	60	32	8	14.4			-8.5°	Fig.2	1.3
		90125R-15-6T-M	●	6	125	40	59			36	9	16.4			-8°		2.3
		90160R-15-7T-M	●	7	160		81	66.7	63	30					-7.5°	Fig.3	4.1
		90200R-15-9T-M	●	9	200	60	68	101.6		32	14	25.7			-7.5°	Fig.4	7.1
	Close pitch	MSO 90063R-15-5T-M	●	5	63	22	17	11	50	21	6.3	10.4	13	+15°	-9.5°	Fig.1	0.6
		90080R-15-6T-M	●	6	80	27	20	14		24	7	12.4			-9°		0.8
		90100R-15-6T-M	●	6	100	32	48	-	60	32	8	14.4			-8.5°	Fig.2	1.3
		90125R-15-7T-M	●	7	125	40	59			36	9	16.4			-8°		2.3
		90160R-15-9T-M	●	9	160		81	66.7	63	30					-7.5°	Fig.3	4.1
		90200R-15-11T-M	●	11	200	60	68	101.6		32	14	25.7			-7.5°	Fig.4	7.1
Bore Dia. Inch spec	Coarse pitch	MSO 90080R-15-4T	○	4	80	25.4	20	13	50	26	6	9.5	13	+15°	-9°	Fig.1	0.8
		90100R-15-5T	○	5	100	31.75	48	-	60	32	8	12.7			-8.5°	Fig.2	1.3
		90125R-15-6T	○	6	125	38.1	59			38	10	15.9			-8°		2.3
		90160R-15-7T	○	7	160	50.8	68		63		11	19.1			-7.5°		4.1
		90200R-15-9T	○	9	200	47.625		101.6			14	25.4			-7.5°	Fig.4	7.1
	Close pitch	MSO 90080R-15-6T	○	6	80	25.4	20	13	50	26	6	9.5	13	+15°	-9°	Fig.1	0.8
		90100R-15-6T	○	6	100	31.75	48	-	60	32	8	12.7			-8.5°	Fig.2	1.3
		90125R-15-7T	○	7	125	38.1	59			38	10	15.9			-8°		2.3
		90160R-15-9T	○	9	160	50.8	68		63		11	19.1			-7.5°		4.1
		90200R-15-11T	○	11	200	47.625		101.6			14	25.4			-7.5°	Fig.4	7.1

Spare Parts

Description	① Clamp Screw	② Wrench	③ Shim	④ Clamp Screw	⑤ Wrench
MSO 90○○○R-15-○T-M	SB-45130TR	DTP-20	MSO-5200	SPW-6045	LW-4.5 (for Clamp Screw)
MSO 90○○○R-15-○T					



・Mounting bolts (HH12X35M) are included in MSO90080R-15-○T and MSO90080R-15-○T-M

Applicable Inserts

Toolholder	Applicable Inserts ➔ M14
MSO90...R-09	SEMM09T308PESR
MSO90○○○R-15...	SEMM150408PESR

Recommended Cutting Conditions

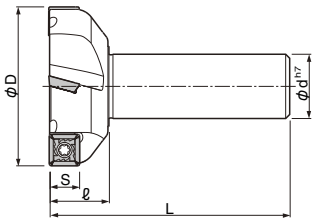
Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min)							
		Cermet	PVD Coated Carbide						Carbide
		TN100M	PR630	PR730	PR830	PR660	PR1025	PR905	KW10
Stainless Steel	~0.20	☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200	☆ 100~200	★ 100~200		
Carbon Steel	~0.20	★ 120~200	☆ 120~200	☆ 120~200	★ 120~200	☆ 100~180	☆ 100~180		
Alloy Steel	~0.20	★ 100~180	☆ 100~180	☆ 100~180	★ 100~180	☆ 80~150			
Mold Steel	~0.20	★ 100~180	☆ 80~150	☆ 80~150	★ 80~150	☆ 60~130			
Cast Iron	~0.20							★ 100~200	☆ 80~150
Non-ferrous Metals	~0.20								★ 100~300

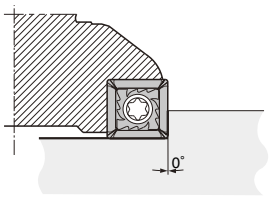
★: 1st Recommendation ☆: 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSO90-S Endmill







● Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm) øD	ød	L	ℓ	S		Rake Angle (°) A.R.	R.R.	Spare Parts Clamp Screw	Wrench	Applicable Inserts ⇒ M14
MSO	9050-S32-09	●	3	50	32	120	30	7		+12°	-9°	SB-3080TR	DT-10	SEMM 09T308PESR
	9063-S32-09	●	4	63										
	9080-S32-09	●		80							-7°			
MSO	9050-S32-15	●	3	50	32	120	30	13		+15°	-10°	SB-5085TR	DT-20	SEMM 150408PESR
	9063-S32-15	●	4	63							-9°			
	9080-S32-15	●		80							-8°			

MSO90-09 Face Mill



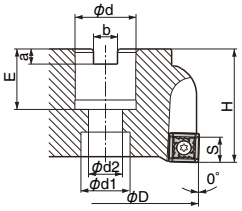


Fig.1

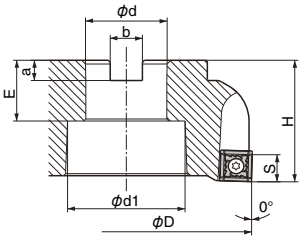
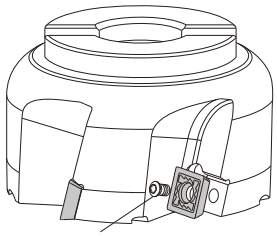


Fig.2



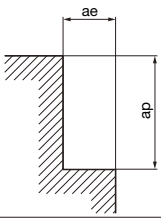
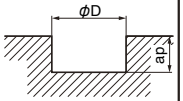
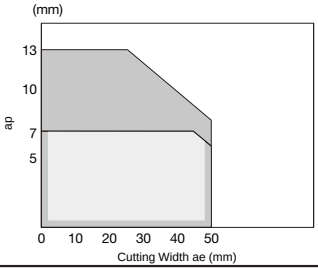
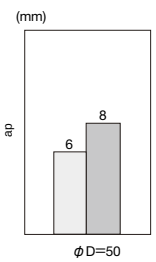
● Toolholder Dimensions

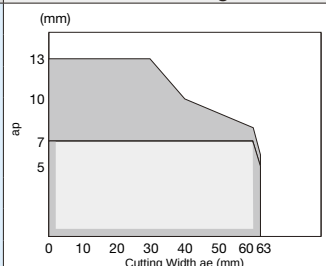
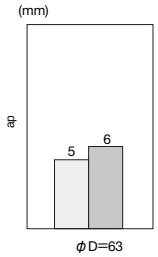
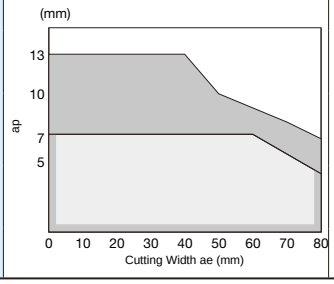
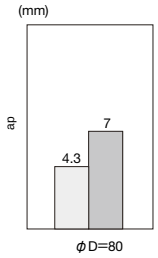
Description		Std.	No. of Insert	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	Rake Angle (°) A.R.	R.R.	Drawing	Weight (kg)	Spare Parts Clamp Screw	Wrench
MSO	90080R-09	○	4	80	25.40	20	14	50	26	6	9.5	7	+12°	-9°	Fig.1	1.3	SB-3080TR	DT-10
	90100R-09	○	5	100	31.75	48	-	60	32	8	12.7				Fig.2	1.9		
	90125R-09	○	6	125	38.10	59			38	10	15.9					3.0		

・Mounting bolts (HH12X30M) are included in MSO90080R-09

● Cutting Performance

[Cutting Conditions] Vc=100m/min, fz=0.15mm/t, Dry

Workpiece Material	Shouldering	Slotting
C50 (S50C)		
Description		
MSO-9050-S32-○○ Insert Size 09 type 15 type		

Description	Shouldering	Slotting
MSO-9063-S32-○○ Insert Size 09 type 15 type		
MSO-9080-S32-○○ Insert Size 09 type 15 type		

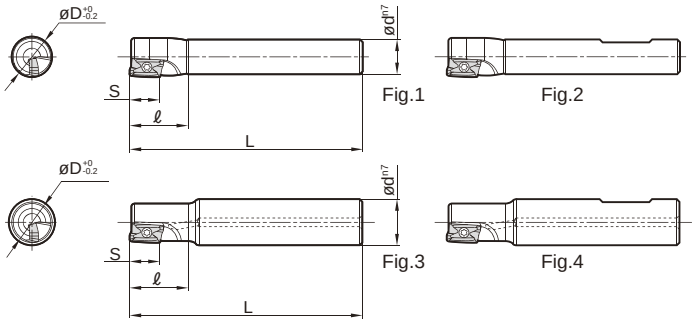
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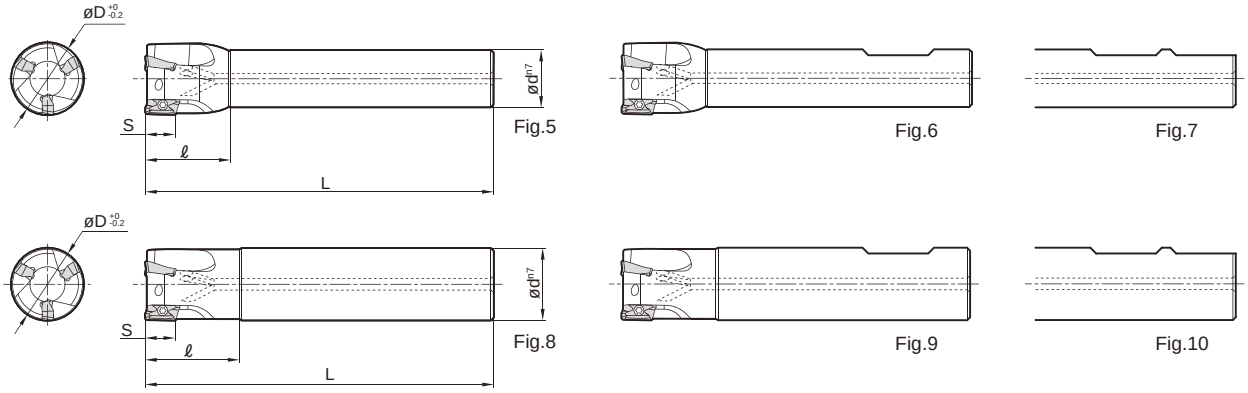
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MEC Endmill


(Straight)


(Weldon)





Toolholder Dimensions

Description			Std.	No. of Insert	Dimension (mm)					Rake Angle (°)		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min^{-1})
					øD	ød	L	ℓ	S	A.R. (MAX)	R.R.			Clamp Screw	Wrench	
Weldon	Standard Shank	MEC 10-W10-1103	●	1	10	10	60	17	10	+10°	-24°	No	Fig.2	SB-2545TR	DTM-8	54,800
		10-W16-1103-H	●			16	68					Yes	Fig.4			
		12-W10-1103	●		12	10	60	20		+12°	-21°	No	Fig.2			50,800
		12-W16-1103-H	●			16	68					Yes	Fig.4			
		14-W12-1103	●		14	12	68			+12°	-19°	No	Fig.2			47,700
		14-W16-1103-H	●			16						Yes	Fig.4			
		MEC 16-W12-11T3	●	2	16	12	68	23	10	+18°	-14°	No	Fig.2	SB-2555TRG	DTM-8	43,750
		18-W16-11T3-H	●		18	16				+19°	-13°	Yes	Fig.6			43,000
		20-W16-11T3-H	●	3	20			25		+20°	-10°					41,000
		22-W20-11T3-H	●		22	20	81	26		+21°						39,600
		25-W20-11T3-H	●		25			29								37,500
		28-W25-11T3-H	●		28	25	88			+22°	-9°		Fig.7			35,800
		30-W25-11T3-H	●	4	30			32		+23°						34,800
		32-W25-11T3-H	●		32											33,900
		40-W32-11T3-H	●	5	40	32	110	50			-8°					30,000
	Same Shank Size	MEC 16-W16-11T3-H	●	2	16	16	68	25	10	+18°	-14°	Yes	Fig.9	SB-2555TRG	DTM-8	43,750
		20-W20-11T3-H	●	3	20	20	81	30		+20°	-10°					41,000
		25-W25-11T3-H	●		25	25	88	32		+21°			Fig.10			37,500
		32-W32-11T3-H	●	4	32	32	100	40		+23°	-9°					33,900
	Standard Shank	MEC 25-W20-1704-H	●	2	25	20	86	36	15.7	+16°	-11°	Yes	Fig.6	SB-4070TRN	DTM-15	35,000
		32-W25-1704-H	●	3	32	25	92			+17°	-7°		Fig.7			30,000
		40-W32-1704-H	●	4	40	32	110	50		+19°						25,000
	Same Shank Size	MEC 25-W25-1704-H	●	2	25	25	92	36	15.7	+16°	-11°	Yes	Fig.10	SB-4070TRN	DTM-15	35,000
		32-W32-1704-H	●	3	32	32	100	40		+17°	-7°					30,000

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholder Dimensions

Description			Std.	No. of Insert	Dimension (mm)					Rake Angle (°)		Coolant Hole	Drawing	Spare Parts		Max. Revolution (min^{-1})
					øD	ød	L	ℓ	S	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	12										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°	-13°					43,000
		19-S16-11T	●	3	19			26		+20°	-10°					42,000
		20-S16-11T	●		20		110									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
		28-S25-11T	●		28	25				+22°	-9°					35,800
		30-S25-11T	●	4	30		130	32		+23°						34,800
		32-S25-11T	●		32											33,900
		40-S32-11T	●	5	40	32	150	50			-8°					30,000
		50-S32-11T	●		50						-7°					22,500
	Same Shank Size	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
		32-S32-11T	●	4	32	32	130	40		+23°	-9°					33,900
	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
	Standard Shank	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 Size	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

■ Max. Revolution

When running the endmill and cutter at the maximum revolution, the insert or holder may be damaged by centrifugal force. For more details, see "Warning" on page **M47**.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MEC Face Mill



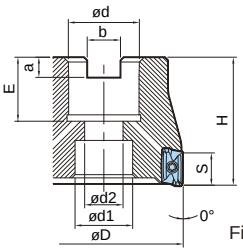


Fig.1

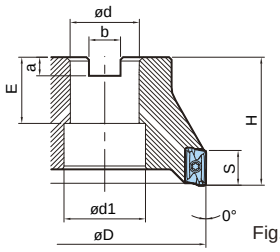


Fig.2

Rake Angle (°)
11Type A.R.(MAX): +23° R.R. : -7°
17Type A.R.(MAX): +19° R.R. : -7°



Dimensions

Description				Std.	No. of Insert	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	Coolant Hole	Drawing	Weight (kg)	Spare Parts: Clamp screw	Spare Parts: Wrench	Max. Revolution (min^{-1})
METRIC	Standard	MEC	040R-11-5T-M	●	5	40	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	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	27	20	14	50	26	7	12.4				1.0			18,500
			100R-11-9T-MN	●	9	100	32	26	17.6	55		8	14.4				1.6			17,000
			125R-11-11T-M	●	11	125	40	45	32	63	33	9.5	16.4				3.1			15,000
			160R-11-14T-M	●	14	160		68	-						No	Fig.2	4.5			13,900
	Standard	MEC	040R-17-4T-M	●	4	40	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	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	27	20	14	50	26	7	12.4				1.0			12,000
			100R-17-7T-MN	●	7	100	32	26	17.6	55		8	14.4				1.8			10,500
			125R-17-9T-M	●	9	125	40	45	32	63	33	9.5	16.4				3.1			8,900
			160R-17-12T-M	●	12	160		68	-						No	Fig.2	4.5			7,400
Bore Dia. Inch spec	Coarse pitch	MEC	063R-11-6T	○	6	63	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											1.0			18,500
			100R-11-9TN	○	9	100	31.75	26	17.6	63	32	8	12.7				1.8			17,000
			125R-11-11T	○	11	125	38.1	45	32		38	10	15.9				3.4			15,000
			160R-11-14T	○	14	160	50.8	70	-		47	10	19.1			Fig.2	4.4			13,900
	Close pitch	MEC	063R-11-8T	○	8	63	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											1.0			18,500
	Coarse pitch	MEC	063R-17-5T	○	5	63	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											1.0			12,000
			100R-17-7TN	○	7	100	31.75	26	17.6	63	32	8	12.7				1.8			10,500
			125R-17-9T	○	9	125	38.1	45	32		38	10	15.9				3.4			8,900
			160R-17-12T	○	12	160	50.8	70	-		47	10	19.1			Fig.2	4.5			7,400
	Close pitch	MEC	063R-17-6T	○	6	63	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											1.0			12,000
			100R-17-9TN	○	9	100	31.75	26	17.6	63	32	8	12.7				1.8			10,500

■ Max. Revolution

When running the endmill and cutter at the maximum revolution, the insert or holder may be damaged by centrifugal force. For more details, see “Warning” on page **M47**.

●When using Center-through Air / Coolant / Mist

If Center Through air (Coolant, Mist) is used, please use appropriate arbor and clamp with arbor bolt. (Table1)

Table1

Toolholder	Arbor clamp bolt (Attachment)	Wrench
MEC040R····-M	HH8×25H	LW-5 (Double width 5mm)
MEC050R····-M MEC063R····-M	HH10×30H	LW-6 (Double width 6mm)
MEC063R···· MEC080R····	HH12×35H	LW-8 (Double width 8mm)
MEC100R····-(M) N	HH16×52H	LW-12 (Double width 12mm)
MEC125R····-(M) MEC160R····-M	HF20×53H	LW-14 (Double width 14mm)
MEC160R····	HF24×60H	LW-17 (Double width 17mm)

Wrench is not included. Please purchase separately.

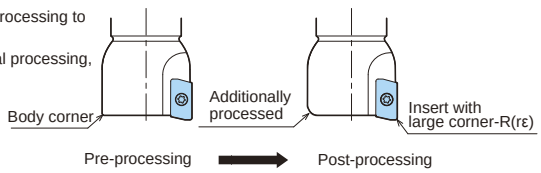
●MEC’s surface finish when shouldering with multiple passes

In order to obtain smoothly finished shoulder wall by multiple passes of MEC Milling Cutter, please keep ap less than 5.5mm for 11T3 type and also keep ap less than 9mm for 1704 type.

■ When using inserts with corner radii R1.6 or larger, additional modifications of the cutter body will be necessary. See the chart below for the recommended modifications.

Insert Corner-R(rε)	Material to be removed from cutter body corner
1.6	R1.0
2.0	
2.4	R1.2
3.1	R1.6
4.0	R2.5

* R shape is recommended for additional processing to the body corner.
When applying chamfer shaped additional processing, do not cut away too much.



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Applicable Inserts

Toolholder	Applicable Inserts ➔ **M16**			Applicable Inserts ➔ M21
				
MEC····-11···	BDMT 1103 ○○ ER-JT	BDMT 1103 ○○ ER-JS	-	-
MEC····-11T··· **MEC··R-11···**	BDMT 11T3 ○○ ER-JT	BDMT 11T3 ○○ ER-JS	BDGT 11T3 ○○ FR-JA	BDMT 11T3 ○○ FR
MEC····-17··· **MEC··R-17···**	BDMT 1704 ○○ ER-JT	BDMT 1704 ○○ ER-JS	BDGT 1704 ○○ FR-JA	BDMT 1704 ○○ FR

Recommended Cutting Conditions (MEC Endmill / Face Mill)

•JT Chipbreaker

Cutting Dia. ø10~ø18
〈MEC10~MEC18〉

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed: m/min)	
		PVD Coated Carbide	
		PR830	**PR905**
Stainless Steel	0.06~0.08~0.1	100~180	-
Carbon Steel	0.06~0.1~0.15	120~200	-
Alloy Steel	0.06~0.1~0.12	100~180	-
Mold Steel	0.06~0.08~0.1	80~150	-
Gray Cast Iron	0.08~0.1~0.15	-	100~180
Nodular Cast Iron	0.06~0.08~0.1	-	80~120

Cutting Dia. ø20~ø160
〈MEC20~MEC40〉〈MEC040R~MEC160R〉

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed: m/min)	
		PVD Coated Carbide	
		PR830	**PR905**
Stainless Steel	0.08~0.12~0.15	100~180	-
Carbon Steel	0.08~0.15~0.25	120~200	-
Alloy Steel	0.08~0.15~0.2	100~180	-
Mold Steel	0.08~0.12~0.2	80~150	-
Gray Cast Iron	0.08~0.18~0.25	-	100~180
Nodular Cast Iron	0.08~0.15~0.2	-	80~120

•JS Chipbreaker

Cutting Dia. ø10~ø18
〈MEC10~MEC18〉

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed: m/min)	
		PVD Coated Carbide	
		PR830	**PR1025**
Stainless Steel	0.06~0.08~0.1	100~180	100~180
Carbon Steel	0.06~0.1~0.12	120~200	100~150
Alloy Steel	0.06~0.08~0.1	100~180	-
Mold Steel	0.06~0.08~0.1	80~150	-

Cutting Dia. ø20~ø160
〈MEC20~MEC40〉〈MEC40R~MEC160R〉

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed: m/min)	
		PVD Coated Carbide	
		PR830	**PR1025**
Stainless Steel	0.08~0.1~0.12	100~180	100~180
Carbon Steel	0.08~0.15~0.18	120~200	100~150
Alloy Steel	0.08~0.12~0.15	100~180	-
Mold Steel	0.08~0.1~0.12	80~150	-

•JA Chipbreaker

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed: m/min)
		Carbide
		GW25
Aluminum Alloy (Si 13% or below)	0.05~0.3	200~800
Aluminum Alloy (Si 13% or above)	0.05~0.2	200~300

•PCD

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed: m/min)
		PCD
		KPD230 (KPD001)
Aluminum Alloy (Si 13% or below)	0.05~0.2	500~1,500
Aluminum Alloy (Si 13% or above)	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. When running the endmill and the facemill at revolutions exceeding the maximum revolution limit, the inserts or toolholder may be damaged due to the centrifugal force.
2. For actual practical revolution, please set within recommended machining 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.

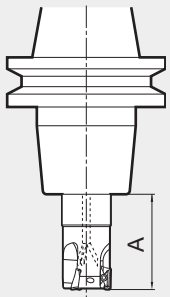
Max. Revolution (min^{-1})	Balance quality grade G ISO 1940-1 / 8821 (JIS B0905)
~20,000	G16
~30,000	G6.3
30,000~	G2.5

Cutting Performance of MEC Endmill

①Cutting edge length 10mm Type
(Standard / Straight Shank)

Cutting Dia.	Description	Overhang Length A (mm)	
ø8	**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

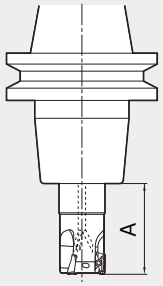
Shape



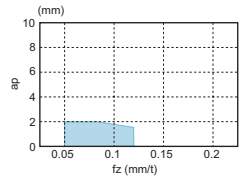
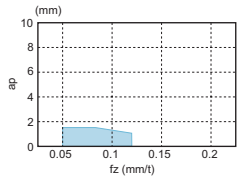
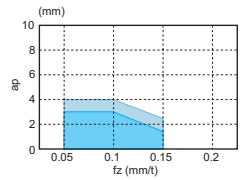
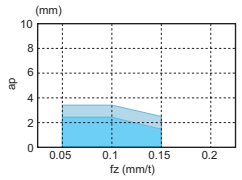
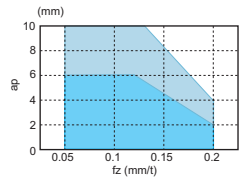
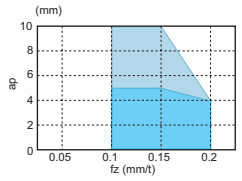
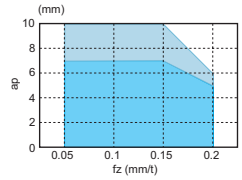
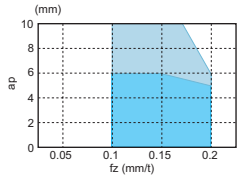
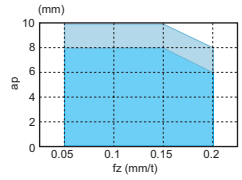
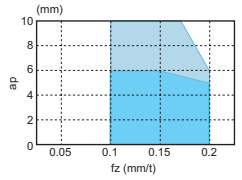
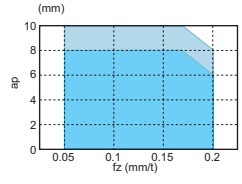
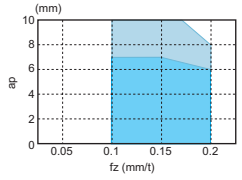
②Cutting edge length 10mm Type
(Long Shank)

Cutting Dia.	Description	Overhang Length A (mm)	
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

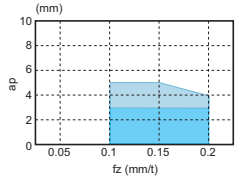
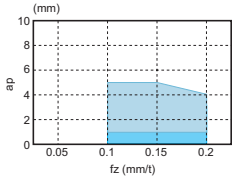
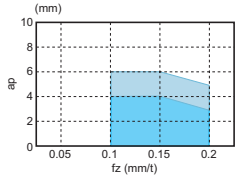
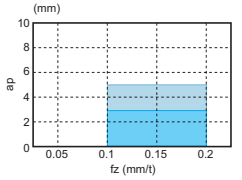
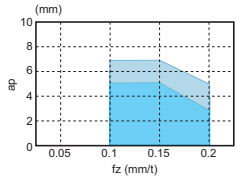
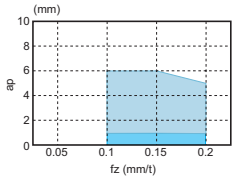
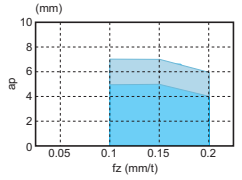
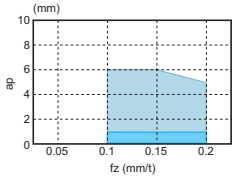
Shape



[Vc=120m/min Workpiece Material: C50 (S50C)]

Description	■ Shouldering (Cutting width ae = øD/2)	■ Slotting ■ Ramping and Helical Milling
MEC10-S10-11		
MEC12-S16-11		
MEC16-S16-11T		
MEC20-S20-11T		
MEC25-S25-11T		
MEC32-S32-11T		

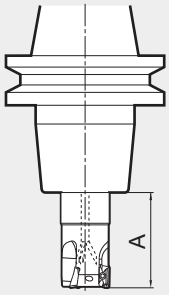
[Vc=120m/min Workpiece Material: C50 (S50C)]

Description	■ Shouldering (Cutting width ae = øD/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		

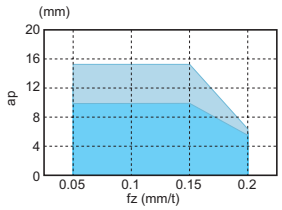
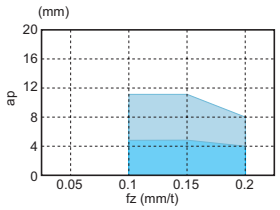
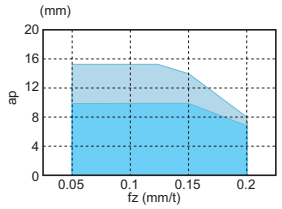
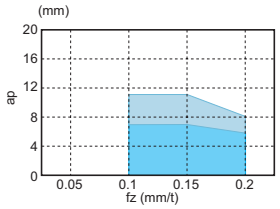
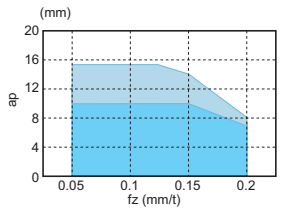
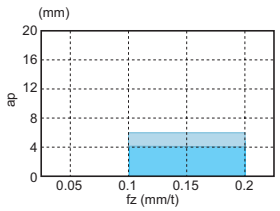
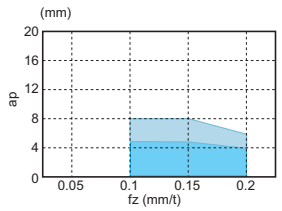
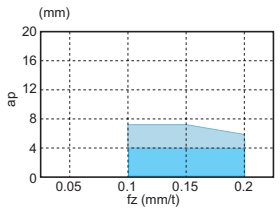
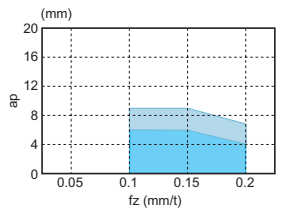
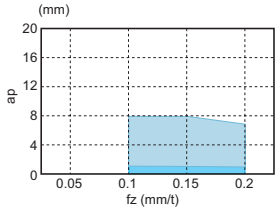
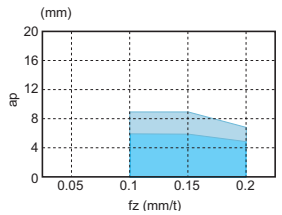
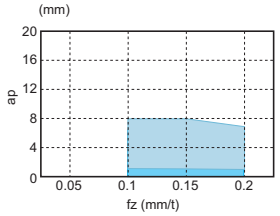
③Cutting edge length 15.7mm Type

Cutting Dia.	Description	Overhang Length A (mm)	
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

Shape



[Vc=120m/min Workpiece Material: C50 (S50C)]

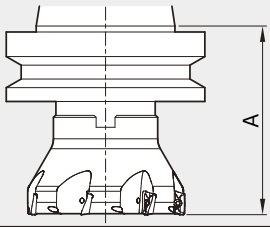
Description	■ Shouldering (When cutting width ae = øD/2)	■ Slotting ■ Ramping and Helical Milling
MEC25-S25-17		
MEC32-S32-17		
MEC40-S32-17		
MEC25 -S25-160-17 Long Shank		
MEC32 -S32-200-17 Long Shank		
MEC40 -S32-240-17 Long Shank		

Cutting Performance of MEC Milling Cutter

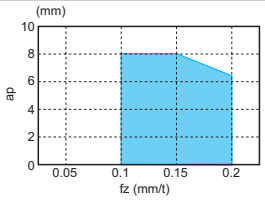
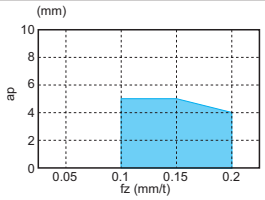
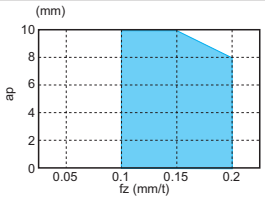
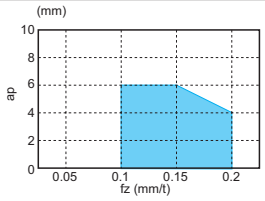
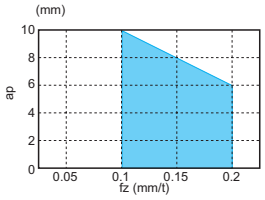
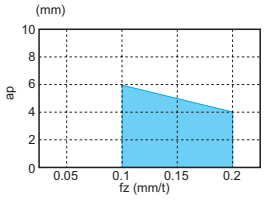
Cutting edge length 10mm Type

Cutting Dia.	Description	Overhang Length A (mm)
ø40	**MEC040R-11-5T-M**	115
ø50	**MEC050R-11-○T-M**	100
ø63	**MEC063R-11-○T (-M)**	95
	MEC063R-11-○T-M	
ø80	**MEC080R-11-○T (-M)**	95
ø100	**MEC100R-11-9TN**	108
	MEC100R-11-9T-MN	100
ø125	**MEC125R-11-11T (-M)**	108
ø160	**MEC160R-11-14T (-M)**	

Shape



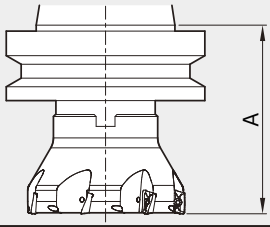
[Vc=120m/min Workpiece Material: C50 (S50C)]

Description	■ Shouldering (When cutting width ae = øD/2)	■ Slotting
MEC040R -11-5T-M		
MEC050R -11-○T-M ≀ MEC100R -11-9TN MEC100R -11-9T-MN		
MEC125R -11-11T (-M) MEC160R -11-11T (-M)		

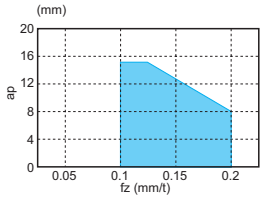
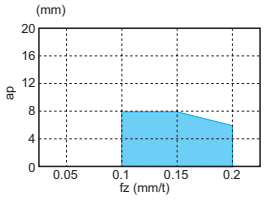
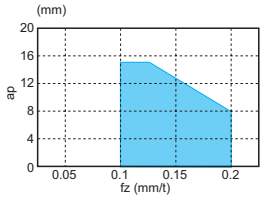
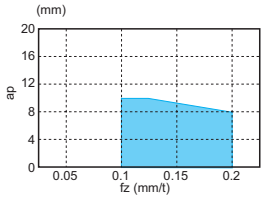
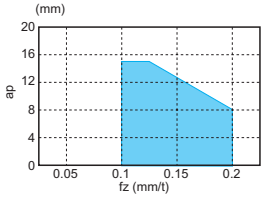
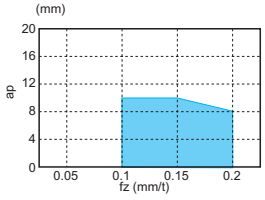
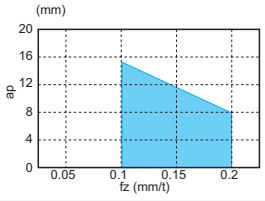
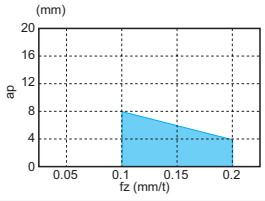
Cutting edge length 15.7mm Type

Cutting Dia.	Description	Overhang Length A (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
	MEC100R-17-7T-MN	100
ø125	**MEC125R-17-9T (-M)**	108
ø160	**MEC160R-17-12T (-M)**	

Shape



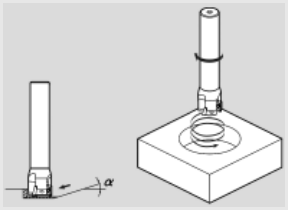
[Vc=120m/min Workpiece Material: C50 (S50C)]

Description	■ Shouldering (When cutting width ae = øD/2)	■ Slotting
MEC040R -17-4T-M		
MEC050R -17-○T-M		
MEC063R -17-○T (-M) ≀ MEC100R -17-○TN MEC100R -17-7T-MN		
MEC125R -17-9T (-M) MEC160R -17-12T (-M)		

Ramping, Helical milling and Vertical milling

Ramping, Helical Milling

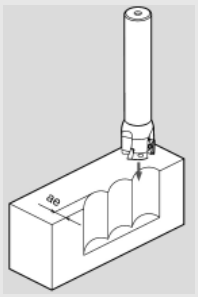
- **Ramping angle is recommended under α°.**
- **Refer each tools' cutting performance list for depth of helical milling per one revolution. Use compressed air during machining.**



Cutting Dia.	Applicable Inserts	Maximum ramping angle (α°)
ø16ø18	BDMT11T3 type BDGT11T3 type	3°
ø20		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.

BDMT/BDGT1103 Type is not recommended for ramping and helical milling.

Vertical milling



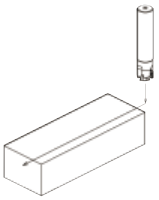
Cutting Dia.	Applicable Inserts	Maximum Width of Cut (ae)
ø16 ø18	BDMT11T3 type BDGT11T3 type	1.5mm
ø20 ~ ø160	BDMT11T3 type BDGT11T3 type	5mm
ø25 ~ ø160	BDMT1704 type BDGT1704 type	8mm

BDMT1103 Type is not recommended for vertical milling.

Case Studies

RC55 (Pre-hardened Tool Steel)

- Test piece (40~45HRC)
- Vc=50m/min (n=800min^{-1})
- apxae=2x14mm
- fz=0.125mm/t (Vf=300mm/min)
- Dry
- MEC20-S20-11T
- 3 flutes
- BDMT11T308ER-JT (PR830)



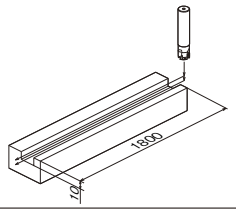
MEC	Chip Removal Amount = 71.3cm^3 (Sustainable)
Competitor's Endmill A	Chip Removal Amount = 2.9cm^3 (Chipping occurred)

Competitor's Endmill A [ø25 (2 flutes) Vc=40m/min fz=0.075mm/t apxae= 2x3mm] had chipping occurred in 10 minutes and had loud cutting sound. MEC could increase the feed rate, and the cutting edge remained in extremely good condition and is still sustainable for further machining.

(Evaluation by the user)

St42-2 (SS400)

- Plate
- Vc=88m/min (n=1400min^{-1})
- ap=5mm×2 passes
- fz=0.12mm/t (Vf=500mm/min)
- Dry
- MEC20-S20-11T
- 3 flutes
- BDMT11T308ER-JT (PR830)



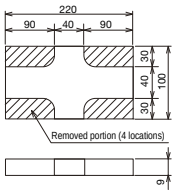
MEC	23pcs/edge
Competitor's Endmill B	10~11pcs/edge

MEC extended the tool life for more than twice.

(Evaluation by the user)

X5CrNi1810 (SUS304)

- Plate
- Vc=125m/min (n =1600min^{-1})
- ap =9.0mm
- fz =0.1mm/t (Vf=320mm/min)
- Dry
- MEC25- S25-17
- 2 flutes
- BDMT170408ER-JT (PR830)



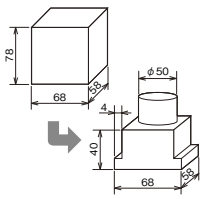
MEC	4pcs/edge or more
Competitor's Endmill C	1pcs/edge or less

Competitor's Endmill C (Slow Away Roughing Endmill) had high cutting resistance and had insert breakage, but MEC had no insert breakage and was still usable for further machining after machined 4 pieces (16 points).

(Evaluation by the user)

DAC10 (Hot Work Tool Steel)

- Mold
- Vc=130m/min (n =1040min^{-1})
- ap × ae =(~3)×(~5) (Varies depending on machining point)
- fz =0.18mm/t(Vf=936mm/min)
- Dry (Compressed Air)
- MEC40- S32-11T • 5 flutes
- BDMT11T308ER-JT (PR830)



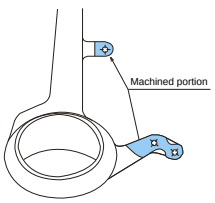
MEC	2 hours (Small Wear: Extendible)
Competitor's Endmill D	2 hours (halted due to insert breakage)

MEC had better cutting performance / insert life comparing to Competitor's Endmill 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 Endmill D. Competitor's Endmill D (6 flutes type) was used with Vf=936mm/min (fz=0.15mm/t).

(Evaluation by the user)

20CrMo4 (SCM420)

- Knuckle Steering
- Vc=150m/min (n=1,200min^{-1})
- ap=0.5~5mm (Shoulder-ing)
- fz=0.1mm/t (Vf=478mm/min)
- Dry
- MEC40-S32-17
- 4 flutes
- BDMT170408ER-JT (PR830)



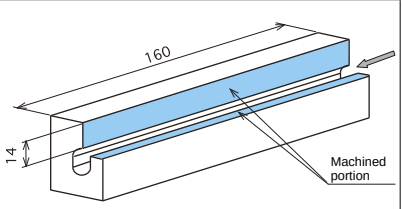
MEC	150pcs/edge
Competitor's Endmill E	40pcs/edge

MEC had a better finished surface comparing to Competitor's Endmill E and also improved the tool life by more than 3 times .

(Evaluation by the user)

Inconel

- 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 (PR925)



MEC	9pcs/edge
Competitor's Endmill F	1pcs/edge or less

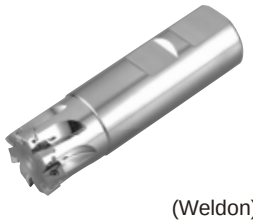
Competitor's Endmill H (Coated Insert) could not finish machining of 1 workpiece, but MEC could machine 9pcs/edge and the finished surface was good.

(Evaluation by the user)

MECX Endmill



(Straight)



(Weldon)

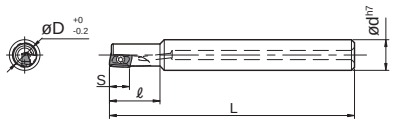


Fig.1

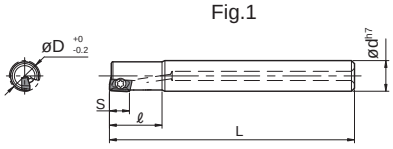


Fig.2

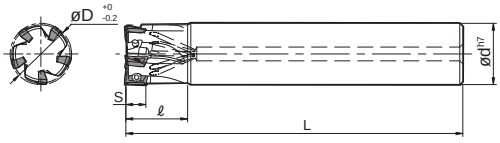


Fig.4

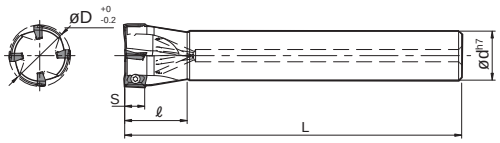


Fig.3

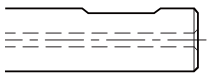


Fig.5

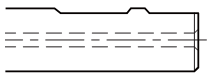


Fig.6

Toolholder Dimensions

Description			Std.	No. of Insert	Dimension (mm)					Rake Angle (°)		Coolant Hole	Drawing	Spare Parts		Applicable Inserts ➔ M16	Max. Revolution (min^{-1})
					øD	ød	L	ℓ	S	A.R. (MAX)	R.R.			Clamp Screw	Wrench		
Cylindrical	Standard	MECX 08-S10-07-1T	●	1	8	10	80	16	6	11.7°	-24.0°	Yes	Fig.1	SB-2035TRG	DTM-6	BDMT0703	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	BDMT0703	40,200
		25-S20-07-7T	●	7	25	20	120	25			-9.7°						37,000
Cylindrical	Standard	MECX 10-S10-07-1T	●	1	10	10	80	17	6	12.8°	-18.7°	Yes	Fig.2	SB-2035TRG	DTM-6	BDMT0703	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
		32-S32-07-6T	●	6	32	32	130	30			-8.9°						33,600
	Fine pitch	MECX 16-S16-07-4T	●	4	16	16	100	20	6	16.3°	-11.3°	Yes	Fig.4	SB-2042TRG	DTM-6	BDMT0703	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
Cylindrical 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	BDMT0703	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
		33-S32-200-07-6T	●	6	33	32	200	30			-8.8°						33,100
Weldon	Standard	MECX 16-W16-07-3T	●	3	16	16	68	20	6	16.3°	-11.3°	Yes	Fig.5	SB-2042TRG	DTM-6	BDMT0703	43,200
		20-W20-07-4T	●	4	20	20	81				-10.4°						40,200
		25-W25-07-5T	●	5	25	25	88	25			-9.7°		Fig.6				37,000
	Fine pitch	MECX 16-W16-07-4T	●	6	16	16	68	20	6	16.3°	-11.3°	Yes	Fig.5	SB-2042TRG	DTM-6	BDMT0703	43,200
		20-W20-07-5T	●	5	20	20	81				-10.4°						40,200
		25-W25-07-7T	●	7	25	25	88	25			-9.7°		Fig.6				37,000

■ Max. Revolution
When running the endmill and cutter at the maximum revolution, the insert or holder may be damaged by centrifugal force. For more details, see "Warning" below.

■ For good shoulder finishes by MECX multistage ap.
In order to obtain smooth cutting wall surface by MECX multistage ap set ap within 5mm for each cut.

⚠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. When running the endmill and the facemill at revolutions exceeding the maximum revolution limit, the inserts or toolholder may be damaged due to the centrifugal force.
2. For actual practical revolution, please set within recommended machining 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.

Max. 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 ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MECX Face Mill



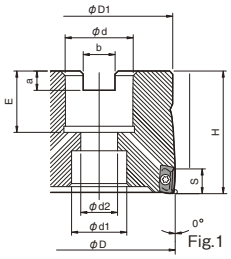


Fig.1

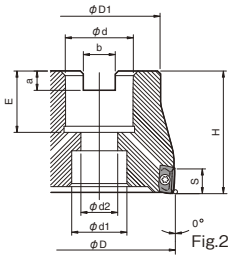
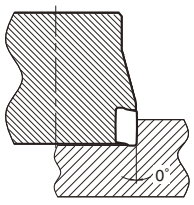


Fig.2



Toolholder Dimensions

Description		Std.	No. of Insert	Dimension (mm)										Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Spare Parts		Max. Revolution (min^{-1})
				øD	øD1	ød	ød1	ød2	H	E	a	b	S	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	+16.3°	-8.9°	Yes	Fig.1	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
	050R-07-12T-M	●	12	50	40										-8.3°		Fig.2	0.35			27,700
	063R-07-14T-M	●	14	63											-7.9°			0.50			24,900

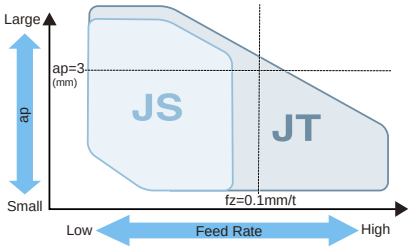
■ Max. Revolution
When running the endmill and cutter at the maximum revolution, the insert or holder may be damaged by centrifugal force. For more details, see "Warning" on page **M52**.

■ For good shoulder finishes by MECX multistage ap.
In order to obtain smooth cutting wall surface by MECX multistage ap set ap within 5mm for each cut.

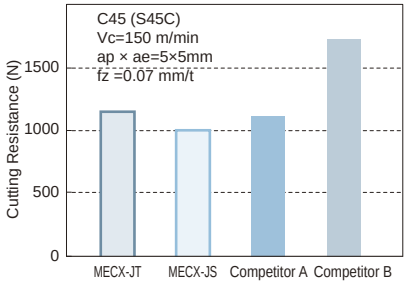
Applicable Inserts (MECX Face Mill)

Toolholder	Applicable Inserts ➔ M16	
		
MECX···R-07..	BDMT 0703 ○○ ER-JT	BDMT 0703 ○○ ER-JS

Selecting Chipbreaker



Cutting Resistance



Recommended Cutting Conditions

(JT Chipbreaker)

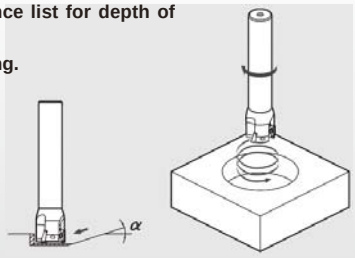
Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min) PVD Coated Carbide		
		PR830	PR1025	PR905
Stainless Steel	0.05~0.07		100~200	
Carbon Steel	0.06~0.1~0.15	120~180		
Alloy Steel	0.06~0.08~0.12	100~180		
Mold Steel	0.06~0.08~0.12	80~150		
Gray Cast Iron	0.08~0.1~0.15			100~180
Nodular Cast Iron	0.08~0.1~0.12			80~120

(JS Chipbreaker)

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min) PVD Coated Carbide		
		PR830	PR1025	PR905
Stainless Steel	0.04~0.05		100~200	
Carbon Steel	0.04~0.08~0.1	120~180		
Alloy Steel	0.04~0.06~0.08	100~180		
Mold Steel	0.04~0.06~0.08	80~150		
Gray Cast Iron	0.04~0.08~0.1			100~180
Nodular Cast Iron	0.04~0.06~0.08			80~120

Ramping, Helical Milling

- **Ramping angle is recommended under α°.**
- **Refer each tools' cutting performance list for depth of helical milling per one revolution.**
- **Use compressed air during machining.**



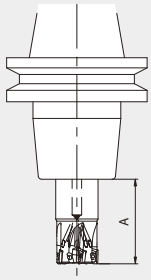
Cutting Dia.	Applicable Inserts	Maximum ramping angle (α°)
ø8	BDMT0703 type	Not recommended.
ø10		1.5°
ø12, ø14		2°
ø16		3°
ø17, ø18		1.5°
ø20		2°
ø21		1.8°
ø25		1.3°
ø26		1.2°
ø32		0.8°
ø33		0.5°

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Cutting Performance of MECX Endmill

Cutting Dia.	Description	Overhang Length A (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



*Machining with extended overhang length is not recommended for ø8 and ø10.

*The cutting performance list shows applicable range of JT Chipbreaker (PR830) with Standard flute-number type.

For Multi-Edge type, use with 70% or less of ap.

*Cutting conditions of JS Chipbreaker

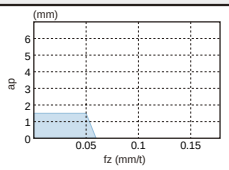
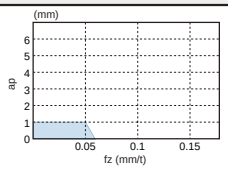
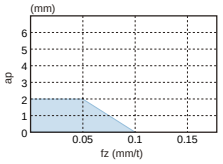
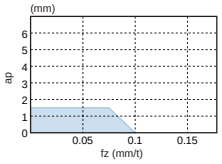
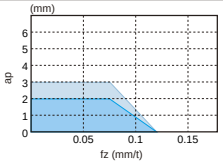
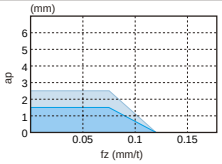
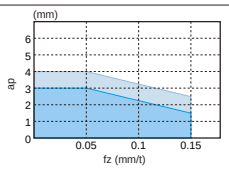
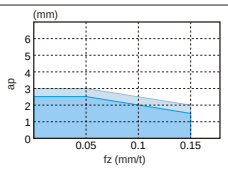
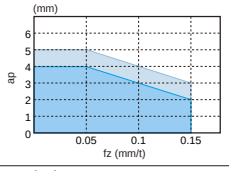
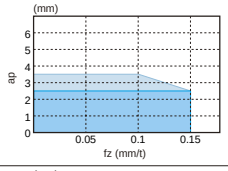
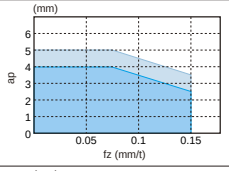
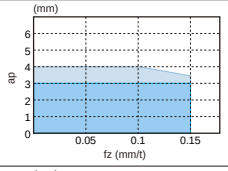
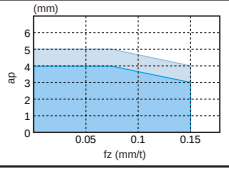
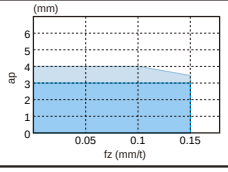
①For MECX08~MECX12

Decrease the feed rate by 25% according to cutting capability list.

②For MECX16 and over

Decrease the feed rate and ap by 30% according to cutting capability list.

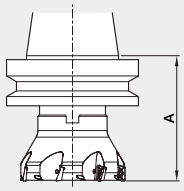
[Vc=150m/min Workpiece Material: C50 (S50C)]

Description	■ Shouldering (Cutting width ae = øD/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		

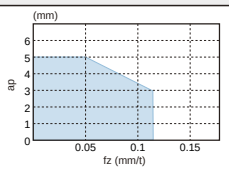
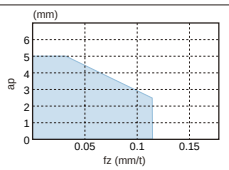
Cutting Performance of MECX Milling Cutter

Cutting Dia.	Description	Overhang Length A (mm)
ø32	MECX032R-07-8T-M	100
ø40	MECX040R-07-10T-M	
ø50	MECX050R-07-12T-M	
ø63	MECX063R-07-14T-M	

Shape



[Vc=150m/min Workpiece Material: C50 (S50C)]

Description	■ Shouldering (Cutting width ae = øD/2)
MECX032R-07-8T-M MECX040R-07-10T-M	
MECX050R-07-12T-M MECX063R-07-14T-M	

*Use JT Chipbreaker.

*Not Recommended for Slotting.

Helical Endmill MECH

Good Chip Evacuation

Good Chip Evacuation

Notched insert breaks chips into small pieces

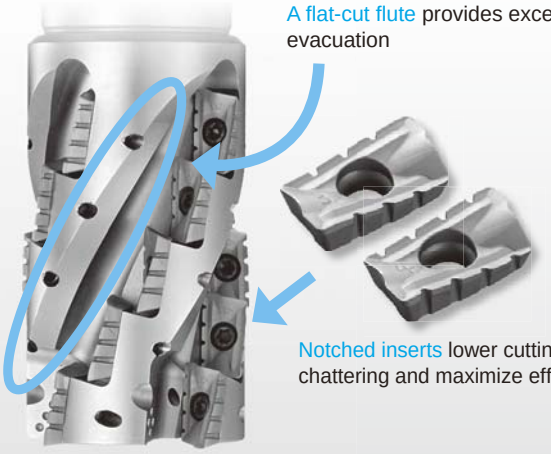


MECH



Competitor A

Workpiece: St42-2 (SS400)
Vc=120 m/min
ap×ae=40mm×10mm
fz=0.12mm/t
MECH032-S32-11-5-4T



A flat-cut flute provides excellent chip evacuation

Notched inserts lower cutting force, reduce chattering and maximize efficiency.

High Efficiency Milling

High efficiency machining with Multi-Edge design

Workpiece: C50 (S50C)
Vc=120m/min (n=1200min^{-1}), ap=40mm,
ae=5~13mm, fz=0.15mm/t

MECH ø32 (4 flute lines)	Competitor A ø32 (3 flute lines)	Competitor B ø32 (3 flute lines)
Improved productivity		
374cm^3/min (Vf=720mm/min, ae=13mm) **(Tripled chip evacuation)**	108cm^3/min (Vf=540mm/min, ae=5mm)	108cm^3/min (Vf=540mm/min, ae=5mm)

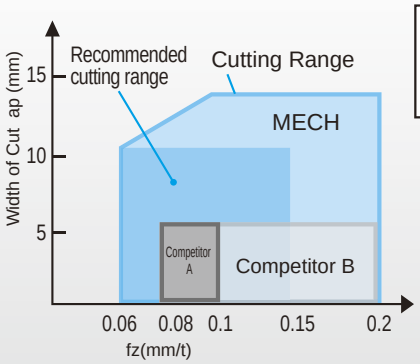






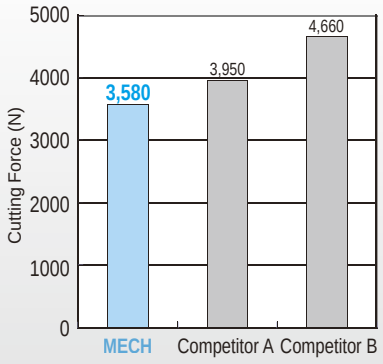
Low Cutting Force

Low Cutting Force due to Notched Inserts



Workpiece Material: C50 (S50C)
Vc=120 m/min
ap×ae=40 mm×5~13 mm
fz=0.06~0.2 mm/t
MECH032-S32-11-5-4T

Cutting Force (principal force)



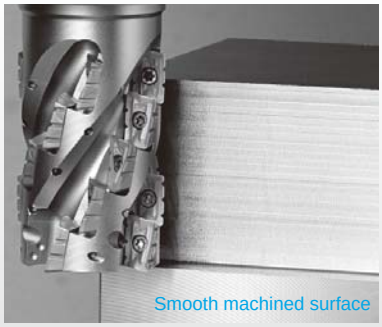
Workpiece Material: C50 (S50C)
Vc=120 m/min
ap×ae=40mm×10 mm
fz=0.1mm/t
MECH032-S32-11-5-4T

(Internal evaluation)

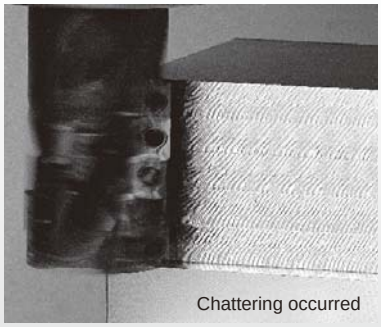
Reduced chattering

Comparison of surface wall (Lateral surface)

Notched insert lowers and disperses cutting force, and enables high feed rates by reducing Chattering.



MECH



Competitor A

Workpiece Material: C50 (S50C)
Vc=120m/min
fz=0.12mm/t
ap×ae=40×7mm

(Internal evaluation)

M

Milling

MECH Endmill



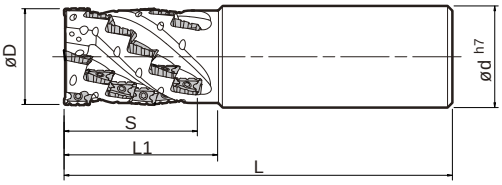


Fig.1

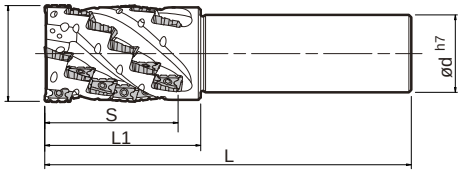


Fig.2

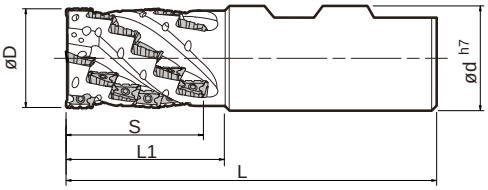


Fig.3

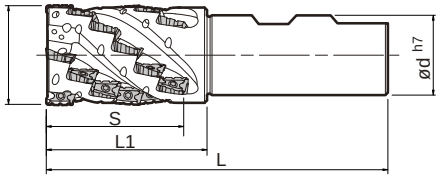


Fig.4

Dimensions

	Description		Std.	No. of Flute	No. of Stage	No. of Insert	Dimension (mm) øD	ød	L	L1	S	Rake Angle (°) A.R. (MAX)	R.R.	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ➔M17
Cylindrical	MECH	025-S25-11-4-2T	●	2	4	8	25	25	120	46	37	+21°	-10°	Fig.1	SB-2555TRG	DTM-8	MP-1	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		170	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	MP-1	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			Fig.2				
Weldon	MECH	025-W25-11-4-2T	●	2	4	8	25	25	104	46	37	+21°	-10°	Fig.3	SB-2555TRG	DTM-8	MP-1	BDMT11T308ER-N2 BDMT11T308ER-N3
		032-W32-11-5-2T	●		5	10	32	32	117	55	46	+23°	-9°					
		032-W32-11-5-4T	●	4		20												
		040-W32-11-6-4T	●		6	24	40		126	64	55		-8°	Fig.4				
		050-W40-11-7-4T	●		7	28	50	40	147	75	64		-7°					
		050-W40-11-7-6T	●	6		42												
	MECH	040-W32-17-4-2T	●	2	4	8	40	32	136	73	59	+19°	-7°	Fig.4	SB-4070TRN	DTM-15	MP-1	BDMT170408ER-N3 BDMT170408ER-N4
		050-W40-17-5-4T	●	4	5	20	50	40	161	88	74							

Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc : m/min) PVD Coated Carbide PR830	PR905
Carbon Steel	0.08~0.1~0.15	100~180	-
Alloy Steel	0.08~0.1~0.15	100~180	-
Mold Steel	0.08~0.1~0.15	100~150	-
Gray Cast Iron	0.08~0.1~0.15	-	100~180
Nodular Cast Iron	0.08~0.1~0.15	-	100~150
Titanium Alloy	0.08~0.1~0.15	-	20~50

*Machining with coolant is recommended for Titanium Alloy.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MECH Shell Mill



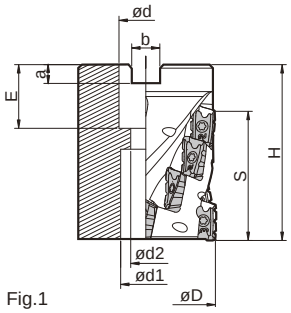


Fig.1

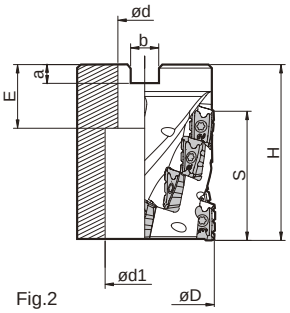


Fig.2

Rake Angle (°)		
Description	A.R. (MAX)	R.R.
MECH•••-11-	+23°	-8°
MECH•••-17-	+19°	-7°

● Dimensions

Description		Std.	No. of Flute	No. of Stage	No. of Insert	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Mounting Bolt	Applicable Inserts ➡ M17
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	MP-1	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	MP-1	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	45					HH12X40	
	080R-17-4-6T-M	●	6	4	24	80	32	26	18	85	28	8	14	59					HH16X45	
	100R-17-4-6T-M	●	6	4	24	100	40	56	-	85	30	9	16	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	MP-1	HH12X40	
	080R-17-4-6T	○	6	4	24	80	31.75	26	18	85	32	8	13	59					HH16X45	
	100R-17-4-6T	○	6	4	24	100	38.1	56	-	85	38	10	16	59	Fig.2				-	

Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

MECH-BT50 / MECH-SK (Integral Arbor type)



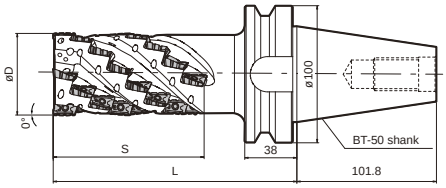


Fig.1

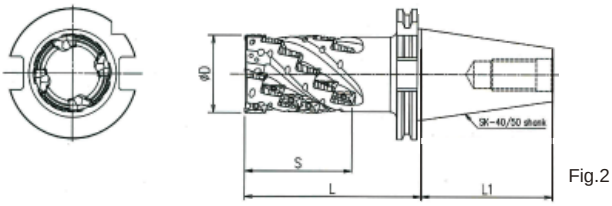


Fig.2

Rake Angle (°)		
Description	A.R. (MAX)	R.R.
MECH•••-11-	+23°	-7°
MECH•••-17-	+19°	-7°

● Dimensions

Description		Std.	No. of Flute	No. of Stage	No. of Insert	Dimension (mm) øD	L	S	Drawing	Weight (kg)	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ➡ M17
MECH	050R11-8-4T-BT50	○	4	8	32	50	143	73	Fig.1	4.8	SB-2555TRG	DTM-8	MP-1	BDMT11T308ER-N2 BDMT11T308ER-N3
MECH	050R17-7-4T-BT50	○	4	7	28	50	173	104		4.9	SB-4070TRN	DTM-15	MP-1	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				
MECH	040R11-6-4T-SK40	●	4	6	24	40	92	55	Fig.2		SB-2555TRG	DTM-8	MP-1	BDMT11T308ER-N2 BDMT11T308ER-N3
MECH	050R11-8-4T-SK50	●		8	32	50	124	73						BDMT11T308ER-N2 BDMT11T308ER-N3
	050R17-7-4T-SK50	●		7	28		154	104			SB-4070TRN	DTM-15	MP-1	BDMT170408ER-N3 BDMT170408ER-N4

Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

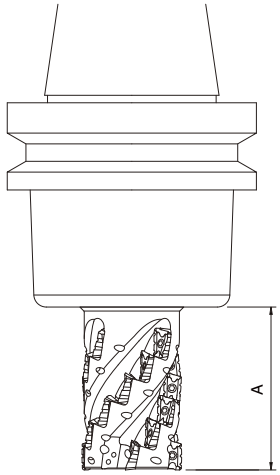
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Cutting Performance (Used Machine: Machining center equivalent to AC15 / 18.5kw)

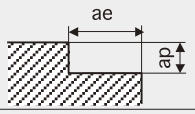
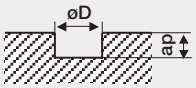
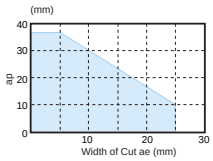
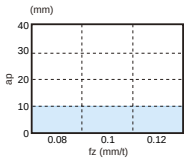
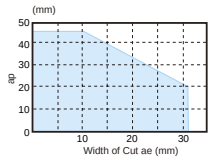
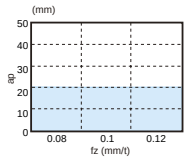
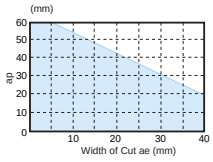
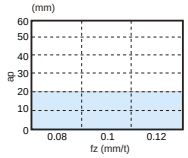
MECH Endmill Type

Cutting Dia.	Description	Overhang Length A (mm)
ø25	MECH025-S25-11-4-2T	48
	MECH025-W25-11-4-2T	
ø32	MECH032-S32-11-5-2T	57
	MECH032-W32-11-5-2T	
	MECH032-S32-11-5-4T	
	MECH032-W32-11-5-4T	
ø40	MECH040-S32-11-6-4T	65
	MECH040-W32-11-6-4T	
	MECH040-S42-11-6-4T	
ø50	MECH050-S42-11-7-4T	76
	MECH050-W40-11-7-4T	
	MECH050-S42-11-7-6T	
	MECH050-W40-11-7-6T	
ø40	MECH040-S32-17-4-2T	74
	MECH040-W32-17-4-2T	
	MECH040-S42-17-4-2T	
ø50	MECH050-S42-17-5-4T	89
	MECH050-W40-17-5-4T	

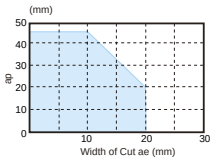
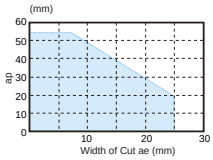
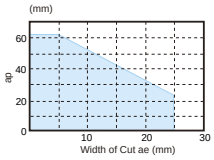
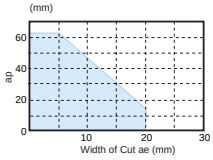
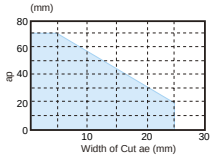
Shape



2 Flute Type [Workpiece Material: C50 (S50C)]

Description	■ Shouldering	■ Slotting
		
	Cutting speed: Vc=100~180m/min Feed Rate: fz=0.08~0.15mm/t	Cutting speed: Vc=100~120m/min Feed Rate: fz=0.08~0.12mm/t
MECH025-S25-11-4-2T MECH025-W25-11-4-2T		
MECH032-S32-11-5-2T MECH032-W32-11-5-2T		
MECH040-S32-17-4-2T MECH040-S42-17-4-2T MECH040-W32-17-4-2T		

4 Flute / 6 Flute Type

MECH032-S32-11-5-4T MECH032-W32-11-5-4T	
MECH040-S32-11-6-4T MECH040-W32-11-6-4T MECH040-W32-11-6-4T	
MECH050-S42-11-7-4T MECH050-W40-11-7-4T	
MECH050-S42-11-7-6T MECH050-W40-11-7-6T	
MECH050-S42-17-5-4T MECH050-W40-17-5-4T	

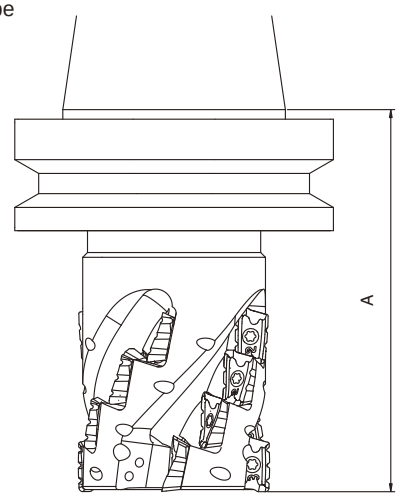
4 Flute / 6 Flute Type are not recommended for Slotting.

● **MECH** Shell Mill Type

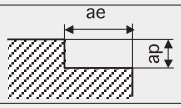
[Workpiece Material: C50 (S50C)]

Cutting Dia.	Description	Overhang Length A (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

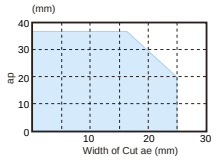


■ Shouldering

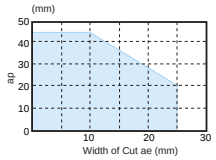


Cutting Speed: Vc=100~180m/min
Feed Rate: fz=0.08~0.15mm/t

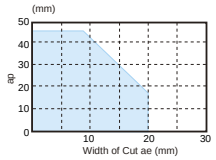
MECH040R -11-4-4T-M



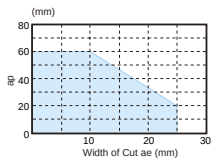
MECH063R -17-3-4T-○



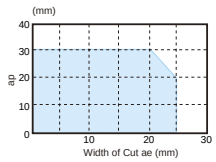
MECH050R -11-5-6T-M



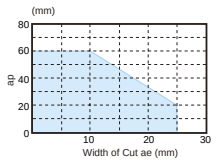
MECH080R -17-4-6T-○



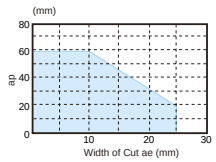
MECH050R -17-2-4T-M



MECH100R -17-4-6T-○



MECH050R -17-4-4T-M



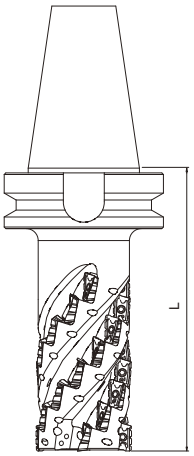
Not Recommended for Slotting.

● **MECH-BT50** (Integral Arbor type) / **MECH-SK50** (Integral Arbor type)

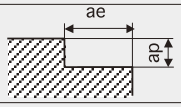
[Workpiece Material: C50 (S50C)]

Cutting Dia.	Description	Overhang Length A (mm)
ø50	**MECH050R11-8-4T-BT50**	143
	MECH050R11-8-4T-SK50	124
	MECH050R17-7-4T-BT50	173
	MECH050R17-7-4T-SK50	154
ø63	**MECH063R17-7-4T-BT50**	173
ø80	**MECH080R17-7-4T-BT50**	
ø100	**MECH100R17-7-6T-BT50**	

Shape

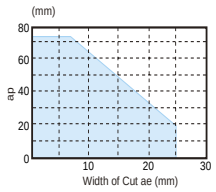


■ Shouldering

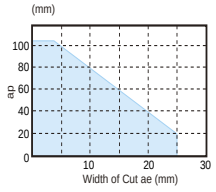


Cutting Speed: Vc=100~180m/min
Feed Rate: fz=0.08~0.15mm/t

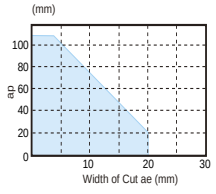
MECH050R11 -8-4T-BT50 MECH050R11 -8-4T-SK50



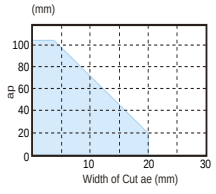
MECH080R17 -7-4T-BT50



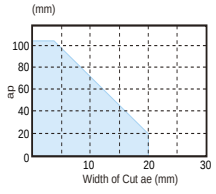
MECH050R17 -7-4T-BT50 MECH050R17 -7-4T-SK



MECH100R17 -7-6T-BT50



MECH063R17 -7-4T-BT50



Not Recommended for Slotting.

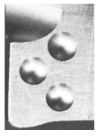
Number of Inserts Installed

Description	No. of Flute	No. of Insert	No. of Inserts Installed			
			BDMT11T308ER-		BDMT170408ER-	
			N2	N3	N3	N4
MECH 025-○25-11-4-2T	2	8	4	4	-	-
032-○32-11-5-2T	2	10	5	5	-	-
032-○32-11-5-4T	4	20	10	10	-	-
040-○32-11-6-4T	4	24	12	12	-	-
040-S42-11-6-4T	4	24	12	12	-	-
050-S42-11-7-4T	4	28	14	14	-	-
050-W40-11-7-4T	4	28	14	14	-	-
050-S42-11-7-6T	6	42	21	21	-	-
050-W40-11-7-6T	6	42	21	21	-	-
MECH 040-○32-17-4-2T	2	8	-	-	4	4
040-S42-17-4-2T	2	8	-	-	4	4
050-S42-17-5-4T	4	20	-	-	10	10
050-W40-17-5-4T	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	4	16	-	-	8	8
063R-17-3-4T-M	4	12	-	-	6	6
080R-17-4-6T-M	6	24	-	-	12	12
100R-17-4-6T-M	6	24	-	-	12	12
MECH 063R-17-3-4T	4	12	-	-	6	6
080R-17-4-6T	6	24	-	-	12	12
100R-17-4-6T	6	24	-	-	12	12
MECH 040R11-6-4T-SK40	4	24	12	12	-	-
MECH 050R11-8-4T-BT50	4	32	16	16	-	-
050R11-8-4T-SK50	4	32	16	16	-	-
MECH 050R17-7-4T-BT50	4	28	-	-	14	14
050R17-7-4T-SK50	4	28	-	-	14	14
063R17-7-4T-BT50	4	28	-	-	14	14
080R17-7-4T-BT50	4	28	-	-	14	14
MECH 100R17-7-6T-BT50	6	42	-	-	21	21

Precautions when installing inserts with notched.

1. Install notched inserts by matching the insert with the number of marks on the holder body.

<Insert Number and Holder 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 holder.

2. When installing notched inserts in flute line, ensure that the number on the insert is the same as the insert in first stage. See Fig.1, 2 and 3.

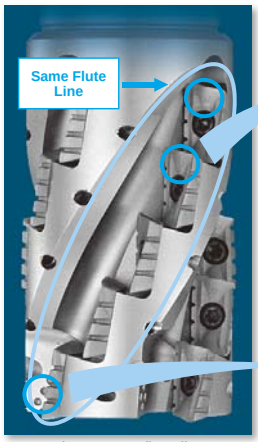
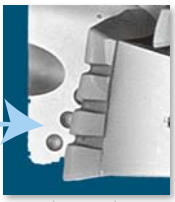


Fig.1 Same flute line


Fig.2 Insert No.

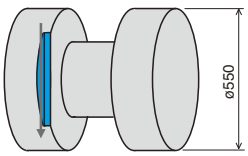

Fig.3 Marks

Case studies (Achievement of productivity improvement and machining time reduction)

C45 (S45C)

- Ship parts
- Vc=150m/min (n=955min^{-1})
- ap × ae=70mm × 10mm
- fz=0.2mm/t (Vf=764mm/min)
- Dry
- MECH050-S42-17-5-4T
- 4 Flutes
- BDMT170408ER-N3
- BDMT170408ER-N4

PR830



Advancing Productivity 4.6 times!

MECH	Chip removal Q=534cc/min.
Competitor A	Chip removal Q=115cc/min.

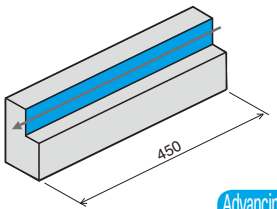
Comp. A removed 115cc of chips per minute. In contrast, MECH removed 534cc per minute. Machining productivity improved to 4.6 times.

(Evaluation by the user)

St42-2 (SS400)

- Plate
- Vc=150m/min (n=955min^{-1})
- ap × ae=70mm × 10mm
- fz=0.2mm/t (Vf=760mm/min)
- Dry
- MECH050-S42-17-5-4T
- 4 flute lines
- BDMT170408ER-N3
- BDMT170408ER-N4

PR830



Advancing Productivity 3.1 times!

MECH	Chip removal Q=532cc/min.
Competitor B	Chip removal Q=170cc/min.

Comp. B removed 170cc of chips per minute. In contrast, MECH removed 532cc per minute. Machining productivity improved to 3.1 times and finished wall condition was excellent.

(Evaluation by the user)

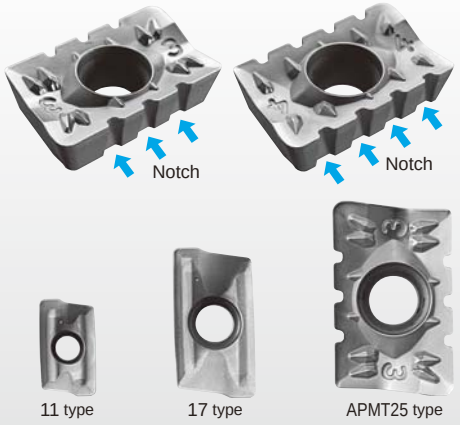
Heavy Milling Cutter MSR



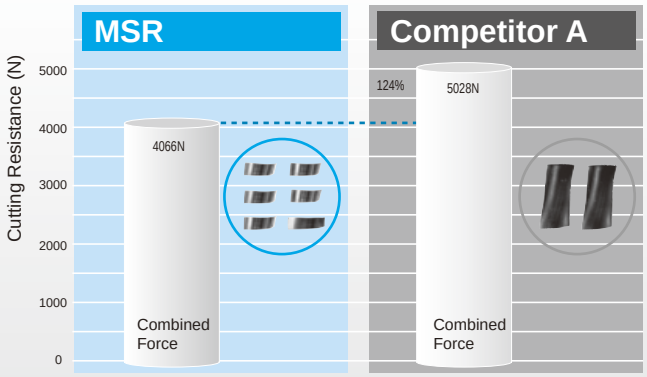
**Notched insert lowers and disperses machining, and enables high feed rates by reducing chattering.
Improved chip evacuation and low resistance due to the special chipbreaker.
Enables heavy milling and deep cutting, and also drastically improves machining efficiency.
(Reduction of machining time)**

Notched Insert

Size Comparison (Full-Scale)



Comparison of Cutting Resistance

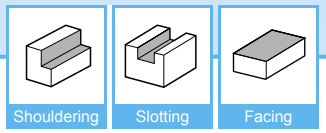


*The exclusive notched chipbreaker provides low resistance and good chip evacuation.

(Internal evaluation)

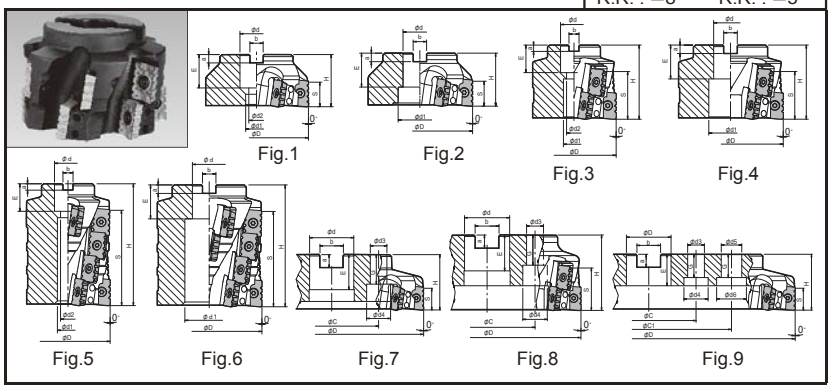


Heavy Milling Cutter MSR



MSR

Rake Angle (°)
ø63~ø80 A.R. : +9° R.R. : −8°
ø100~ A.R. : +9° R.R. : −5°



Spare Parts (Bore ød: common to Inch type / Metric type)

Description	Spare Parts					
	Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-○○	SB-60120TR	TT-25L	-	-	-	MP-1
MSR 080R-○○ ~ 315R-○○	for Insert Clamp		for Shim Clamp			

Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

Toolholder Dimensions (Bore ød: Metric type)

Description	Std.	No. of Insert	No. of Flute	No. of Stage	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	ød3	ød4	ød5	ød6	øC	øC1	G	Drawing	Weight (kg)
MSR 063R-1M	●	4	4	1	63	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	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	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	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	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	60	-	-	60	38	15	25.4	23.5	ø18	ø26	-	-	101.6	-	32	Fig.7	7.0
200R-2M	●	20		2					80				45								Fig.8	9.9
250R-1M	●	12	12	1	250	60	-	-	60	38	15	25.4	23.5	ø18	ø26	-	-	101.6	-	32	Fig.7	10.3
250R-2M	●	24		2					80				45								Fig.8	14.2

·Shim is not available for MSR063R Dia. D=63).
·Arbor attachment bolt (HH12x40) is included for MSR063R/MSR080R.
·It is not recommended using only top edge part (ap = 30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
·Deep grooving is not recommended for this cutter.

Toolholder Dimensions (Bore ød: Inch type)

Description	Std.	No. of Insert	No. of Flute	No. of Stage	Dimension (mm) øD	ød	ød1	ød2	H	E	a	b	S	ød3	ød4	ød5	ød6	øC	øC1	G	Drawing	Weight (kg)
MSR 063R-1	○	4	4	1	63	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	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	○					31.75	27	18		32	8	12.7									Fig.3	1.7
080R-4	○	16		4		25.4	20	14	115	26	6	9.5	90								Fig.5	2.6
080R-4-31.75	○					31.75	27	18		32	8	12.7									Fig.5	2.7
100R-1	○	6	6	1	100	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	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	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	47.625	-	-	60	38	14	25.4	23.5	ø18	ø26	-	-	101.6	-	32	Fig.7	7.5
200R-2	○	20		2					80				45								Fig.8	10.4
250R-1	○	12	12	1	250	47.625	-	-	60	38	14	25.4	23.5	ø18	ø26	-	-	101.6	-	32	Fig.7	10.9
250R-2	○	24		2					80				45								Fig.8	14.7
315R-1	○	14	14	1	315	47.625	-	-	60	35	14	25.4	23.5	ø17	ø27	ø22	ø32	101.6	177.8	25	Fig.9	16.0

·Shim is not available for MSR063R Dia. D=63).
·Arbor attachment bolt (HH12x40) is included for MSR063R type / MSR080R-○ type. Arbor attachment bolt (HH16x45) is included for MSR080R-○-31.75.
·It is not recommended using only top edge part (ap = 30mm) for 4 stages type. If ap is small, use 1 stage or 2 stages type.
·Deep grooving is not recommended for this cutter.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSR-BT50



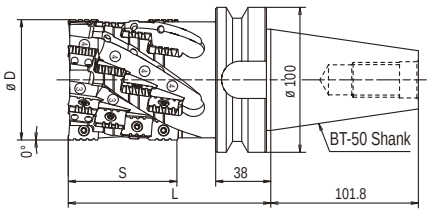


Fig.1

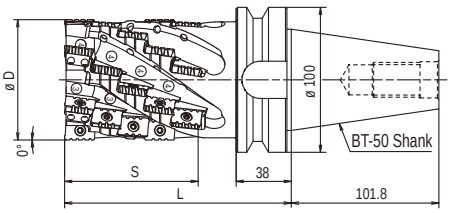


Fig.2

Toolholder Dimensions (BT50 Integral Arbor type)

Description	Std.	No. of Insert	No. of Flute	No.of Stage	Dimension (mm)			Rake Angle (°)		Drawing	Weight (kg)	Spare Parts					
					øD	L	S	A.R.	R.R.			Clamp Screw	Wrench	Shim	Clamp Screw	Wrench	Anti-seize Compound
MSR 063R-BT50-4	○	16	4	4	63	160	90	+9°	-5°	Fig.1	5.7	SB-60120TR	TT-25L	-	-	-	MP-1
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		for Shim Clamp			
100R-BT50-4	○	24	6	4	100	160	90			Fig.1	9.6						
100R-BT50-5	○	30		5		180	111			Fig.2	10.5						

- Shim is not available for MSR063R (Dia. D=63).
- It is not recommended using only top edge part (ap = 30mm) for 4 stages / 5 stages type. If ap is small, use previous page's 1 stage type or 2 stages type.
- Deep grooving is not recommended for this cutter.

Applicable Inserts

Description	Applicable Inserts ➔ M17			
	 3-Notched	 4-Notched	 Low Cutting Force 3-Notched	 Low Cutting Force 4-Notched
MSR 063R···	APMT 250608ER-NB3 APMT 250616ER-NB3 APMT 250640ER-NB3	APMT 250608ER-NB4 APMT 250616ER-NB4 APMT 250640ER-NB4	APMT 250616ER-NB3P	APMT 250616ER-NB4P
080R···				
100R···				
125R···				
160R···				
200R···				
250R···				

Caution of installing Notched Insert

"When installing Notched Insert, it is important to install it in the correct position. If it is installed in incorrect position, the tool cannot machine the workpiece and it may damage the toolholder body."
For MSR Type, Notched Insert location indicator is marked at Insert installed area.

Please be minded followings when you install Inserts to toolholders.
Indication is marked near the Insert pocket for MSR type.

1) ③is for AP□□○○○○○○ER-NB3
2) ④is for AP□□○○○○○○ER-NB4

(No. of Inserts - Example)

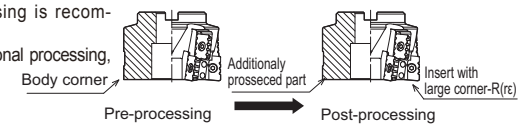
Description	Number of Insert	No. of Flute	No. of Inserts With Notch	
			NB3	NB4
MSR 100R-1	6	6	3	3
100R-2	12		6	6
100R-4	24		12	12

Caution when installing the Insert with Corner-R(rε) 4.0

When installing the insert with corner-radius 4.0mm, additional processing to the body is needed. Apply additional processing to the body corner according to the chart.

Insert Corner-R(rε)	Additional Processing Dimension to Body Corner
4.0	R2.0

*Round- shaped additional processing is recommended.
When applying chamfer shaped additional processing, do not cut away too much.



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

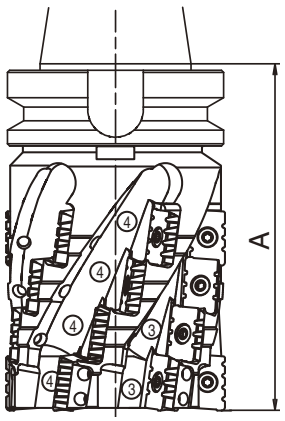
Cutting Conditions

1) Shouldering

● In case of MSR100R-1

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 100mm	Vc=180m/min	fz=0.2mm/t	20×80	1100
	100~200mm	Vc=180m/min	fz=0.2mm/t	20×40	550
	201mm and over	Vc=120m/min	fz=0.2mm/t	20×30	276
Carbon Steel	Less than 100mm	Vc=150m/min	fz=0.2mm/t	20×80	920
	100~200mm	Vc=150m/min	fz=0.2mm/t	20×40	460
	201mm and over	Vc=100m/min	fz=0.2mm/t	20×30	228
Stainless Steel	-	Not recommended			
Non-ferrous Metals	-	Not recommended			

Overhang Length A (mm)



● In case of MSR100R-2

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 130mm	Vc=180m/min	fz=0.2mm/t	40×40	1100
	130~230mm	Vc=180m/min	fz=0.2mm/t	40×20	550
	231mm and over	Vc=120m/min	fz=0.2mm/t	40×20	368
Carbon Steel	Less than 130mm	Vc=150m/min	fz=0.2mm/t	40×40	920
	130~230mm	Vc=150m/min	fz=0.2mm/t	40×20	460
	231mm and over	Vc=100m/min	fz=0.2mm/t	40×20	304
Stainless Steel	-	Not recommended			
Non-ferrous Metals	-	Not recommended			

● In case of MSR100R-4

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 180mm	Vc=180m/min	fz=0.2mm/t	75×20	1035
	180~280mm	Vc=180m/min	fz=0.2mm/t	75×10	518
	281mm and over	Vc=120m/min	fz=0.2mm/t	75×10	345
Carbon Steel	Less than 180mm	Vc=150m/min	fz=0.2mm/t	75×20	863
	180~280mm	Vc=150m/min	fz=0.2mm/t	75×10	431
	281mm and over	Vc=100m/min	fz=0.2mm/t	75×10	285
Stainless Steel	-	Not recommended			
Non-ferrous Metals	-	Not recommended			

2) Slotting

● In case of MSR100R-1

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 100mm	Vc=180m/min	fz=0.2mm/t	14×100	966
	100~200mm	Vc=150m/min	fz=0.2mm/t	7×100	403
	201mm and over	Vc=120m/min	fz=0.2mm/t	4×100	184
Carbon Steel	Less than 100mm	Vc=150m/min	fz=0.2mm/t	7×100	403
	100~200mm	Vc=120m/min	fz=0.2mm/t	4×100	184
	201mm and over	Vc=100m/min	fz=0.2mm/t	3×100	114
Stainless Steel	-	Not recommended			
Non-ferrous Metals	-	Not recommended			

● In case of MSR100R-2

Workpiece Material	Overhang Length A (mm)	Cutting Conditions		ap×ae (mm)	Chip Removal Rate (cc/min)
		Cutting speed	Feed rate		
Cast Iron	Less than 130mm	Vc=180m/min	fz=0.2mm/t	14×100	966
	130~230mm	Vc=150m/min	fz=0.2mm/t	7×100	403
	231mm and over	Vc=120m/min	fz=0.2mm/t	4×100	184
Carbon Steel	Less than 130mm	Vc=150m/min	fz=0.2mm/t	7×100	403
	130~230mm	Vc=120m/min	fz=0.2mm/t	4×100	184
	231mm and over	Vc=100m/min	fz=0.2mm/t	3×100	114
Stainless Steel	-	Not recommended			
Non-ferrous Metals	-	Not recommended			

Note) MSR...-4 (No. of stage)
Slotting is not recommended.

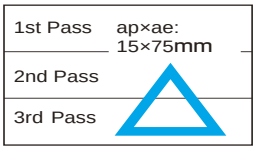
Q&A

Q-1 What is the most recommended condition for MSR?

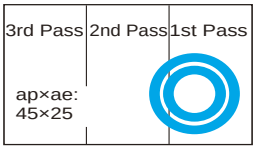
A-1 Vc=150m/min, fz=0.2mm/t, larger cutting depth and smaller cutting width

In case of MSR100R-2

e.g.) Load meter 120%



e.g.) Load meter 90%



Q-2 Required equipments for MSR?

A-2 Maximum spindle revolution should be lower than 4000min^{-1}. 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 is the points to remember in case of less power machine?

A-3 Do not use large size cutters.
⇒ø63 or ø80 is recommended
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.
Please increase cutting speed and decrease feed rate.
*Machine torque curve will be prioritized.

Q-4 In case of unstable workpiece.

A-4 Decrease feed ratio at start cutting workpiece.

* Almost all cases f 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)
Machining time: 90min. (calculated value)
Machining distance: 65m (calculated value)
•How great 1000cc/min? ⇒ About 7.8kg chips removed per minute
•Tool life time = 700kg (Chip weight)÷7.8kg (Chip evacuation amount per 1min) = 90min
•Machining distance= 90min (Time by the end of tool life) x 717mm/min (Table feed ratio per 1min)=65m
*In case of machining Vc=150m/min, apxae: 20x70mm, Vf=717mm/min.
*Tool : MSR100R-2 (6 Flutes)

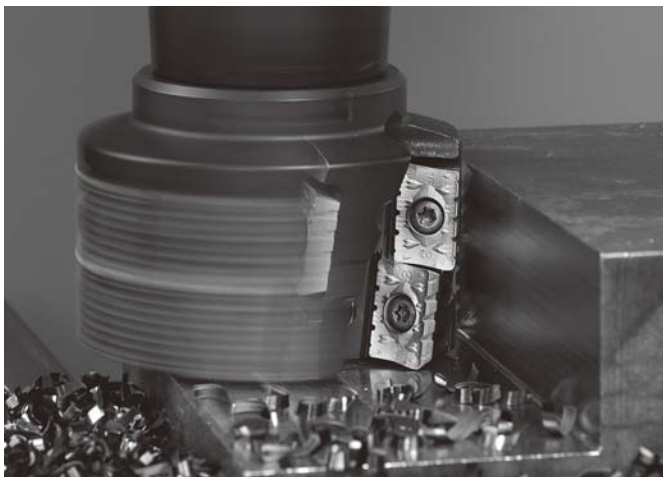
Q-6 How to reduce chattering.

A-6 If chattering is caused under.
●In case of chattering machining environment, following condition is 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

Heavy Milling Cutter MSR

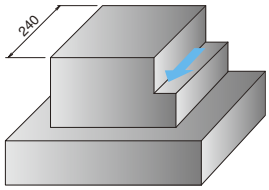
Case Studies



St42-2 (SS400)

- Base
- Vc=150m/min (n=478min-1)
- apxae=40×15mm
- fz=0.15mm/t (Vf=430mm/min)
- Dry (Air blow)
- MSR100R-2
- 6 flutes
- APMT250616ER-NB3
- APMT250616ER-NB4

(PR660)



MSR	Chip Removal Rate = 258cc/min.
Competitor's Cutter A	Chip Removal Rate = 43cc/min.

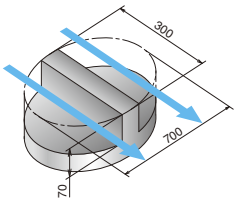
Since MSR is able to machine a greater ap than competitor.
Cutter A [dia 100mm (6 edges) Vc=150m/min fz=0.12mm/t (Vf=344mm/min) apxae=5x25mm] Chip Removal rate=43cc/min, the cutting time is drastically improved.

(Evaluation by the user)

C45 (S45C)

- Plate
- Vc=140m/min (n=446min-1)
- apxae=43×15
- fz=0.2mm/t (Vf=535mm/min)
- Dry
- MSR100R-2
- 6 flutes
- APMT250616ER-NB3
- APMT250616ER-NB4

(PR660)



MSR	Chip Removal Rate = 345cc/min.
Competitor's Cutter B	Chip Removal Rate = 33cc/min.

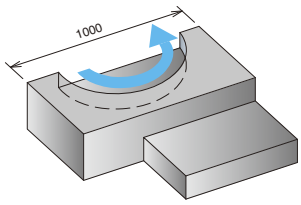
Since MSR is able to evacuate more than 10 times as many chips as competitor Cutter B [dia 125mm (6 Edges) Vc=120m/min fz=0.1mm/t (Vf=184mm/min) apxae=6x30mm] Chip Removal rate= 33cc/min, the cutting time is improved.

(Evaluation by the user)

C35 (S35C)

- Bracket
- Vc=150m/min (n=478min-1)
- apxae=20×70
- fz=0.25mm/t (Vf=718mm/min)
- Dry (Mist)
- MSR100R-2
- 6 flutes
- APMT250616ER-NB3
- APMT250616ER-NB4

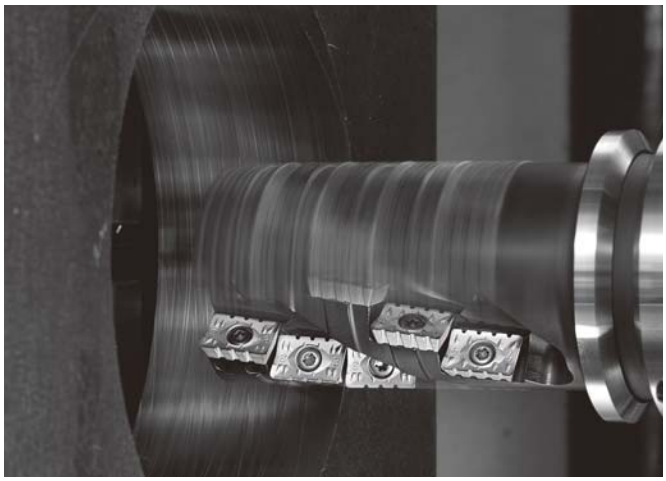
(PR660)



MSR	Chip Removal Rate = 1005cc/min.
Competitor's Cutter C	Chip Removal Rate = 417cc/min.

Since MSR is able to cut stably even by increasing feed rate 2.4 times compared competitor Cutter C [dia 100mm (6 edge lines) Vc=130m/min fz=0.12mm/t (Vf=298mm/min) apxae=20x70mm], cutting efficiency is improved.

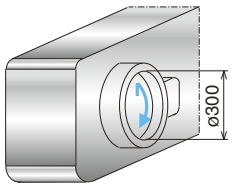
(Evaluation by the user)



GS-45 (SC450)

- Construction Machine Part
- Vc=125m/min (n=400min-1)
- apxae=15×45mm
- fz=0.15mm/t (Vf=360mm/min)
- Dry
- MSR100R-2
- 6 flutes
- APMT250616ER-NB3
- APMT250616ER-NB4

(PR660)



MSR	Chip Removal Rate = 244cc/min.
Competitor's Cutter D	Chip Removal Rate = 122cc/min.

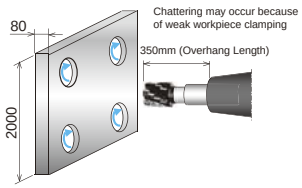
Even with double the feed rate, stable machining was possible. and machining efficiency was improved compared with Competitor Cutter D[Dia. 100(4 edges) Vc=125m/min fz=0.08mm/t (Vf=180mm/min) apxae=15x45mm]

(Evaluation by the user)

St42-2 (SS400)

- Plate
- Vc=200m/min (n=640min-1)
- apxae=80×10mm
- fz=0.06mm/t (Vf=230mm/min)
- Dry
- MSR100R-4 (4Stage type)
- 6 flutes
- APMT250616ER-NB3
- APMT250616ER-NB4

(PR660)



MSR	Chip Removal Rate = 184cc/min.
Competitor's Cutter E	Chip Removal Rate = 78cc/min.

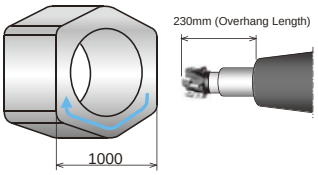
Comparing to Competitor Cutter E's [ø100 (4 Edges) Vc=250m/min fz=0.06mm/t (Vf=200mm/min) ap×ae=39×10mm] Chip Removal Amount = 78cc/min., MSR had Chip Removal Amount = 184cc/min due to its large cut (ap) and improved machining efficiency by 2.3 times with quiet cutting sound.

(Evaluation by the user)

GGG50 (FCD500)

- Construction Machine Part
- Vc=173m/min (n=550min-1)
- apxae=5×50mm
- fz=0.2mm/t (Vf=660mm/min)
- Dry
- MSR100R-2
- 6 flutes
- APMT250616ER-NB3
- APMT250616ER-NB4

(PR905)

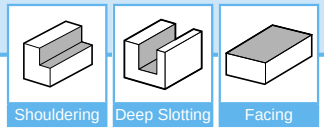


MSR	Chip Removal Rate = 165cc/min.
Competitor's Cutter F	Chip Removal Rate = 51cc/min.

Comparing to Competitor Cutter F's [ø100 (6 Edges) Vc=90m/min fz=0.2mm/t (Vf=343mm/min) ap×ae=3×50mm] Chip Removal Amount = 51cc/min., MSR had Chip Removal Amount = 165cc/min. and improved cutting efficiency by 3.2 times.

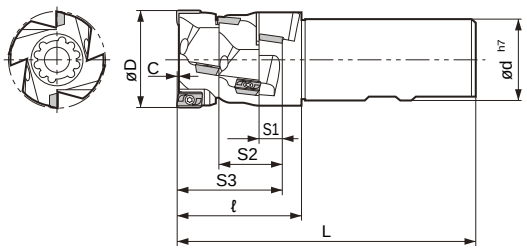
(Evaluation by the user)

MHD Helical Endmill



MHD-SA Separate type (Base Unit A + 2 Front Pieces)





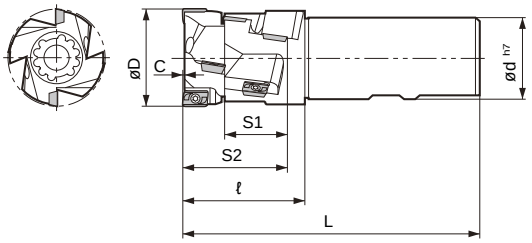
Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm) øD	ød	L	ℓ	C	S1	S2	S3	Rake Angle (°) A.R.	R.R.
MHD 32-S32-SA	●	10	2	32	32	132	50	0.7	8.3	24.7	41.8	+9°	-7°
40-S32-SA	●			40	32	147	64	0.9	10.9	31.9	53.8		-3°
40-S40-SA	●				40	154							
40-S42-SA	●				42								
50-S42-SA	●			50									-1°

・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

MHD-SB Separate type (Base Unit B + 1 Front Piece)





Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm) øD	ød	L	ℓ	C	S1	S2	Rake Angle (°) A.R.	R.R.
MHD 40-S42-SB	●	10	2	40	42	154	64	0.9	31.9	53.8	+9°	-3°
50-S42-SB	●			50								-1°

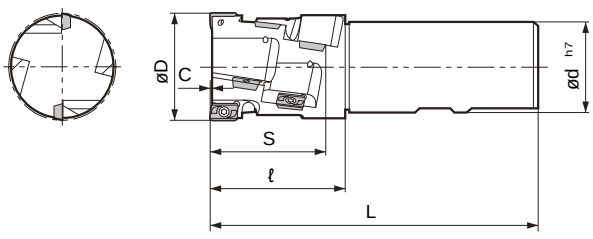
・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

Applicable Inserts and Composition of Toolholder

Endmill	Applicable Inserts ➡ M18, M19	Base Unit ➡ M68	Front Piece (Middle) ➡ M69	Front Piece (End) ➡ M69
MHD 32-S32-SA	NDKW090304ER,NDKT090304ER-V / N1 / N2	MHD32-S32-A	MHD32-F	MHD32-F
40-S32-SA	NDMM12T308ER-T / N2 / N3	MHD40-S32-A	MHD40-F	MHD40-F
40-S40-SA		MHD40-S40-A		
40-S42-SA		MHD40-S42-A		
50-S42-SA		MHD50-S42-A	MHD50-F	MHD50-F
MHD 40-S42-SB	NDMM12T308ER-T / N2 / N3	MHD40-S42-B	-	MHD40-F
50-S42-SB		MHD50-S42-B	-	MHD50-F

MHD-C Integral Type





Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm) øD	ød	L	ℓ	C	S	Rake Angle (°) A.R.	R.R.	Applicable Inserts ➡ M18, M19
MHD 20S-S20-C	●	3	1	20	20	96	24.5	0.5	17.5	+9°	-7°	NDKW090304ER NDKT090304ER-V
25-S25-C	●	8	2	25	25	116	41.5	0.5	34.5		-3°	NDKT090304ER-N1 / N2
32-S32-C	●	10		32	32	132	50	0.7	41.8		-7°	
40-S42-C	●			40	42	154	64	0.9	53.8		-3°	NDMM12T308ER-T / N2 / N3
50-S42-C	●			50							-1°	

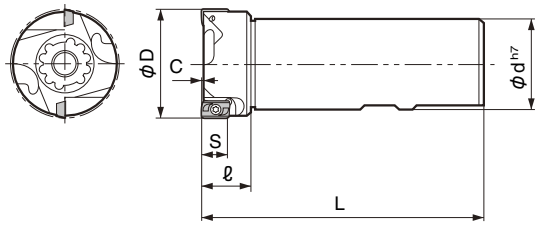
・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MHD Helical Endmill

MHD-A Base Unit A





Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm)								Rake Angle (°)	
				øD	ød	L	ℓ	C	S			A.R.	R.R.
MHD 32-S32-A	●	2	2	32	32	100	18.7	0.7	9.0			+9°	-7°
40-S32-A	●			40		106	23	0.9	11.8				-3°
40-S40-A	●			40	40	113							
40-S42-A	●			40	42								
50-S42-A	●			50									-1°
MHD 32-S32-A-130	●	2	2	32	32	130	32.8	0.7	9.0			+9°	-7°
40-S32-A-150	●			40		150	42	0.9	11.8				-3°
50-S42-A-150	●			50	42								-1°

・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

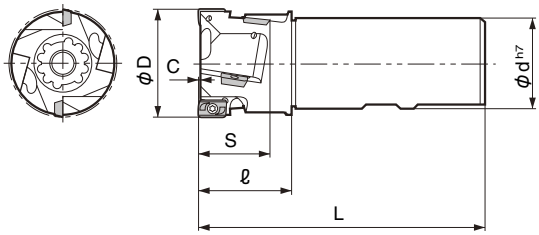
Applicable Inserts and Front Piece

Endmill	Applicable Inserts ➡ **M18, M19**	Applicable Front Piece (Middle) ➡ **M68**	Applicable Front Piece (End) ➡ **M69, M129**
MHD 32-S32-A	NDKW090304ER,NDKT090304ER-V / N1 / N2	MHD32-F	MHD32-F, (MHD32-4RF)
40-S32-A	NDMM12T308ER-T / N2 / N3	MHD40-F	MHD40-F, (MHD40-5RF)
40-S40-A			
40-S42-A			
50-S42-A		MHD50-F	MHD50-F, (MHD50-6RF)
MHD 32-S32-A-130	NDKW090304ER,NDKT090304ER-V / N1 / N2	MHD32-F	MHD32-F, (MHD32-4RF)
40-S32-A-150	NDMM12T308ER-T / N2 / N3	MHD40-F	MHD40-F, (MHD40-5RF)
50-S42-A-150		MHD50-F	MHD50-F, (MHD50-6RF)

・Component in ( ) is for Radius Plus Mill Series. ➡ **M133**

MHD-B Base Unit B





Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm)								Rake Angle (°)	
				øD	ød	L	ℓ	C	S			A.R.	R.R.
MHD 40-S42-B	●	6	2	40	42	133	42	0.9	32.8			+9°	-3°
50-S42-B	●			50									-1°

・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

Applicable Inserts and Front Piece

Endmill	Applicable Inserts ➡ **M19**	Applicable Front Piece (End) ➡ **M69, M133**
MHD 40-S42-B	NDMM12T308ER-T / N2 / N3	MHD40-F, (MHD40-5RF)
50-S42-B		MHD50-F, (MHD50-6RF)

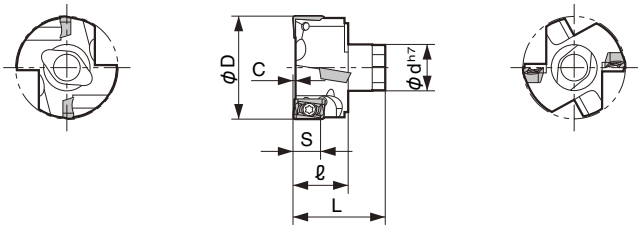
・Component in ( ) is for Radius Plus Mill Series. ➡ **M133**

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MHD-F Front Piece

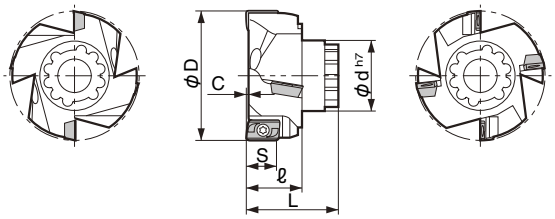


MHD32-F





MHD40/50-F

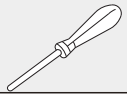


Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm) øD	ød	L	ℓ	C	S	Rake Angle (°) A.R.	R.R.	Applicable Inserts ➡ M18, M19
MHD 32-F	●	4	2	32	14.4	28.6	17.1	0.7	9.0	+9°	-7°	NDKW090304ER NDKT090304ER-V / N1 / N2
40-F	●			40	19	35	21.9	0.9	11.8		-3°	NDMM12T308ER-T / N2 / N3
50-F	●			50	27	36					-1°	

・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

Spare Parts

Description		Spare Parts: Clamp Screw For Bottom Insert	Clamp Screw For Middle Insert	Wrench For Bottom Insert	Wrench For Middle Insert	Clamp Bolt For 1 Front Pieces	Clamp Bolt For 2 Front Pieces	Wrench	Anti-seize Compound
									
Separate Type	MHD 32-S32-SA	SB-2560TR		DT-8		-	HH8X50	LW-6	MP-1
	40-S32-SA	SB-3080TR		DT-10			HH8X65		
	40-S40-SA								
	40-S42-SA								
	50-S42-SA						HH12X65	LW-10	
	MHD 40-S42-SB					HH8X40	-	LW-6	
	50-S42-SB					HH12X40		LW-10	
Integral Type	MHD 20S-S20-C	SB-2560TR		DT-8		-	-	-	
	25-S25-C								
	32-S32-C								
	40-S42-C	SB-3080TR		DT-10					
	50-S42-C								
Base Unit	MHD 32-S32-A	SB-2560TR		DT-8		HH8X35	HH8X50	LW-6	
	40-S32-A	SB-3080TR		DT-10		HH8X40	HH8X65		
	40-S40-A								
	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	
Front Piece	MHD 32-F	SB-2560TR		DT-8		-	-	-	-
	40-F	SB-3080TR		DT-10					
	50-F								

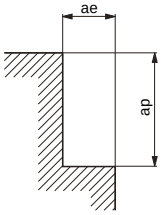
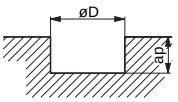
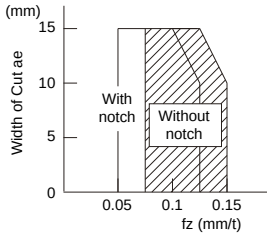
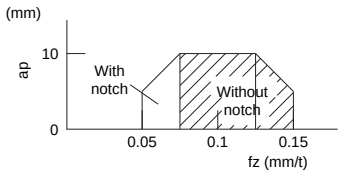
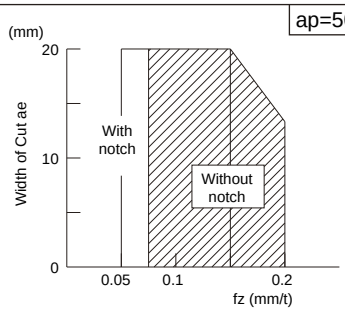
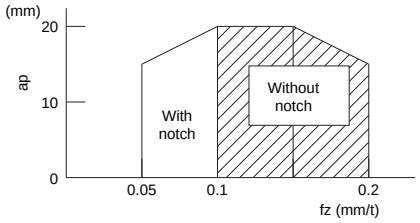
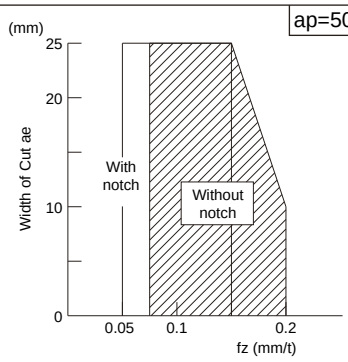
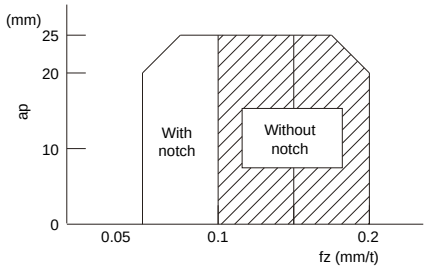
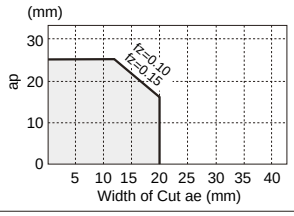
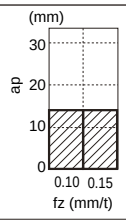
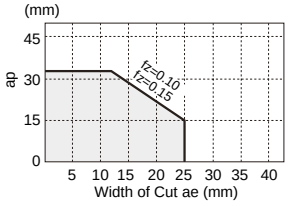
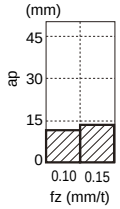
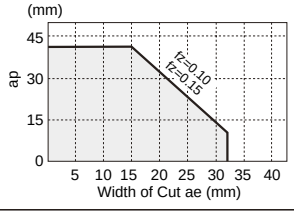
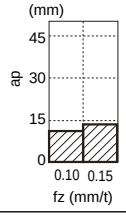
・When purchasing the front piece separately, the wrench (DT-8 or DT-10 or DT-15) is not included.
・When purchasing the base unit and front pieces separately for assembly, the clamp bolt and wrench (for bolt) are not included. Please purchase them separately.
・Various clamp bolts for front pieces are available. ➡ M77
・For Seperate type (MHD…-SA type) and Base Unit (MHD…-A type), the clamp bolts for regular type front piece (MHD…-F) installation are attached.
If replacing the end with the radius-type front piece (MHD…-RF), a different type of clamp bolt may be required. ➡ M77



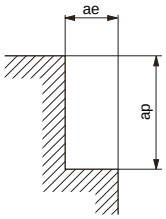
Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

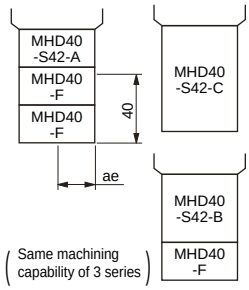
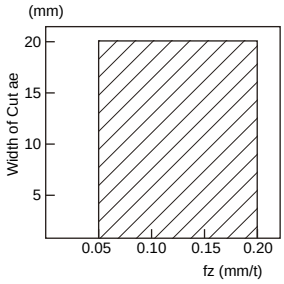
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

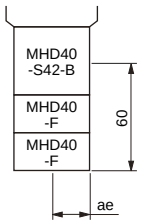
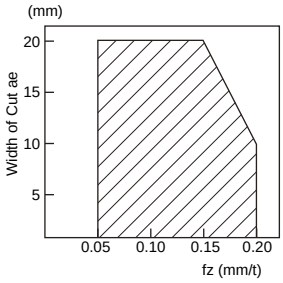
Cutting Performance of Plus Mill

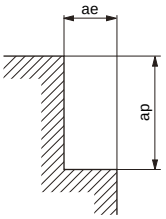
Workpiece Material	Shouldering	Slotting
C50 (S50C)		
Description		
MHD32-S32-SA	ap=40mm 	
MHD40-S32-SA **MHD40-S40-SA** **MHD40-S42-SA** **MHD40-S42-SB** **MHD40-S42-C**	ap=50mm 	
MHD50-S42-SA **MHD50-S42-SB** **MHD50-S42-C**	ap=50mm 	
MHD20S-S20-C		
MHD25-S25-C		
MHD32-S32-C		

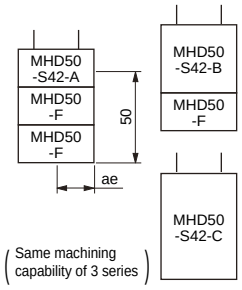
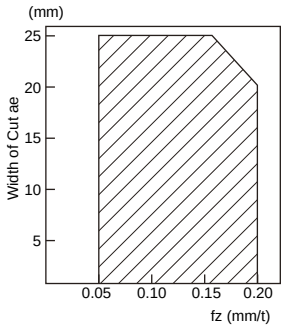
◆ Cutting Performance at Shouldering (Extending front piece of ø40 / ø50)

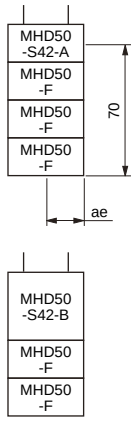
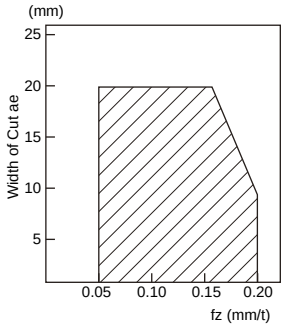
Cutting Conditions	
Cutting Dia.: ø40 Workpiece Material: C50 (S50C) Insert: With notch NDMM12T308ER-N2 / N3 (PR660)	

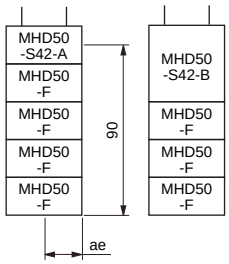
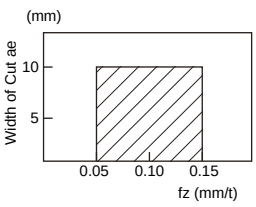
Combination	Cutting Speed	Vc=70~120m/min
	ap 40	

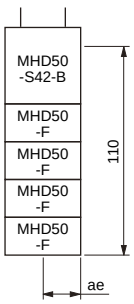
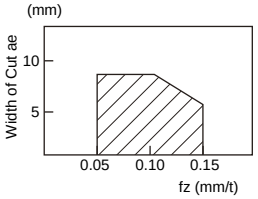
Combination	Cutting Speed	Vc=70~120m/min
	ap 60	

Cutting Conditions	
Cutting Dia.: ø50 Workpiece Material: C50 (S50C) Insert: With notch NDMM12T308ER-N2 / N3 (PR660)	

Combination	Cutting Speed	Vc=70~120m/min
	ap 50	

Combination	Cutting Speed	Vc=70~120m/min (Limit ae=15mm) Vc=60~90m/min (In case of ae=15~20mm)
	ap 70	

Combination	Cutting Speed	Vc=70~120m/min
	ap 90	

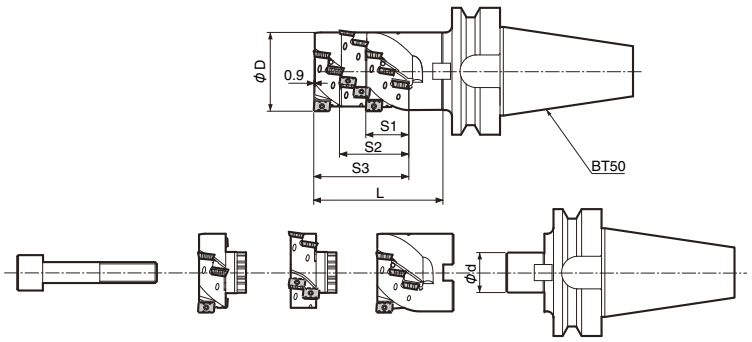
Combination	Cutting Speed	Vc=70~120m/min
	ap 110	

MHD Helical Endmill

Shouldering | Deep Slotting | Facing

MHD-FMA-SA Arbor-Free type (Base Unit+2 Front Pieces+Clamp Bolt)





Arbor should be purchased separately.

Use notched insert (-N2, -N3).

Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm)							Rake Angle (°)		Weight (Kg)
				øD	ød	L	C	S1	S2	S3	A.R.	R.R.	
MHD 63-FMA-SA	○	21	3	63	31.75	102.9	0.9	31.8	52.8	74.7	+9°	0°	1.6
80-FMA-SA	○	27		80	38.1	123.9			63.3	95.7			3.5
100-FMA-SA	○	40	4	100	50.8	129.9		42.3	73.8	106.2			5.7

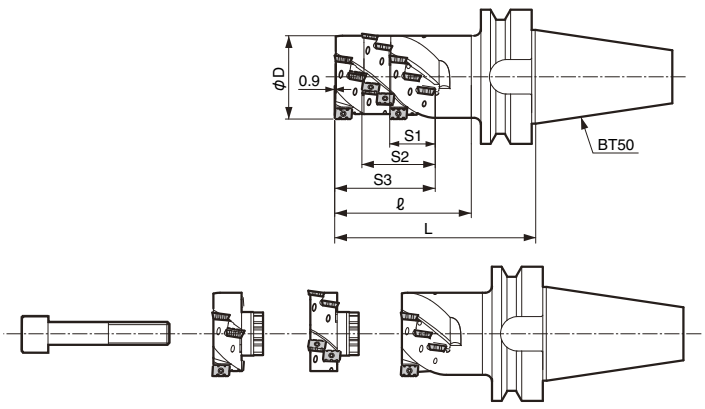
・Above weight does not include arbor's weight.

Applicable Insert and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M73	Front Piece (2pcs) ➡ M74	Applicable Arbor
MHD 63-FMA-SA	NDMM12T308ER-N2 / N3	MHD63-FMA-A	MHD63-F	BT50-FMA31.75-○○
80-FMA-SA		MHD80-FMA-A	MHD80-F	BT50-FMA38.1-○○
100-FMA-SA		MHD100-FMA-A	MHD100-F	BT50-FMA50.8-○○

MHD-BT50-SA Integral Arbor type (Base Unit+2 Front Pieces+Clamp Bolt)





Use notched insert (-N2, -N3).

Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm)							Rake Angle (°)		Weight (Kg)
				øD	L	ℓ	C	S1	S2	S3	A.R.	R.R.	
MHD 63-BT50-SA	○	21	3	63	137	89	0.9	31.8	52.8	74.7	+9°	0°	5.3
80-BT50-SA	○	27		80	158	110			63.3	95.7			7.6
100-BT50-SA	○	40	4	100	168	129.9		42.3	73.8	106.2			10.2

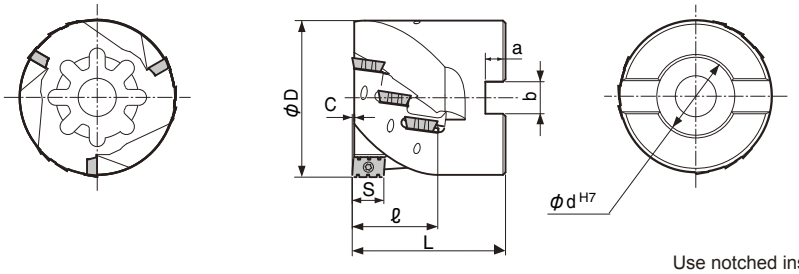
Applicable Inserts and Composition of Toolholder

Endmill	Applicable Inserts ➡ M19	Base Unit ➡ M73	Front Piece (2pcs) ➡ M74
MHD 63-BT50-SA	NDMM12T308ER-N2 / N3	MHD63-BT50-A	MHD63-F
80-BT50-SA		MHD80-BT50-A	MHD80-F
100-BT50-SA		MHD100-BT50-A	MHD100-F

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MHD-FMA-A Base Unit (FMA Arbor-Free type)





Use notched insert (-N2, -N3).

● Toolholder Dimensions

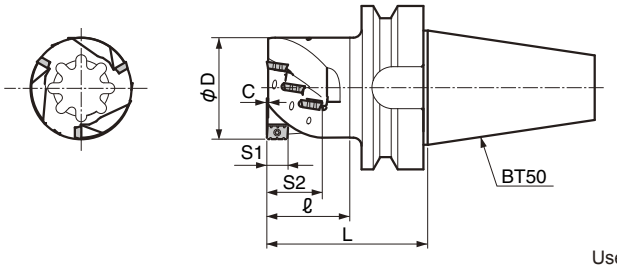
Description	Std.	No. of Insert	No. of Flute	Dimension (mm)							Rake Angle (°)		Weight (Kg)
				øD	ød	L	ℓ	C	a	b	A.R.	R.R.	
MHD 63-FMA-A	○	9	3	63	31.75	60.9	32.7	0.9	8	12.7	+9°	0°	0.8
80-FMA-A	○			80	38.1				10	15.9			1.4
100-FMA-A	○	16	4	100	50.8	66.9	43.2		11	19.0			2.3

● Applicable Inserts, Front Piece and Arbor

Endmill	Applicable Inserts ➡ M19	Applicable Front Piece ➡ M74	Applicable Arbor
MHD 63-FMA-A	NDMM12T308ER-N2 / N3	MHD63-F	BT50-FMA31.75-○○
80-FMA-A		MHD80-F	BT50-FMA38.1-○○
100-FMA-A		MHD100-F	BT50-FMA50.8-○○

MHD-BT50-A Base Unit (BT50 Integral Arbor type)





Use notched insert (-N2, -N3).

● Toolholder Dimensions

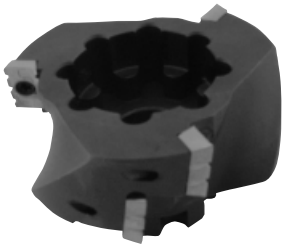
Description	Std.	No. of Insert	No. of Flute	Dimension (mm)							Rake Angle (°)		Weight (Kg)
				øD	L	ℓ	C	S1	S2		A.R.	R.R.	
MHD 63-BT50-A	○	9	3	63	94.1	46.1	0.9	11.8	31.8		+9°	+0°	4.5
80-BT50-A	○			80									5.5
100-BT50-A	○	16	4	100	104	66.0			42.3				6.8

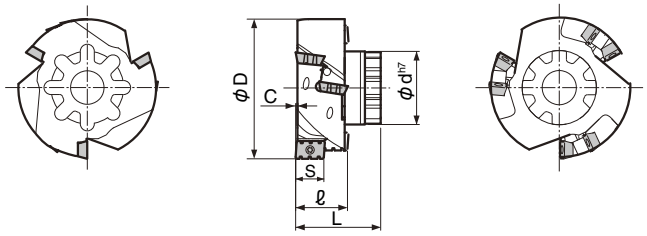
● Applicable Inserts and Front Piece

Endmill	Applicable Inserts ➡ M19	Applicable Front Piece ➡ M74
MHD 63-BT50-A	NDMM12T308ER-N2 / N3	MHD63-F
80-BT50-A		MHD80-F
100-BT50-A		MHD100-F

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MHD-F (Front Piece)



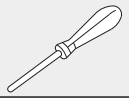
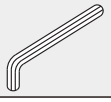


Use notched insert (-N2, -N3).

Toolholder Dimensions

Description	Std.	No. of Insert	No. of Flute	Dimension (mm) øD	ød	L	ℓ	C	S	Rake Angle (°) A.R.	R.R.	Weight (Kg)	Applicable Inserts ➔M19
MHD 63-F	●	6	3	63	32.5	37.9	21.9	0.9	11.8	+9°	0°	0.3	NDMM12T308ER-N2 / N3
80-F	●	9		80	42	51.9	32.4					0.9	
100-F	●	12	4	100	61	56.4	32.4					1.4	

Spare Parts

Description		Spare Parts: Clamp Screw	Wrench	Clamp Bolt	Wrench	Anti-seize Compound
						
Arbor -Free Type ➔M70	MHD 63-FMA-SA	SB-3080TR	DT-10	HH16X90	LW-14	MP-1
	80-FMA-SA			HH20X110	LW-17	
	100-FMA-SA			HH24X110	LW-19	
Base Unit ➔M71	MHD 63-FMA-A			HH16X90	LW-14	
	80-FMA-A			HH20X110	LW-17	
	100-FMA-A			HH24X110	LW-19	
Arbor Integral Type ➔M70	MHD 63-BT50-SA			HH16X65	LW-14	
	80-BT50-SA			HH20X90	LW-17	
	100-BT50-SA			HH24X90	LW-19	
Base Unit ➔M71	MHD 63-BT50-A			HH16X65	LW-14	
	80-BT50-A			HH20X90	LW-17	
	100-BT50-A			HH24X90	LW-19	
Front Piece ➔M72	MHD 63-F			-	-	-
	80-F					
	100-F					

・If purchasing the front piece only, the wrench (DT-10) is not included.
・When purchasing the base unit and front pieces separately for assembly, the clamp bolt and wrench (for bolt) are not included. Please purchase them separately.
・Various clamp bolts for front pieces are available. ➔M77



Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

◆ Applicable Inserts (common to MHD-SA / -SB / -C)

Toolholder	Applicable Inserts ➔ M18, M19				Applicable Inserts ➔ M18		
			 1-Notched	 2-Notched		 2-Notched	 3-Notched
MHD 32-S32-SA	NDKW 090304ER	NDKT 090304ER-V	NDKT 090304ER-N1	NDKT 090304ER-N2	-	-	-
MHD 20S-S20-C			-	-			
MHD 25-S25-C	-	-	NDKT 090304ER-N1	NDKT 090304ER-N2			
32-S32-C							
MHD 40-S32-SA	-	-	-	-	NDMM 12T308ER-T	NDMM 12T308ER-N2	NDMM 12T308ER-N3
40-S40-SA							
40-S42-SA							
50-S42-SA							
MHD 40-S42-SB							
50-S42-SB							
MHD 40-S42-C							
50-S42-C							
MHD 63-FMA-SA	-	-	-	-	-		
80-FMA-SA							
100-FMA-SA							
MHD 63-BT50-SA							
80-BT50-SA							
100-BT50-SA							

・For installation of nicked insert, make sure to see **M76**.

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grade (Cutting Speed Vc: m/min)												
			Cermet			PVD Coated Carbide								Carbide	
	øD ø20~ø32	øD ø40~ø100	TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.13	0.05~0.18		☆ 100~200		☆ 80~180	☆ 80~180				★ 60~150			
Carbon Steel	0.05~0.15	0.05~0.2		★ 100~200		☆ 80~180	★ 80~180				☆ 60~150			
Alloy Steel	0.05~0.15	0.05~0.2		★ 80~180		☆ 80~180	★ 80~180				☆ 60~150			
Mold Steel	0.05~0.15	0.05~0.2		★ 80~180		☆ 60~150	★ 60~150				☆ 60~130			
Cast Iron	0.05~0.15	0.05~0.2										★ 60~150		☆ 60~130
Non-ferrous Metals	0.05~0.15	0.05~0.2												★ 100~300

・Reduce the ap by 20-50% when machining with long overhang length or using long shank types.
・Reduce the cutting speed by 20-50% when machining with multiple front pieces.
・Compressed air is recommended to aid in chip evacuation.

No. of inserts to be installed in the Plus Mill

Description		No. of Insert	No. of Flute	NDK □ 09 type Without notch	With notch N1	With notch N2	FPMT09 Type	RPMT10 Type
Separate Type	MHD 32-S32-SA	10	2	-	5	5	-	-
	32-S32-4RSA				4	4	2	
Base Unit	MHD 32-S32-A	2	2	-	1	1	-	-
Front Piece	MHD 32-F	4	2	-	2	2	-	-
	32-4RF				1	1	2	
Integral Type	MHD 20S-S20-C	3	1	3	-	-	-	-
	25-S25-C	8	2	-	4	4		
	32-S32-C	10	2	-	5	5		
	MHD 20-S20-4RC	3	1	2	-	-	1	-
	25S-S25-4RC	4					2	
	32-S32-5RC	10	2	-	4	4	-	2

Description		No. of Insert	No. of Flute	NDMM12 type With notch N2	With notch N3	RPMT10 Type	RPMT12 Type
Separate Type	MHD 40-S32-SA	10	2	5	5	-	-
	40-S40-SA						
	40-S42-SA						
	50-S42-SA						
	MHD 63-FMA-SA	21	3	7	14		
	80-FMA-SA	27	3	9	18		
	100-FMA-SA	40	4	20	20		
	MHD 63-BT50-SA	21	3	7	14		
	80-BT50-SA	27	3	9	18		
	100-BT50-SA	40	4	20	20		
	MHD 40-S32-5RSA	10	2	4	4	2	-
	40-S42-5RSA						
	50-S42-6RSA					-	2
	MHD 40-S42-SB	10	2	5	5	-	-
	50-S42-SB						
Base Unit	MHD 40-S32-A	2	2	1	1	-	-
	40-S40-A						
	40-S42-A						
	50-S42-A						
	MHD 63-FMA-A	9	3	3	6		
	80-FMA-A						
	100-FMA-A	16	4	8	6		
	MHD 63-BT50-A	9	3	3	6		
	80-BT50-A						
	100-BT50-A	16	4	8	8		
	MHD 40-S42-B	6	2	3	3		
	50-S42-B						
Front Piece	MHD 40-F	4	2	2	2	-	-
	50-F						
	63-F	6	3	2	4		
	80-F	9		3	6		
	100-F	12	4	6	6		
	MHD 40-5RF	4	2	1	1	2	-
	50-6RF					-	2
Integral Type	MHD 40-S42-C	10	2	5	5	-	-
	50-S42-C						
	MHD 40-S42-5RC	10	2	4	4	2	-
	50-S42-6RC					-	2

Caution at installing Notched Insert

When installing Notched Insert, it is important to install it in the correct position. When it is installed wrongly, the tool cannot machine the workpiece and it may damage the toolholder body.

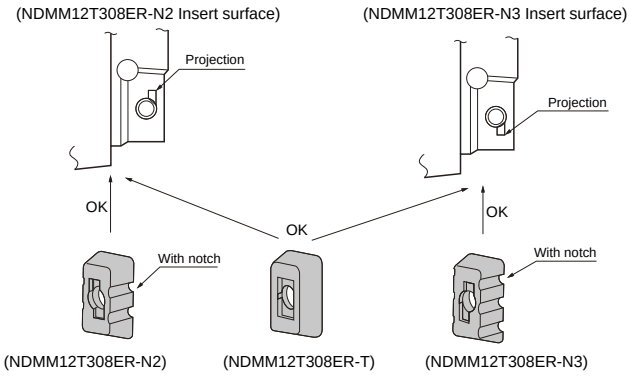
Description of Notched Insert	Applicable Toolholder In case of having insert installation mark
NDKT 090304ER-N1 / N2	MHD25,32
NDMM 12T308ER-N2 / N3	MHD40,50,63,80,100

In case of "having insert installation mark"

Caution during insert installation

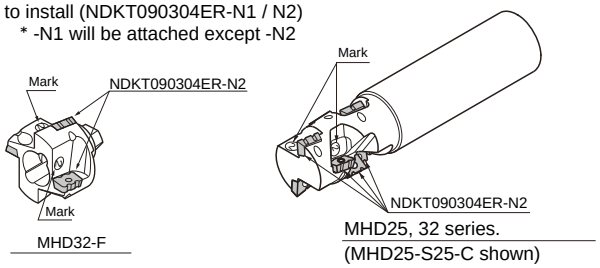
1) NDMM12T308ER-N2 or -3 in the insert pocket with projection (only MHD40 / 50)
2) ND□□○○○○○○ER-N2 in the insert pocket marked ②
3) ND□□○○○○○○ER-N3 in the insert pocket marked ③

1. How to install (MHD40, 50)

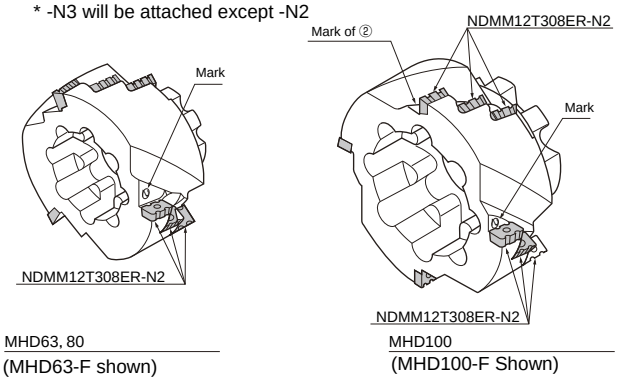


2. How to install (MHD25, 32, 63, 80, 100)

● How to install (NDKT090304ER-N1 / N2)
* -N1 will be attached except -N2

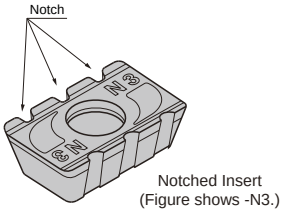


● How to install (NDMM12T308ER-N2 / N3)
* -N3 will be attached except -N2



Notched Insert Benefits

Notched Insert shows not only lowering cutting resistance but also great effect of chattering reduction by good approach to workpieces.



Cutting Edge Length of Plus Mill

Base Unit	No. of Flute	No. of Insert	Plus Mill ➔ M67~M69				Radius Plus Mill ➔ M133, M134					
			Front Piece (Both Middle and End)		Length of cutting edge (mm)	Clamp Bolt	Front Piece (Middle)		Radius Front Piece (End)		Length of cutting edge (mm)	Clamp Bolt
			Description	No.of pcs			Description	No.of pcs	Description	No.of pcs		
MHD32-S32-A	2	6	**MHD32-F**	1	25.4	**HH8X35**	**MHD32-F**	0	**MHD32-4RF**	1	25.6	**HH8X35**
		10		2	41.8	**HH8X50**		1		1	42.0	**HH8X50**
		14		3	58.2	**HH8X70**		2		1	58.4	**HH8X65**
MHD40-S32-A (MHD40-S32-B) MHD40-S40-A MHD40-S42-A (MHD40-S42-B)	2	6	**MHD40-F**	1	32.8 (53.8)	**HH8X40**	**MHD40-F**	0	**MHD40-5RF**	1	27.2 (48.2)	**HH8X35**
		10		2	53.8 (74.8)	**HH8X65**		1		1	48.2 (69.2)	**HH8X55**
		14		3	74.8 (95.8)	**HH8X85**		2		1	69.2 (90.2)	**HH8X80**
		18		4	95.8 (116.8)	**HH8X110**		3		1	90.2 (111.2)	**HH8X100**
MHD50-S42-A (MHD50-S42-B)	2	6	**MHD50-F**	1	32.8 (53.8)	**HH12X40**	**MHD50-F**	0	**MHD50-6RF**	1	28.2 (49.2)	**HH12X40**
		10		2	53.8 (74.8)	**HH12X65**		1		1	49.2 (70.2)	**HH12X55**
		14		3	74.8 (95.8)	**HH12X85**		2		1	70.2 (91.2)	**HH12X80**
		18		4	95.8 (116.8)	**HH12X110**		3		1	91.2 (112.2)	**HH12X100**
		22		5	116.8 (137.8)	**HH12X130**		4		1	112.2 (133.2)	**HH12X120**
		26		6	137.8 (158.8)	**HH12X150**		5		1	133.2 (154.2)	**HH12X140**
MHD63-FMA-A	3	9	**MHD63-F**	0	32.7	**HH16X45**	-	-	-	-	-	-
		15		1	53.7	**HH16X65**						
		21		2	74.7	**HH16X90**						
		27		3	95.7	**HH16X110**						
		33		4	116.7	**HH16X130**						
MHD80-FMA-A	3	9	**MHD80-F**	0	32.7	**HH20X40**	-	-	-	-	-	-
		18		1	64.2	**HH20X75**						
		27		2	95.7	**HH20X110**						
		36		3	127.2	**HH20X140**						
		45		4	158.7	**HH20X170**						
MHD100-FMA-A	3	16	**MHD100-F**	0	43.2	**HH24X40**	-	-	-	-	-	-
		28		1	74.7	**HH24X75**						
		40		2	106.2	**HH24X110**						
		52		3	137.7	**HH24X140**						
		64		4	169.2	**HH24X170**						
MHD63-BT50-A	3	15	**MHD63-F**	1	53.7	**HH16X45**	-	-	-	-	-	-
		21		2	74.7	**HH16X65**						
		27		3	95.7	**HH16X90**						
		33		4	116.7	**HH16X110**						
MHD80-BT50-A	3	18	**MHD80-F**	1	64.2	**HH20X55**	-	-	-	-	-	-
		27		2	95.7	**HH20X90**						
		36		3	127.2	**HH20X120**						
		45		4	158.7	**HH20X150**						
MHD100-BT50-A	4	28	**MHD100-F**	1	74.7	**HH24X60**	-	-	-	-	-	-
		40		2	106.2	**HH24X90**						
		52		3	137.7	**HH24X120**						
		64		4	169.2	**HH24X150**						

・Dimension in ( ) is for Base Unit B.
・Clamp Bolt Description (HH ○○ X □□): ○○ ...indicates screw standard (M ○○), □□ ...indicates bolt's nominal length (mm).
・Clamp Bolt Descriptions are common to both Base Unit A and B.

Difference of Cutting Edge Length between Radius Plus Mill and Plus Mill

As shown in Fig.1, the edge length of front piece in Radius Plus Mill (ℓ2) and the edge length of front piece in Plus Mill (ℓ1) are different.

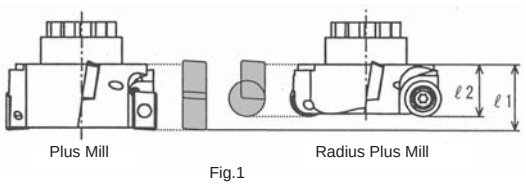


Fig.1

For Radius Plus Mill and Plus Mill,
the number of Front Piece required varies depending on the ap.

Difference of Clamp Bolt Length in the Front Piece

Radius Plus Mill's inserts protrude from the bottom of the body for the function of ramping or helical milling, as well as the difference of Front Piece Length.
For this reason, the Radius Plus Mill's clamp bolt length in the front piece is shorter than that of Plus Mill. (Fig.2)

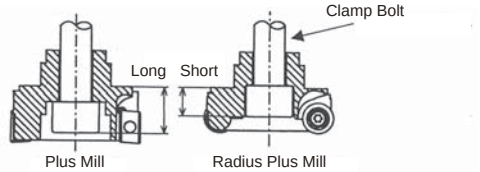


Fig.2

When using Radius Plus Mill's front piece, be careful for the difference of clamp bolt length as mentioned above.
If the length of clamp bolt is too long, the front piece will not be secured even when the bolt is tightened. Make sure to check the length of clamp bolt for installation of the front piece to avoid troubles such as tool damages.

DMC / DMC-SX Endmill



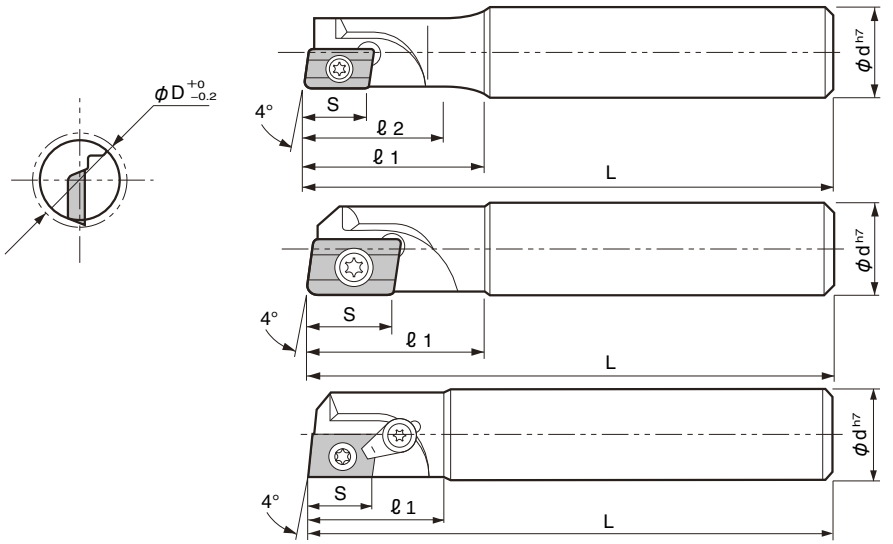


Fig.1 Fig.2 Fig.3

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	ød	L	ℓ1	ℓ2	S	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts: Clamp Set	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						+3°	-10°				
812-S16	●		12			31	20		+5°	-10°				
813-S16	●		13			28.5			+5°	-9°				
814-S16	●		14		100	33.5	25		+6°	-8°				
815-S16	●		15						+6°	-8°				
816-S16	●	2	16			31			+6°	-4°				
818-S20	●		18	20					+6°	-3°				
820-S20	●	3	20		120	36	30		+8°	-6°				
822-S25	●		22	25					+8°	-5°				
825-S25	●		25			46	40		+8°	-5°				
DMC 810	●	1	10	10	70	20	-	8.5	+3°	-6°	Fig.2		SB-2545TR	FT-8
812	●		12	12	80	25			+3°	-5°				
DMC 014	●	1	14	16	90	25	-	11.0	+3°	-4°	Fig.2		SB-3060TR	FT-10
016	●		16						+4°	-2°				
020	●	2	20	20	110	30			+5°	0°				
DMC 316SXT	●	1	16	16	90	30	-	14.0	+3°	-3°	Fig.2	-	SB-4060TR	FT-15
320SX	●		20	20	110					-3°				
325SX	●	2	25	25	120	40				-2°	Fig.3	CPS-2TR	SB-4065TR	
332SX	●		32	32	130					0°				
340SX	●		40	32	150					0°				
DMC 320SX-200	●	1	20	20	200	50	-	14.0	+3°	-3°	Fig.2	-	SB-4065TR	FT-15
325SX-220	●	2	25	25	220	60				-2°				
332SX-250	v		32	32	250	80				0°				

Applicable Inserts

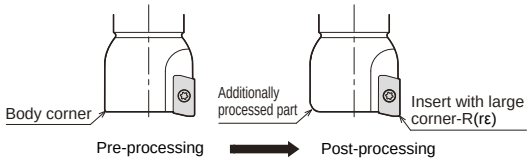
Toolholder	Applicable Inserts M18		
DMC8○○(-S○○)	-	NDCT 090204TR 090204FR	NDMM 090204ER-SP
DMC0○○		NDCT 120208TR 120208FR	NDMM 120204ER-SP 120208ER-SP
DMC 316SXT	NDCW 150302TR	NDCT 150308TR 150308FR (NDCT 150308TRX)	NDMM 150304ER-SP 150308ER-SP
320SX	150304TR		
325SX	150308TR		
332SX	150320TR		
340SX	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.(See lower section of **M79**)

■When installing inserts with corner-R(rε) 2.0 / 3.0 / 4.0, grind off the corner part of the tool's insert pocket so as not to contact the workpiece.
(Not necessary additional grind off in case of under corner-R(rε) 0.8)

Insert Corner-R(rε)	Additional processing dimension for the body corner. (mm)
2.0	R1.0
3.0	R1.6
4.0	R2.0

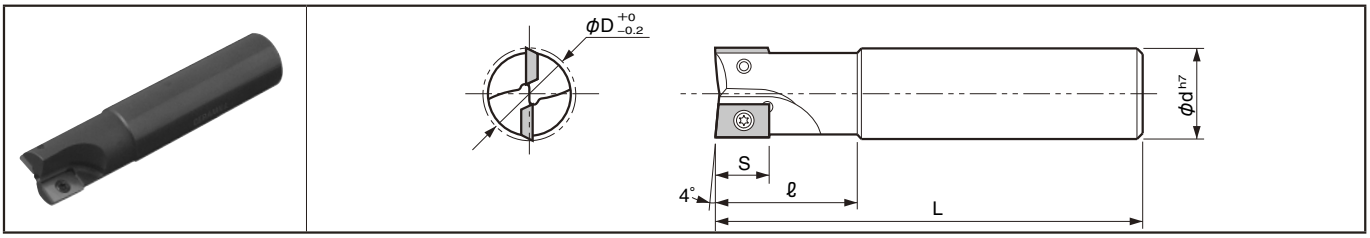
*R shape is recommended for additional processing toward the body corner. When applying chamfer shaped additional processing, do not cut away too much.



For recommended cutting conditions, see page M141

● : Std. Item ○ : Check Availability
R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DMC-H Endmill (High Rake type)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	ød	L	ℓ	S		Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts 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°		SB-4065TR		
325H	●	2	25	25	120	40			+8°	-2°				
332H	●		32	32	130				+8°	0°				
340H	●		40		150				+8°	0°				

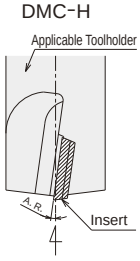
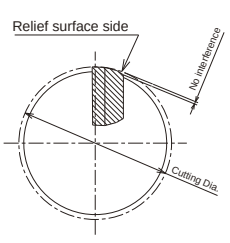
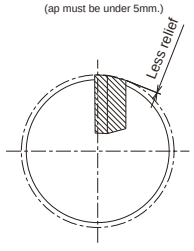
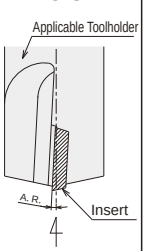
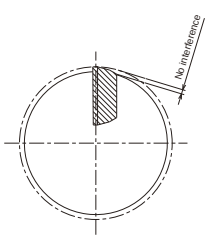
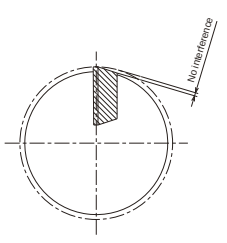
Applicable Inserts

Toolholder	Applicable Inserts ➡ M18, M19			Applicable Inserts ➡ M21
				
DMC 316H 320H 325H 332H 340H	NDMM 150304ER-SP 150308ER-SP	NDCT 150308TRX	NDCW 150308TRX 150308FRX	NDCW 150302FRX 150302FRX-NE (PCD)

DMC-H type Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min) Cermet TN100M	Cermet TC60	PVD Coated Carbide PR630	PR730	PR830			PR660	PR905	Carbide PW30	KW10	PCD KPD230 (KPD001)	KPD010	Max. ap (mm) Cutting Dia. (øD)	Slotting (ap)	Shouldering (apxae)
Stainless Steel	~0.15	☆ 120~200	☆ 120~200	☆ 100~200	★ 120~200										~ø20	3	6×2
															ø25~	6	13×3
Carbon Steel	~0.2	★ 120~200	☆ 120~200	☆ 100~200	★ 120~200										~ø20	4	8×4
															ø25~	8	14×6
Alloy Steel	~0.2	★ 100~180	☆ 100~180	☆ 100~180	★ 100~180										~ø20	4	8×4
															ø25~	8	13×6
Mold Steel	~0.15	★ 100~180	☆ 100~180	☆ 80~150	★ 80~150										~ø20	3	5×2
															ø25~	6	10×3
Cast Iron	~0.2											★ 80~150			~ø20	4	8×4
															ø25~	6	14×6
Non-ferrous Metals	~0.2											★ 100~300	★ 300~500	☆ 300~500	~ø20	4	8×4
															ø25~	6	14×6

• Above inserts are also applicable to DMC ○○○ SX type, but the conventional NDCW1503 ○○ TR type insert is not applicable for this endmill. ★ : 1st Recommendation ☆ : 2nd Recommendation

Insert / Description	NDCT . . . TRX NDCW . . . (T / F) RX	NDCW . . . TR NDCT . . . (T / F) R	Insert / Description	NDCT . . . TRX NDCW . . . (T / F) RX	NDCW . . . TR NDCT . . . (T / F) R
DMC-H	No interference of relief surface	Less relief (ap must be under 5mm.)	DMC-SX	No interference of relief surface	No interference of relief surface
					

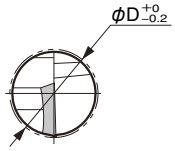
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Endmill for Aluminum Machining

Shouldering | Slotting | Facing

MEAL (Aluminum Machining: with air hole)





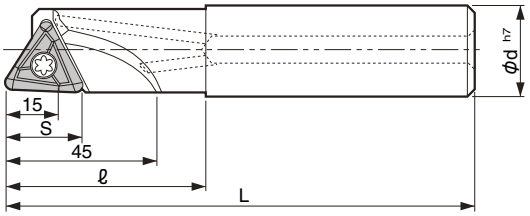
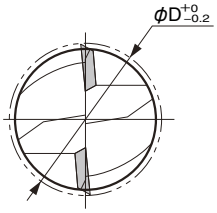


Fig.1





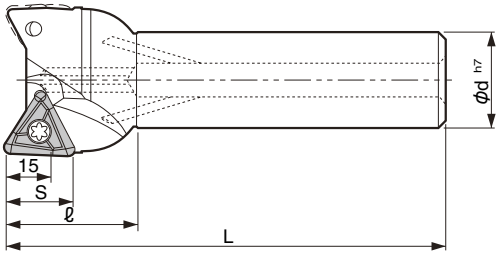
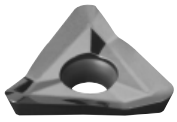


Fig.2

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Rake Angle (°)		Drawing	Spare Parts		
			øD	ød	L	ℓ	S		A.R.	R.R.		Clamp Screw	Wrench	
MEAL 25-S25	●	1	25	25	140	60	20		+12°	-7°	Fig.1	SB-5085TR	DT-20	
50-S32	●	2	50	32	150	45				-3.5°	Fig.2			

Applicable Insert

Toolholder	Applicable Insert ➔ **M15**
	
MEAL 25-S25 50-S32	TEMT 250624-AQ

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)
		Carbide
		KW10
Non-ferrous Metals	0.1~0.3	★ 300~500

• ap is recommended to be under 15.0mm

★ : 1st Recommendation

M

Milling

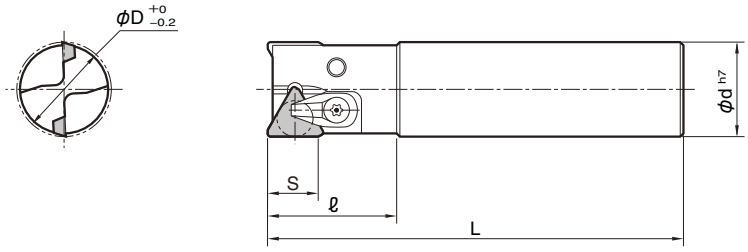
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Endmill [TP □□ / TE □□ Insert]

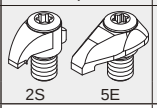
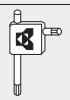
Shouldering | Slotting | Facing

MTPS / MTES

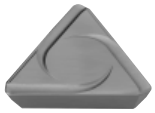
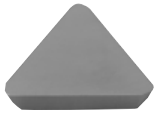
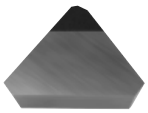




Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Rake Angle (°)		Spare Parts		
			øD	ød	L	ℓ	S		A.R.	R.R.	Clamp Set	Wrench	
											 2S 5E		
MTPS 216	●	1	16	16	80	25	9.0		+3°	-5°	CPS-2S	FT-15	
220	●	2	20	20	90	30			+5°	-4°			
MTES 325	●	2	25	25	110	35	13.5		+11°	-2°	CPS-5E	FT-15	
330	●	2	30	32	125	45			+15°	-2°			
335	●	3	35	32	125	45			+15°	0°			

Applicable Inserts

Toolholder	Applicable Inserts				
	M12	**M21**	**M12**	**M12**	**M21**
					
MTPS 216 220	TPGN 110302 110304 110308 TPMN 110304 110308	TPGN 110302 ○○ 110304 ○○ 110308 ○○ (CBN/PCD)	-	-	-
MTES 325 330 335	-	-	TEMR 1603PTER-H	TEKN 1603PTTR 1603PTFR	TEEN 1603PTFR 1603PTFR-NE (PCD)

MTPS / MTES Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)													Max. ap (mm)		
		Cermet			PVDCoated Carbide				Carbide		CBN		PCD				
		TN60	TN100M	TC60M	PR630	PR730	PR830	PR905	PW30	KW10	KBN10B	KBN25B	KPD001	KPD010	Cutting Dia. (øD)	Slotting (ap)	Shouldering (ap×ae)
Stainless Steel	~0.12		☆ 120~200	☆ 120~200	☆ 120~200	★ 120~200			☆ 80~120						~ø20	2	5×2
															ø25~	4	13×5
Carbon Steel	~0.15	☆ 150~200	★ 120~200	☆ 120~200	☆ 120~200	★ 120~200			☆ 60~120						~ø20	3	6×2
															ø25~	6	13×5
Alloy Steel	~0.15	☆ 120~200	★ 100~180	☆ 100~180	☆ 100~180	★ 100~180			☆ 60~120						~ø20	3	6×2
															ø25~	6	13×5
Mold Steel	~0.15	☆ 120~200	★ 100~180	☆ 100~180	☆ 80~150	★ 80~150			☆ 60~120						~ø20	3	6×2
															ø25~	6	13×5
Cast Iron	~0.2							★ 80~180		☆ 80~150	☆ 300~500	★ 300~500			~ø20	3	6×2
															ø25~	6	13×5
Non-ferrous Metals	~0.2									★ 100~300			★ 300~500	☆ 300~500	~ø20	3	6×2
															ø25~	6	13×5
Hard Materials	~0.05											★ 80~150			~ø20	-	2×0.5

★ : 1st Recommendation ☆ : 2nd Recommendation

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MEA / MEB


Standard (Straight)


Standard (Weldon)


Same Shank (Straight)


Same Shank (Weldon)


Long Shank (Straight)


Long Shank (Weldon)

- Standard type

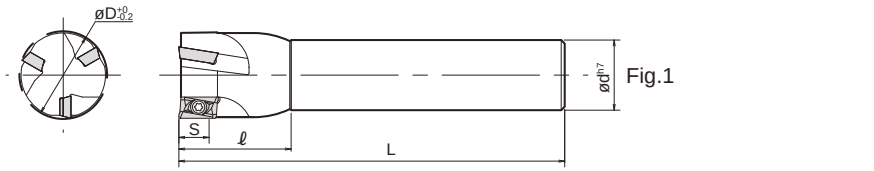


Fig.1 Fig.2 Fig.3

- Same Shank type

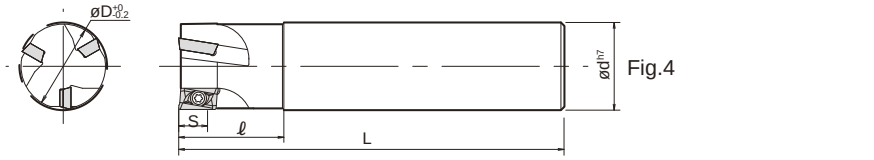


Fig.4 Fig.5 Fig.6

- Long Shank type

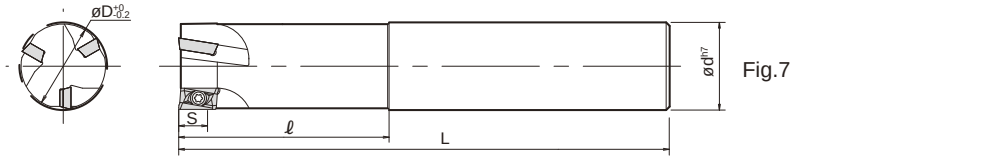


Fig.7 Fig.8 Fig.9

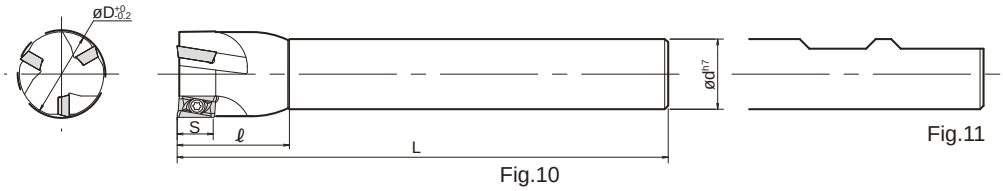


Fig.10 Fig.11

Applicable Inserts

Description	Applicable Inserts ➔ **M18**					
				 1 Notched	 2 Notched	 3 Notched
MEA	NDKW 090304ER	NDKT 090304TR	NDKT 0903..ER-V	NDKT 090304ER-N1	NDKT 090304ER-N2	-
MEB	NDKW 1504..ER	NDKT 150408TR	NDKT 1504..(E / T) R-V	-	-	NDKT 150408ER-N3

● Toolholder Dimensions (**MEA**) Cutting Edge S = 9.0mm

	Description	Std.	No. of Insert	Dimension (mm) øD	ød	L	ℓ	S	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ M18
Weldon	MEA 16-S12-W	○	2	16	12	90	23	9.0	+9°	-14°	Fig.2	SB-2560TR	DT-8	NDKW09 NDKT09
	20-S16-W	○	3	20	16	110	26			-13°				
	25-S20-W	○	3	25	20		29			-10°	Fig.3			
	32-S25-W	○	4	32	25	130	32			-4°				
	40-S32-110W-6T	○	6	40	32	110	32			-3°				
	MEA 10-S10-W	○	1	10	10	80	17	9.0	+4°	-31°	Fig.5	SB-2560TR	DT-8	NDKW09 NDKT09
	12-S12-W	○		12	12		20			-24°				
	16-S16-W	○	2	16	16	90	30		+9°	-14°				
	20-S20-W	○	3	20	20	110				-13°				
	25-S25-W-4T	○	4	25	25	90				-10°	Fig.6			
	32-S32-W-5T	○	5	32	32	100	40			-4°				
Weldon	MEA 20-S20-130W	○	2	20	20	130	60	9.0	+9°	-13°	Fig.8	SB-2560TR	DT-8	NDKW09 NDKT09
	25-S25-140W	○	3	25	25	140				-10°	Fig.9			
	32-S25-160W	○	4	32		160	32			-4°	Fig.11			
	40-S32-200W	○		40	32	200				-3°				
Cylindrical	MEA 12-S10	○	1	12	10	80	20	9.0	+9°	-24°	Fig.1	SB-2560TR	DT-8	NDKW09 NDKT09
	12-S16	○			16		27			-24°				
	13-S12	○		13	12		20			-22°				
	14-S12	○		14						-21°				
	16-S12	○	2	16		90	23			-14°				
	17-S16	○		17	16					-13°				
	18-S16	○		18						-12°				
	19-S16	○		19		110	26			-11°				
	20-S16	○	3	20						-13°				
	21-S20	○		21	20					-12°				
	22-S20	○		22						-12°				
	24-S20	○		24			29			-11°				
	25-S20	○		25						-10°				
	28-S25	○		28	25					-10°				
	30-S25	○	4	30		130	32			-7°				
	32-S25	○		32						-4°				
	40-S32	○	5	40	32					-3°				
	50-S32	○	6	50			35			-3°				
	63-S32	○	8	63						-3°				
	80-S32	○		80						-3°				
	MEA 10-S10	○	1	10	10	80	17	9.0	+4°	-31°	Fig.4	SB-2560TR	DT-8	NDKW09 NDKT09
	16-S16	○	2	16	16	90	30		+9°	-14°				
	20-S20	○	3	20	20	110				-13°				
	20-S20-Z2	○	2							-13°				
	25-S25	○	3	25	25					-10°				
	32-S32	○	4	32	32	130	40			-4°				
Cylindrical Long Shank	MEA 20-S20-130	○	2	20	20	130	60	9.0	+9°	-13°	Fig.7	SB-2560TR	DT-8	NDKW09 NDKT09
	25-S25-140	○	3	25	25	140				-10°				
	32-S25-160	○	4	32		160	32			-4°	Fig.10			
	40-S32-200	○		40	32	200				-3°				

● Toolholder Dimensions (**MEB**) Cutting Edge S = 15.0mm

	Description	Std.	No. of Insert	Dimension (mm) øD	ød	L	ℓ	S	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ M18
Standard (Weldon)	MEB 25-S20-W	○	2	25	20	120	36	15.0	+11°	-11°	Fig.3	SB-4085TR	DT-15	NDKW15 NDKT15
	32-S25-W	○	3	32	25		40			-9°				
	40-S32-W	○	4	40	32	150	45			-7°				
	40-S32-115W-4T	○				115								
Same Shank (Weldon)	MEB 25-S25-W	○	2	25	25	120	36	15.0	+11°	-11°	Fig.6	SB-4085TR	DT-15	NDKW15 NDKT15
	25-S25-100W-2T	○				100								
	32-S32-W	○	3	32	32	120	40			-9°				
	32-S32-110W-3T	○				110								
Standard (Straight)	MEB 25-S20	○	2	25	20	120	36	15.0	+11°	-11°	Fig.1	SB-4085TR	DT-15	NDKW15 NDKT15
	32-S25	○	3	32	25		40			-9°				
	40-S32	○	4	40	32	150	45			-7°				
	50-S32	○		50						-6°				
	63-S32	○	5	63						-5°				
	80-S32	○	6	80						-4°				
Same Shank (Straight)	MEB 25-S25	○	2	25	25	120	36	15.0	+11°	-11°	Fig.2	SB-4085TR	DT-15	NDKW15 NDKT15
	32-S32	○	3	32	32		40			-9°				

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions (MEA)

Workpiece Material	fz (mm/t)		Recommended Insert Grade (Vc: m/min)												Max. ap (mm)		
			Cermet			PVD Coated								Carbide				
	øD ø12~ø20	øD ø21~ø80	TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	Cutting Dia. (øD)	Slotting (ap)	Shouldering (ap×ae)
Stainless Steel	0.03~0.08	0.07~0.15		☆ 120~200		☆ 120~200	☆ 120~200				★ 100~200				~ø14	1	8×1
															ø16~ø28	3	8×3
															ø30~ø80	2	8×5
Carbon Steel	0.03~0.12	0.07~0.15		★ 120~200		☆ 120~200	★ 120~200				☆ 100~180				~ø14	1.5	8×2
															ø16~ø28	6	8×6
															ø30~ø80	3	8×10
Alloy Steel	0.03~0.12	0.07~0.15		★ 100~180		☆ 100~180	★ 100~180				☆ 80~150				~ø14	1.5	8×2
															ø16~ø28	5	8×5
															ø30~ø80	3	8×10
Metal Mold Steel	0.03~0.1	0.07~0.15		★ 100~180		☆ 80~150	★ 80~150				☆ 60~130				~ø14	1.5	8×2
															ø16~ø28	4	8×4
															ø30~ø80	3	8×10
Cast Iron	0.05~0.15	0.1~0.2										★ 100~200		☆ 80~150	~ø14	1.5	8×2
															ø16~ø28	6	8×6
															ø30~ø80	4	8×10
Non-ferrous Material	0.05~0.2	0.1~0.25												★ 100~300	~ø14	3	8×3
															ø16~ø28	6	8×10
															ø30~ø80	4	8×20

• Reduce the *ap* by 20-50% when machining with long overhang length or using long shank types.

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (MEB)

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Vc: m/min)											Max. ap (mm)		
		Cermet			PVD Coated							Carbide			
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	Cutting Dia. (øD)	Slotting (ap)	Shouldering (ap×ae)
Stainless Steel	~0.2		☆ 120~200		☆ 120~200	☆ 120~200				★ 100~200				ø25	2	14×3
														ø32, ø40	3	14×5
														ø50~ø80	–	14×10
Carbon Steel	~0.25		★ 120~200		☆ 120~200	★ 120~200				☆ 100~180				ø25	5	14×7
														ø32, ø40	5	14×10
														ø50~ø80	–	14×20
Alloy Steel	~0.25		★ 100~180		☆ 100~180	★ 100~180				☆ 80~150				ø25	4	14×6
														ø32, ø40	5	14×8
														ø50~ø80	–	14×15
Metal Mold Steel	~0.2		★ 100~180		☆ 80~150	★ 80~150				☆ 60~130				ø25	4	14×6
														ø32, ø40	5	14×8
														ø50~ø80	–	14×15
Cast Iron	~0.25										★ 100~200		☆ 80~150	ø25	6	14×8
														ø32, ø40	5	14×12
														ø50~ø80	–	14×20
Non-ferrous Material	~0.2												★ 100~300	ø25	7	14×10
														ø32, ø40	5	14×15
														ø50~ø80	–	14×30

• Slotting with a tool over ø50 mm is not recommended.

★ : 1st Recommendation ☆ : 2nd Recommendation

Caution of installing Notched Insert

• Notched Inserts are necessary to be installed correct position. When it is installed wrongly, the tool cannot machine the workpiece and it may damage the toolholder body.
• Please be minded following tables when you install Inserts to toolholders. Indication is not marked near the Insert pocket for MEA / MEB. Please refer Table1 or Table2 and make correct combination.
It is not available to install same Notched Insert (-N1, -N2 or -N3).

Table 1

Description	No. of Insert	NDK□ 09 type		
		Without notch	With notch N1	With notch N2
MEA 12-S10 12-S16 13-S12 14-S12	1	1	-	-
16-S12 (-...) 17-S16 18-S16 19-S16	2	-	1	1
20-S16 (-...) 21-S20 22-S20 24-S20 25-S20 (-...) 28-S25	3	-	2	1

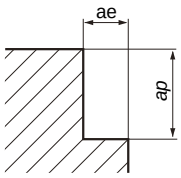
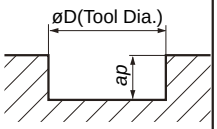
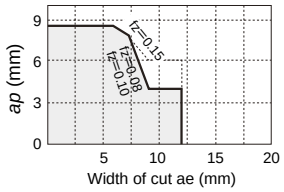
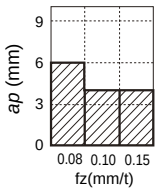
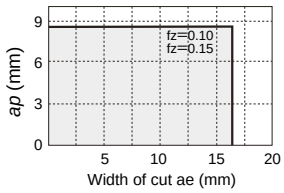
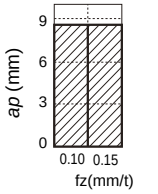
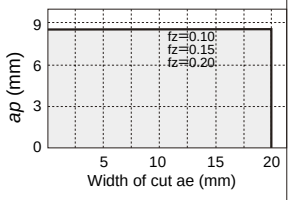
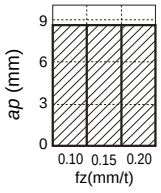
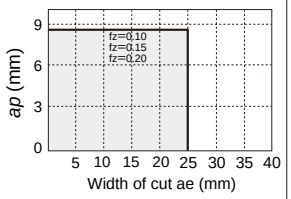
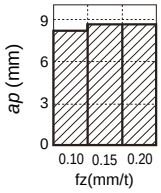
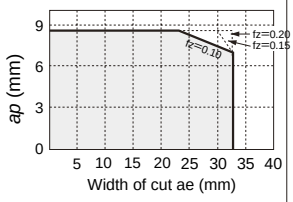
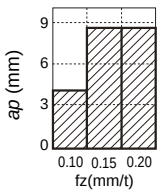
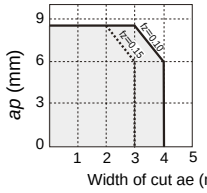
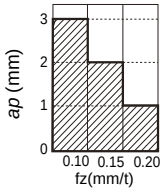
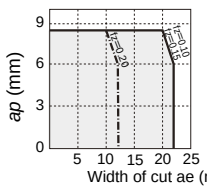
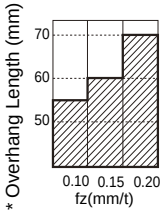
Description	No. of Insert	NDK□ 09 type		
		Without notch	With notch N1	With notch N2
MEA 30-S25 32-S25 (-...)	4	-	2	2
32-S32-W-5T 40-S32	5	-	3	2
40-S32-110W-6T 50-S32	6	-	3	3
63-S32 80-S32	8	-	4	4
MEA 10-S10 (-...) 12-S12-W	1	1	-	-
16-S16 (-...) 20-S20-Z2	2	-	1	1
20-S20 (-...) 25-S25	3	-	2	1
25-S25-W-4T 32-S32	4	-	2	2
MEA 20-S20-130(W)	2	-	1	1
25-S25-140(W)	3	-	2	1
32-S25-160(W) 40-S32-200(W)	4	-	2	2

Table 2

Description	No. of Insert	NDK□ 15 type	
		Without notch	With notch N3
MEB 25-S20 (-...) 25-S25 (-...)	2	1	1
32-S25 (-...) 32-S32 (-...)	3	2	1
40-S32 (-...) 50-S32	4	2	2
63-S32	5	3	2
80-S32	6	3	3

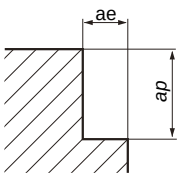
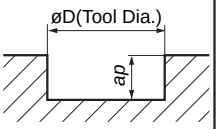
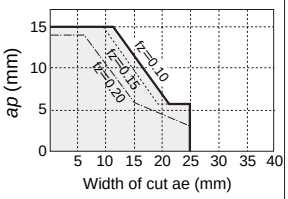
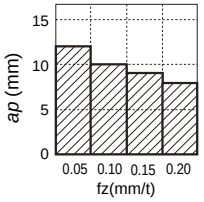
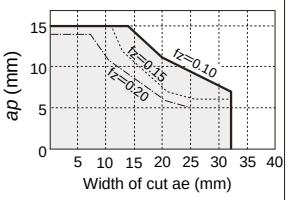
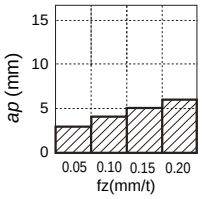
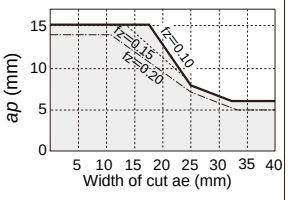
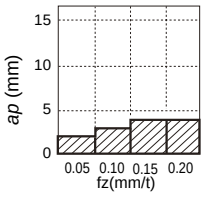
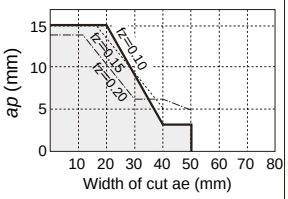
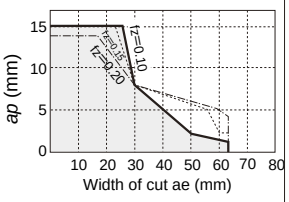
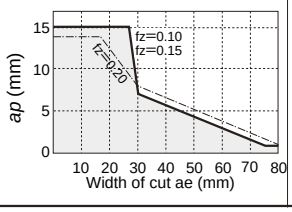
◆ Cutting Performance of MEA

[CUTTING CONDITIONS] CUTTING SPEED: Vc=100m/min,
OVERHANG LENGTH: same as ℓ in the dimension table
INSERT: NDKT090304ER-V (PR660),
COOLANT: No

Workpiece Material	Shouldering	Slotting
C50 (S50C) (Overhang Length: 20mm)		
Description		
MEA12-S10 (Overhang Length: 20mm)		
MEA16-S10 (Overhang Length: 23mm)		
MEA20-S16 (Overhang Length: 26mm)		
MEA25-S20 (Overhang Length: 29mm)		
MEA32-S25 (Overhang Length: 32mm)		
MEA20-S20-130 (Overhang Length: 60mm)		
MEA40-S32-200	 Holder overhang Length:120mm	

◆ Cutting Performance of MEB

[CUTTING CONDITIONS] CUTTING SPEED: Vc=100m/min,
OVERHANG LENGTH: same as ℓ in the dimension table
INSERT: NDKT150408ER-V (PR660),
COOLANT: No

Workpiece Material	Shouldering	Slotting
C50 (S50C) (Overhang Length: 20mm)		
Description		
MEB25-S20 (Overhang Length: 36mm)		
MEB32-S25 (Overhang Length: 40mm)		
MEB40-S32 (Overhang Length: 45mm)		
MEB50-S32 (Overhang Length: 45mm)		Not recommended for Slotting
MEB63-S32 (Overhang Length: 45mm)		Not recommended for Slotting
MEB80-S32 (Overhang Length: 45mm)		Not recommended for Slotting

* In this case only, ap is fixed at 3mm and overhang length is changed.

MEY



With Coolant Hole Standard (Weldon)



Standard (Straight)



Long Head (Straight)



Long Shank (Straight)

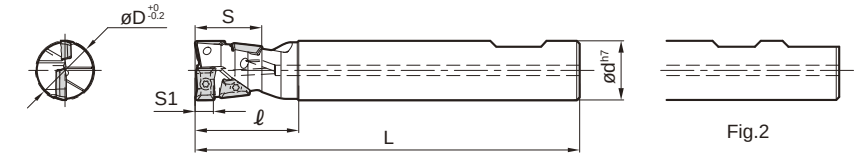


Fig.1

Fig.2

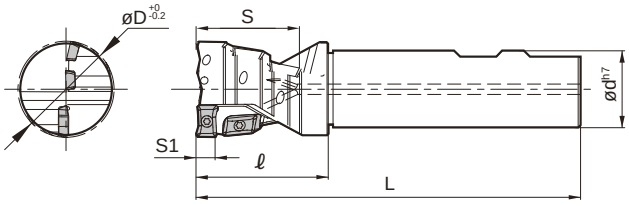


Fig.3

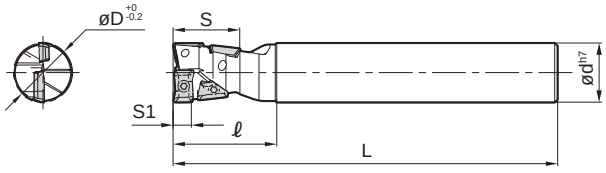


Fig.4

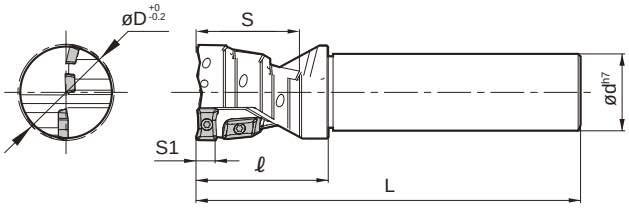


Fig.5

Toolholder Dimensions

Description			Std.	No. of Insert	No. of Flute	Dimension (mm)						Rake Angle (°)		Drawing	Spare Parts		
						øD	ød	L	ℓ	S	S1	A.R.	R.R.		Clamp Screw	Wrench	Anti-seize Compound
Weldon	MEY	16-S16-80W-H	●	4	2	16	16	80	31	19	4.5	+11°	-11°	Fig.1	SB-2040TRG	DTM-6	MP-1
		17-S16-80W-H	●			17											
		20-S20-85W-H	●			20	20	85	35	22	6	+13°	-9°		SB-2555TRG	DT-8	
		21-S20-85W-H	●			21											
		25-S25-95W-H	●			25	25	95	40	28	7.5		-11°	Fig.2	SB-3070TRG	DT-10	
		26-S25-95W-H	●			26											
		32-S32-110W-H	●			32	32	110	50	36	9.5		-9°		SB-4070TRG	DT-15	
		33-S32-110W-H	●			33											
		40-S32-130W-H	●	7		40		130	55	42	7.5		-11°	Fig.3	SB-3070TRG	DT-10	
		50-S42-140W-H	●			50	42	140	70	54	9.5		-9°		SB-4070TRG	DT-15	
Cylindrical	MEY	16-S16	●	4	2	16	16	120	31	19	4.5	+11°	-11°	Fig.4	SB-2040TRG	DTM-6	MP-1
		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.5	SB-3070TRG	DT-10	
		50-S42	●			50	42	170	70	54	9.5		-9°		SB-4070TRG	DT-15	
Cylindrical Long Head	MEY	16-S16-140H	●	4	2	16	16	140	51	19	4.5	+11°	-11°	Fig.4	SB-2040TRG	DTM-6	MP-1
		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	

• S1 shows the edge length of the complete 2-flute part.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholder Dimensions

Description			Std.	No. of Insert	No. of Flute	Dimension (mm) øD	ød	L	ℓ	S	S1	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound
Cylindrical Long Shank	MEY	16-S16-190	●	4	2	16	16	190	61	19	4.5	+11°	-11°	Fig.4	SB-2040TRG	DTM-6	MP-1
		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.5	SB-3070TRG	DT-10	
		50-S42-250	●			50	42	250	70	54	9.5		-9°		SB-4070TRG	DT-15	

• S1 shows the edge length of the complete 2-flute part.

Applicable Inserts (Quantity of Inserts)

Description		Applicable Inserts ➔ M18 Side Edge Insert		Center Edge Insert	
					
MEY	16-S16(-...)	JOMT08T208ER-D	3 pcs	GOMT08T208ER-D	1 pc
	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 pcs	GOMT13T308ER-D	
	50-S42(-...)	JOMT160408ER-D		GOMT160408ER-D	

Recommended Cutting Conditions

Workpiece Material	fz (mm/t) Drilling	Shouldering Slotting	Recommended Insert Grade (Cutting Speed Vc : m/min) Cermet TN60	TN100M	TC60	PVD Coated Carbide PR630	PR730	PR830			PR660	PR905	Carbide PW30	KW10
Stainless Steel	0.08~0.12	0.05~0.15						★ 100~180						
Carbon Steel	0.08~0.15	0.05~0.25						★ 120~200						
Alloy Steel	0.08~0.15	0.05~0.25						★ 100~180						
Mold Steel	0.08~0.12	0.05~0.15						★ 80~150						
Cast Iron	0.05~0.20	0.05~0.25										★ 100~200		

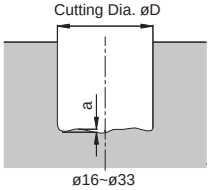
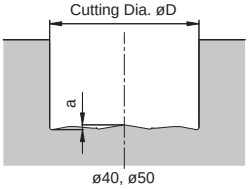
★ : 1st Recommendation

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 right list for maximum hole depth.

Cutting Dia. (øD)	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	 ø16~ø33
ø20, ø21	0.64	
ø25, ø26	0.85	
ø32, ø33	1.12	
ø40	1.54	 ø40, ø50
ø50	1.65	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

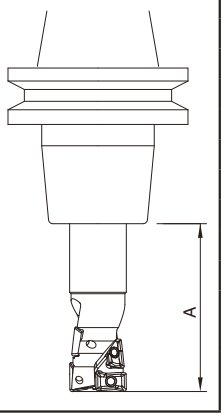
Multi-Function Machining Endmill

Cutting Performance of MEY

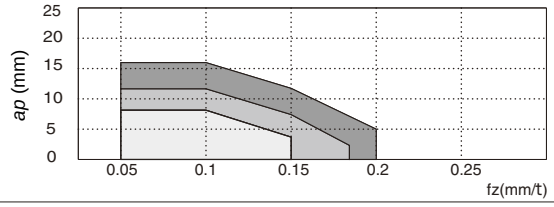
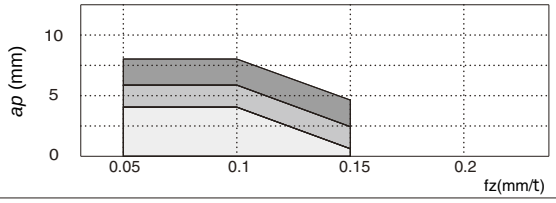
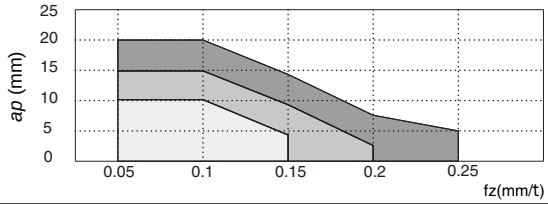
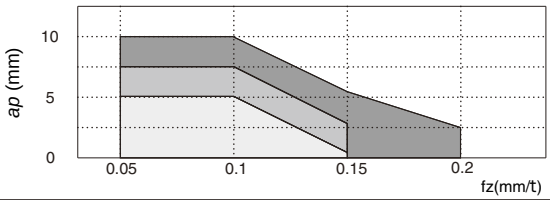
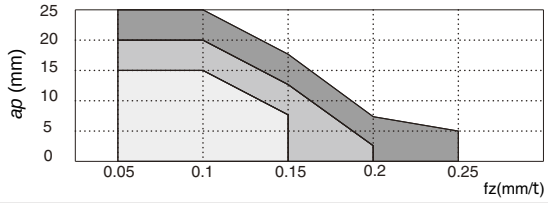
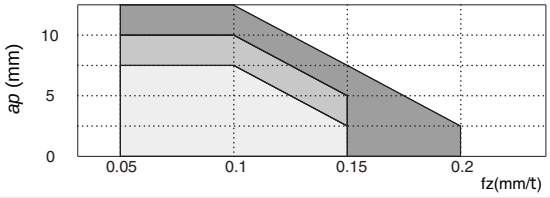
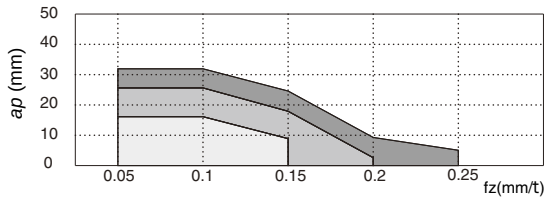
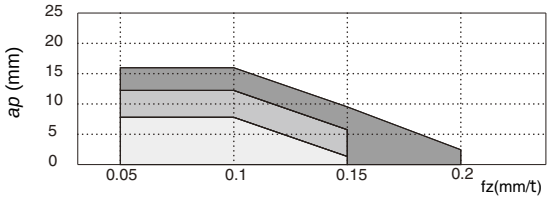
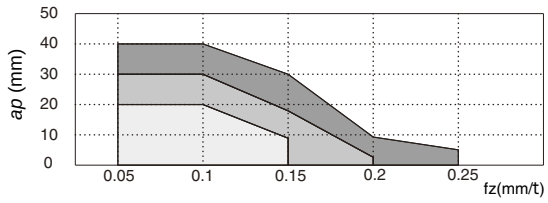
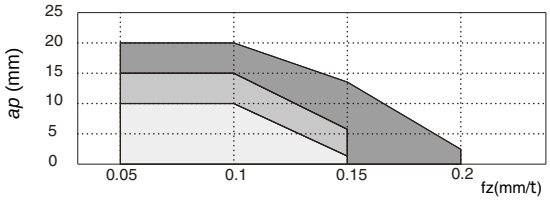
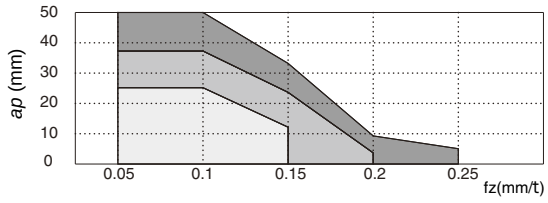
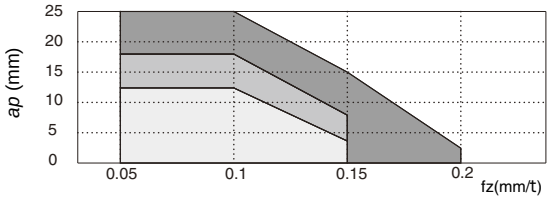
[Workpiece Material: C50 (S50C)]

Cutting Dia.	Description	Overhang Length A (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



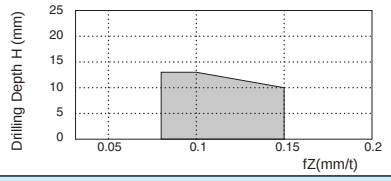
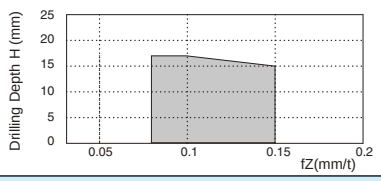
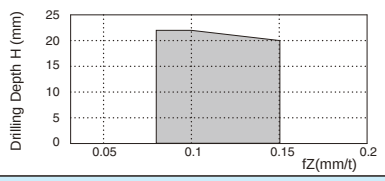
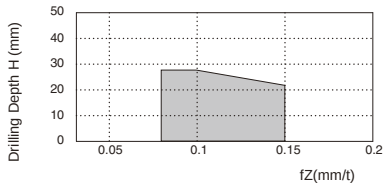
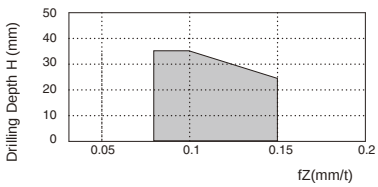
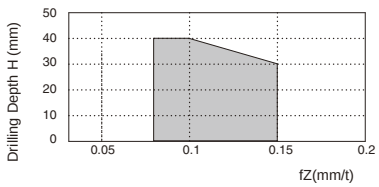
When using in [ ] dimension,
be careful that the chucking length to the shank may get too short.

Description	■ Shouldering (Cutting Width ae =øD/2) Note) ▭ Part ae=øD/4	■ Slotting ■ Ramping • Helical Milling
MEY16-S16 MEY17-S16		
MEY20-S20 MEY21-S20		
MEY25-S25 MEY26-S25		
MEY32-S32 MEY33-S32		
MEY40-S32		
MEY50-S42		

M

Milling

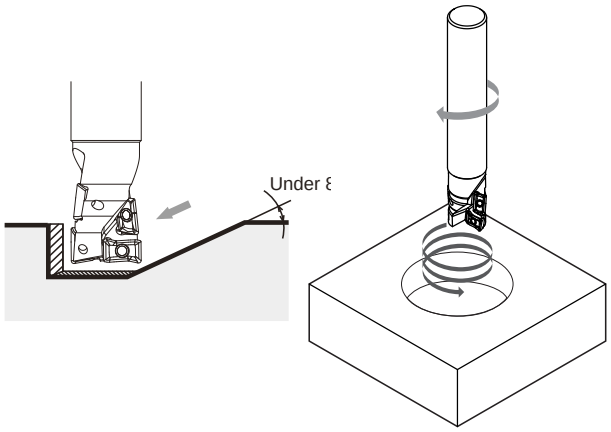
Drilling Depth [Standard / Long Head / Long Shank: C50 (S50C)]

MEY16-S16 MEY17-S16	MEY20-S20 MEY21-S20	MEY25-S25 MEY26-S25
		
MEY32-S32 MEY33-S32	**MEY40-S32**	**MEY50-S42**
		

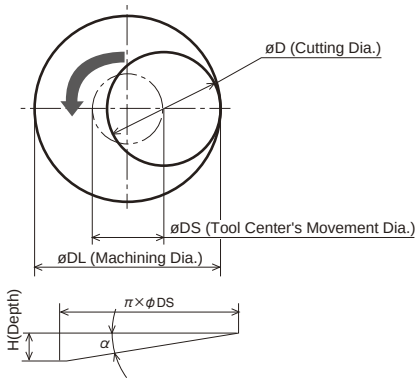
How to Use MEY Effectively

Ramping / Helical Milling

- Ramping angle is recommended to be under 8°.
- Plunge depth per revolution of helical milling should be set under 1/2 of the tool diameter.
  Use compressed air during machining.



■ Helical Milling Factors

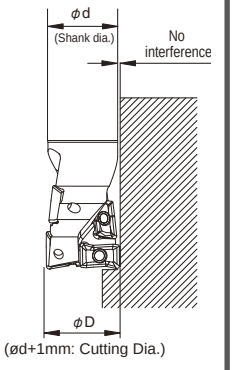


How to Find "øDS"
øDS=øDL-øD

How to Find "h"
H=×øDS×tanα (α should be under 8°)

Endmilling

- Tools with 1mm larger cutting diameter than shank diameter are available.
  High wall shouldering is possible
- Lineup



MEZ-G



Standard (Straight)



Standard (Weldon)



Long Head (Straight)



Long Shank (Straight)



With Coolant Hole (Weldon)

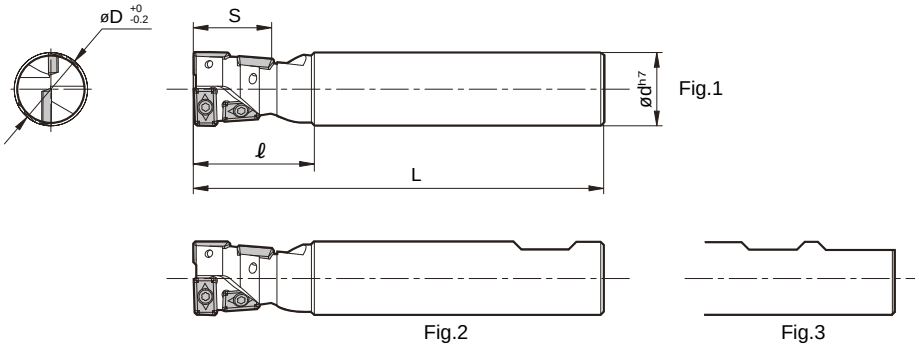


Fig.1

Fig.2

Fig.3

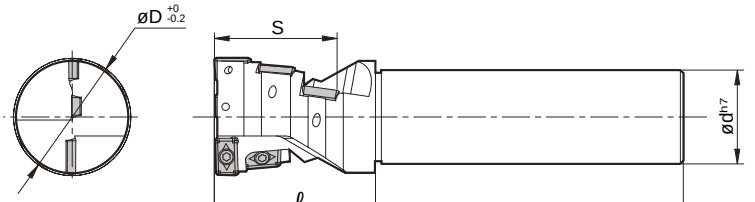


Fig.4

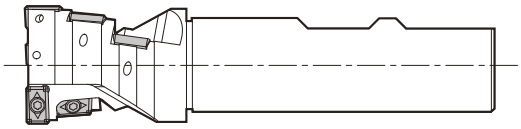


Fig.5

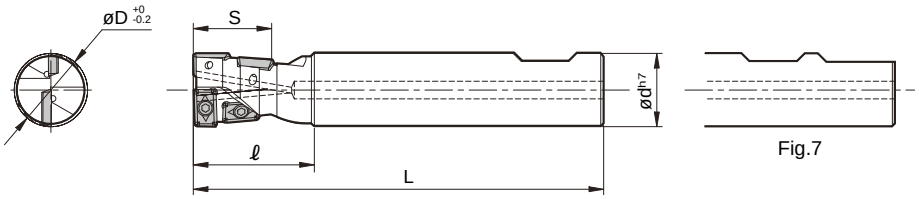


Fig.6

Fig.7

Toolholder Dimensions

Description		Std.	No. of Insert	No. of Flute	Dimension (mm) øD	ød	L	ℓ	S	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts: Clamp Screw	Spare Parts: Wrench
Cylindrical	MEZ 16-S16G	●	4	2	16	16	120	31	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6
	20-S20G	●			20	20	130	33	21		-4°		SB-2555TRG	DT-8
	25-S25G	●			25	25	140	40	25		-5°		SB-3070TRG	DT-10
	32-S32G	●			32	32	150	50	33		-2°		SB-4070TRG	DT-15
	40-S32G	●	7		39	32	160	55	39		-3°	Fig.4	SB-3070TRG	DT-10
	50-S42G	●			49	42	170	70	51		-2°		SB-4070TRG	DT-15
Weldon	MEZ 16-S16-120GW	●	4	2	16	16	120	31	16	+9°	-5°	Fig.2	SB-2040TRG	DTM-6
	20-S20-130GW	●			20	20	130	33	21		-4°		SB-2555TRG	DT-8
	25-S25-140GW	●			25	25	140	40	25		-5°	Fig.3	SB-3070TRG	DT-10
	32-S32-150GW	●			32	32	150	50	33		-2°		SB-4070TRG	DT-15
	40-S32-160GW	●	7		39	32	160	55	39		-3°	Fig.5	SB-3070TRG	DT-10
	50-S40-170GW	●			49	40	170	70	51		-2°		SB-4070TRG	DT-15
Cylindrical Long Head	MEZ 16-S16-140HG	●	4	2	16	16	140	51	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6
	20-S20-150HG	●			20	20	150	53	21		-4°		SB-2555TRG	DT-8
	25-S25-170HG	●			25	25	170	70	25		-5°		SB-3070TRG	DT-10
	32-S32-180HG	●			32	32	180	80	33		-2°		SB-4070TRG	DT-15
Cylindrical Long Shank	MEZ 16-S16-190G	●	4	2	16	16	190	61	16	+9°	-5°	Fig.1	SB-2040TRG	DTM-6
	20-S20-200G	●			20	20	200	63	21		-4°		SB-2555TRG	DT-8
	25-S25-220G	●			25	25	220	80	25		-5°		SB-3070TRG	DT-10
	32-S32-230G	●			32	32	230	90	33		-2°		SB-4070TRG	DT-15
	40-S32-240G	●	7		39	32	240	55	39		-3°	Fig.4	SB-3070TRG	DT-10
	50-S42-250G	●			49	42	250	70	51		-2°		SB-4070TRG	DT-15
Weldon With Coolant Hole	MEZ 16-S16-80GW-H	●	4	2	16	16	80	31	16	+9°	-5°	Fig.6	SB-2040TRG	DTM-6
	20-S20-85GW-H	●			20	20	85	33	21		-4°		SB-2555TRG	DT-8
	25-S25-95GW-H	●			25	25	95	40	25		-5°	Fig.7	SB-3070TRG	DT-10
	32-S32-110GW-H	●			32	32	110	50	33		-2°		SB-4070TRG	DT-15

Applicable Inserts

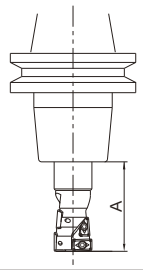
Description		Applicable Inserts → M19 Tough Edge	
MEZ	16-S16(-...)	NDMT 080208ER-DH	NDMT 080208ER-D
	20-S20(-...)	NDMT 10T208ER-DH	NDMT 10T208ER-D
	25-S25(-...)	NEMT 120308ER-DH	NEMT 120308ER-D
	32-S32(-...)	NEMT 16T308ER-DH	NEMT 16T308ER-D
	40-S32(-...)	NEMT 120308ER-DH	NEMT 120308ER-D
	50-S42(-...)	NEMT 16T308ER-DH	NEMT 16T308ER-D

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

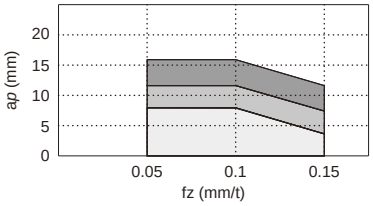
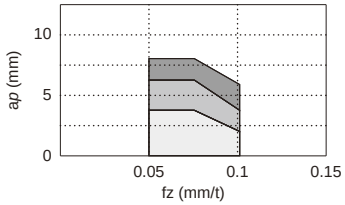
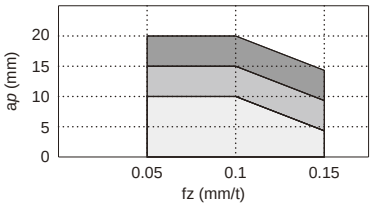
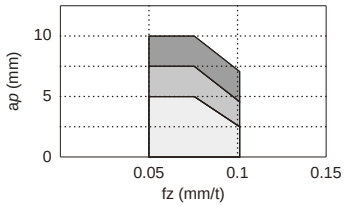
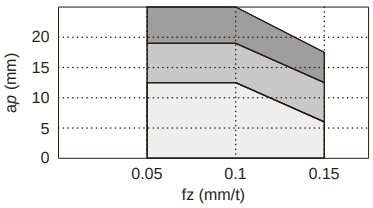
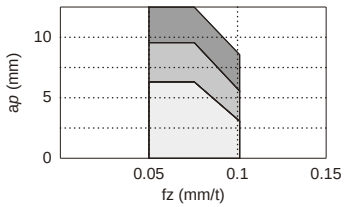
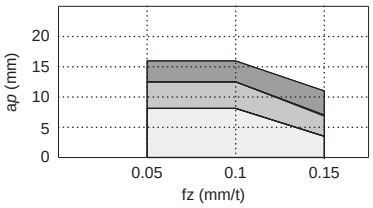
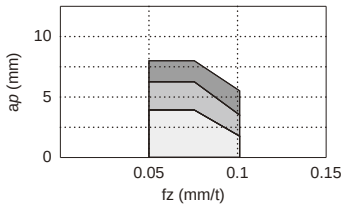
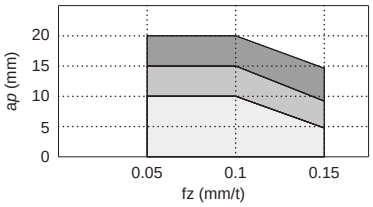
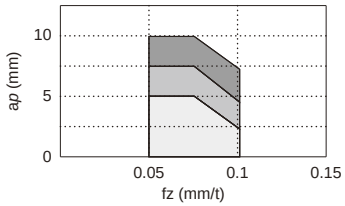
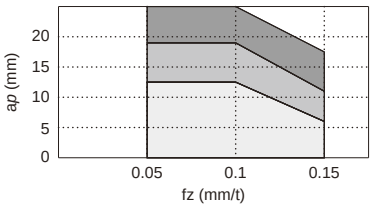
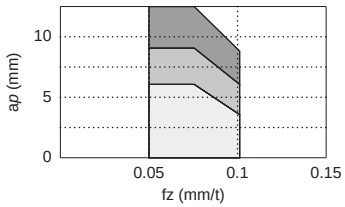
Multi-Function Machining Endmill

◆ Cutting Performance of Silver Drill Mill / Drill Mill

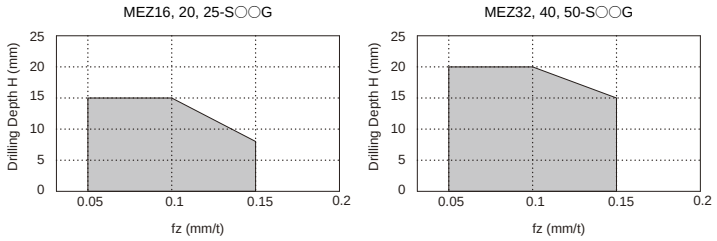
[Workpiece Material: C50 (S50C)]

Cutting Dia.	Description	Overhang Length: A (mm)			Cutting Dia.	Description	Overhang Length: A (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)	ø40	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)	ø50	MEZ50-S42G	70	[~100]	[~130]	
	MEZ25-S25-170HG	-	70	[~100]		-	-	-	-	
	MEZ25-S25-220G	-	80	~100		MEZ50-S42-250G	70	~100	~130	

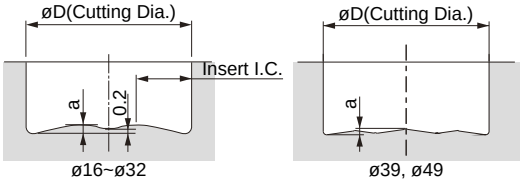
• When using in [ ] dimension, be careful that the chucking length to the shank may get too short.

Description	■ Shouldering (Cutting Width ae =øD/2) ▭ Part ae=øD/4	■ Slotting ■ Ramping • Helical Milling
MEZ16-S16G MWZ16 -S16-140HG MEZ16 -S16-190G		
MEZ20-S20G MEZ20 -S20-150HG MEZ20- S20-200G		
MEZ25-S25G MEZ25 -S25-170HG MEZ25 -S25-220G		
MEZ32-S32G MEZ32 -S32-180HG MEZ32 -S32-230G		
MEZ40-S32G MEZ40 -S32-240G		
MEZ50-S42G MEZ50 -S42-250G		

■ Drilling Depth (Standard / Long Head / Long Shank)



Shape of drilled hole (ø16~ø49)

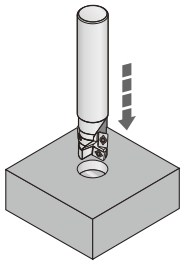


Cutting Dia.	ø16	ø20	ø25	ø32	ø39	ø49
a (mm)	0.30	0.33	0.38	0.45	0.68	0.74

◆ How to use the Silver Drill Mill (MEZ-G) and Drill Mill (MEZ) effectively

Drilling

- Step feeding is recommended for good chip control (Depth approx. 1mm).
- Drill depth should be under 0.5D. (D: Drilling Dia.) Use compressed air during drilling.
- PR660 is recommended for heavy drilling.



Endmilling

- Tough edge insert is recommended for high load endmilling. (High feed rate, large a*p*)
  Use a low cutting force insert to prevent chattering.



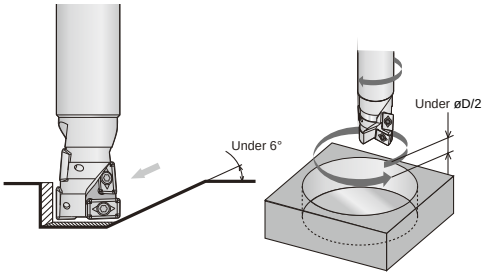
N(D / E)MT...ER-DH
(Tough Edge)



N(D / E)MT...ER-D
(Low Cutting Force)

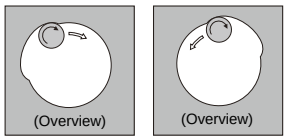
Ramping•Helical Milling

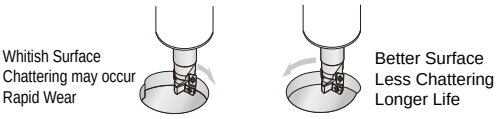
- Ramping angle is recommended to be under 6°.
- Plunge depth per revolution when helical milling should be under 1/2D. Use compressed air when drilling.
  Use compressed air during drilling.



Others

- Down-Cut milling is recommended for the improvement of tool life and surface finish.
- Compressed air is recommended.





◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grade (Cutting Speed Vc : m/min)												
			Cermet			PVD Coated Carbide								Carbide	
	Drilling	Shouldering Slotting	TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.12	0.05~0.15		☆ 120~200		☆ 120~200	☆ 120~200				★ 100~180			
Carbon Steel	0.05~0.2	0.05~0.2		★ 120~200		☆ 120~200	★ 120~200				☆ 100~180			
Alloy Steel	0.05~0.2	0.05~0.2		★ 100~180		☆ 100~180	★ 100~180				☆ 80~150			
Mold Steel	0.05~0.12	0.05~0.15		★ 100~180		☆ 80~150	★ 80~150				☆ 60~130			
Cast Iron	0.05~0.2	0.05~0.2										★ 100~180		☆ 80~150
Non-ferrous Metals	0.05~0.2	0.05~0.2												★ 100~300

- 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.
- PR660 is recommended for heavy drilling.

★ : 1st Recommendation ☆ : 2nd Recommendation

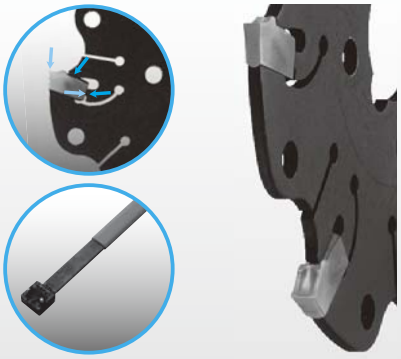
Slot Mill MST



Full range from 1.6mm to 23.3mm in 3 types

Slot Mill MSTA (Slot width 1.6, 2.2, 3.0, 4.0mm)

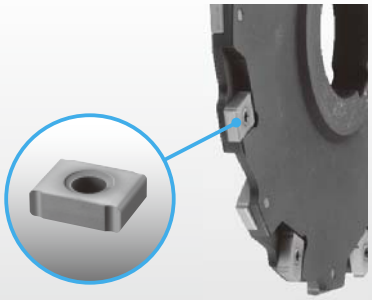
- Self-clamping type Slot Mill
  MSTA Slot Mills have simple self-clamping system to allow for easy attachment by just installing the insert.
- High Rigidity Clamping System
  Toolholders achieve high operability through the stopper highly rigid clamping system and achieve stable slotting by maintaining an accurate edge position.
- Double-Prism Clamping System
  High replacement precision due to the clamping system with two prisms.
- 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
  MSTB Slot Mills are a very simple form used to screw clamp inserts.
- Inserts have four edge and are, therefore, cost-effective
  * Inserts for 6mm / 7mm slotting width has two 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 1mm in 0.5mm increments.

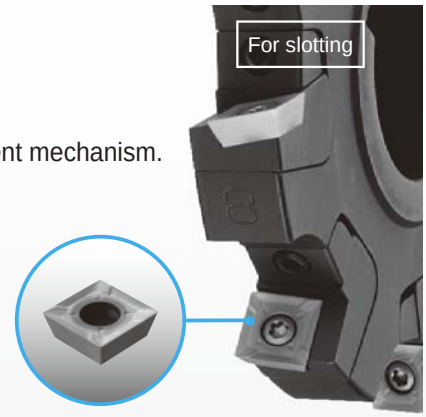


Full lineup of MST Series Slot Mills

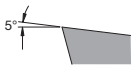
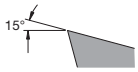
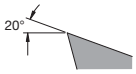
Type	Applicable Inserts	Features	Slot Width (mm)													
			1.6	2.2	3	4	6	8	10	12	14	16	18	20	22	24
MSTA	SLT..	1.6~4mm fixed	●	●	●	●										
MSTB	LNEU12..	6~13mm semi-adjustable					←			→						
							* Adjustable in 0.5mm increments between 6mm and 13mm with the combination of inserts									
MSTC	SP..10T3..	14~18mm full-adjustable									←		→			
											* Adjustable between 14mm and 18mm					
	SD..1204...	18~23.3mm full-adjustable												←		→
														* Adjustable between 18mm and 23.3mm		

Slot Mill MSTC (Slot width 14.0~23.3mm)

- Lay-down type / fully 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 can be available by unique cam style adjustment mechanism.
- Four-edges inserts that are cost-effective.
- Wide range corner R repertories are suitable for various work.
- By wiper edge insert, excellent surface finish can be expected.
- By abundant insert geometry and grades, applicable for various type of workpiece machining.



Feature of Insert Grades

Insert			
Symbol	SB	SD	SE
Rake Angle			
Shape			

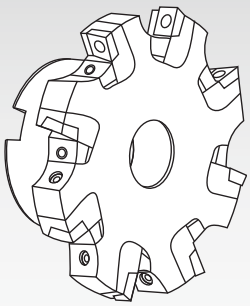
CA0835
- TiN+TiCN+Al_2O_3 based CVD Coated Carbide
- For carbon steel, alloy steel, stainless steel and nodular cast iron
- For middle to high speed cutting

PR0725
- TiN+TiCN+TiN based PVD Multi-layered Coating
- For carbon steel, alloy steel, stainless steel, heat resistant alloy and nodular cast iron
- For middle speed cutting

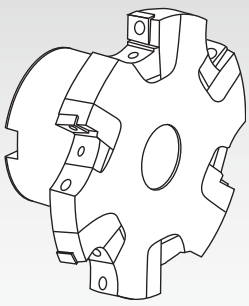
PR0110
- TiB2 based PVD Coated Carbide
- For Non-ferrous Metal such as Aluminum Alloy (Si<10%) and Titanium Alloy
- For high speed cutting

With Boss

Right-Hand



Left-hand



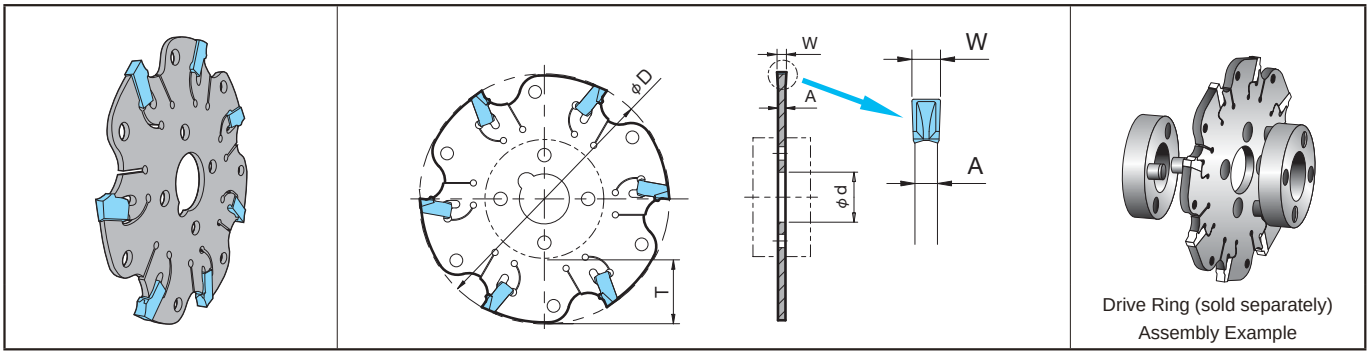


Identification System

MSTA ○○○ **N** ○○○-○○ **T**

MSTA	○○○	N	○○○-○○	T
Slot Mill with self-clamping system	Cutting Dia.	Neutral	Edge Width	No. of Insert

MSTA (Metric)



Drive Ring (sold separately) Assembly Example

Toolholder Dimensions

Description		Std.	Edge Width W (mm)	Slot Depth T (mm)	No of Insert	Dimension (mm) øD	Dimension (mm) ød (H7)	Dimension (mm) A	Weight (kg)	Applicable Inserts See page M98	Max. Revolution (min⁻¹)	Parts Wrench	Recommended Cutting Conditions	Applicable Arbor
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 →M99	See page M99	See page M119
	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	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	●	3.0	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	●	4.0	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 type slot mill to use. Drive ring is sold per single quantity.
Please purchase two drive rings per one MSTA type 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 separately.

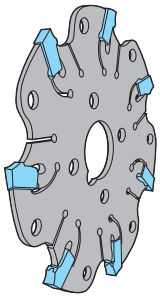
Drive Ring (For Metric)

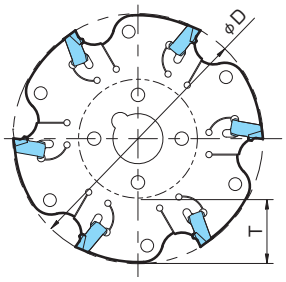
Shape	Description	Std.	Dimension (mm) ød	øD	A1	a	ød1	Drawing	Applicable Toolholders
Fig.1	DR16-32A	●	16	32	8	4.1	3	Fig.2	MSTA 63N16-5T, 63N22-7T
Fig.2	DR16-32B	●					4	Fig.1	MSTA 63N30-4T, 63N40-4T
Fig.3	DR16-38	●		38				Fig.3	MSTA 80N○○-○T
	DR22-46	●	22	46	10	6.1	5		MSTA 100N○○-○T
	DR32-55	●	32	55		8.1	6		MSTA 125N○○-○○T
	DR40-80	●	40	80	12	10.1	12		MSTA 160N○○-○○T

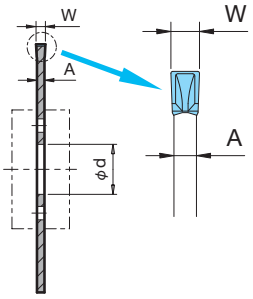
Wrenches and drive rings are sold in 1 piece per 1 box.

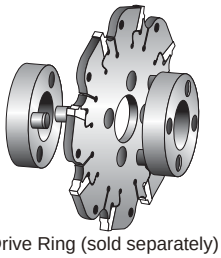
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MSTA (inch spec)









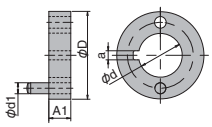
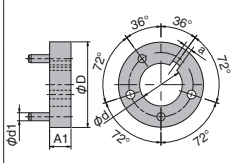
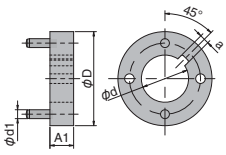
Drive Ring (sold separately)
Assembly Example

Toolholder Dimensions

Description		Std.	Edge Width W (inch)	Slot Depth T (inch)	Number of Flutes	Dimension (inch) øD	Dimension (inch) ød (H7)	Dimension (inch) A	Weight (kg)	Applicable Inserts See page M98	Max. Revolution (min^{-1})	Parts Wrench	Recommended Cutting Conditions	Applicable Arbor
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 See →M99	See page M99	See page M119
	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)	.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 (3.0mm)	.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 (4.0mm)	.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 type slot mill to use. Drive ring is sold per single quantity.
Please purchase two drive rings per one MSTA type 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 separately.

Drive Ring (For Inch spec)

Shape	Description	Std.	Dimensions (inch) ød	øD	A1	a	ød1	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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Wrenches and drive rings are sold in 1 piece per 1 box.

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	2.2mm

③ Corner R(rε)

Symbol	Corner-R
15	0.15mm
20	0.2mm

④ Cutting Edge Spec.

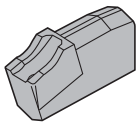
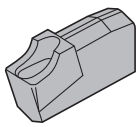
Symbol	Cutting Edge Spec.
S	Chamfer + R-honed

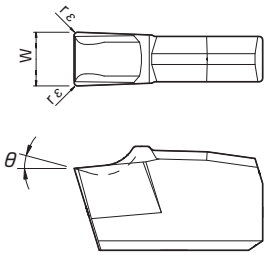
⑤ Chipbreaker Symbol

Symbol	Rake Angle
KB	5°
KD	15°

SLT

Classification of usage			CVD Coated Carbide	PVD Coated Carbide	Ref. Page for Applicable Toolholder
●: 1st Choice ○: 2nd Choice	P	Carbon Steel / Alloy Steel	●	○	
	M	Stainless Steel	○	●	
	K	Cast Iron	○		
	N	Non-ferrous Metals			
	S	Heat-resistant alloy		●	
		Titanium Alloy			

Insert	Description		Dimension (mm) W	Dimension (mm) rε	Rake Angle (°) θ	CVD Coated Carbide CA0835	PVD Coated Carbide PR0735	Ref. Page for Applicable Toolholder
	SLT	16-15SKB	1.6 +0 -0.1	0.15	5°	●	●	M96 M97
		22-20SKB	2.2 +0.08 -0.05	0.2		●	●	
		30-20SKB	3.05 +0.15 -0			●	●	
		40-20SKB	4.05 +0.15 -0			●	●	
 Low resistant Chipbreaker	SLT	16-15SKD	1.6 +0 -0.1	0.15	15°	●	●	
		22-20SKD	2.2 +0.08 -0.05	0.2		●	●	
		30-20SKD	3.05 +0.15 -0			●	●	
		40-20SKD	4.05 +0.15 -0			●	●	



Chipbreaker selection

KB Chipbreaker … General use chipbreaker for Steel and Cast Iron
KD Chipbreaker … Low cutting force chipbreaker for Stainless Steel

Feature of Insert Grades

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 cutting

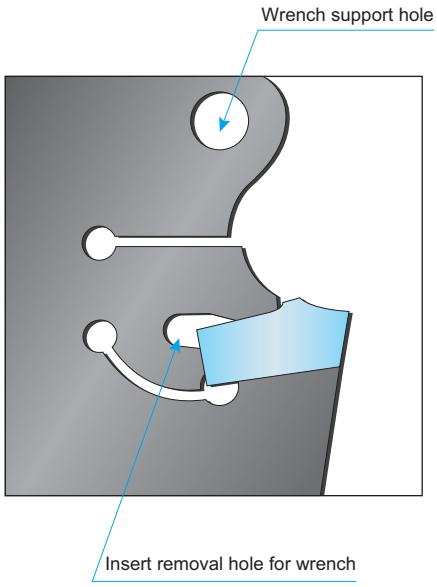
PR0735

- TiN based PVD Coated Carbide
- For Stainless Steel, Heat-Resistant Alloy, etc
- For low to middle speed cutting

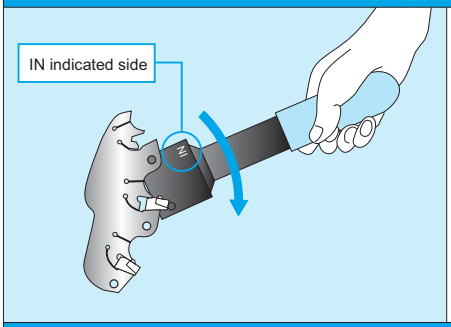
Inserts are sold in 10 piece boxes.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Set up

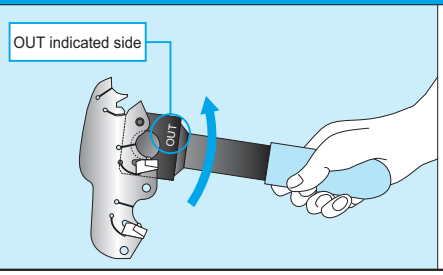


How to attach inserts



1. Put insert inside the slot mill.
2. Insert one of the pin 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



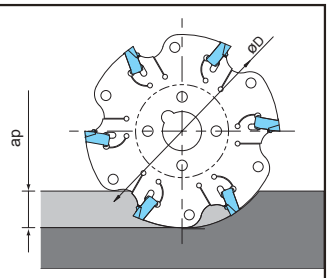
1. Insert one of the pin on the wrench (on OUT indicated side) into the wrench support hole, and insert other pin into the hole on releasing wrench.
2. Insert can be uninstalled by rotating the wrench counter clock wise. (A magnet is installed out side)

Note) Use appropriate wrench for set up.

Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grade (Cutting Speed Vc: m/min)		fz (mm/t)				Remarks
			CVD Coated Carbide	PVD Coated Carbide	Edge Width (mm)				
			CA0835	**PR0735**	1.6	2.2	3.0	4.0	
Low Carbon Steel	St42-2 C10E~C25	125	250-310	200-250	0.03-0.12	0.04-0.14	0.06-0.18	0.08-0.20	Coolant
Carbon Steel	C30~C60 (Annealed)	190	160-190	130-160	0.03-0.12	0.04-0.14	0.06-0.18	0.08-0.20	
	C30~C60 (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	34CrMo4 (Annealed)	180	140-180	110-150	0.03-0.12	0.04-0.14	0.06-0.18	0.08-0.20	
	34CrMo4 (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 Carbide	X40CrMoV51, etc.	280	100-140	80-120	0.03-0.10	0.04-0.12	0.06-0.16	0.08-0.18	
Stainless Steel	X5CrNi1810, etc.	220	150-190	80-120	0.03-0.10	0.04-0.12	0.06-0.16	0.08-0.18	
	X10Cr13, etc.	300	140-180	60-80	0.03-0.10	0.04-0.12	0.06-0.16	0.08-0.18	
Gray Cast Iron	GG25~GG35	260	160-200	-	0.03-0.12	0.04-0.14	0.06-0.18	0.08-0.20	Dry
Nodular Cast Iron	GGG40~GGG50	160	130-160	-	0.03-0.12	0.04-0.14	0.06-0.18	0.08-0.20	
	GGG60~GGG80	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 under 1/10 of Cutter Dia.(øD), it is possible to increase feed per tooth(fz) 40%.



Identification System

● MSTB Slot Mill

Metric

MSTB ○○○ A N ○○ ○○ - ○ T

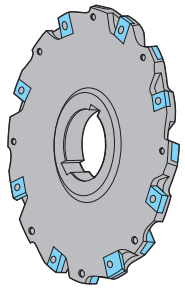
- MSTB: Slot Mill with Up-right Insert
- ○○○: Cutting Dia. (mm)
- A: Without Boss / S: With Boss
- N: Neutral
- ○○: Edge Width (mm)
- ○○: No. of Edge Line
- T

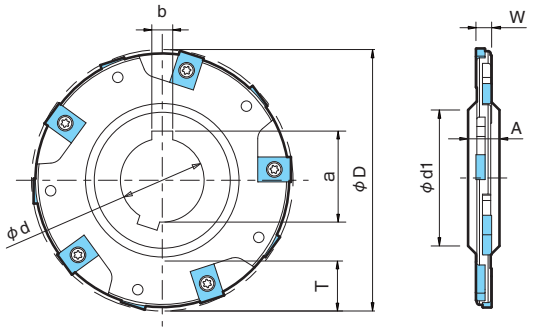
Inch spec

MSTB ○○○ A N ○○○ - ○ T

- MSTB: Slot Mill with Up-right Insert
- ○○○: Cutting Dia. (inch)
- A: Without Boss
- N: Neutral
- ○○○: Min. Edge Width (inch)
- ○: No. of Edge Line
- 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)

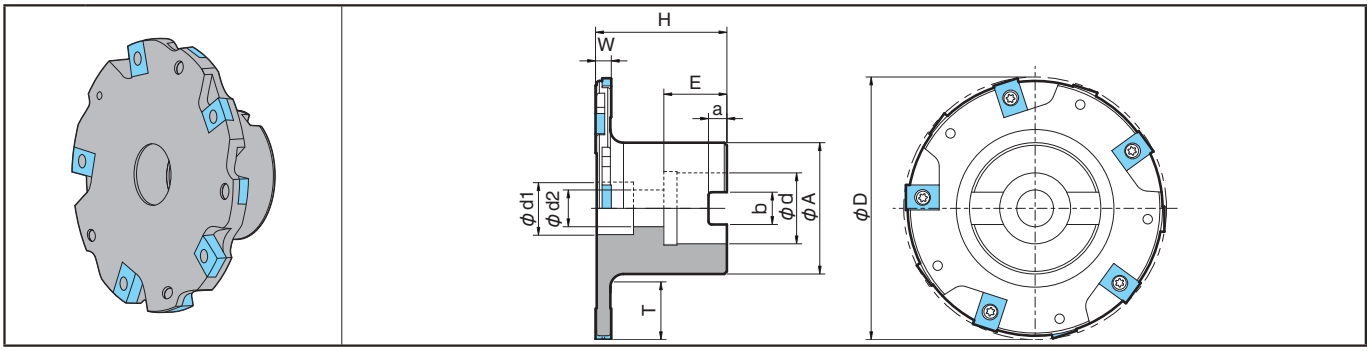
Description	Std.	Edge Width (mm) W (min)	Edge Width (mm) W (max)	Slot Depth T (mm)	No. of Insert	No. of Edge Line	Dimension (mm) øD	Dimension (mm) ød (H7)	Dimension (mm) ød1	Dimension (mm) A	Dimension (mm) a	Dimension (mm) b	Weight (kg)	Max. Revolution (min^{-1})
MSTB 80AN0607-4T	●	6	7	15	8	4	80	27	44	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	6,450
MSTB 125AN1011-4T	●	10	11	30	12	4	125						0.9	7,390
160AN1011-5T	●			47.5	15	5	160						1.6	6,450
MSTB 160AN1213-5T	●	12	13	48.5	15	5	160						1.6	6,450

● Toolholder Dimensions (Inch spec)

Description	Std.	Edge Width (inch) W (min)	Edge Width (inch) W (max)	Slot Depth T (inch)	No. of Insert	No. of Edge Line	Dimension (inch) øD	Dimension (inch) ød (H7)	Dimension (inch) ød1	Dimension (inch) A	Dimension (inch) a	Dimension (inch) b	Weight (kg)	Max. Revolution (min^{-1})
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 R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

With Boss



● Toolholder Dimensions (Metric)

Description		Std.	Edge Width (mm)		Slot Depth	No. of Insert	No. of Edge Line	Dimension (mm)									Weight (kg)	Max. Revolution (min^{-1})
			W (min)	W (max)	T (mm)			øD	ød (H7)	øA	H (min)	E	a	b	ød1	ød2		
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) H(min) dimension shows in case of minimum of edge width.

Spare Parts and Applicable Inserts

● Spare Parts

Description			Spare Parts				Applicable Inserts	Recommended Cutting Conditions	Applicable Arbor
			Clamp Screw	Wrench	Anti-seize Compound	Arbor Clamp Screw			
									
Metric	Without Boss	MSTB ○○○AN0607-○T	SE-40050TR	TT-15L	MP-1	-	See page **LN12... M102, M103**	See page **M104**	See page **M119**
		○○○AN0809-○T	SE-40068TR						
		○○○AN1011-○T							
		160AN1213-5T	SE-40090TR						
	With Boss	MSTB 80SN0607-4T	SE-40050TR			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-15L	MP-1	-			
		○○○○AN312-○T	SE-40068TR						
		○○○○AN375-○T							
		○○○○AN500-○T	SE-40090TR						


Coat anti-seize compound (MP-1) thinly on clamp screw when insert is fixed.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

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

② Edge Width

Symbol	Edge Width
35	3.5mm
40	4.0mm

③ Corner R(rε)

Symbol	Corner-R
03	0.3mm
04	0.4mm

④ Edge Prep.

Symbol	Cutting Edge Spec.
S	Chamfer + R-honed

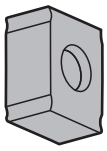
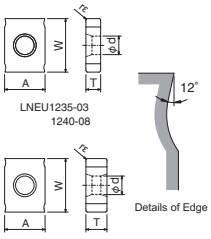
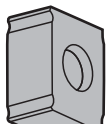
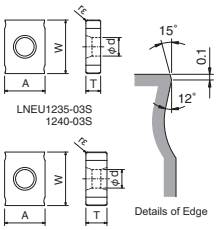
LN

(mm)

Description	W	A	ød
LENU12	12.7	9.6	4.4

Classification of usage
● : 1st Choice
○ : 2nd Choice

P	Carbon Steel / Alloy Steel	●
M	Stainless Steel	●
K	Cast Iron	○
N	Non-ferrous Metal	
S	Heat-resistant alloy	●
	Titanium Alloy	○

Insert		Description		No. of Edge	Dimension (mm) T	Dimension (mm) rε	PVD Coated Carbide PR0725	Applicable Clamp Screw	Ref. Page for Toolholder	Ref. Page for Recommended Cutting Conditions
 Honed		LNEU	1235-03	2	3.5	0.3	●	SE-40050TR	M100 M101	M104
			1240-08	2	4.0	0.8	●	SE-40055TR		
			1245-04	4	4.5	0.4	●	SE-40068TR		
			1245-08			0.8	●			
			1250-04	4	5.0	0.4	●	SE-40080TR		
			1250-08			0.8	●			
			1255-04	4	5.5	0.4	●	SE-40090TR		
			1255-08			0.8	●			
			1260-04	4	6.0	0.4	●	SE-40100TR		
 Tough Edge		LNEU	1235-03S	2	3.5	0.3	●	SE-40050TR		
			1240-03S	2	4.0	0.3	●	SE-40055TR		
			1245-04S	4	4.5	0.4	●	SE-40068TR		
			1245-08S			0.8	●			
			1250-04S	4	5.0	0.4	●	SE-40080TR		
			1250-08S			0.8				

Note) 1. Please select the applicable clamp screw depending on each insert description.
2. See **M107** for insert description and applicable clamp screw depending on edge width.

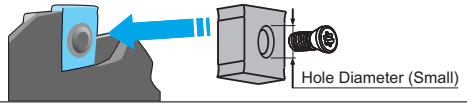
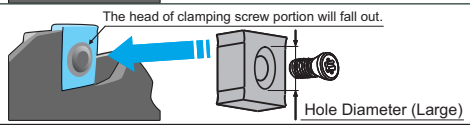
Feature of Insert Grades

● PR0725

- TiN+TiCN+TiN based PVD Multi-layer Coating
- For carbon steel, alloy steel, stainless steel, heat resistant alloy and nodular cast iron
- For middle speed cutting

Precautions when installing 2-edge type inserts (LNEU1235•• / LNEU1240••)

Insert LNEU1235・・/ LNEU1240・・(MSTB..0607 / MSTB..250) Please be sure for clamping screw attachment direction for 2-edge type.

Attach Direction		Attach Status
○ OK	Attach clamping screw from small hole side.	
× Wrong	Attach clamping screw from large hole side. ⬇ The head of clamping screw portion will fall out.	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

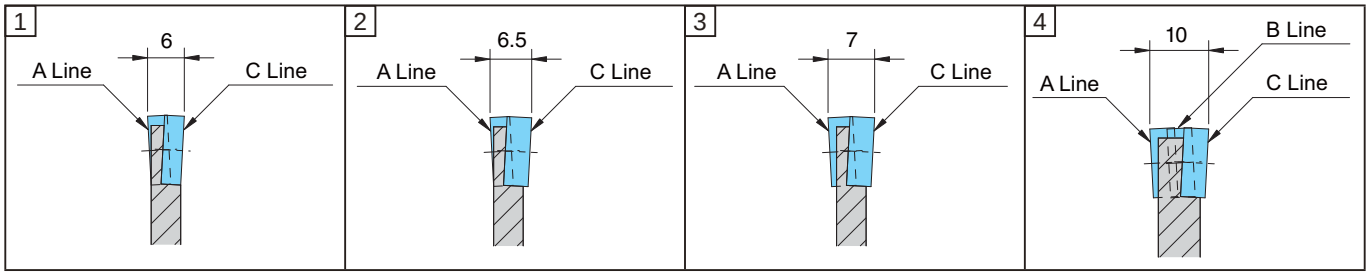
Inserts are sold in 10 piece boxes.

Combination of Applicable Inserts

Description		Clamp Screw (Standard attachment parts)	Edge Width		A Line		B Line		C Line		Wrench For Clamp Screw	Tightening Torque (Nm)
			mm	inch (mm)	Applicable Insert	Clamp Screw	Applicable Insert	Clamp Screw	Applicable Insert	Clamp Screw		
Metric	MSTB ○○○AN0607-○T	SE-40050TR	6	-	LNEU1235..	SE-40050TR	-	-	LNEU1235..	SE-40050TR	TT-15L	3
	○○○SN0607-○T		6.5						LNEU1240..	SE-40055TR		
			7		LNEU1240..	SE-40055TR						
	MSTB ○○○AN0809-○T	SE-40068TR	8	-	LNEU1245..	SE-40068TR	-	-	LNEU1245..	SE-40068TR		
	○○○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		
	○○○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-Type 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, that has a difference of width more than 1mm (.039").

Bottom cutting shape of MSTB Slot Mill

Slot bottom shape will be (Fig.1) convex shape.

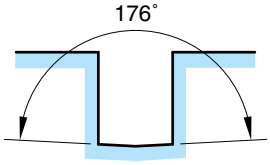


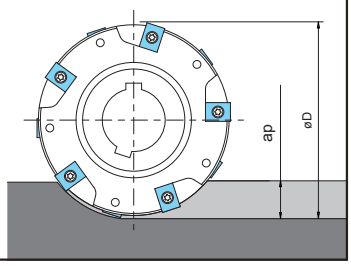
Fig.1 Convex bottom shape

Slot Mill Up-right: LN Insert

◆ Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Recommended Insert Grade (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	St42-2 C10E~C25	125	170-210	0.07-0.20	0.10-0.22	Dry
Carbon Steel	C30~C60 (Annealed)	190	100-140	0.07-0.20	0.10-0.22	
	C30~C60 (Heat treated)	250	90-120	0.07-0.20	0.10-0.22	
Alloy Steel	34CrMo4 (Annealed)	180	90-120	0.07-0.20	0.10-0.22	
	34CrMo4 (Heat treated)	275	80-110	0.05-0.18	0.08-0.20	
High Carbon Carbide	X40CrMoV51, etc.	280	70-90	0.05-0.18	0.08-0.20	
Stainless Steel	X5CrNi1810, etc.	220	110-140	0.05-0.18	0.08-0.20	Coolant
	X10Cr13, etc.	300	100-120	0.05-0.18	0.08-0.20	
Heat-resistant Alloy	Inconel 718, etc.	350	15-30	0.05-0.18	0.08-0.20	
Titanium Alloy	TiAl6V4, etc.	270	20-50	0.05-0.18	0.08-0.20	
Gray Cast Iron	GG25~GG35	260	110-130	0.07-0.22	0.10-0.25	Dry
Nodular Cast Iron	GGG40~GGG50	160	80-100	0.07-0.22	0.10-0.25	
	GGG60~GGG80	250	70-90	0.07-0.22	0.10-0.25	

Note) 1. Use down-cut machining.
2. If ap is under 1/10 of Cutter Dia.(øD), it is possible to increase feed per tooth(fz) 40%.



Identification System

● MSTC Slot Mill

Metric

MSTC ○○○ **A** **N** ○○ ○○ - ○○ - ○○ **T**

Slot Mill with Lay-down type	Cutting Dia. (mm)	A: Without Boss S: With Boss	N: Neutral R: R-hand L : L-hand	Edge Width (mm)	No. of Edge line Applicable Insert 10: SP..10T3.. 12: SD..1204..

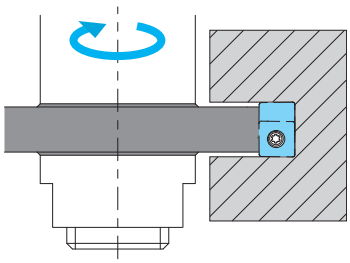
Inch spec

MSTC ○○○ **A** **N** ○○○ - ○○○ - ○○

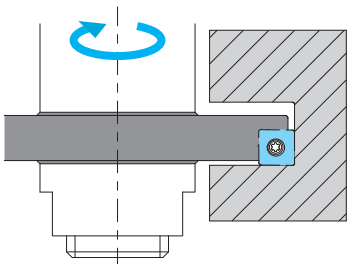
Slot Mill with Lay-down type	Cutting Dia. (inch)	A: Without Boss	N: Neutral R: R-hand L : L-hand	Edge Width (inch)	Applicable Insert 10: SP..10T3.. 12: SD..1204..

Machining Direction of MSTC Slot Mill

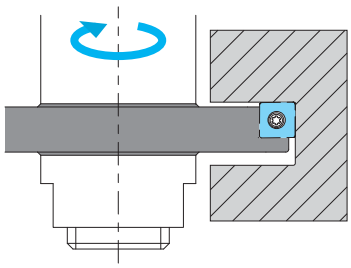
AN (Slotting)



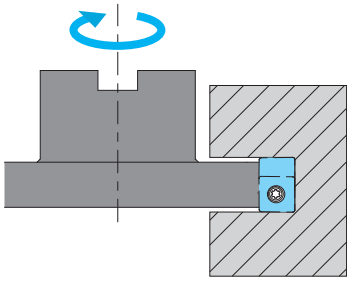
AR (Lower surface machining)



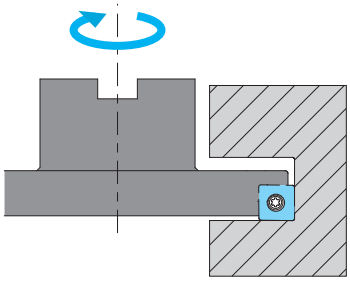
AL (Upper surface machining)



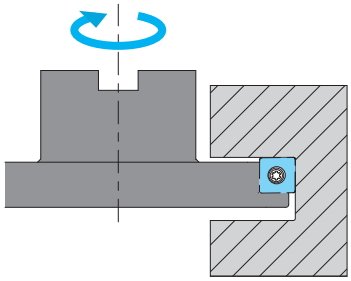
SN (Slotting)



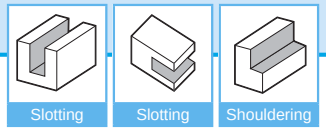
SR (Lower surface machining)



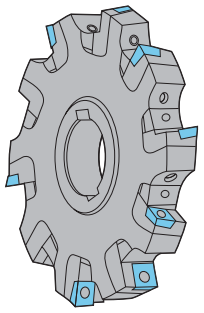
SL (Upper surface machining)

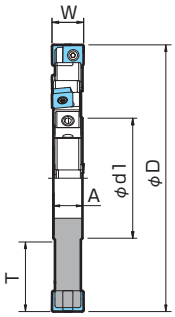


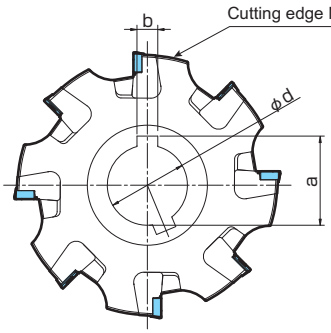
Slot Mill Lay-down type



Without Boss







In order to use more than two slot mills of combination, there are two key slots on the slot mill itself.

Toolholder Dimensions (Metric)

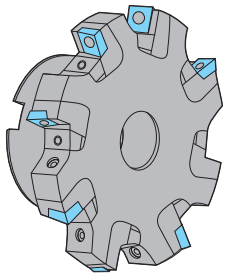
Description		Std.	Edge Width (mm)		Slot Depth	No. of Insert	No. of Edge Line	Dimension (mm)						Weight (kg)	Max. Revolution (min^{-1})
			W	W	T			øD	ød (H7)	ød1	A	a	b		
MSTC	100AN1416-10-3T	●	14	16	25.9	6	3	100	32	46.8	13.9	34.8	8	0.5	17,250
	125AN1416-10-4T	●			34.4	8	4	125	40	54.8		43.5	10	0.8	15,450
	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	20.7	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	●	21	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		Std.	Edge Width (inch)		Slot Depth	No. of Insert	No. of Edge Line	Dimension (inch)						Weight (kg)	Max. Revolution (min^{-1})
			W (min)	W (max)	T (inch)			øD	ød (H7)	ød1	A	a	b		
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 (23.2mm)	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 R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

With Boss



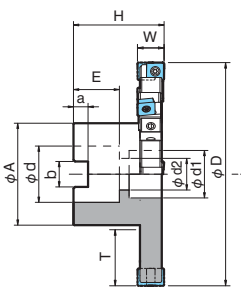


Fig.1

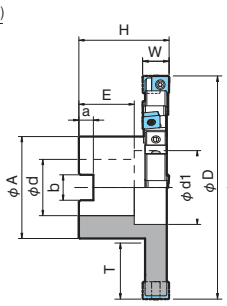


Fig.2

● Toolholder Dimensions (Metric)

Description		Std.	Edge Width (mm)		Slot Depth	No. of Insert	No. of Edge Line	Dimension (mm)									Drawing	Weight (kg)	Max. Revolution (min^{-1})
			W (min)	W (max)	T (mm)			øD	ød (H7)	øA	H (min)	E	a	b	ød1	ød2			
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	20.7	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	●	20.7	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) H(min) dimension shows in case of minimum of edge width.

Applicable Inserts (common to Inch spec / Metric)

Description	Edge No. (Marked)	Applicable Inserts ➡ See page **M114-M115**	
		With hand	Neutral
MSTC...AN...10.. **MSTC...SN...10..**	Odd Number	SP..10T3...R...	SP..10T3...N...
	Even Number	SP..10T3...L...	
MSTC...AN...12.. **MSTC...SN...12..**	Odd Number	SD..1204...R...	SD..1204...N...
	Even Number	SD..1204...L...	

• When installing handed inserts to slot mill above, the number of R-hand and L-hand inserts needs to match with the number of edge line.

For recommended cutting conditions, see page ➡M116

Spare Parts (common to Inch spec / Metric)

• For spare parts, see page M112.

Slot width (edge width) adjustment

• See page M117~M118.

Applicable Arbor

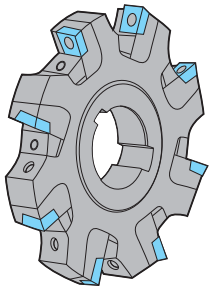
• See page M119.

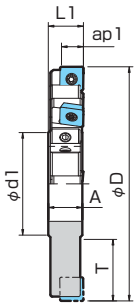
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

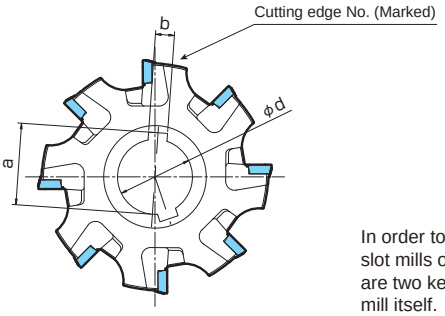
Half Side Slot Mill

Shouldering

Without Boss (R-hand)







● Right-hand Shown

In order to use more than two slot mills of combination, there are two key slots on the slot mill itself.

Toolholder Dimensions (Metric)

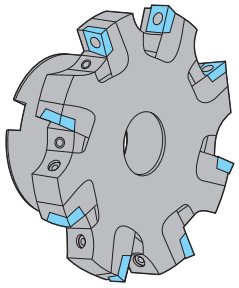
Description		Std.	No. of Insert	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	100AR1416-10-6T	●	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
	125AR1416-10-8T	●	8	125	40	54.8				34.4		43.5	10	0.8	15,450
	160AR1416-10-10T	●	10	160						51.9				1.5	13,650
MSTC	125AR1618-10-8T	●	8	125			15.9	15.2	16.2	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

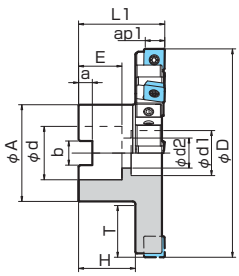
Toolholder Dimensions (Inch spec)

Description		Std.	No. of Insert	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	400AR551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	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 (15.93mm)	.667 (16.94mm)	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 (22.04mm)	1.331 (33.8mm)				1.3	10,300
	600AR813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				2.0	9,400

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

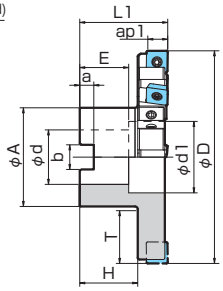
With Boss (R-hand)





● Right-hand Shown

Fig.1



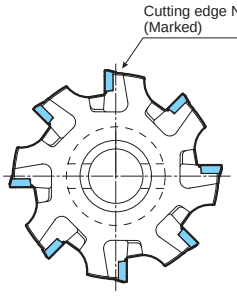


Fig.2

Toolholder Dimensions (Metric)

Description		Std.	No. of Insert	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	øA	H	L1 (min)	L1 (max)	T	ap1 (max)	E	a	b	ød1	ød2			
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 Inch spec / Metric)

Description	Applicable Inserts See page **M114-M115**	
	With hand	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...

For recommended cutting conditions, see page **M116**

Spare Parts (common to Inch spec / Metric)

• For spare parts, see page M113.

Slot width (edge width) adjustment

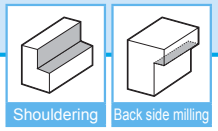
• See page M117~M118.

Applicable Arbor

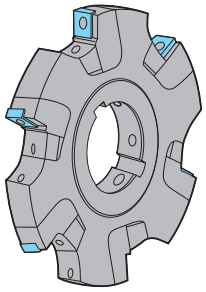
• See page M119.

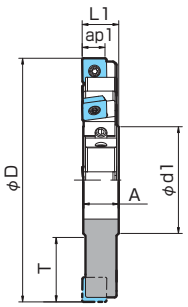
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

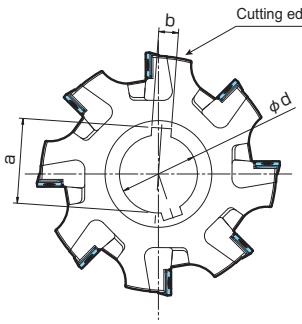
Half Side Slot Mill



Without Boss (L-hand)







● Left-hand Shown

In order to use more than two slot mills of combination, there are two key slots on the slot mill itself.

Toolholder Dimensions (Metric)

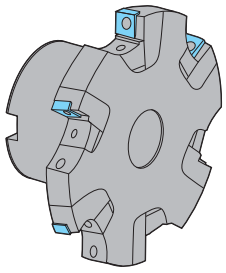
Description		Std.	No. of Insert	Dimension (mm)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	100AL1416-10-6T	●	6	100	32	46.8	13.9	13.9	14.9	25.9	9.1	34.8	8	0.5	17,250
	125AL1416-10-8T	●	8	125	40	54.8				34.4		43.5	10	0.8	15,450
	160AL1416-10-10T	●	10	160						51.9				1.5	13,650
MSTC	125AL1618-10-8T	●	8	125			15.9	15.2	16.2	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

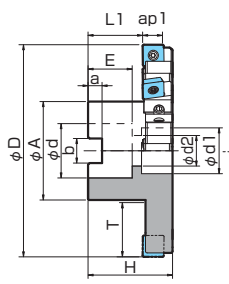
Toolholder Dimensions (Inch spec)

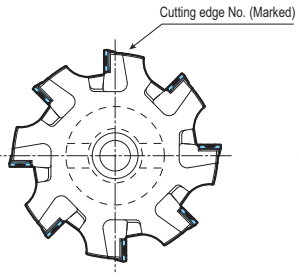
Description		Std.	No. of Insert	Dimension (inch)										Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	ød1	A	L1 (min)	L1 (max)	T	ap1 (max)	a	b		
MSTC	400AL551-630-10	○	6	4.000 (101.6mm)	1.250 (31.75mm)	1.880 (47.75mm)	.545 (13.84mm)	.548 (13.92mm)	.588 (14.94mm)	1.030 (26.1mm)	.359 (9.1mm)	1.386 (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 (15.93mm)	.667 (16.94mm)	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 (22.04mm)	1.331 (33.8mm)				1.3	10,300
	600AL813-917-12	○	10	6.000 (152.4mm)						1.831 (46.5mm)				2.0	9,400

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

With Boss (L-hand)

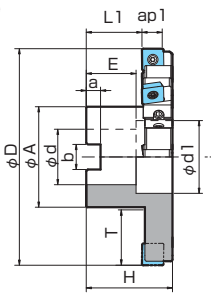






• Left-hand Shown

Fig.1



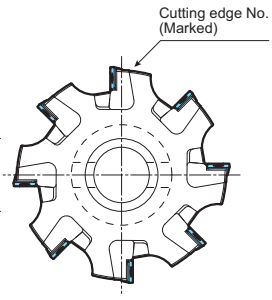


Fig.2

Toolholder Dimensions (Metric)

Description		Std.	No. of Insert	Dimension (mm)													Drawing	Weight (kg)	Max. Revolution (min^{-1})
				øD	ød (H7)	øA	H	L1 (min)	L1 (max)	T	ap1 (max)	E	a	b	ød1	ød2			
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 Inch spec / Metric)

Description	Applicable Inserts ➡ See page **M114-M115**	
	With hand	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...

For recommended cutting conditions, see page ➡**M116**

Spare Parts (common to Inch spec / Metric)

• For spare parts, see page M113.

Slot width (edge width) adjustment

• See page M117~M118.

Applicable Arbor

• See page M119.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Spare Parts (common to Inch spec / Metric)

Description			Spare Parts										
			Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting Bolt
			R-hand	L-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
													
Without Boss	Metric	MSTC 100AN1416-10-3T	C90SP1416-10R	C90SP1416-10L	WC-14	W6 X 18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC 125AN1416-10-4T				W6 X 20							
		MSTC 160AN1416-10-5T											
		MSTC 125AN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16	W6 X 20							
		MSTC 160AN1618-10-5T											
		MSTC 125AN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6 X 20	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	W6 X 18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9		
		MSTC 500AN551-630-10				W6 X 20							
		MSTC 600AN551-630-10											
		MSTC 500AN630-709-10	C90SP1618-10R	C90SP1618-10L	WC-16	W6 X 20							
		MSTC 600AN630-709-10											
		MSTC 500AN709-813-12	C90SD1820-12R	C90SD1820-12L	WC-18	W6 X 20	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	W6 X 20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	HH12 X 35
		MSTC 125SN1416-10-4T											HH16 X 35
		MSTC 160SN1416-10-5T											-
		MSTC 125SN1618-10-4T	C90SP1618-10R	C90SP1618-10L	WC-16								HH16 X 35
		MSTC 160SN1618-10-5T											-
		MSTC 125SN1820-12-4T	C90SD1820-12R	C90SD1820-12L	WC-18	W6 X 20	AP-1820	SB-3590TRP		LW-3	DTP-15	MP-1	HH16 X 35
		MSTC 160SN1820-12-5T											-
		MSTC 125SN2123-12-4T	C90SD2023-12R	C90SD2023-12L	WC-20								HH16 X 35
		MSTC 160SN2123-12-5T											-


Coat anti-seize compound (MP-1) thinly on clamp screw when insert is fixed.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (Nm)	5-6	1.5	4

Half Side Slot Mill

Spare Parts (common to Inch spec / Metric)

Description				Spare Parts										
				Cartridge		Wedge	Wedge Screw	Cam Pin	Clamp Screw	Wrench			Anti-seize Compound	Mounting Bolt
				R-hand	L-hand					for Wedge Screw	for Cam Pin	for Clamp Screw		
														
Without Boss	Metric	MSTC	100AR1416-10-6T	C90SP1416-10R	-	WC-14	W6 X 18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	-
		MSTC	125AR1416-10-8T				W6 X 20							
		MSTC	160AR1416-10-10T											
		MSTC	125AR1618-10-8T	C90SP1618-10R		WC-16	W6 X 20							
		MSTC	160AR1618-10-10T											
		MSTC	125AR1820-12-8T	C90SD1820-12R		WC-18	W6 X 20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC	160AR1820-12-10T											
		MSTC	125AR2123-12-8T	C90SD2023-12R		WC-20								
		MSTC	160AR2123-12-10T											
		MSTC	100AL1416-10-6T	-	C90SP1416-10L	WC-14	W6 X 18	AP-1416	SE-3070TRP		LW-2.5	DTP-9		
		MSTC	125AL1416-10-8T				W6 X 20							
		MSTC	160AL1416-10-10T											
		MSTC	125AL1618-10-8T		C90SP1618-10L	WC-16	W6 X 20							
		MSTC	160AL1618-10-10T											
		MSTC	125AL1820-12-8T		C90SD1820-12L	WC-18	W6 X 20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC	160AL1820-12-10T											
		MSTC	125AL2123-12-8T		C90SD2023-12L	WC-20								
		MSTC	160AL2123-12-10T											
	Inch spec	MSTC	400AR551-630-10	C90SP1416-10R	-	WC-14	W6 X 18	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9		
		MSTC	500AR551-630-10				W6 X 20							
		MSTC	600AR551-630-10											
		MSTC	500AR630-709-10	C90SP1618-10R		WC-16	W6 X 20							
		MSTC	600AR630-709-10											
		MSTC	500AR709-813-12	C90SD1820-12R		WC-18	W6 X 20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC	600AR709-813-12											
		MSTC	500AR813-917-12	C90SD2023-12R		WC-20								
		MSTC	600AR813-917-12											
		MSTC	400AL551-630-10	-	C90SP1416-10L	WC-14	W6 X 18	AP-1416	SE-3070TRP		LW-2.5	DTP-9		
		MSTC	500AL551-630-10				W6 X 20							
		MSTC	600AL551-630-10											
		MSTC	500AL630-709-10		C90SP1618-10L	WC-16	W6 X 20							
		MSTC	600AL630-709-10											
		MSTC	500AL709-813-12		C90SD1820-12L	WC-18	W6 X 20	AP-1820	SB-3590TRP		LW-3	DTP-15		
		MSTC	600AL709-813-12											
		MSTC	500AL813-917-12		C90SD2023-12L	WC-20								
		MSTC	600AL813-917-12											
With Boss	Metric	MSTC	100SR1416-10-6T	C90SP1416-10R	-	WC-14	W6 X 20	AP-1416	SE-3070TRP	TH-3L	LW-2.5	DTP-9	MP-1	HH12 X 35
		MSTC	125SR1416-10-8T											HH16 X 35
		MSTC	160SR1416-10-10T											-
		MSTC	125SR1618-10-8T	C90SP1618-10R		WC-16								HH16 X 35
		MSTC	160SR1618-10-10T											-
		MSTC	125SR1820-12-8T	C90SD1820-12R		WC-18	W6 X 20	AP-1820	SB-3590TRP		LW-3	DTP-15		HH16 X 35
		MSTC	160SR1820-12-10T											-
		MSTC	125SR2123-12-8T	C90SD2023-12R		WC-20								HH16 X 35
		MSTC	160SR2123-12-10T											-
		MSTC	100SL1416-10-6T	-	C90SP1416-10L	WC-14	W6 X 20	AP-1416	SE-3070TRP		LW-2.5	DTP-9		HH12 X 35
		MSTC	125SL1416-10-8T											HH16 X 35
		MSTC	160SL1416-10-10T											-
		MSTC	125SL1618-10-8T		C90SP1618-10L	WC-16								HH16 X 35
		MSTC	160SL1618-10-10T											-
		MSTC	125SL1820-12-8T		C90SD1820-12L	WC-18	W6 X 20	AP-1820	SB-3590TRP		LW-3	DTP-15		HH16 X 35
		MSTC	160SL1820-12-10T											-
		MSTC	125SL2123-12-8T		C90SD2023-12L	WC-20								HH16 X 35
		MSTC	160SL2123-12-10T											-


Coat anti-seize compound (MP-1) thinly on clamp screw when insert is fixed.

Tightening Torque

Wrench	TH-3L	DTP-9	DTP-15
			
Tightening Torque (Nm)	5-6	1.5	4

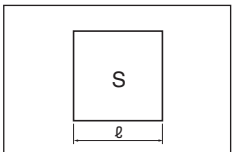
Inserts Identification System

Symbol	Hand
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
16	1.6mm
12	1.2mm
08	0.8mm

⑦ Corner R(rε)

Symbol	Hand
N	Without Hand
L	L-hand
R	R-hand

⑨ Hand

S	P	C	T	10	T3	08	E	R	-	SD
①	②	③	④	⑤	⑥	⑦	⑧	⑨		⑩

⑩ Chipbreaker

Symbol	Rake Angle
SB	5°
SD	15°
SE	20°

② Relief Angle

Symbol	Relief Angle
D	15°
P	11°

④ Hole / Chipbreaker

Symbol	Shape
T	1 edge chipbreaker, with hole

⑥ Thickness

Symbol	Thickness
T3	3.97mm
04	4.76mm

⑧ Edge Prep.

Symbol	Cutting Edge Spec.
E	Honing
F	Sharp Edge
S	Chamfer + R-honed

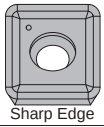
SP..10T3

● Applicable Inserts (mm)

Description	A	T	ød	α
SP..10T3	10.0	3.97	3.4	11°

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 alloy		●	
	Titanium Alloy		●	○

Insert (Handed Insert shows Right-hand)	Description	No. of Edge	Dimension (mm) rε	Dimension (mm) W (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	●	●	
 With Wiper Edge Tough Edge	**SPET 10T308S$^{R}_{L}$-SB**		0.8	2.7	●	●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

SD..1204

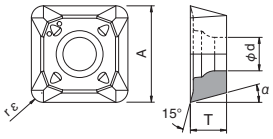
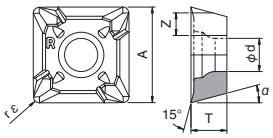
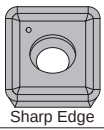
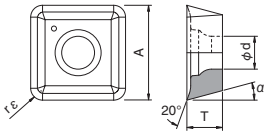
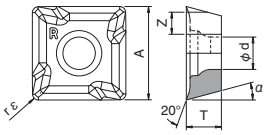
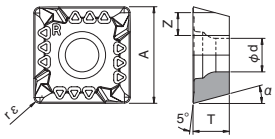
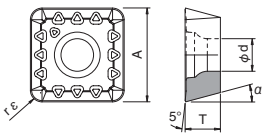
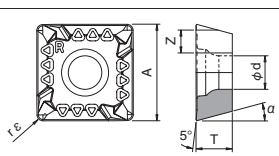
Applicable Inserts

(mm)

Description	A	T	ød	α
SD..1204	12.7	4.76	4.4	15°

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 alloy		●	
	Titanium Alloy		●	○

Insert Handed Insert shows Right-hand	Description	No. of Edge	Dimension (mm) rε	Dimension (mm) W (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	-	●	●	
 With Wiper Edge Tough Edge 	**SDET 120408S$^{R}_{L}$-SB**		0.8	2.5	●	●	

Feature of Insert Grades

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 cutting

PR0725

- TiN+TiCN+TiN based PVD Multi-layer Coating
- For carbon steel, alloy steel, stainless steel, heat resistant alloy and nodular cast iron.
- For middle speed cutting

PR0110

- TiB2 based PVD Coated Carbide
- For non ferrous metals such as aluminum alloy (Si<10%) and titanium alloy
- For high speed cutting

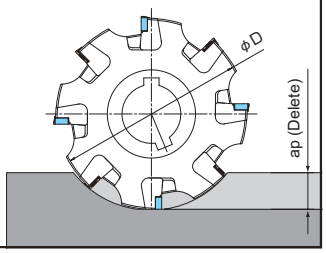
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes.

Recommended Cutting Conditions (For **CA0835** / **PR0725**)

Workpiece Material		Hardness (HB)	Recommended Insert Grade (Cutting Speed Vc: m/min)		fz (mm/t)			Remarks
			CVD Coated Carbide	PVD Coated Carbide	Chipbreaker			
			CA0835	**PR0725**	EN-SD ER-SD EL-SD	ER-SB EL-SB	SN-SB SR-SB SL-SB	
Low Carbon Steel	St42-2 C10E~C25	125	250-310	170-210	0.07-0.20	0.10-0.22	0.15-0.3	Dry
Carbon Steel	C30~C60 (Annealed)	190	160-190	100-140	0.07-0.20	0.10-0.22	0.15-0.3	
	C30~C60 (Heat treated)	250	140-180	90-120	0.07-0.20	0.10-0.22	0.15-0.3	
Alloy Steel	34CrMo4 (Annealed)	180	140-180	90-120	0.07-0.20	0.10-0.22	0.15-0.3	
	34CrMo4 (Heat treated)	275	120-160	80-110	0.05-0.18	0.08-0.20	0.12-0.25	
High Carbon Carbide	X40CrMoV51, etc.	280	110-130	70-90	0.05-0.18	0.08-0.20	0.12-0.25	
Stainless Steel	X5CrNi1810, etc.	220	160-200	110-140	0.05-0.18	0.08-0.20	0.12-0.25	Coolant
	X10Cr13, etc.	300	150-180	100-120	0.05-0.18	0.08-0.20	0.12-0.25	
Heat-resistant Alloy	Inconel 718, etc.	350	-	15-30	0.05-0.18	0.08-0.20	0.12-0.25	
Titanium Alloy	Ti-6Al-4V, etc.	270	-	20-50	0.05-0.18	0.08-0.20	0.12-0.25	
Gray Cast Iron	GG25~GG35	260	160-200	110-130	0.07-0.22	0.10-0.25	0.15-0.35	Dry
Nodular Cast Iron	GGG40~GGG50	160	130-160	80-100	0.07-0.22	0.10-0.25	0.15-0.35	
	GGG60~GGG80	250	110-140	70-90	0.07-0.22	0.10-0.25	0.15-0.35	

Note) 1. Use down-cut machining.
2. If ap is under 1/10 of Cutter Dia.(øD), it is possible to increase feed per tooth(fz) 40%.



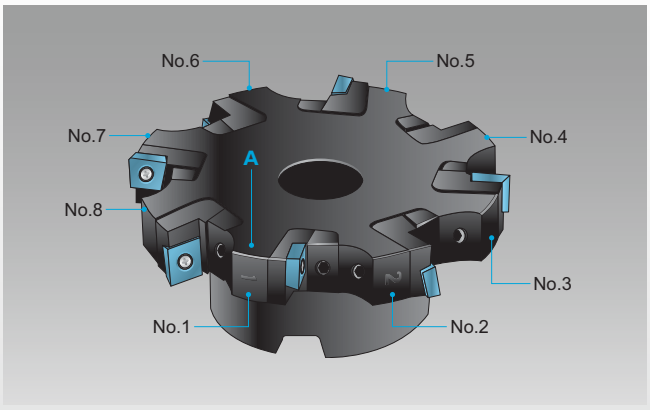
Recommended Cutting Conditions (For **PR0110**)

Workpiece Material		Hardness (HB)	Recommended Insert Grade (Cutting Speed Vc: m/min)	fz (mm/t)	Remarks
			PVD Coated Carbide	Chipbreaker	
			PR0110	FN-SE FR-SE FL-SE	
Non-ferrous Metals	AlZnMgCu1.5, G-AlSi7Mg	-	750-950	0.07-0.20	Coolant

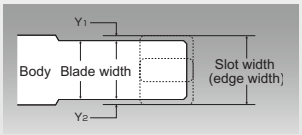
Note) 1. Use down-cut machining.
2. If ap is under 1/10 of Cutter Dia.(øD), it is possible to increase feed per tooth(fz) 40%.

Slot width (edge width) adjustment of MSTC slot mills

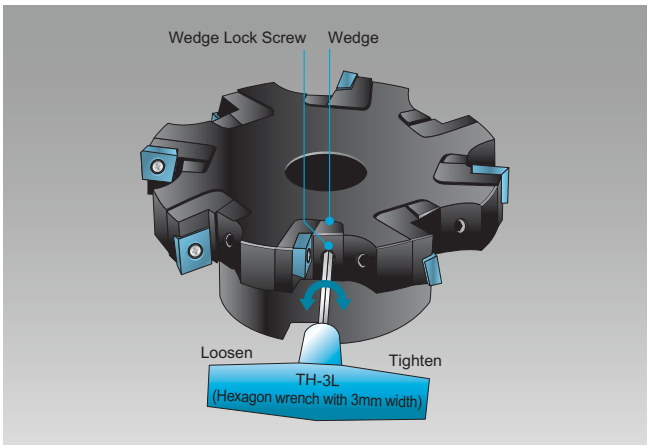
Slot width (edge width) measurement



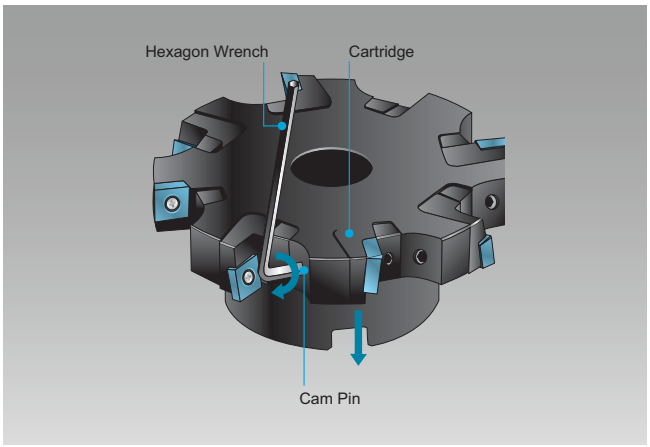
1) Please check slot mill egde location number.
(The edge location number is marked on the slot mill body.)
2) Set up the slot mill on length measuring equipment such as tool presetters.
3) Place the point A of the slot mill body near the position No.1 to “0 (zero)” of the length measuring equipment.
4) Move the length measuring equipment to the insert corner part and measure the step (Y1) between the point A and the insert No.1.
5) Likewise, measure the step between the slot mill body and the insert, and you will obtain the slot width (edge width).



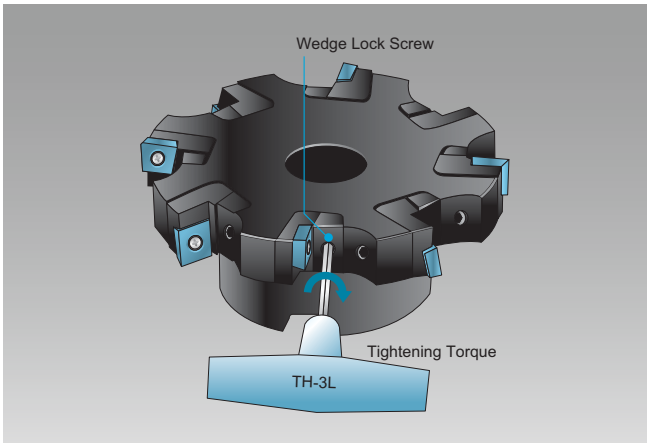
In the case of changing the slot width (edge width)



1) Set up the slot mill on length measuring equipment such as tool presetters.
2) Insert a 3mm Hexagon wrench(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 Nm to tighten the wedge lightly and make the wedge to contact the cartridge and the slot mill body. In doing so, some resistance occurs against the cartridge.

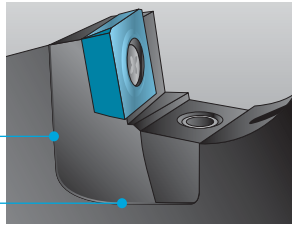


5) Insert a Hexagon wrench (LW-2.5 or LW-3) into the Cam Pin on the back of the cartridge.
6) Turn the wrench and adjust the position of the Cartridge.
7) To secure the adjustment, back the Cam Pin off and make sure that it does not touch the groove surface of the back of the Cartridge.
8) Remove the Hexagon wrench from the Cam Pin.



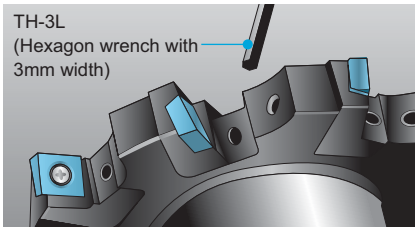
9) Insert TH-3L into the Wedge Screw.
10) Tighten the Wedge Screw by the torque of 5-6Nm.
(Use a torque wrench to get the correct torque.)
11) Make sure there is no gap between the Cartridge and the Slot Mill body.

Make sure there is no gap.

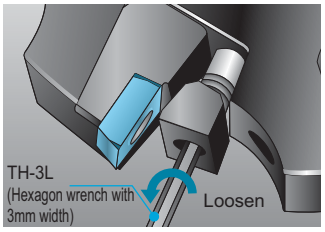


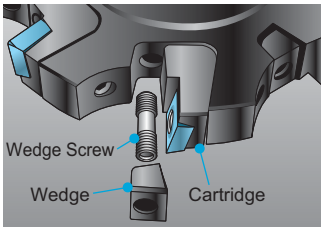
Replacement of the Cartridge

Follow the instruction below to replace the Cartridge.



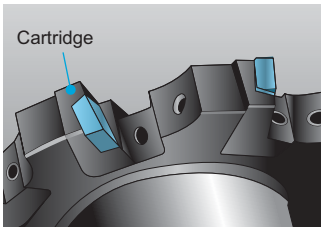
1) Insert Hexagon wrench with 3mm width (TH-3L) into the Wedge Screw.

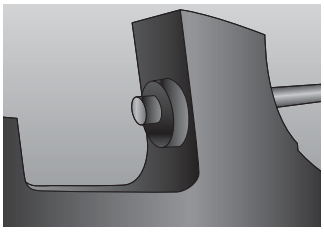




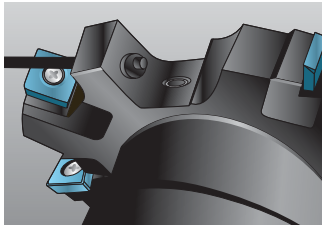
2) Loosen the Wedge Screw.

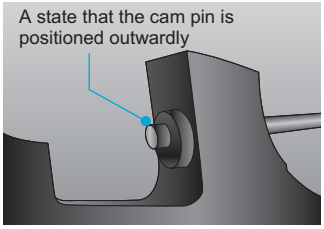
3) Remove the Wedge Screw and Wedge.



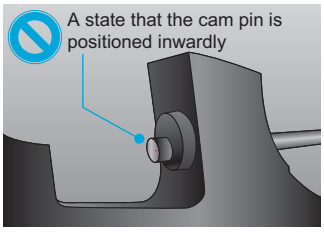


4) Remove the Cartridge.

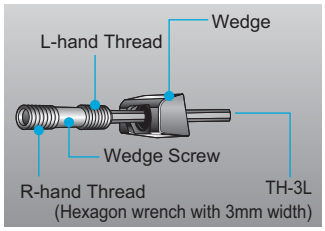


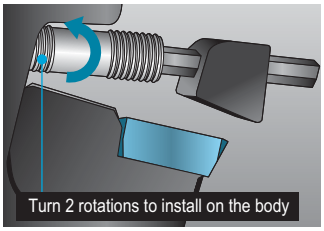


5) Before replacing the Cartridge, confirm that the Cam Pin is positioned radially-outwardly.



6) If the Cam Pin is in the position shown in the left diagram, assembling the Cartridge is not possible.

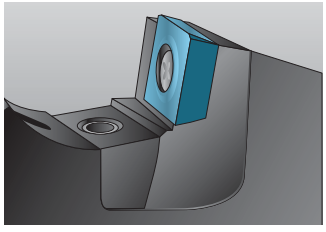




7) Place the wedge so that its larger slant surface faces toward the Cartridge.

8) Turn the Wedge Screw two times 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 5-6Nm.
Keep the Screw head and the Wedge even (prevent either of those from sticking out)

Slot Mill Applicable Arbor

BT Shank

Shape	Ref. Page	Toolholder		Bore Dia. (ød)	BT Shank				
					BIG	MST	NIKKEN	NT TOOL	SHOWA
Without Boss	M96	MSTA	63N..	16			BT○○-SCA16..	BT○○-SCA16..	
			80N..	16			BT○○-SCA16..	BT○○-SCA16..	
			100N..	22			BT○○-SCA22..	BT○○-SCA22..	
			125N..	32			BT○○-SCA32..	BT○○-SCA32..	
			160N..	40			BT○○-SCA40..	BT○○-SCA40..	
	M97	MSTA	02N..	.625 (15.875)			BT○○-SCA15.875..	BT○○-SCA15.875..	BT○○-SCA15.875..
			03N..	.625 (15.875)			BT○○-SCA15.875..	BT○○-SCA15.875..	BT○○-SCA15.875..
			04N..	1.000 (25.4)	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..
			05N..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			06N..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
	M100	MSTB	80AN..	27			BT○○-SCA27..	BT○○-SCA27..	
			100AN..	32			BT○○-SCA32..	BT○○-SCA32..	
			125AN..	40			BT○○-SCA40..	BT○○-SCA40..	
			160AN..	40			BT○○-SCA40..	BT○○-SCA40..	
		MSTB	3000AN..	1.000 (25.4)	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..	BT○○-SCA25.4..
			4000AN..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			5000AN..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			6000AN..	1.500 (38.1)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
	M106 M108 M110	MSTC	100A○..	32			BT○○-SCA32..	BT○○-SCA32..	
			125A○..	40			BT○○-SCA40..	BT○○-SCA40..	
			160A○..	40			BT○○-SCA40..	BT○○-SCA40..	
		MSTC	400A○..	1.250 (31.75)	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..	BT○○-SCA31.75..
			500A○..	1.500 (38.1)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
			600A○..	1.500 (38.1)	BT○○-SCA38.1..		BT○○-SCA38.1..	BT○○-SCA38.1..	BT○○-SCA38.1..
With Boss	M101	MSTB	80SN..	22	BBT○○-FMC22..		BT○○-FMC22..	BT○○-FMC22..	BT○○-FMC22..
			100SN..	27	BBT○○-FMC27..		BT○○-FMC27..	BT○○-FMC27..	BT○○-FMC27..
			125SN..	40	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..
			160SN..	40	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..
	M107 M109 M111	MSTC	100S○..	27	BBT○○-FMC27..		BT○○-FMC27..	BT○○-FMC27..	BT○○-FMC27..
			125S○..	32	BBT○○-FMC32..		BT○○-FMC32..	BT○○-FMC32..	BT○○-FMC32..
			160S○..	40	BBT○○-FMB40..		BT○○-FMB40..	BT○○-FMB40..	BT○○-FMB40..

Straight Shank

Shape	Ref. Page	Toolholder		Bore Dia. (ød)	Straight Shank				
					BIG	MST	NIKKEN	NT TOOL	SHOWA
Without Boss	M96	MSTA	63N..	16					
			80N..	16					
			100N..	22					
			125N..	32					
			160N..	40					
	M97	MSTA	02N..	.625 (15.875)					ST○○-SCA15.875..
			03N..	.625 (15.875)					ST○○-SCA15.875..
			04N..	1.000 (25.4)		S○○-SCA25.4..	K○○-SCA25.4..		ST○○-SCA25.4..
			05N..	1.250 (31.75)					ST○○-SCA31.75..
			06N..	1.250 (31.75)					ST○○-SCA31.75..
	M100	MSTB	80AN..	27					
			100AN..	32					
			125AN..	40					
			160AN..	40					
		MSTB	3000AN..	1.000 (25.4)		S○○-SCA25.4..	K○○-SCA25.4..		ST○○-SCA25.4..
			4000AN..	1.250 (31.75)					ST○○-SCA31.75..
			5000AN..	1.250 (31.75)					ST○○-SCA31.75..
			6000AN..	1.500 (38.1)					ST○○-SCA38.1..
	M106 M108 M110	MSTC	100A○..	32					
			125A○..	40					
			160A○..	40					
		MSTC	400A○..	1.250 (31.75)					ST○○-SCA31.75..
			500A○..	1.500 (38.1)					ST○○-SCA38.1..
			600A○..	1.500 (38.1)					ST○○-SCA38.1..

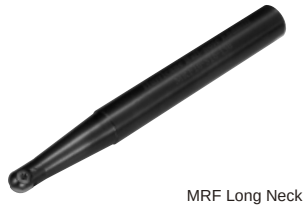
This table is created, based on companies' catalogues and publications, and not officially approved by those companies.

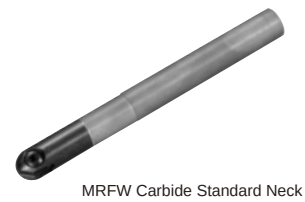
Ball-Nose Endmill

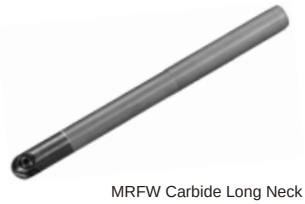
Finishing Contouring / Profiling | Finishing Pocketing

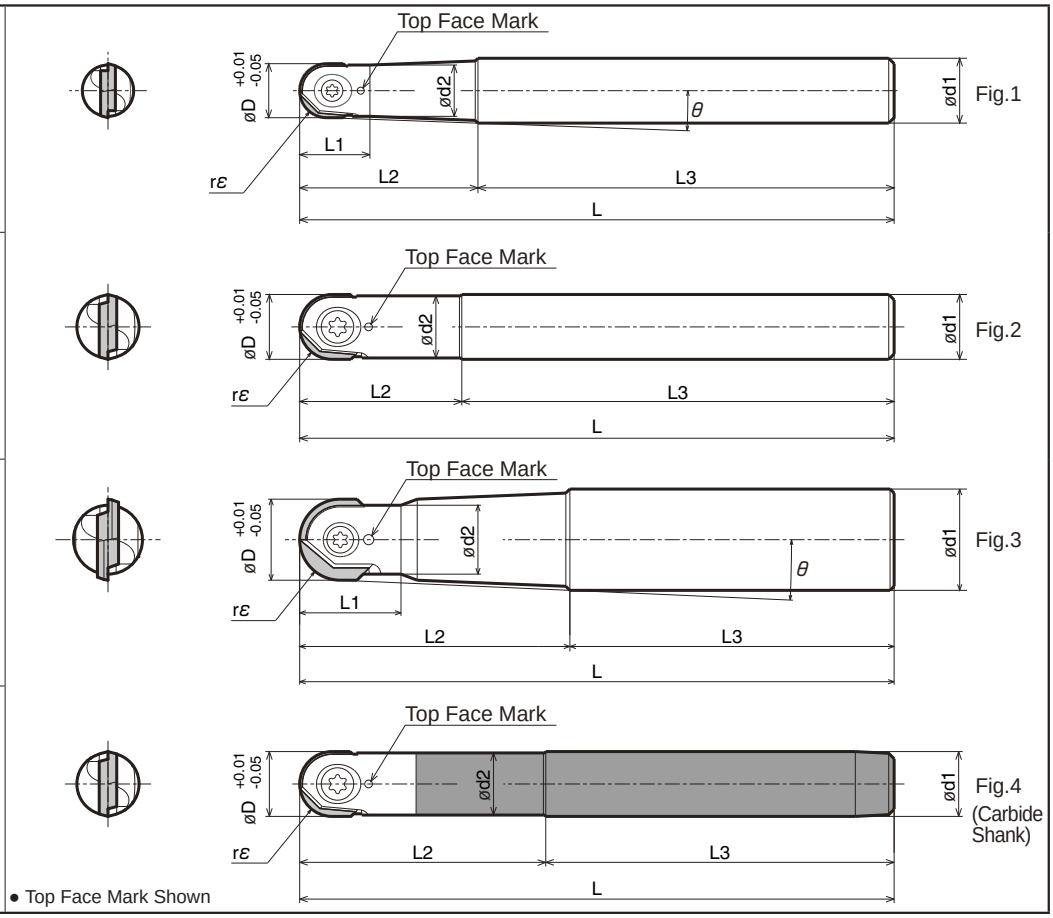
MRF / MRFW (Carbide Shank)


MRF Standard Neck


MRF Long Neck


MRFW Carbide Standard Neck


MRFW Carbide Long Neck



● Top Face Mark Shown

Toolholder Dimensions

Description			Std.	No. of Insert	Dimension (mm) rε	øD	ød1	ød2	L	L1	L2	L3	θ	Drawing	Spare Parts: Clamp Screw	Wrench	Anti-seize Compound	Applicable Inserts ➔ M20
Standard Neck	MRF	08-S12	●	1	4	8	12	7.5	100	10	22	78	6°20'	Fig.1	SC-30067	DT-8	MP-1	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	MP-1	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	MP-1	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	MP-1	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

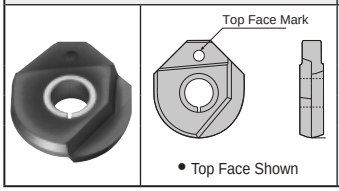
・θ (Toolholder's interference angle) is the angle formed by the tangential line from insert dia. to toolholder's shank dia.



Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

Shape	Description
	RDFG 08FR 10FR 12FR 16FR 20FR 25FR

・Check the Top Face Mark of both insert and toolholder.

Recommended ap

Description		ap	Pf	Application
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	

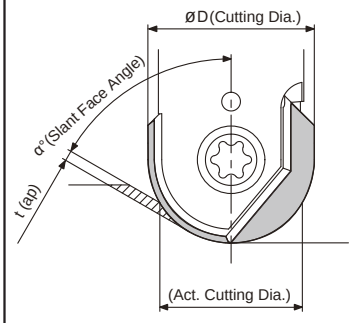
For ø8, Holder may be broken because of over load if ap exceeds 0.3mm.

Recommended Cutting Conditions (At Cutting Dia. øD)

Workpiece Material	Insert Grade	Vc (m/min)	fz (mm/t)	ø8		ø10		ø12	
				Vc (m/min) (n: min^{-1})	fz (mm/t) (Vf: mm/min)	Vc (m/min) (n: min^{-1})	fz (mm/t) (Vf: mm/min)	Vc (m/min) (n: min^{-1})	fz (mm/t) (Vf: mm/min)
Stainless Steel	PR915	50~150	0.1~0.2	100 (3980)	0.15 (1190)	100 (3180)	0.15 (950)	100 (2650)	0.15 (800)
Carbon Steel	PR915	100~200	0.1~0.3	150 (5970)	0.2 (2930)	150 (4770)	0.2 (1190)	150 (3980)	0.2 (1590)
Alloy Steel	PR915	80~180	0.1~0.3	130 (5170)	0.2 (2070)	130 (4140)	0.2 (1660)	130 (3450)	0.2 (1380)
Mold Steel	PR915	50~150	0.1~0.2	100 (3980)	0.15 (1190)	100 (3180)	0.15 (950)	100 (2650)	0.15 (800)
Cast Iron	PR915	100~200	0.2~0.4	150 (5970)	0.3 (3580)	150 (4770)	0.3 (2860)	150 (3980)	0.3 (2390)
Workpiece Material	Insert Grade	Vc (m/min)	fz (mm/t)	ø16		ø20		ø25	
				Vc (m/min) (n: min^{-1})	fz (mm/t) (Vf: mm/min)	Vc (m/min) (n: min^{-1})	fz (mm/t) (Vf: mm/min)	Vc (m/min) (n: min^{-1})	fz (mm/t) (Vf: mm/min)
Stainless Steel	PR915	50~150	0.1~0.2	100 (1990)	0.15 (600)	100 (1590)	0.15 (480)	100 (1270)	0.15 (380)
Carbon Steel	PR915	100~200	0.1~0.3	150 (2980)	0.2 (1190)	150 (2390)	0.2 (950)	150 (1910)	0.2 (760)
Alloy Steel	PR915	80~180	0.1~0.3	130 (2950)	0.2 (1030)	130 (2070)	0.2 (830)	130 (1660)	0.2 (660)
Mold Steel	PR915	50~150	0.1~0.2	100 (1990)	0.15 (600)	100 (1590)	0.15 (480)	100 (1270)	0.15 (380)
Cast Iron	PR915	100~200	0.2~0.4	150 (2980)	0.3 (1790)	150 (2390)	0.3 (1430)	150 (1910)	0.3 (1150)

Actual Cutting Speed (Vd) Conversion Coefficient Table

The actual Vc 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.(øD)		ø8		ø10		ø12	
	ap(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.(øD)		ø16		ø20		ø25	
	ap(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

MRP-S End Mill



Standard (Weldon)



Standard (Straight)



Long Shank (Straight)

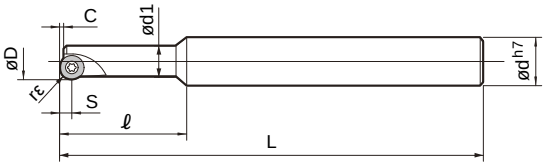


Fig.1

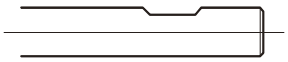


Fig.2

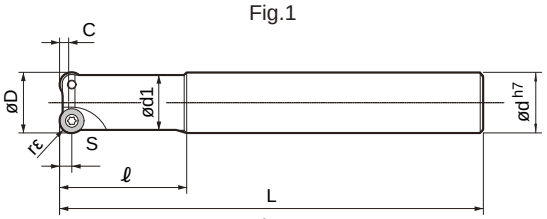


Fig.3



Fig.4

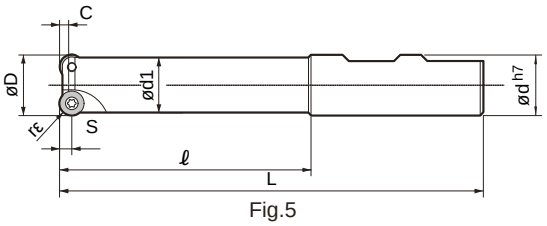


Fig.5

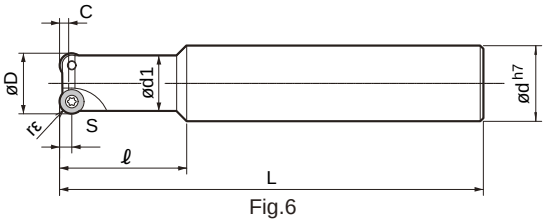


Fig.6

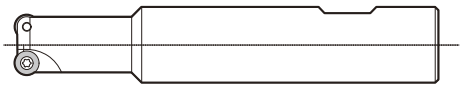


Fig.7

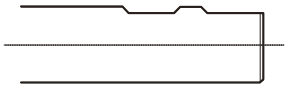


Fig.8

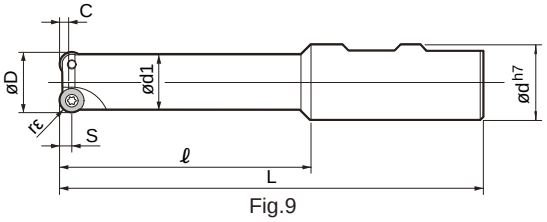


Fig.9

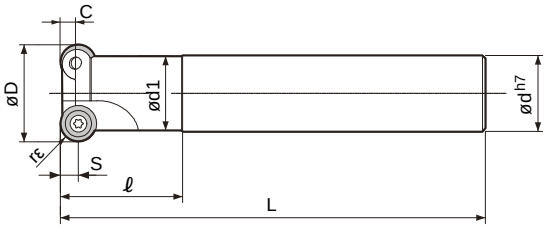


Fig.10

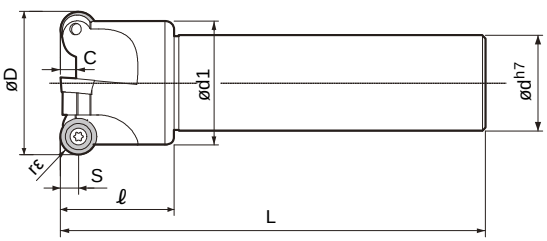


Fig.11

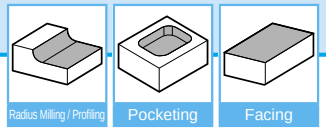
● Toolholder Dimensions

	Description	Std.	No. of Insert	Dimension (mm)									Rake Angle (°)		Drawing	Spare Parts		Applicable Inserts ➔ M20
				rε	øD	ød	ød1	L	ℓ	C	Pd	S	A.R.	R.R.		Clamp Screw	Wrench	
Weldon	MRP 012-W16-1T042-90	○	1	4	12	16	10.4	90	42	3	2	4	-8.5°	-5.5°	Fig.2	SB-3060TR	DT-10	RDMT08T2M0-H
	012-W16-1T042-130	○						130										
	016-W16-2T042-90	○	2	4	16	16	14.4	90	42	3	2	4	0°	-5.5°	Fig.4			
	016-W20-2T042-132	○				20		132							Fig.7			
	016-W25-2T042-183	○				25		183							Fig.8			
	020-W20-2T042-92	○	2	4	20	20	17	92	42	3	2	4	+5°	-4°	Fig.4			
	020-W25-2T082-138	○				25		138	82						Fig.9			
	020-W25-2T082-183	○				25		183	82									
	MRP 025-W32-3T082-142	○	3	5	25	32	21	142	82	3.5	2.5	5	+2°	-6°	Fig.9	SB-3080TR	DT-10	RPMT10T3M0
	025-W32-3T127-187	○						187	127									
	032-W32-4T082-142	○	4	5	32	32	28	142	82	3.5	2.5	5	+2°	-6°	Fig.5			
	032-W32-4T127-187	○						187	127									
Cylindrical	MRP 012-S16-08	●	1	4	12	16	10.4	110	40	3	N.A.	4	-8.5°	-5.5°	Fig.1	SB-3060TR	DT-10	RDMT08T2M0-H
	016-S16-08	●	2		16		14.4				0.5		0°		Fig.3			
	020-S20-08	●	2		20	20	17	120			2		+5°	-4°				
	MRP 025-S25-10-3T	●	3	5	25	25	21	120		3.5	2.5	5	+2°	-6°	Fig.3	SB-3080TR	DT-10	RPMT10T3M0
	032-S32-10-4T	●	4		32	32	28	140										
	MRP 032-S25-12	●	2	6	32	25	24.4	140		5	4	6	+5°	-4°	Fig.10	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	040-S32-12	●	3		40	32	31.4	160						-5°				
	040-S32-12-4T	●	4					140		4.5	3.5							
	050-S42-12	●	4		50	42	41.4	170		5	4					SB-40115TR		
	MRP 040-S32-16	●	2	8	40	32	31.4	160		7	6	8		-3°	Fig.10	SB-50120TR	DT-20	RPMT1606M0-H
	050-S42-16	●	3		50	42	41.4	170										
	063-S42-16	●	4		63		54.4		50						Fig.11			
Cylindrical Long Shank	MRP 012-S16-08-160	●	1	4	12	16	10.4	160	40	3	N.A.	4	-8.5°	-5.5°	Fig.1	SB-3060TR	DT-10	RDMT08T2M0-H
	016-S16-08-160	●	2		16		14.4				0.5		0°		Fig.3			
	020-S20-08-180	●	2		20	20	17	180			2		+5°	-4°				
	MRP 025-S25-10-3T-180	●	3	5	25	25	21	180		3.5	2.5	5	+2°	-6°	Fig.3	SB-3080TR	DT-10	RPMT10T3M0
	032-S32-10-4T-200	●	4		32	32	28	200										
	MRP 032-S25-12-300	●	2	6	32	25	24.4	300		5	4	6	+5°	-4°	Fig.10	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
	040-S32-12-300	●	3		40	32	31.4							-5°				
	040-S32-12-4T-200	●	4					200		4.5	3.5							
	050-S42-12-300	●	4		50	42	41.4	300		5	4					SB-40115TR		
	MRP 040-S32-16-300	●	2	8	40	32	31.4			7	6	8		-3°	Fig.10	SB-50120TR	DT-20	RPMT1606M0-H
	050-S42-16-300	●	3		50	42	41.4											
	063-S42-16-300	●	4		63	42	54.4		50						Fig.11			

• Pd: Max. Plunging Depth

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MRP Radius Mill



MRP Face Mill



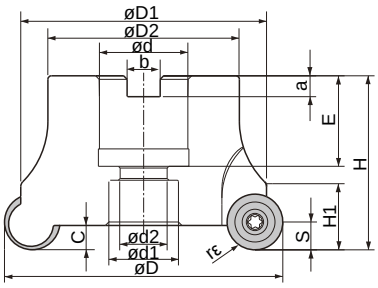


Fig.1

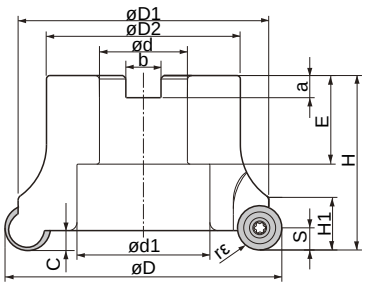


Fig.2

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)															Rake Angle (°)		Drawing	Weight (kg)
			rε	øD	øD1	øD2	ød	ød1	ød2	H	H1	E	a	b	C	Pd	S	A.R.	R.R.		
MRP 050R-10-6T	○	6	5	50	45.0	38	22.0	18	12	50	13	20	6.3	10.4	3.5	2.5	5.0	+5°	-5°	Fig.1	0.4
063R-10-7T	○	7		63	57.9	50	25.4	20	14			26	6.0	9.5							0.5
MRP 050R-12	○	4	6	50	41.4	38	22.0	18	12		15	20	6.3	10.4	5.0	4.0	6.0	+5°	-5°	Fig.1	0.4
063R-12	○	5		63	54.4	50	25.4	20	14			26	6.0	9.5							0.5
080R-12	○	6		80	71.4	55													-3°		0.7
080R-12-7T	○	7			74.4	59									4.5	3.5			-5°		
MRP 080R-16	○	5	8	80	70.6	55	25.4	20	14	50	19	26	6.0	9.5	7.0	6.0	8.0	+5°	-3°	Fig.1	0.8
100R-16	○	6		100	90.5	70	31.75	48	-	63		32	8.0	12.7					-5°	Fig.2	1.0
100R-16-7T	○	7			93.0										6.0	5.0			-6°		
125R-16	○	6		125	115.5	80	38.10	58				38	10.0	15.9	7.0	6.0			-5°		1.7
125R-16-8T	○	8			118.0										6.0	5.0			-6°		
MRP 080R-20	○	4	10	80	67.3	55	25.4	20	14	50	23	24	6.0	9.5	8.5	N.A.	10.0	+5°	-3°	Fig.1	0.8
100R-20	○	5		100	87.3	70	31.75	48	-	63		32	8.0	12.7					-5°	Fig.2	1.0
MRP 052R-10E-6T	○	6	5	52	47.0	41	22	18	11.0	50	13.0	20	6.3	10.4	3.5	2.5	5.0	+5°	-5°	Fig.1	0.4
066R-10E-7T	○	7		66	60.9	49	27	20	13.5			22	7.0	12.4							0.5
MRP 080R-12E-7T	○	7	6	80	74.4	59	27	20	13.5	50	14.0	22	7.0	12.4	4.6	3.6	6.0	+5°	-5°	Fig.1	0.8
MRP 100R-16E-7T	○	7	8	100	93.0	70	32	45	-	55	18.4	30	8.0	14.4	6.0	5.0	8.0	+5°	-6°	Fig.2	1.0
125R-16E-8T	○	8		125	118.0	80	40	60					9.0	16.4							1.7

- Pd: Max. Plunging Depth
- Use BT ○○ -FMC22 (TMT Standard in the market) for MRP050R-10-6T and MRP050R-12.

Spare Parts

Description	Clamp Screw	Wrench	Applicable Inserts ➔ M20
MRP 050R-10-6T 063R-10-7T	SB-3080TR	DT-10	RPMT10T3M0
MRP 050R-12 063R-12	SB-40115TR	DT-15	RPMT1204M0-H RPMT1204M0
080R-12 080R-12-7T	SB-4085TR		
MRP 080R-16 100R-16 100R-16-7T 125R-16 125R-16-8T	SB-50120TR	DT-20	RPMT1606M0-H
MRP 080R-20 100R-20	SB-60120TR	DT-25	RPMT2006M0-H
MRP 052R-10E-6T 066R-10E-7T	SB-3080TR	DT-10	RPMT10T3M0
MRP 080R-12E-7T	SB-4085TR	DT-15	RPMT1204M0-H RPMT1204M0
MRP 100R-16E-7T 125R-16E-8T	SB-50120TR	DT-20	RPMT1606M0-H

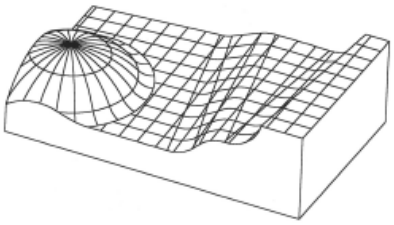
- Mounting Bolt (HH10X30) is included for MRP050R.
- Mounting Bolt (HH12X25) is included for MRP063R and MRP066R-10E-7T.
- Mounting Bolt (HH12X25) is included for MRP080R and MRP080R-12E-7T.
- Mounting Bolt (HH10X25) is included for MRP052R-10E-6T.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable Inserts

Toolholder		Applicable Inserts ⇒ M20		
		 Tough Edge	 Tough Edge	
MRP	**…-08**	RDMT08T2M0-H	-	-
	…-10	-		RPMT10T3M0
	…-12		RPMT1204M0-H	RPMT1204M0
	…-16		RPMT1606M0-H	-
	…-20		RPMT2006M0-H	

Flexible Curved Facing





Top Face

Low cutting force and good chip evacuation by new chipbreaker design.
"-H" type insert has a land at the cutting edge which adds edge strength.

New ratchet design prevents the insert's movement and holds the insert firmly in the insert pocket even when the heavy machining. (Only RPMT)

Bottom Face



Insert	Land at Edge	Features	Remarks
RPMT10T3M0 **RPMT1204M0**	No	Low Cutting Force	Even if the workpiece clamp is weak, or if the workpiece is thin, sharp cutting performance and less chattering is demonstrated.
RPMT08T2M0-H **RPMT1204M0-H** **RPMT1606M0-H** **RPMT2006M0-H**	Parallel Land 0.2mm Width	Tough Edge	Used in General Roughing.

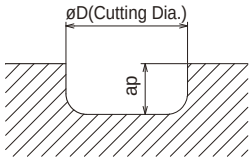
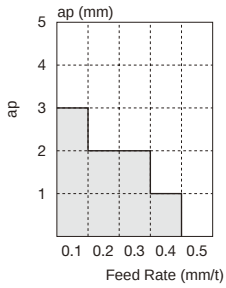
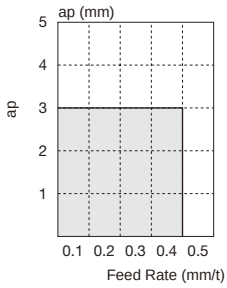
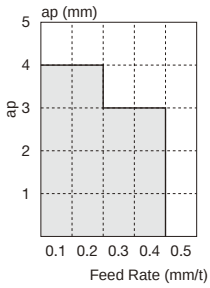
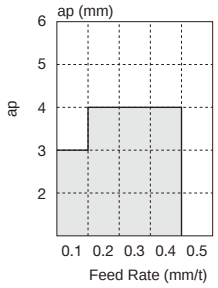
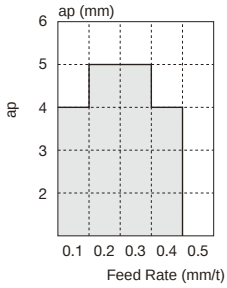
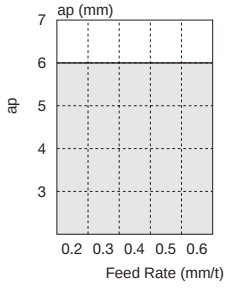
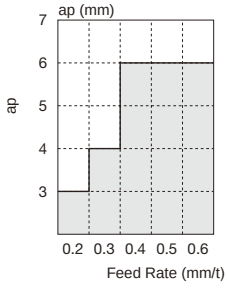
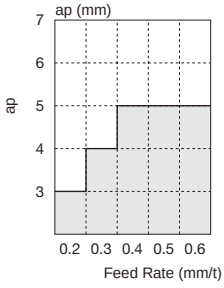
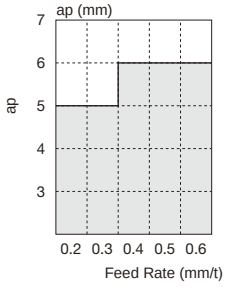
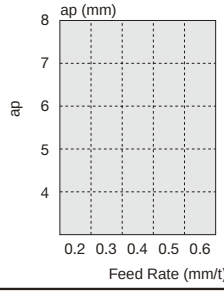
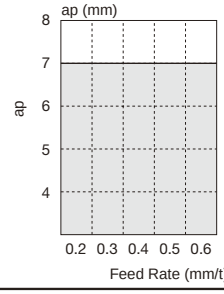
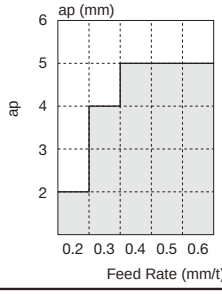
Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			PVD Coated Carbide							Carbide		PCD	
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.4		☆ 120~200			☆ 120~200				★ 100~180					
Carbon Steel	~0.6		★ 120~200			★ 120~200				☆ 100~180					
Alloy Steel	~0.6		★ 100~180			★ 100~180				☆ 80~150					
Mold Steel	~0.5		★ 100~180			★ 80~150				☆ 60~130					
Cast Iron	~0.6										★ 100~180		☆ 80~150		
Non-ferrous Metals	~0.6												★ 100~300		

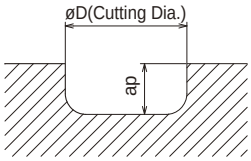
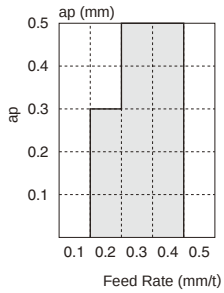
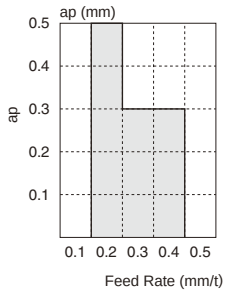
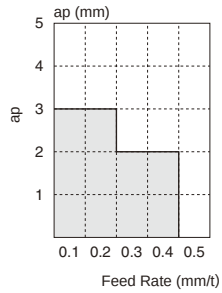
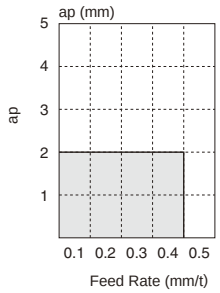
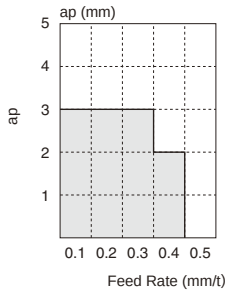
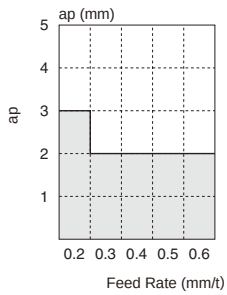
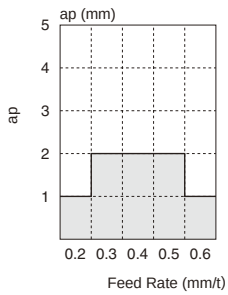
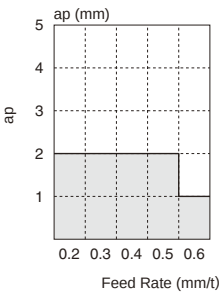
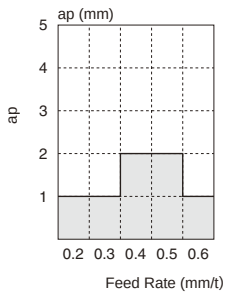
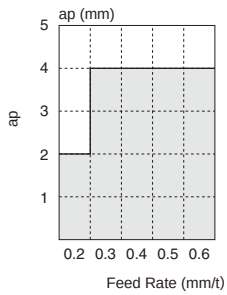
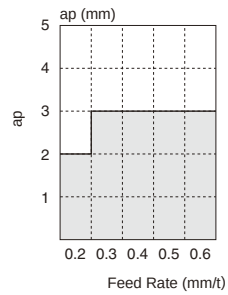
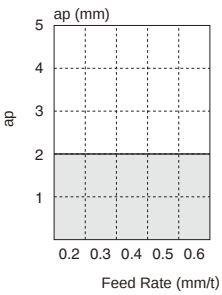
Note) Reduce the ap by 20-50% when machining with long overhang length or using long shank types.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Cutting Performance of Radius Mill (Standard-type)

Workpiece Material	Slotting			
C50 (S50C)		?Cutting Conditions Tooholder: Standard Vc=120 ~ 150m/min (See below table) ap = varied fz= varied Dry Overhang Length = L1 (See below table)		
Description				
08 type (RDMT08T2M0-H)	MRP012-S16-08 n=3980min-1 (Vc=150m/min) L1=42mm 	MRP016-S16-08 n=2980min-1 (Vc=150m/min) L1=42mm 	MRP020-S20-08 n=2390min-1 (Vc=150m/min) L1=42mm 	
10 type (RPMT10T3M0)	MRP025-S25-10-3T n=1910min-1 (Vc=150m/min) L1=60mm 	MRP032-S32-10-4T n=1490min-1 (Vc=150m/min) L1=80mm 		
12 type (RPMT1204M0-H)	MRP032-S25-12 n=1490min-1 (Vc=150m/min) L1=80mm 	MRP040-S32-12 n=1195min-1 (Vc=150m/min) L1=80mm 	MRP040-S32-12-4T n=1195min-1 (Vc=150m/min) L1=80mm 	MRP050-S42-12 n=765min-1 (Vc=120m/min) L1=80mm 
16 type (RPMT1606M0-H)	MRP040-S32-16 n=1195min-1 (Vc=150m/min) L1=90mm 	MRP050-S42-16 n=765min-1 (Vc=120m/min) L1=90mm 	MRP063-S42-16 n=605min-1 (Vc=120m/min) L1=90mm 	

◆ Cutting Performance of Radius Mill (Long Shank type)

Workpiece Material	Slotting			
C50 (S50C)	 ●Cutting Conditions Tooholder: Standard Vc=120 ～150m/min (See below table) ap = varied fz= varied Dry Overhang Length = L_1 (See below table)			
Description				
08 type (RDMT08T2M0-H)	MRP012-S16-08-160 n=3980min^{-1} (Vc=150m/min) L_1=80mm 	MRP016-S16-08-160 n=2980min^{-1} (Vc=150m/min) L_1=80mm 	MRP020-S20-08-180 n=2390min^{-1} (Vc=150m/min) L_1=90mm 	
10 type (RPMT10T3M0)	MRP025-S25-10-3T-180 n=1910min^{-1} (Vc=150m/min) L_1=90mm 	MRP032-S32-10-4T-200 n=1490min^{-1} (Vc=150m/min) L_1=100mm 		
12 type (RPMT1204M0-H)	MRP032-S25-12-300 n=1490min^{-1} (Vc=150m/min) L_1=150mm 	MRP040-S32-12-300 n=1195min^{-1} (Vc=150m/min) L_1=150mm 	MRP040-S32-12-4T-200 n=1195min^{-1} (Vc=150m/min) L_1=100mm 	MRP050-S42-12-300 n=765min^{-1} (Vc=120m/min) L_1=150mm 
16 type (RPMT1606M0-H)	MRP040-S32-16-300 n=1195min^{-1} (Vc=150m/min) L_1=150mm 	MRP050-S42-16-300 n=765min^{-1} (Vc=120m/min) L_1=150mm 	MRP063-S42-16-300 n=605min^{-1} (Vc=120m/min) L_1=150mm 	

Guide for Drilling

【Depth of Drilling】

・See Pd value of Toolholder Dimension Table in page M127, M128.
(Pd Shows the maximum plunge depth.)

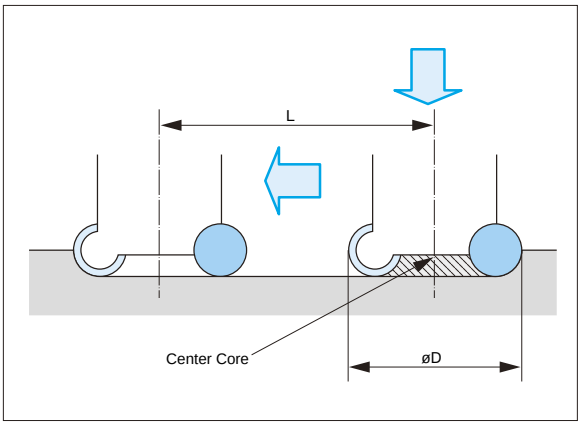
【Traversing after Drilling】

When Traversing after Drilling

① Reduce the table feed by 50% until the center core part (reminder of grinding) is completely cut off.
(The internal cutting edge's radial rake angle is larger in the negative direction)

② The Min. transfer length “L” to make the flat face is as follows.

Insert	L (mm)
RDMT08T2M0-H	øD-7
RPMT10T3M0	øD-9
RPMT1204M0 **RPMT1204M0-H**	øD-11
RPMT1606M0-H	øD-15



Guide for Ramping (Slant Milling)

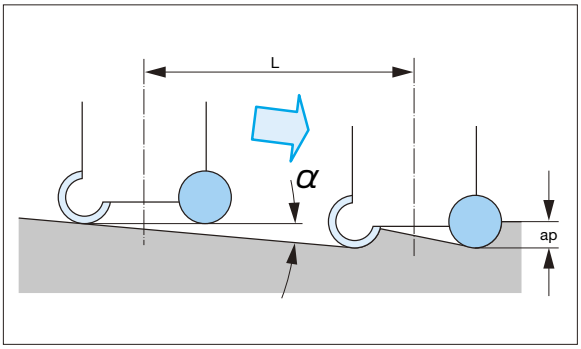
The transfer length “L” at the maximum slant angle α in the ramping operation depends on the ap.

Toolholder	Angle α (°)	tan α
MRP **012-S16-08(-160)**	Ramping is not available	
016-S16-08(-160)	4°	0.070
020-S20-08(-180)	14°	0.249
MRP **025-S25-10-3T(-180)**	14°	0.249
032-S32-10-4T(-200)	8°	0.141
MRP **032-S25-12(-300)**	15°	0.268
040-S32-12(-300)	10°	0.176
040-S32-12-4T(-200)	9°	0.158
050-S42-12(-300)	7°	0.123
MRP **040-S32-16(-300)**	20°	0.364
050-S42-16(-300)	13°	0.231
063-S42-16(-300)	8°	0.141
MRP **050R-10-6T**	4°	0.070
063R-10-7T	3°	0.052
MRP **050R-12**	7°	0.123
063R-12	5°	0.087
080R-12	3°	0.052
080R-12-7T	3°	0.052
MRP **080R-16**	6°	0.105
100R-16	4°	0.070
100R-16-7T	3°	0.052
125R-16	3°	0.052
125R-16-8T	2°	0.035
MRP **080R-20**	8°	0.141
100R-20	6°	0.105

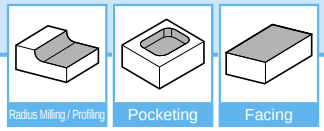
* Above is the value considering the clearance 1mm between the tool body and the workpiece.

Formula of the Transfer Length “L” at Max. Slant Angle

$$L = \frac{ap}{\tan \alpha}$$

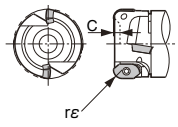


Radius Helical Endmill

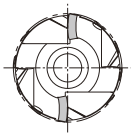


MHD-RSA Separate-type (Base Unit A + Front Piece + Radius Front Piece)

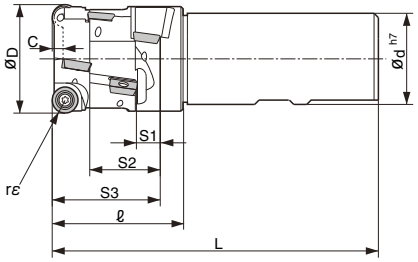




MHD32



MHD40
MHD50



Toolholder Dimensions

Description		Std.	No. of Insert		No. of Flute	Dimension (mm)									Rake Angle (°)		
			Bottom Edge	Middle Edge		rε	øD	ød	L	ℓ	C	S1	S2	S3	A.R.	R.R. Bottom Edge	R.R. Middle Edge
MHD	32-S32-4RSA	●	2	8	2	4	32	32	133	50	3.0	8.3	24.7	42.0	+9°	-5°	-7°
	40-S32-5RSA	●				5	40	32	143	58	4.0	10.9	31.9	48.2		-3°	-3°
	40-S42-5RSA	●				5	40	42	149	58	4.0					-3°	-3°
	50-S42-6RSA	●				6	50	42	150	59	5.0					0°	-1°

・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

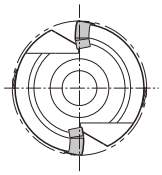
Applicable Inserts and Composition of Toolholder

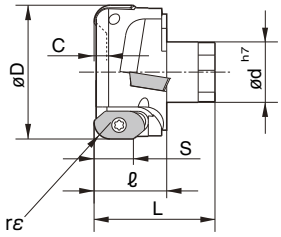
Endmill		Applicable Inserts ➔ M18~M20	Base Unit ➔ M67	Front Piece (Middle) ➔ M69	Front Piece (End) ➔ M129
MHD	32-S32-4RSA	FPMT090340ER,NDKT090304ER-V / N1 / N2	MHD32-S32-A	MHD32-F	MHD32-4RF
	40-S32-5RSA	RPMT10T3M0,NDMM12T308ER-T / N2 / N3	MHD40-S32-A MHD40-S42-A	MHD40-F	MHD40-5RF
	40-S42-5RSA				
	50-S42-6RSA	RPMT1204M0(-H),NDMM12T308ER-T / N2 / N3	MHD50-S42-A	MHD50-F	MHD50-6RF

MHD-RF Radius Front Piece



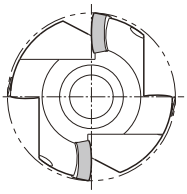
MHD32-4RF

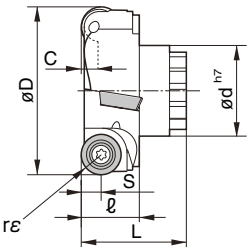






MHD40-5RF
50-6RF





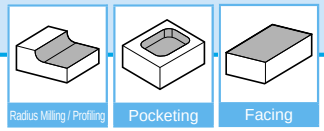
Toolholder Dimensions

Description		Std.	No. of Insert		No. of Flute	Dimension (mm)							Rake Angle (°)			Applicable Inserts ➔ M18~M20
			Bottom Edge	Middle Edge		rε	øD	ød	L	ℓ	C	S	A.R.	R.R. Bottom Edge	R.R. Middle Edge	
MHD	32-4RF	●	2	2	2	4	32	14.4	28.8	17.3	3	9.2	+9°	-5°	-7°	FPMT090340ER NDKT090304ER-V / N1 / N2
	40-5RF	●				5	40	19	29.3	16.3	4	5		-3°	-3°	RPMT10T3M0 NDMM12T308ER-T / N2 / N3
	50-6RF	●				6	50	27	31.3	17.3	5	6		0°	-1°	RPMT1204M0(-H) NDMM12T308ER-T / N2 / N3

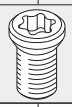
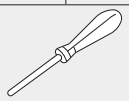
・When using "-T" Insert, the finished diameter (øD) will be approx. 0.2mm smaller.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Radius Helical Endmill



Spare Parts

Description			Spare Parts							
			Clamp Screw		Wrench		Clamp Bolt		Wrench	Anti-seize Compound
			For End Insert	For Middle Insert	For End Insert	For Middle Insert	For 1 Front Piece	For 2 Front Piece		
										
Separate Type	MHD	32-S32-4RSA	SB-2560TR	SB-2560TR	DT-8	DT-8	-	HH8X50	LW-6	MP-1
		40-S32-5RSA	SB-3080TR	SB-3080TR	DT-10	DT-10	-	HH8X55	LW-6	
		40-S42-5RSA								
		50-S42-6RSA	SB-4085TR	SB-3080TR	DT-15	DT-10	-	HH12X55	LW-10	
Base Unit	MHD	32-S32-A	SB-2560TR		DT-8		-	HH8X50	LW-6	MP-1
		40-S32-A	SB-3080TR		DT-10		-	HH8X65	LW-6	
		40-S42-A								
		50-S42-A	SB-3080TR		DT-10		-	HH12X65	LW-10	
Front Piece	MHD	32-F	SB-2560TR		DT-8		-	-	-	-
		40-F	SB-3080TR		DT-10					
		50-F								
Radius Front Piece	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	SB-3080TR	DT-15	DT-10				

・When purchasing the front piece separately, the wrench (DT-8 or DT-10 or DT-15)is not included.
・When purchasing the base unit and front pieces separately, the clamp bolt and wrench are not included.
・Various clamp bolts for front pieces are available. ➡ **M77**
・The clamp bolt for the front piece (MHD...-F) is included with separate-type (MHD...-SA/SB) and base unit (MHD...-A/-B).
If replacing the end with the radius-type front piece (MHD…-RF), a different type of clamp bolt may be required. ➡ **M77**



Coat Anti-seize Compound (MP-1) thinly on clamp screw when insert is fixed.

Applicable Inserts

ND □□ 09 Insert

Description	Applicable Inserts ➡ **M18, M19**				Applicable Inserts ➡ **M20**
			 1-Notched	 2-Notched	
MHD 32-S32-4RSA	NDKW 090304ER	NDKT 090304ER-V	NDKT 090304ER-N1	NDKT 090304ER-N2	FPMT090340ER

ND □□ 12 Insert

Description	Applicable Inserts ➡ **M19**			Applicable Inserts ➡ **M20**		
		 2-Notched	 3-Notched			 Tough Edge
MHD 40-S32-5RSA 40-S42-5RSA	NDMM 12T308ER-T	NDMM 12T308ER-N2	NDMM 12T308ER-N3	RPMT 10T3M0	-	-
MHD 50-S42-6RSA				-	RPMT 1204M0	-
					-	RPMT 1204M0-H

・For installation of notched insert, make sure to see page **M76**.

◆ Recommended Cutting Conditions (MHD-RSA)

Application	Description	Workpiece Material: C50 (S50C)				Workpiece Material: Cast Iron			
		Cutting Speed Vc (m/min)	fz (mm/t)	Max. Condition		Cutting Speed Vc (m/min)	fz (mm/t)	Max. Condition	
				Depth ap (mm)	Width ae (mm)			Depth ap (mm)	Width ae (mm)
Shouldering	MHD 32-S32-4RSA	100	0.1	40	1/2 of Cutting Dia.	120	0.15	45	1/2 of Cutting Dia.
	40-S32-5RSA 40-S42-5RSA 50-S42-6RSA	100	0.1	45	1/2 of Cutting Dia.				
Slotting	MHD 32-S32-4RSA 40-S32-5RSA 40-S42-5RSA 50-S42-6RSA	80	0.1	1/2 of Cutting Dia.		100	0.15	1/2 of Cutting Dia.	
Ramping Shouldering	MHD 32-S32-4RSA	80	0.1	40	1/2 of Cutting Dia.	80	0.1	45	1/2 of Cutting Dia.
	40-S32-5RSA 40-S42-5RSA 50-S42-6RSA	80	0.1	45	1/2 of Cutting Dia.				
Ramping Slotting	MHD 32-S32-4RSA 40-S32-5RSA 40-S42-5RSA 50-S42-6RSA	80	0.1	1/2 of Cutting Dia.		80	0.1	1/2 of Cutting Dia.	

・MHD32-S32-4RSA is not suitable for slotting and slant slotting of carbon steel / alloy steel.

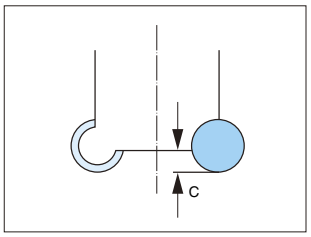
Guide for Drilling

【Depth of Drilling】

・Radius Helical Endmill MHD-RSA / MHD-RC

Description	C-Dimension (Distance from body bottom to insert end: mm)	Recommended ap when Drilling
FPMT090340ER	3mm	2mm
RPMT10T3M0	4mm	3mm
RPMT1204M0 RPMT1204M0-H	5mm	4mm

The ap should have approx. 1mm clearance from C-dimension when Drilling.



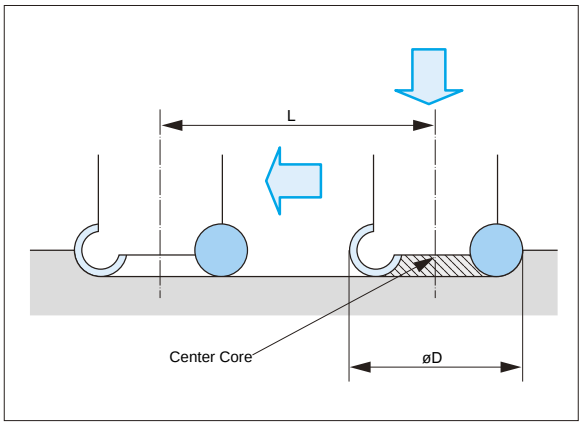
【Traversing after Drilling】

When Traversing after Drilling

① Reduce the table feed by 50% until the center core part is completely cut off.
(The internal cutting edge's radial rake angle is large in the negative direction)

② The Min. transfer length “L” to make the flat face is as follows.

Insert	L (mm)
FPMT090340ER	øD-7
RPMT10T3M0	øD-9
RPMT1204M0 RPMT1204M0-H	øD-11



Guide for Ramping (Slant Milling)

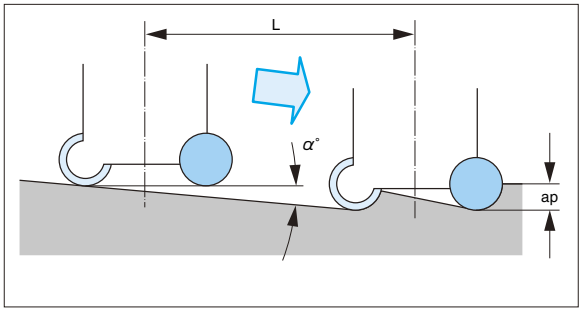
The transfer length “L” at the maximum slant angle α in the ramping operation depends on the ap.

Toolholder	Angle α (°)	tan α
MHD32-S32-4RSA(MHD32-4R)	6°	0.105
MHD40-S32-5RSA(MHD40-5R)	8°	0.141
MHD40-S42-5RSA(MHD40-5R)	8°	0.141
MHD50-S42-6RSA(MHD50-6R)	8°	0.141

* Above is the value considering the clearance 1mm between the tool body and the workpiece.

Formula of the Transfer Length “L” at Max. Slant Angle

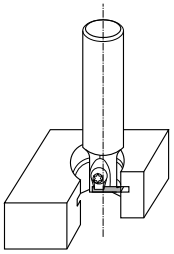
$$L = \frac{ap}{\tan \alpha}$$



MGI Grooving Endmill

MGI





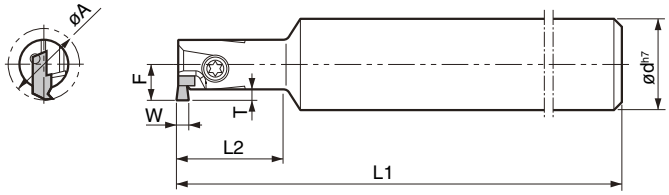


Fig1

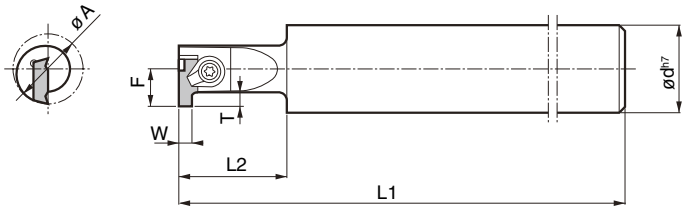


Fig2

Toolholder Dimensions

Description		Std.	Min. Bore Dia. øA	Dimension (mm) ød	L1	L2	F	T	Edge Width W	Drawing	Spare Parts: Clamp Set	Clamp Screw	Wrench	Applicable Inserts ➡ M133
MGI	1420-1SS	●	14	20	100	20	6.8	2.2	1.0~3.0	Fig.1	-	SB-4065TR	FT-15	GVR100SS~GVR300SS
	1620-1S	●	16		110	25	7.8				-	SB-4085TR	FT-15	GVR100S~GVR340S
	2020-1A	●	20			30	9.8	2.2	1.0~3.4	Fig.2	CPS-5F	-	FT-15	GVR100A~GVR340A GVR100AR~150AR
	2220-1B	●	22				11	2.8	1.45~4.0					GVR145B~GVR400B GVR100BR~150BR
	3225-1C	●	32	25	120	35	16	5.5 (4.5)	2.8~4.25		CPS-6F	-	LW-3	GVR280C~GVR425C
	4025-1C	●	40			40	20							

Spare Parts: Clamp Set 5F / 6F; Clamp Screw; Wrench FT / LW

・Dimension T: shows available grooving depth.

・GVR280C, GVR300C is available to the groove depth up to 4.5mm.

・GVR430C~500C can be installed to MGI3225-1C and 4025-1C, but not recommended for steel machining because of toolholder's rigidity.

Recommended Cutting Conditions

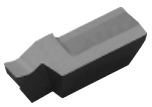
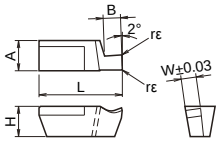
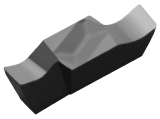
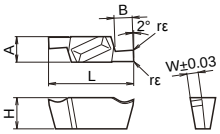
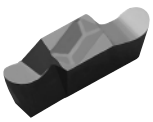
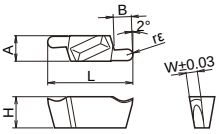
Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min) Cermet TN60	TN90	TC40	TC60	CVD Coated Carbide CR9025	PVD Coated Carbide PR630	PR930	Carbide KW10
Stainless Steel	0.03~0.12		☆ 100~180	☆ 100~180	★ 80~150		☆ 60~130	★ 60~130	
Carbon Steel	0.05~0.15		★ 120~200	☆ 120~200	☆ 100~180		☆ 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	
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 ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

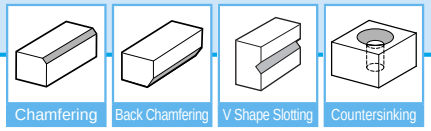
Applicable Inserts

Insert (Right-hand Shown)		Description	(Previous Description)	W	B	rε	A	L	H	Insert Grade: Cermet TN60	Cermet TN90	Cermet TC40	PVD Coated Carbide TC60	PVD Coated Carbide PR630	PVD Coated Carbide PR930	Carbide KW10
 1-edge		**GVR 100-020SS**	GVR 100SS	1.00	2.3	0.2	3.6	9	3.0		○		●	●	R	●
		125-020SS	125SS	1.25							○		●	●	R	●
		145-020SS	145SS	1.45							○		●	●	●	●
		200-020SS	200SS	2.00							○		●	●	R	●
		250-020SS	250SS	2.50							○		●	●	R	●
		300-020SS	300SS	3.00							○		●	●	●	●
		GVR 100-020S	GVR 100S	1.00	2.3	0.2	4.0	11	4.0		○	○	●	●	●	●
		125-020S	125S	1.25							○	○	●	●	R	●
		145-020S	145S	1.45							○	○	●	●	R	●
		185-020S	185S	1.85							○	○	●	●	R	●
		200-020S	200S	2.00							○	○	●	●	●	●
		250-020S	250S	2.50							○	○	●	●	R	●
		340-020S	340S	3.40								○	●	●	R	●
 2-edge		**GVR 100-020A**	GVR 100A	1.00	2.3	0.2	4.0	12	5.0		○	○	●	●	●	●
		120-020A	120A	1.20									●			
		125-020A	125A	1.25							○	○	●	●	R	●
		140-020A	140A	1.40									●			
		145-020A	145A	1.45							○	○	●	●	R	●
		170-020A	170A	1.70									●			
		185-020A	185A	1.85							○	○	●	●	R	●
		195-020A	195A	1.95									●			
		200-020A	200A	2.00							○	○	●	●	●	●
		225-020A	225A	2.25									●			
		250-020A	250A	2.50							○	○	●	●	R	●
		275-020A	275A	2.75									●			
		300-020A	300A	3.00							○	○	●	●	R	●
		340-020A	340A	3.40							○	○	●	●	R	●
		GVR 145-020B	GVR 145B	1.45	2.8	0.2	4.5	15	5.5		○	○	●	●	●	●
		185-020B	185B	1.85							○	○	●	●	R	●
		200-020B	200B	2.00	3.2						○	○	●	●	●	●
		225-020B	225B	2.25									●			
		230-020B	230B	2.30							○	○	●	●	●	R
		250-020B	250B	2.50							○	○	●	●	●	●
		275-020B	275B	2.75									●			
		280-020B	280B	2.80							○	○	●	●	R	R
		300-020B	300B	3.00	4.2						○	○	●	●	●	●
		325-020B	325B	3.25									●			
		340-020B	340B	3.40							○	○	●	●	R	R
		400-020B	400B	4.00							○	○	●	●	R	●
		GVR 280-020C	GVR 280C	2.80	4.5	0.2	5.8	21	6.5		○	○	●	●	R	●
		300-020C	300C	3.00							○	○	●	●	●	●
		325-020C	325C	3.25	5.5								●			
		340-020C	340C	3.40							○	○	●	●	●	●
		400-020C	400C	4.00							○	○	●	●	●	●
		425-020C	425C	4.25	6.3								●			
		(430-020C)	(430C)	4.30							○	○	●	●	R	●
		(460-020C)	(460C)	4.60								○	●	●	R	●
		(500-020C)	(500C)	5.00							○	○	●	●	●	●
 2-edge Full-R		**GVR 200-100AR**	GVR 100AR	2.00		1.00							●	R	●	R
		250-125AR	125AR	2.50	2.3	1.25	4.0	12	5.0				R	R	R	R
		300-150AR	150AR	3.00		1.50							R	R	R	R
		GVR 200-100BR	GVR 100BR	2.00	3.2	1.00	4.5	15	5.5				●	R	R	R
		300-150BR	150BR	3.00	4.2	1.50							R	R	R	R

• Only R-hand insert is applicable.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

MCSE Chamfering Endmill



MCSE



Standard (Straight)



Standard (Weldon)

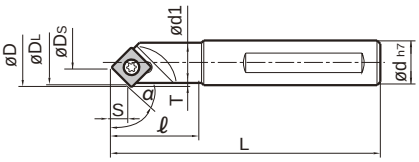


Fig.1

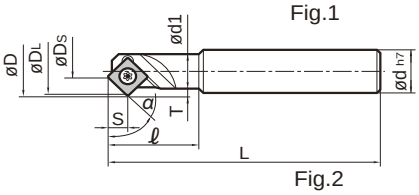


Fig.2

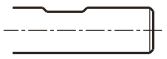


Fig.3

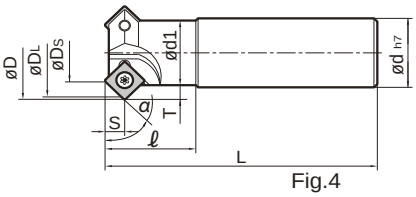


Fig.4



Fig.5

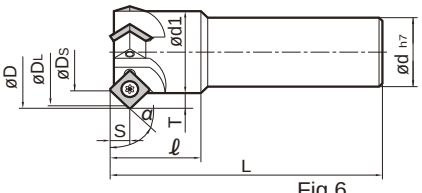
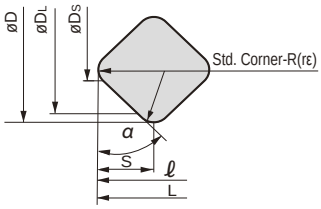


Fig.6



Fig.7



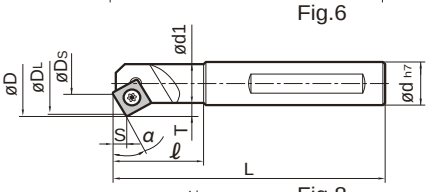


Fig.8

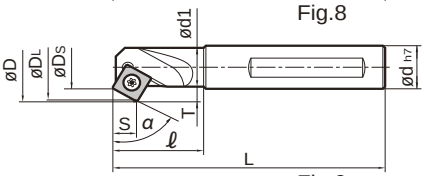


Fig.9

Toolholder Dimensions

Toolholder Dimensions			Std.	No. of Insert	Dimension (mm)									Std. Corner-R(rε)	Angle (°)	Rake Angle (°)		Drawing	Spare Parts	
					øD	øDL	øDS	ød	ød1	L	ℓ	S	T		α	A.R.	R.R.		Clamp Screw	Wrench
Cylindrical	MCSE	104	●	1	16	15	4	16	15	85	30	6.5	0.5	0.4	45°	0°	-4.5°	Fig.1	SB-3060TR	DT-10
		106	●		22	21	6	20	16	120	40	8.6	3.0	0.8			-1°	Fig.2	SB-5090TR	LTW-20
		115	●		31	30	15		18				6.5				+5°			
		227	●	2	43	42	27	32	30				6.5				+8°	Fig.4		
		336	●	3	52	51	36		38				7.0				+10°	Fig.6		
Weldon	MCSE	106-W	●	1	22	21	6	20	16	92	40	8.6	3.0	0.8	45°	0°	-1°	Fig.3	SB-5090TR	LTW-20
		115-W	●		31	30	15		18				6.5				+5°			
		227-W	●	2	43	42	27	32	30	120			6.5				+8°	Fig.5		
		336-W	●	3	52	51	36		38	105	45		7.0				+10°	Fig.7		
Cylindrical	MCSE	104-30D	●	1	19	18	4	16	15	85	30	4.7	2.0	0.4	30°	0°	-4°	Fig.8	SB-3060TR	DT-10
		108-30D	●		28	27	8	20	19	110	40	6.3	4.5	0.8			-2.5°		SB-5090TR	LTW-20
		110-30D	●		30	28	10		18	120			6.0				0°			
	MCSE	108-60D	●		19.5	19	8	20	19	110	40	10	0.25	0.8	60°	0°	-3.5°	Fig.9	SB-5070TR	LTW-20
		120-60D	●		31	30	20		18	120			6.5				0°		SB-5090TR	

• Dimension T indicates available back chamfering dimension.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

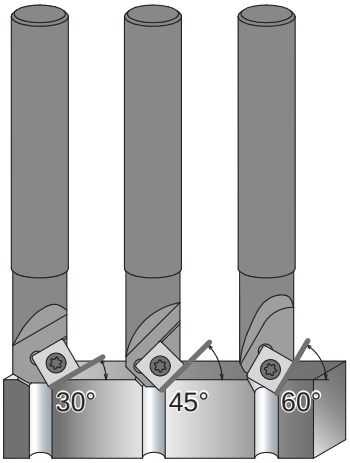
Applicable Inserts

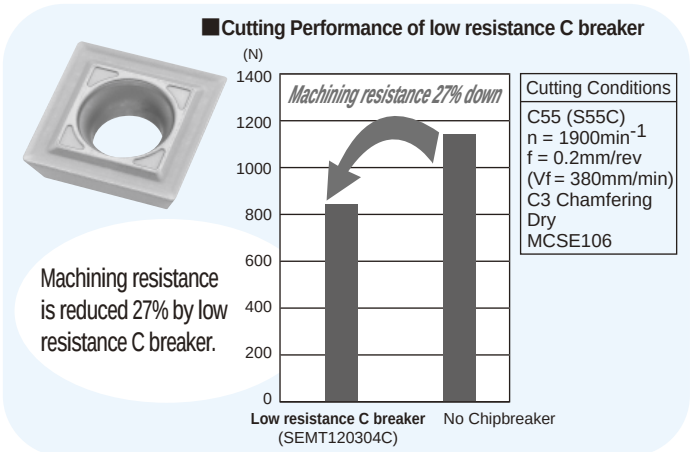
Description	Applicable Inserts → M13		
			
MCSE 104 **104-30D**	**SDKW 09T204TN**	**SDKW 09T204FN**	**SDMT 09T204C**
MCSE 106 (-W) **115 (-W)** **227 (-W)** **336 (-W)**	**SEKW 120304TN** **120308TN**	**SEKW 120304FN** **120308FN**	**SEMT 120304C**
MCSE 108-30D **110-30D**			
MCSE 108-60D **120-60D**			

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)		Recommended Insert Grade (Cutting Speed Vc: m/min)											
			Cermet			PVD Coated Carbide							Carbide	
	øDs (ø4~ø20)	øDs (ø27~ø36)	TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.2	0.1~0.3		☆ 100~180	☆ 80~160	☆ 100~180	★ 100~180							
Carbon Steel	0.05~0.25	0.2~0.4		★ 100~180	☆ 80~160	☆ 100~180	★ 100~180							
Alloy Steel	0.05~0.25	0.2~0.4		★ 100~180	☆ 80~160	☆ 80~150	★ 80~150							
Mold Steel	0.05~0.25	0.2~0.4		★ 100~150	☆ 80~130	☆ 60~130	★ 60~130							
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





MEF Bolt Countersink Endmill

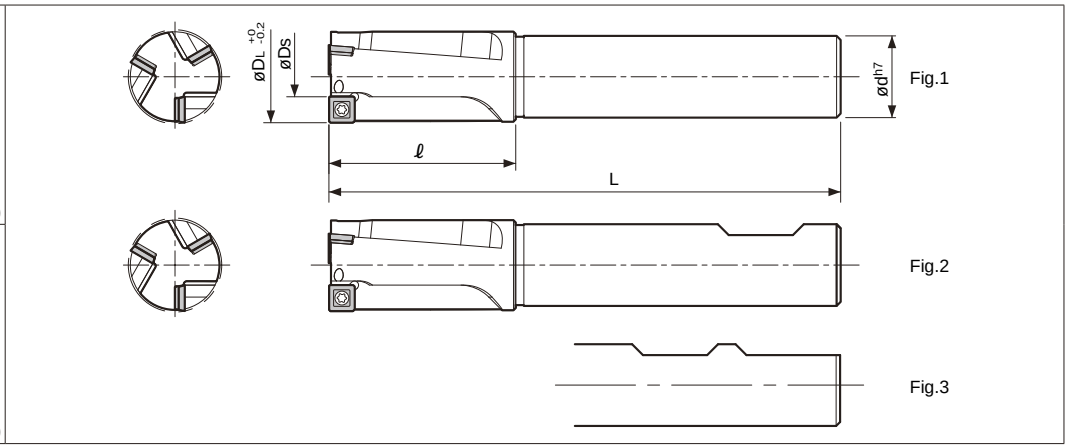
MEF



Standard (Straight)



Standard (Weldon)



Toolholder Dimensions

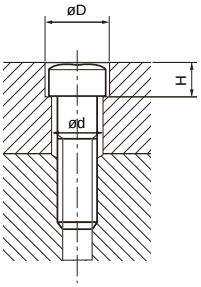
Description		Std.	No. of Insert	Dimension (mm) øDL	øDs	ød	L	ℓ	Std. Corner-R(rε)	Rake Angle (°) A.R.	R.R.	Drawing	Objective Bolt Size	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ M15
Cylindrical	MEF 11-S10	●	1	11	3.0	10	103	23	0.4	+5°	-13°	Fig.1	M6	SB-2250TR	DT-7	SPMT060204E-Z 060208E-Z
	14-S12	●	1	14	4.5	12	108	28					M8			
	17-S16	●	2	17.5	7.3	16	115	35					M10	SB-2260TR		
	18-S16	●	2	18	7.7		117	38					-			
	20-S16	●	3	20	9.5		120	0.4			-12°		M12			
	22-S20	●	3	22	11.4	20	124	44					-			
	23-S20	●	3	23	12.4		126	46					M14			
	24-S20	●	3	24	13.4		128	48					-			
	25-S20	●	3	25	14.4		130	50					-			
	25-S25	●	3			25							-			
	26-S25	●	3	26	9.8	25	132	52	0.8		-13°		M16	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	27-S25	●	3	27	10.6		134	54					-			
	28-S25	●	3	28	11.5		136	56					-			
	29-S25	●	3	29	12.6		138	58					M18			
	30-S25	●	3	30	13.5		140	60					-			
	32-S25	●	3	32	15.5		144	64					M20			
	35-S32	●	3	35	18.4	32	150	70					M22			
	39-S32	●	4	39	22.5		158	78					M24			
	43-S32	●	4	43	26.2		166	86			-12°		M27			
	48-S32	●	4	48	31.3		176	96					M30			
Weldon	MEF 15-S12-80W	●	1	15	4.6	12	80	30			-13°	Fig.2	M8	SB-2260TR	DT-7	SPMT060204E-Z 060208E-Z
	18-S16-90W	●	2	18	7.5	16	90	36					M10			
	20-S16-90W	●	2	20	8.3			40			-12°		M12			
	26-S25-120W	●	3	26	9.8	25	120	52			-13°	Fig.3	M16	SB-3080TR	DT-10	SPMT090304E-Z 090308E-Z
	33-S25-140W	●	3	33	16.5		140	66					M20			
	40-S32-160W	●	4	40	23.3	32	160	80					M24			

- Before machining, the workpiece must have a hole with diameter larger than øDs.
- Although Corner R(rε) pertains to MEF11-S10, ø Ds=3.0mm.

Applicable Inserts

Insert	Description
	SPMT 060204E-Z 060208E-Z
	SPMT 090304E-Z 090308E-Z

Bolt Counter Sink (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	25	30	33
Applicable Endmill	MEF11	MEF14	MEF17	MEF20	MEF23	MEF26	MEF29	MEF32	MEF35	MEF39	MEF43	MEF48

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

◆ Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)											
		Cermet			PVD Coated Carbide							Carbide	
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10
Stainless Steel	0.05~0.1					☆ 60~120				★ 60~120			
Carbon Steel	0.1~0.15					★ 80~150				☆ 60~130			
Alloy Steel	0.1~0.15					★ 80~150				☆ 60~130			
Mold Steel	0.05~0.1					★ 70~120				☆ 70~120			
Cast Iron	0.1~0.2										★ 100~180		☆ 80~120
Non-ferrous Metals	0.1~0.2												★ 100~300

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Points at Bolt Counter Sink Milling

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**.

Description	Cutting Speed Vc (m/min)	Feed Rate 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.

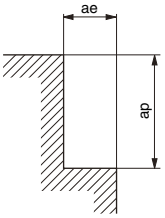
Description	Cutting Speed Vc (m/min)	Feed Rate fz (mm/t)	Step Feed (mm)
MEF11~MEF48	80~150	0.1~0.15	0.5~1.5

③ Stainless Steel

Use a lower Cutting Speed. High Cutting Speeds cause chattering.

◆ Cutting Performance when Shouldering

MEF Bolt Countersink Endmill is also recommended of shouldering.



Vc=80~120m/min
C55
DRY
Overhang Length: Same as ℓ 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. (See Fig.1)

・MEF type's side edge is designed to have a slight clearance for the countersink milling.
Therefore, worked side wall is approx. 1° inclined against the vertical face.
(Fig.2)

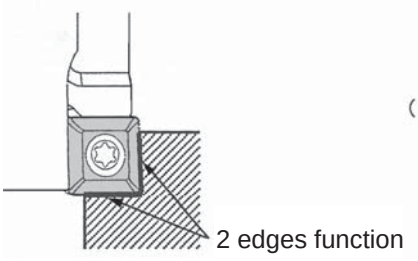


Fig.1

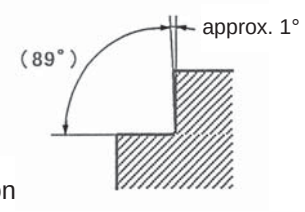
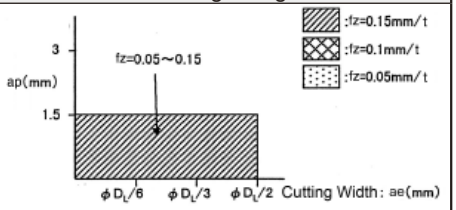
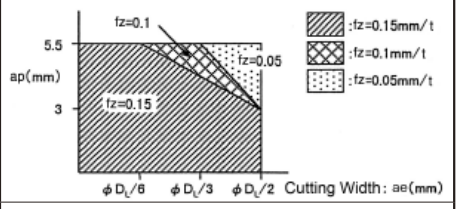
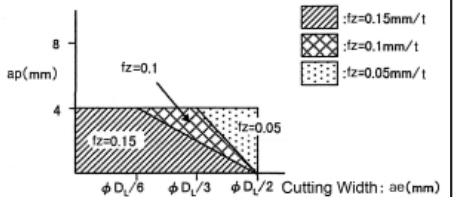
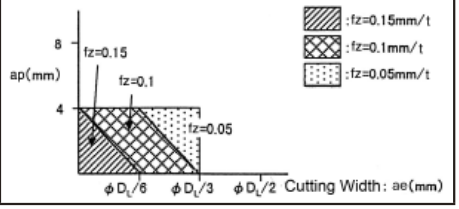


Fig.2

Description	Cutting Range
MEF11-S12 **MEF14-S12** **MEF17-S16** **MEF18-S16**	
MEF20-S16 **MEF22-S20** 〜 **MEF25-S25**	
MEF26-S25 〜 **MEF32-S25** **MEF35-S32**	
MEF39-S32 **MEF43-S32** **MEF48-S32**	

T-Slotting | Back side milling

METS



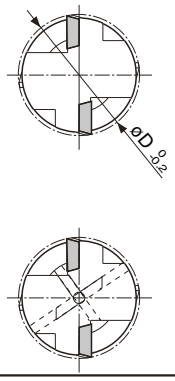


Fig.1

Fig.2

Toolholder Dimensions

Description		Std.	No. of Insert	No. of Edge Line	Dimension (mm) øD	ød	ød1	ℓ	L1	L2	L3	L4	L5	Rake Angle (°) A.R.	R.R.	Drawing	Spare Parts Clamp Screw	Spare Parts Wrench	Applicable Inserts M13
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	●			32	32	15.5	14	120	38	36	14	19		-12°		SB-3060TR	DT-10	SDMT080308E-K
	40-S32	●	4	2	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	●			32	32	15.5	14	120	38	36	14	19		-12°		SB-3060TR	DT-10	SDMT080308E-K
	40-S32-H	●	4	2	40		20.5	18	130	50							SB-4085TR	DT-15	SDMT120408E-K
	50-S32-H	●			50		26.5	22	140	60									

・METS…-H type has air holes

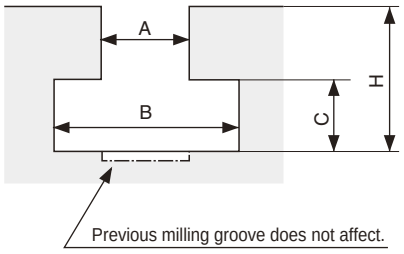
Applicable Inserts

Toolholder		Applicable Inserts M13
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 +3 0	45	38
28	46 +4 0	20 +4 0	56	48



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)											
		Cermet			PVD Coated Carbide							Carbide	
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10
Stainless Steel	-												
Carbon Steel	0.1~0.15					★ 80~150				☆ 60~130			
Alloy Steel	0.08~0.12					★ 80~150				☆ 60~130			
Mold Steel	0.05~0.1					☆ 60~100				★ 60~100			
Cast Iron	0.1~0.15										★ 80~150		☆ 80~120
Non-ferrous Metals	0.1~0.15												★ 100~300

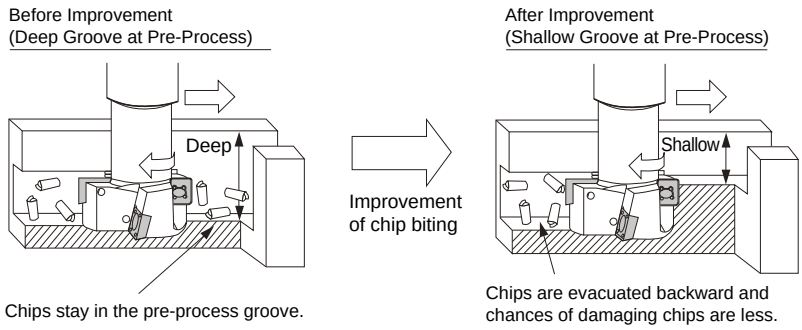
★ : 1st Recommendation ☆ : 2nd Recommendation

Toolholder Description (T Slot Nominal Size)	Steel			Cast Iron		
	Recommended Groove Shape at Pre-process	Recommended T-Slotting Conditions	Recommended conditions to prevent chattering	Recommended Groove Shape at Pre-process	Recommended T-Slotting Conditions	Recommended conditions to prevent chattering
METS21-S25(-H) (Nominal Size 12)	C=1~3mm	Vc= 120 fz= 0.1 (n= 1820) (Vf= 182)	Vc= 60 fz= 0.15 (n= 920) (Vf= 137)	C= over 1mm	Vc= 120 fz= 0.12 (n= 1820) (Vf= 218)	Vc= 80 fz= 0.15 (n= 1210) (Vf= 182)
METS25-S25(-H) (Nominal Size 14)	C=1~3mm	Vc= 120 fz= 0.1 (n= 1530) (Vf= 306)	Vc= 60 fz= 0.15 (n= 760) (Vf= 228)	C= over 1mm	Vc= 120 fz= 0.12 (n= 1530) (Vf= 367)	Vc= 80 fz= 0.15 (n= 1020) (Vf= 306)
METS32-S32(-H) (Nominal Size 18)	C=1~3mm	Vc= 100 fz= 0.1 (n= 1000) (Vf= 200)	Vc= 60 fz= 0.15 (n= 600) (Vf= 180)	C= over 1mm	Vc= 120 fz= 0.12 (n= 1190) (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= over 9mm	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), Spindle Revolution: n (min^{-1}), Feed Rate fz (mm/t), Table Feed Vf (mm/min)]

・Chattering is likely when f is less than fz=0.1mm/t. Keep feed rate between fz=0.1~0.15mm/t.
For cast iron machining, the bigger the C-dimension becomes, the less chattering occurs.

How to prevent damaging Chips when Steel machining

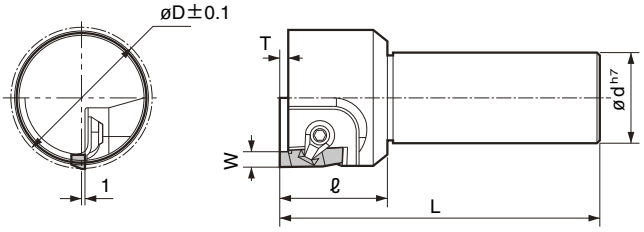


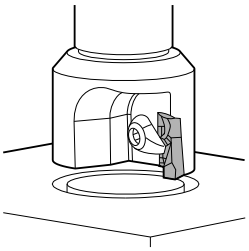
Make pre-process groove shallower to prevent the tool damage from chips.
Use compressed air to aid in chip evacuation.

MVG Ring Grooving Endmill

MVG





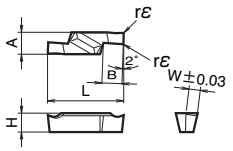


Toolholder Dimensions

Description		Std.	Dimension (mm)					Edge Width	Spare Parts	
			øD	ød	L	ℓ	T	W	Clamp Set	Wrench
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							
	6532	○	65							
	7032	○	70							
	7532	○	75							

・Dimension T shows available grooving depth.

Applicable Inserts

Insert (Handed Insert shows Right-hand)		Description	(Previous Description)	Dimension (mm)						Insert Grade: Cermet				Insert Grade: PVD Coated Carbide		Insert Grade: Carbide
				W	B	rε	A	L	H	TN60	TN90	TC40	TC60	PR630	PR930	KW10
		GVFR 400-020B	GVFR 400B	4.00	5.3	0.2	5.8	20	5.0				●		●	●
		GVFR 430-020B	GVFR 430B	4.30									●		●	●
		GVFR 460-020B	GVFR 460B	4.60									●		●	●
		GVFR 490-020B	GVFR 490B	4.90									●		●	●

・GVFR430B is applicable for sealing groove of G-series
For other ring grooving, GVFR400B~490B are applicable.
・Only right-hand insert is applicable.

Recommended Cutting Conditions

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)						
		Cermet				PVD Coated Carbide		Carbide
		TN60	TN90	TC40	TC60	PR630	PR930	KW10
Stainless Steel	0.03~0.12			☆ 100~180	☆ 80~150	☆ 60~130	★ 60~130	
Carbon Steel	0.05~0.15			★ 120~200	☆ 100~180	☆ 80~150	☆ 80~150	
Alloy Steel	0.05~0.15			★ 120~200	☆ 100~180	☆ 80~150	☆ 80~150	
Mold Steel	0.03~0.12			★ 100~180	☆ 80~150	☆ 60~130	☆ 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 ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Cutting Conditions Table

Recommended Cutting Conditions (MSD45 ⇒ **M31**, MSP15 ⇒ **M39**)

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			PVD Coated Carbide							Carbide		PCD	
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	☆ 120~200	☆ 120~200				★ 100~200		☆ 80~120			
Carbon Steel	~0.3	☆ 150~220	★ 120~200	☆ 120~200	☆ 120~200	★ 120~200				☆ 100~180		☆ 80~150			
Alloy Steel	~0.3	☆ 120~200	★ 100~180	☆ 100~180	☆ 100~180	★ 100~180				☆ 80~150		☆ 80~150			
Mold Steel	~0.25	☆ 120~200	★ 100~180	☆ 100~180	☆ 80~150	★ 80~150				☆ 60~130		☆ 80~150			
Cast Iron	~0.3										★ 100~200		☆ 80~150		
Non-ferrous Metals	~0.2												★ 100~300	★ 300~800	☆ 300~800

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (MSO45・・ー09 ⇒ **M34**)

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			PVD Coated Carbide							Carbide		PCD	
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25		☆ 120~200		☆ 120~200	☆ 120~200				★ 100~200					
Carbon Steel	~0.3		★ 120~200		☆ 120~200	★ 120~200				☆ 100~180					
Alloy Steel	~0.3		★ 100~180		☆ 100~180	★ 100~180				☆ 80~150					
Mold Steel	~0.25		★ 100~180		☆ 80~150	★ 80~150				☆ 60~130					
Cast Iron	~0.3										★ 100~200		☆ 80~150		
Non-ferrous Metals	~0.2												★ 100~300		

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (MSE15 ⇒ **M39**)

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)													
		Cermet			PVD Coated Carbide							Carbide		PCD	
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	KPD001	KPD010
Stainless Steel	~0.25		☆ 120~200	☆ 120~200	☆ 120~200	★ 120~200									
Carbon Steel	~0.25		★ 120~200	☆ 120~200	☆ 120~200	★ 120~200									
Alloy Steel	~0.25		★ 100~180	☆ 100~180	☆ 100~180	★ 100~180									
Mold Steel	~0.25		★ 100~180	☆ 100~180	☆ 80~150	★ 80~150									
Cast Iron	-														
Non-ferrous Metals	-														

★ : 1st Recommendation ☆ : 2nd Recommendation

Recommended Cutting Conditions (DMC / DMC-SX ⇒ **M78**)

Workpiece Material	fz (mm/t)	Recommended Insert Grade (Cutting Speed Vc: m/min)												Max. ap (mm)		
		Cermet			PVDCoated Carbide							Carbide				
		TN60	TN100M	TC60	PR630	PR730	PR830			PR660	PR905	PW30	KW10	Cutting Dia. (øD)	Slotting (ap)	Shouldering (ap×ae)
Stainless Steel	~0.15		☆ 120~200	☆ 120~200	☆ 100~200	★ 120~200								~ø12	1.5	4×2
														ø14~	2	6×2
Carbon Steel	~0.2		★ 120~200	☆ 120~200	☆ 100~200	★ 120~200								~ø12	2	6×2
														ø14~	3	9×3
Alloy Steel	~0.2		★ 100~180	☆ 100~180	☆ 100~180	★ 100~180								~ø12	2	6×2
														ø14~	3	9×3
Mold Steel	~0.15		★ 100~180	☆ 100~180	☆ 80~150	★ 80~150								~ø12	2	6×2
														ø14~	3	9×3
Cast Iron	~0.2												★ 80~150	~ø12	2	6×2
														ø14~	3	9×3
Non-ferrous Metals	~0.2												★ 100~300	~ø12	2	6×2
														ø14~	3	9×3

・Use DMC8 ○○ with d = 6mm Max. for shouldering.

★ : 1st Recommendation ☆ : 2nd Recommendation

Tools for Turning Mill

N1~N12

Tools for Turning Mill **N2~N12**

HSK-T (ICTM Standard) Tooling **N2**

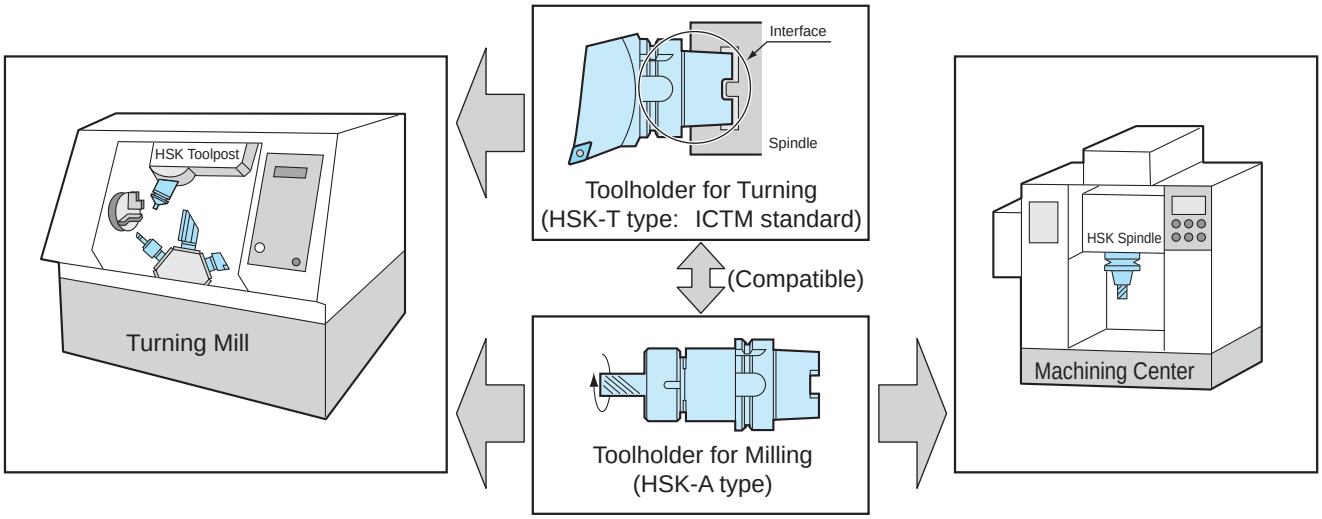


Tools for Turning Mill

- Turning mill is the machine tool which combines turning and milling functions. Now the interface (joint part of toolpost and toolholder: equivalent to the arbor for milling) for the turning mill meeting ICTM standard is available.
- ICTM standard is the standard developed by 16 companies in Japan as the interface of turning mill machine 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 shown as HSK-T○○.

Features

① Compatible with HSK-A type for Machining Center.



② Machining precision at turning has improved by minimizing the gap between the drive key slot at toolholder side and the drive key at toolpost side.

Table 1: Comparison of the gap of a key and key slot

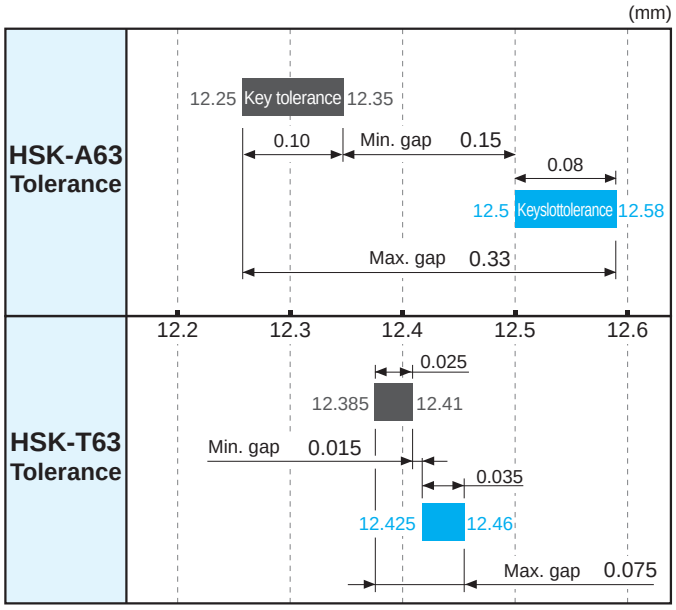
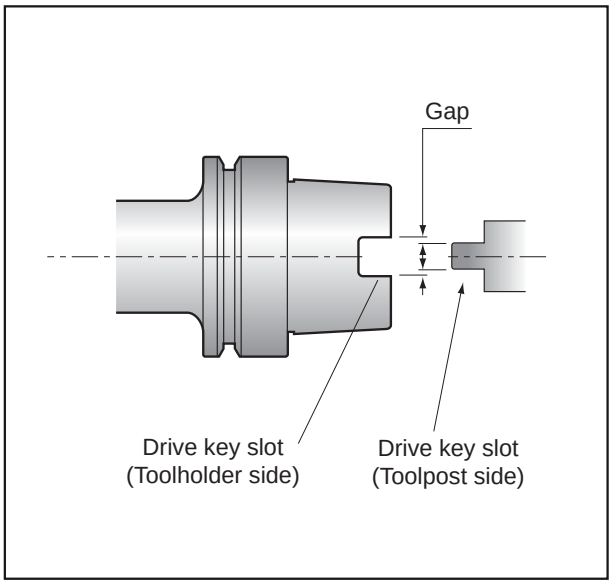
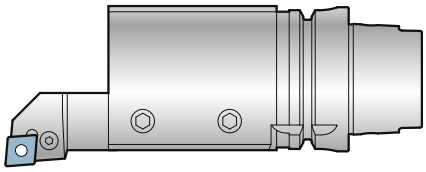
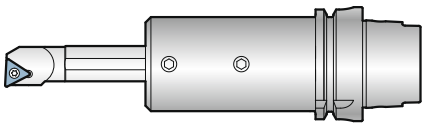
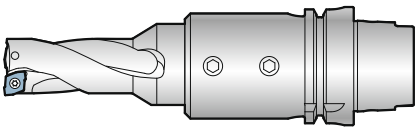


Table 2: Effect of the gap



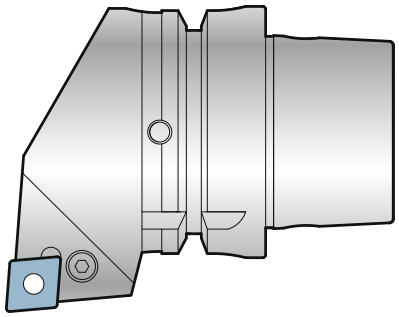
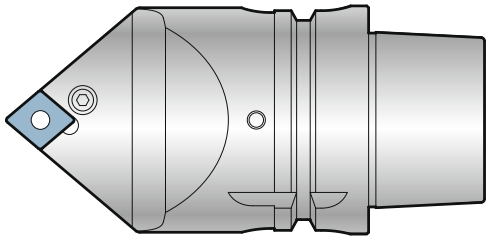
Toolholder Variation

● Conventional Type

For Square Shank	For Boring Bar	For Drill
		

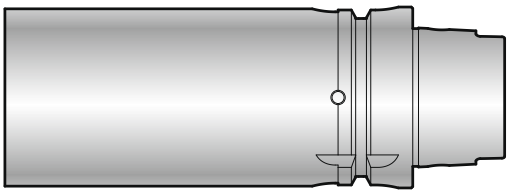
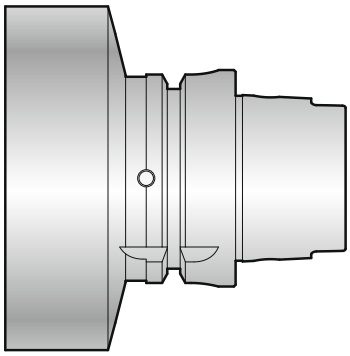
1) For square shank, boring bar, and drill at conventional NC lathe machining.
2) Long type for boring bar and short type for drill are available.

● Solid type Toolholder

Handed Type	Neutral Type(Two types of allover length)
	

1) Solid type toolholder combining interface focusing on rigidity improvement.
2) Neutral type is available as double handed tool (right / left) by moving B-spindle of the spindle head.
3) Two different lengths available for Neutral type to prevent the spindle head from interfering with workpiece by selecting the suitable tool length depending on the spindle diameter.

● Blank Type

1) Blank type for special order is available.
2) Interface part is already processed based on HSK-T Standard.

* About Milling Tool
For milling tool, use conventional HSK-A type shank. It is compatible with HSK-T standard.

Identification System (For External)

Interface Size	Manual Clump Hole	Shank Size	Hand	Toolholder Length
T63:HSK-T63 T100:HSK-T100	H Yes No code No	Square (Height / Width)	R Right L Left	Length from Gauge Line

(mm)

T63 **H** – **S2525** **R** – **105** …(Toolholder for Square Shank)

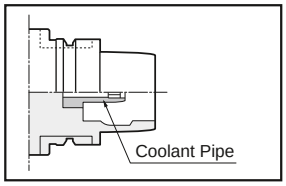
A63 (Previous Description)

P **C** **L** **N** **R** – **DX** **12** …(Solid Type)

Clamp System	Insert Shape	Edge Shape	Insert Clearance	Hand	Toolholder Length (Length from Gauge Line) (mm)	Edge Length
P : Lever Lock M : Double Clamp W : Wedge Lock S : Screw Clamp	C : 80° Diamond D : 55° Diamond T : 60° Triangle V : 35° Diamond 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 L Left N No Hand	DX : 65 H : 100 L : 140	T, C, D, V (L)

Coolant Pipe

• Coolant pipe is built into toolholder.



Toolholder for Square Shank (For External / Facing)

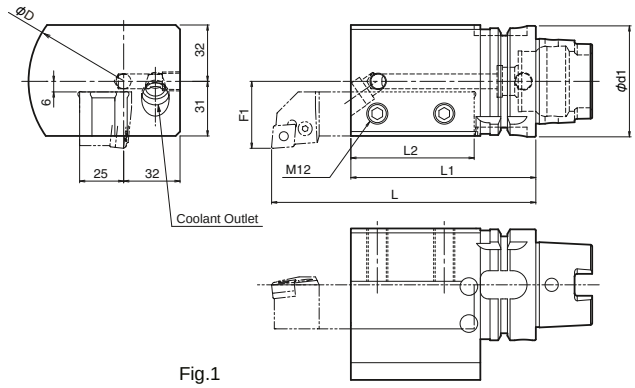


Fig.1

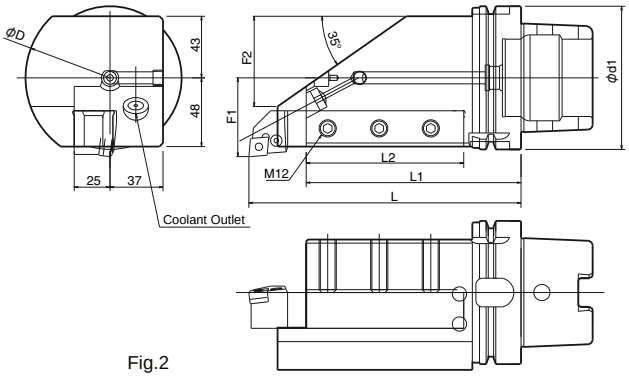


Fig.2

• Right-hand shown

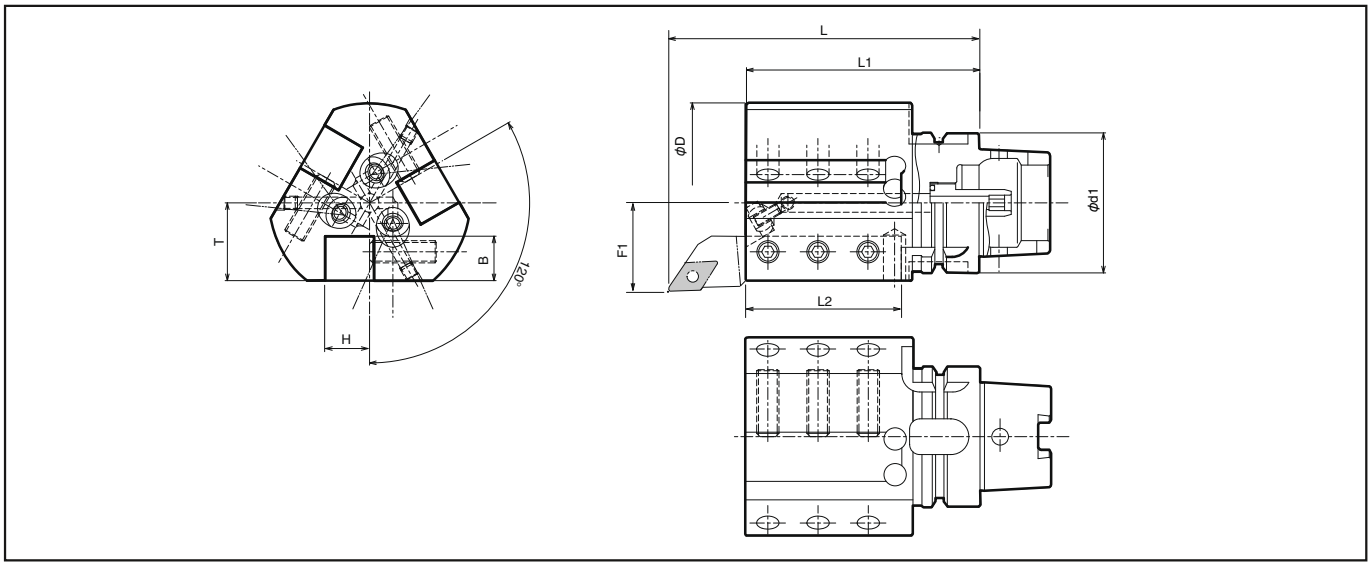
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)							Drawing	Spare Parts		
					ød1	øD	L	L1	L2	F1	F2		Clamp Screw	Wrench	Coolant Pipe
T63H-	S2525R-105	A63-WH-	S2525R-105	●	63	108	150	105	70	38	-	Fig.1	HS12X25	LW-6	CL63-1
	S2525L-105		S2525L-105	●											
T100H-	S2525R-150	-		●	100	118	190	150	110	55	63	Fig.2	HS12X30		CL100-1
	S2525L-150			●											

• Coolant outlet direction is adjustable.
• For 25mm square shank.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Toolholder for Square Shank (For External / Facing)

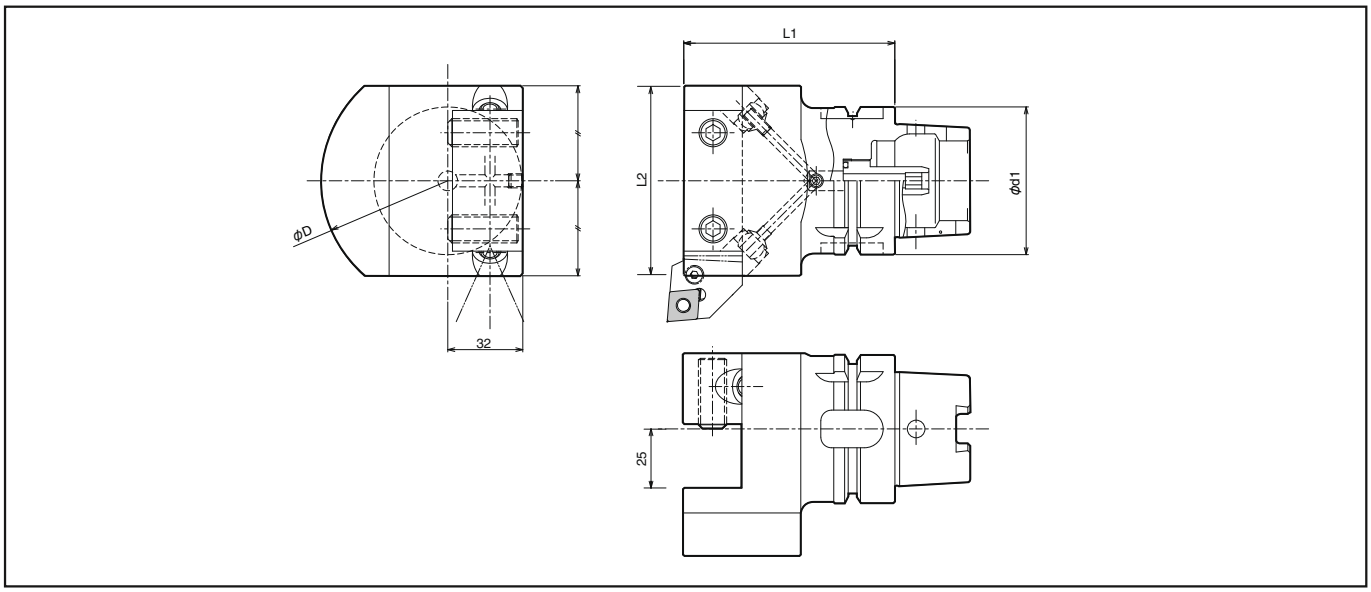


● Toolholder Dimensions

Description	Attachment holder Shank Dimension	Std.	Dimension (mm)									Spare Parts		
			ød1	øD	H	B	T	L	L1	L2	F1	Clamp 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 (For External / Facing)



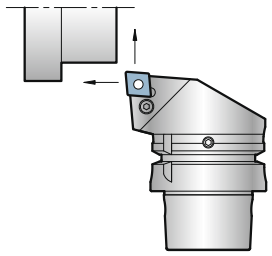
● Toolholder Dimensions

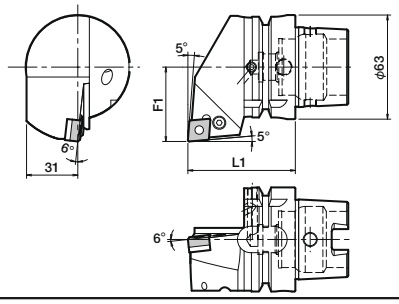
Description	(Previous Description)	Std.	Dimension (mm)				Spare Parts		
			ød1	øD	L1	L2	Clamp Screw	Wrench	Coolant Pipe
T63H- S2525-90F	-	●	63	108	90	81	HS12X30	LW-6	CL63-1
S2525-120F		●			120				
T100H- S2525-105F	-	●	100	118	105	96			CL100-1
S2525-150F		●			150				

• Coolant outlet direction is adjustable.
• For 25mm square shank.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PCLN (External / Facing)





● Right-hand shown

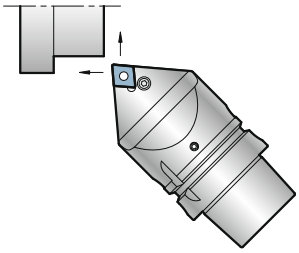
Applicable Insert	
CNGA CNGG CNMA CNMG CNMM CNMP	1204..

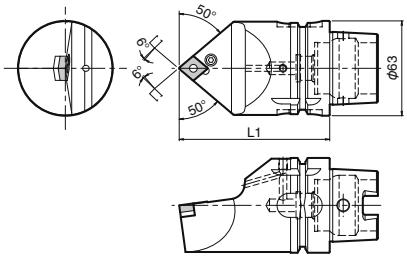
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
					L1	F1	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PCLNR-DX12	A63-WH-	PCLNR-DX12	●	65	45	LL-2N (LL-2)	LS-2N (LS-2)	LC-42N (LC-42)	LSP-2	PC-2	LW-3	CL63-1
	PCLNL-DX12		PCLNL-DX12	●									

• New descriptions of spare parts (LL-2N, LS-2N, LC-42N) can be used for previous description toolholders.

PCMN (External / Facing)





● Right-hand shown

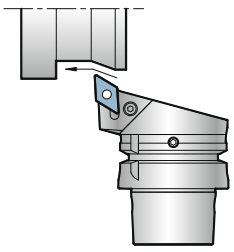
Applicable Insert	
CNGA CNGG CNMA CNMG CNMM CNMP	1204..

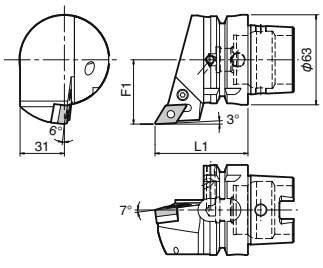
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts						
					L1	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PCMNN-H12	A63-WH-	PCMNN-H12	●	100	LL-2N (LL-2)	LS-2N (LS-2)	LC-42N (LC-42)	LSP-2	PC-2	LW-3	CL63-1
	PCMNN-L12		PCMNN-L12	●	140							

• New descriptions of spare parts (LL-2N, LS-2N, LC-42N) can be used for previous description toolholders.

PDJN (External / Copying)





● Right-hand shown

Applicable Insert	
DNGA DNGG DNMA DNMG DNMM DNMP	1504..

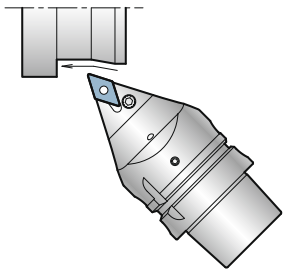
Toolholder Dimensions

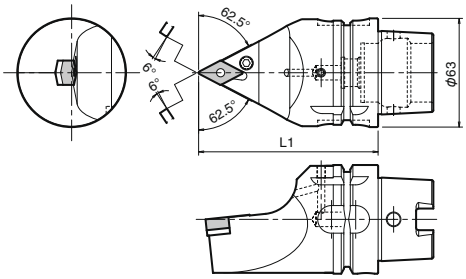
Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
					L1	F1	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PDJNR-DX15	A63-WH-	PDJNR-DX15	●	65	45	LL-3N (LL-3)	LS-2N (LS-2)	LD-42	LSP-2	PC-2	LW-3	CL63-1
	PDJNL-DX15		PDJNL-DX15	●									

• New descriptions of spare parts (LL-3N, LS-2N) can be used for previous description toolholders.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PDNN (External / Copying)





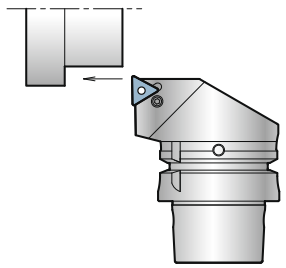
Applicable Insert	
DNGA DNGG DNMA DNMG DNMM DNMP	1504..

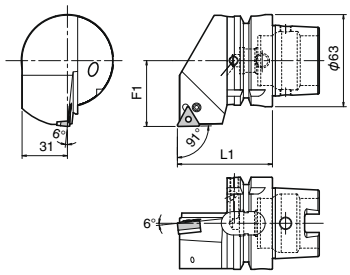
● Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts						
						Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
					L1							
T63H-	PDNNN-H15	A63-WH-	PDNNN-H15	●	100	LL-3N (LL-3)	LS-2N (LS-2)	LD-42	LSP-2	PC-2	LW-3	CL63-1
	PDNNN-L15		PDNNN-L15	●	140							

• New descriptions of spare parts (LL-3N, LS-2N) can be used for previous description toolholders.

PTGN (External)





● Right-hand shown

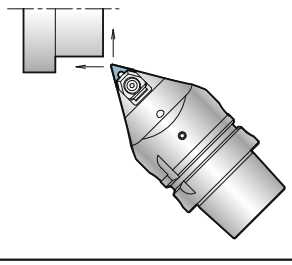
Applicable Insert	
TNGA TNGG TNMA TNMG TNMM TNMP	1604..

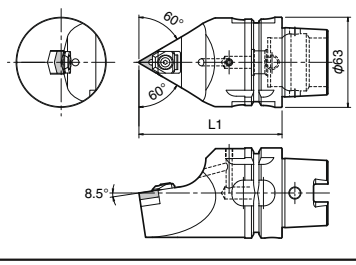
● Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
							Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
					L1	F1							
T63H-	PTGNR-DX16	A63-WH-	PTGNR-DX16	●	65	45	LL-1N (LL-1)	LS-1N (LS-1)	LT-32N (LT-32)	LSP-1	PC-1	FH-2.5	CL63-1
	PTGNL-DX16		PTGNL-DX16	●									

• New descriptions of spare parts (LL-3N, LS-2N) can be used for previous description toolholders.

WTEN (External)





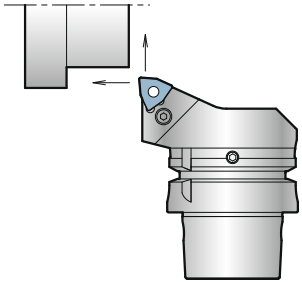
Applicable Insert	
TNGA TNGG TNMA TNMG TNMM TNMP	1604..

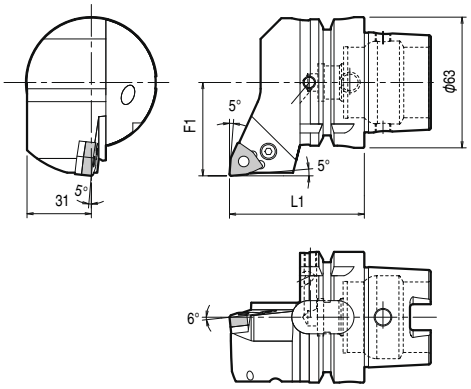
● Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts						
						Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Spacer	Coolant Pipe
					L1							
T63H-	WTENN-H16	A63-WH-	WTENN-H16	●	100	WCS-1N	WTN-33	WP-1S	WN-1	LW-3	WSP-1	CL63-1
	WTENN-L16		WTENN-L16	●	140							

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

PWLN (External / Facing)





Applicable Insert	
WNGA WNMA WNMG WNMM WNMP	0804..

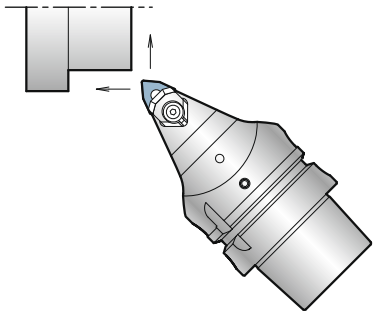
● Right-hand shown

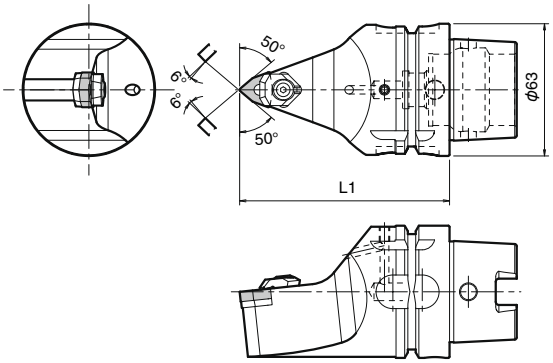
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts						
					L1	F1	Lever	Lock Screw	Shim	Shim Pin	Punch	Wrench	Coolant Pipe
T63H-	PWLNR-DX08	A63-WH-	PWLNR-DX08	●	65	45	LL-2N (LL-2)	LS-2N (LS-2)	LW-42N (LW42)	LSP-2	PC-2	LW-3	CL63-1
	PWLNL-DX08		PWLNL-DX08	●									

• New descriptions of spare parts (LL-2N, LS-2N, LW-42N) can be used for previous description toolholders.

WWMN (External / Facing)





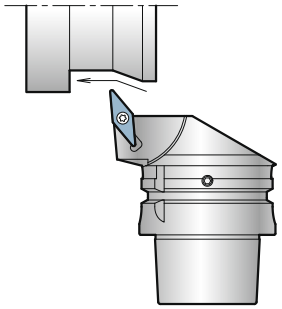
Applicable Insert	
WNGA WNMA WNMG WNMM WNMP	0804..

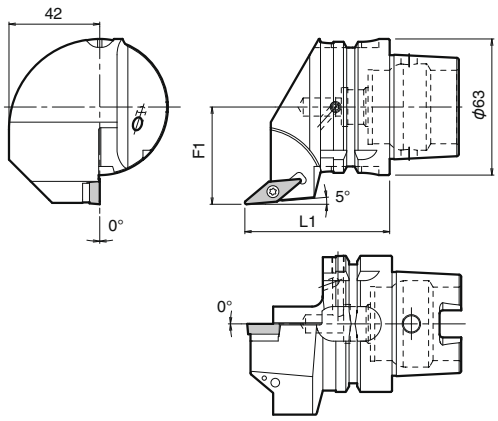
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)	Spare Parts					
					L1	Clamp Set	Shim	Shim Pin	Shim Nut	Wrench	Coolant Pipe
T63H-	WWMNN-H08	A63-WH-	WWMNN-H08	●	100	WCS-8	WWN-42	WP5X15	WN-1	LW-3	CL63-1
	WWMNN-L08		WWMNN-L08	●	140						

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SVLB (External / Copying)





Applicable Insert	
VBGT VBMT VBGW VBMW VCGT VCMT VCGW	1604..

● Right-hand shown

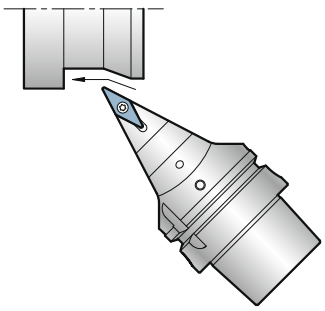
Toolholder Dimensions

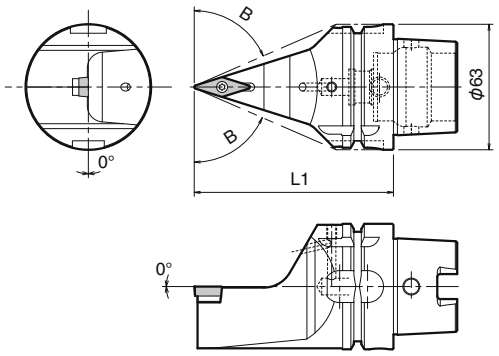
Description		Std.	Dimension (mm)		Spare Parts							
			L1	F1	Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)	Shim Screw	Wrench	Coolant Pipe
A63-WH-	SVLBR-DX16		65	45	SB-40115TR	FT-15	SVN-32	-	-	SB-2050TR	FT-6	CL63-1
	SVLBL-DX16											
T63H-	SVLBR-DX16N	●	65	45	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4	-	-	CL63-1
	SVLBL-DX16N	●										

Description Change

• A63-WH-SVLB$^{R}_{L}$-DX16 will be switched to T63-SVLB$^{R}_{L}$-DX16N.

SVVB (External / Copying)





Applicable Insert	
VBGT VBMT VBGW VBMW VCGT VCMT VCGW	1604..

Toolholder Dimensions

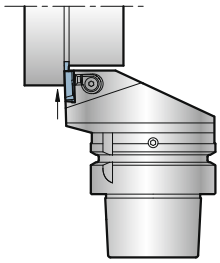
Description		Std.	Dimension (mm)		Spare Parts							
			L1	*B (°)	Clamp Screw	Wrench	Shim	Shim Screw	Wrench (for Shim Screw)	Shim Screw	Wrench	Coolant Pipe
A63-WH-	SVVBN-H16		100	66.5	SB-40115TR	FT-15	SVN-32	-	-	SB-2050TR	FT-6	CL63-1
	SVVBN-L16		140	72.5								
T63H-	SVVBN-H16N	●	100	66.5	SB-40125TRN	FT-15	SVN-32N	SS-4N	LW-4	-	-	CL63-1
	SVVBN-L16N	●	140	72.5								

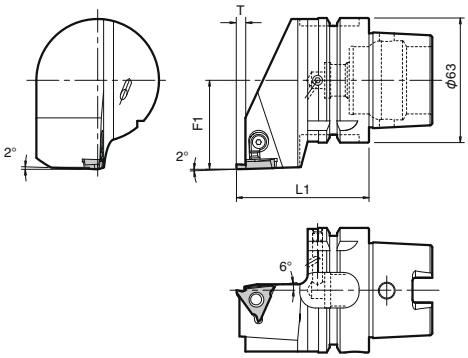
Description Change

* Angle B indicates interference angle made by edge point and toolholder.
• A63-WH-SVVBN-H16 will be switched to T63H-SVVBN-H16N.
• A63-WH-SVVBN-L16 will be switched to T63H-SVVBN-L16N.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

KGBA (External Grooving)





● Right-hand shown

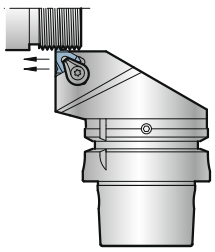
R-hand Insert for R-hand Toolholder,
L-hand Insert for L-hand Toolholder.

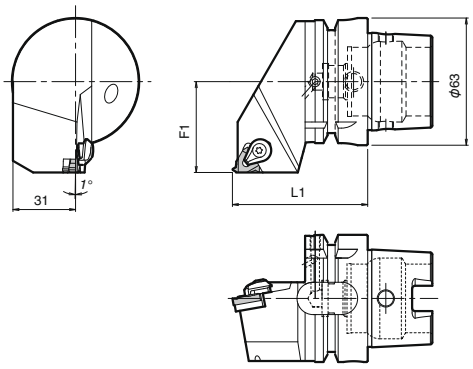
Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)			Spare Parts			Applicable Insert ➡ G6~G8
					L1	F1	T	Clamp Set	Wrench	Coolant Pipe	
T63H-	KGBAR-16	A63-WH-	KGBAR-16	●	65	45	2.5	LGBA-16RS	FT-15	CL63-1	GBA32R type
	KGBAR-22-15		KGBAR-22-15	●	65	45	4.0	LGBA-22RS			GBA43R type
	KGBAR-22-25		KGBAR-22-25	●			4.5				
	KGBAR-22-35		KGBAR-22-35	●			5.5				
T63H-	KGBAL-16	A63-WH-	KGBAL-16	●	65	45	2.5	LGBA-16LS	FT-15	CL63-1	GBA32L type
	KGBAL-22-15		KGBAL-22-15	●	65	45	4.0	LGBA-22LS			GBA43L type
	KGBAL-22-25		KGBAL-22-25	●			4.5				
	KGBAL-22-35		KGBAL-22-35	●			5.5				

* For details of applicable inserts, please refer to the General Catalog.
• Dimension T shows the distance from the Toolholder to the cutting edge.

KTN (Threading)





● Right-hand shown

R-hand Insert for R-hand Toolholder,
L-hand Insert for L-hand Toolholder.

Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)		Spare Parts					Applicable Insert ➡ J6~J15
					L1	F1	Clamp Set	Wrench	Shim	Shim Screw	Coolant Pipe	
T63H-	KTNR-16	A63-WH-	KTNR-16	●	65	45	CPS-5S	FT-15	TN-32 (TNW-32)*	SP3X8	CL63-1	16ER type
	KTNR-22		KTNR-22	●			CPS-6S	LW-3	TN-43	SP3X8	CL63-1	22ER type

* Shim: Please separately purchase TNW-32 when using 2-thread type threading insert. (e.g. 16ER○○○ISO-M02)
* For details of applicable inserts, please refer to the General Catalog.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Identification System (For Boring Bar / Drill / Blank Tool)

T63 **H** — **N** **08** — **70**

Interface Size
T63:HSK-T63 T100:HSK-T100

Manual Clump Hole	
H	Yes
No code	No

Toolholder	
N	For Boring Bar
C	For Drill
BL	For Blank Tool

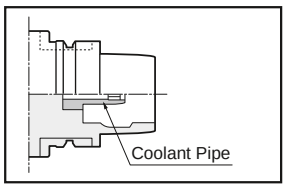
Internal Dia.	
08	ø8
10	ø10
	…

(mm)

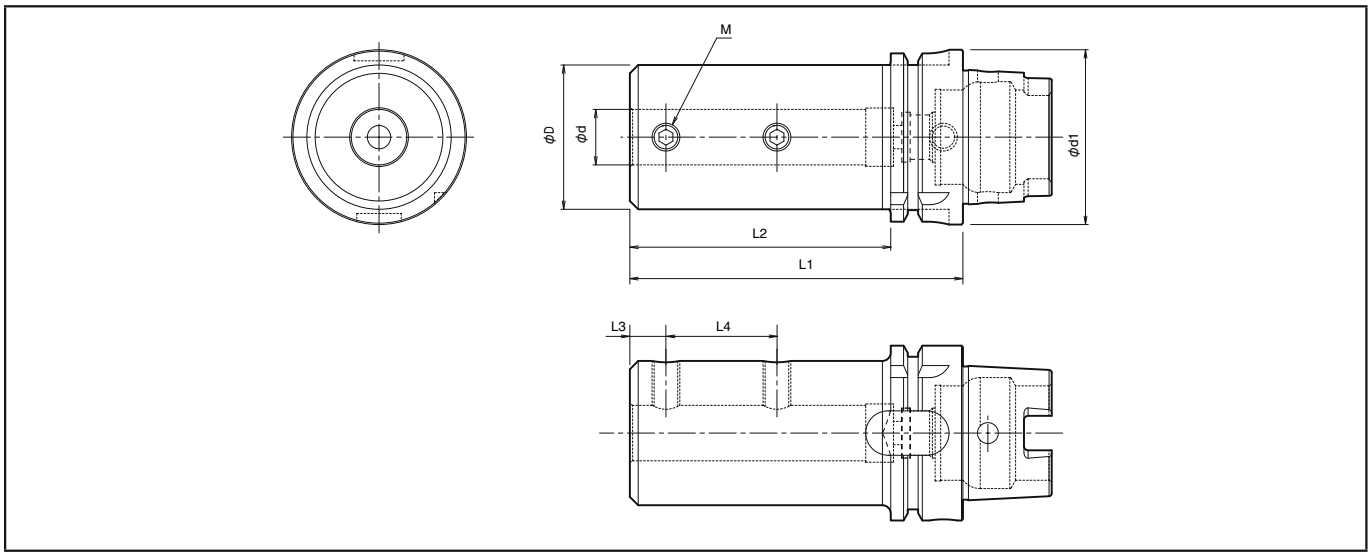
Toolholder Length
Length from Gauge Line

Coolant Pipe

• Coolant pipe is built into toolholder.



Toolholder for Boring Bar / Drill



Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)								Spare Parts			Remarks
													Clamp Screw	Wrench	Coolant Pipe	
					ød	ød1	øD	L1	L2	L3	L4	M				
T63H-	N08-70	A63-WH-	N08-70	●	8	63	28	70	45	9	20	M8	HS8X10	LW-4	CL63-1	Boring Bar Installation
	N10-80		N10-80	●	10		35	80	55	9	22		HS8X12			
	N12-90		N12-90	●	12		42	90	65	9	22					
	N16-100		N16-100	●	16		48	100	75	11	30	M10	HS10X16	LW-5		
	N20-120		N20-120	●	20		52	120	95	13	40					
	N25-140		N25-140	●	25		56	140	115	13	50	M12	HS12X16	LW-6		
	N32-160		N32-160	●	32		56	160	135	13	60		HS12X12			
T63H-	C20-75	A63-WH-	C20-75	●	20	63	52	75	50	13	22	M10	HS10X16	LW-5	CL63-1	* For Drill Installation
	C25-85		C25-85	●	25		56	85	58	15	28	M12	HS12X16	LW-6		
	C32-90		C32-90	●	32		56	90	62	15	30		HS12X12			
	C40-100		C40-100	●	40		68	100	72	18	35	M16	HS16X12	LW-8		
T100H-	N08-80	-		●	8	100	28	80	51	9	20	M8	HS8X10	LW-4	CL100-1	Boring Bar Installation
	N10-90			●	10		35	90	61	9	22		HS8X12			
	N12-100			●	12		42	100	71	9	22					
	N16-110			●	16		48	110	81	11	30	M10	HS10X16	LW-5		
	N20-130			●	20		52	130	101	13	40					
	N25-150			●	25		62	150	121	13	50	M12	HS12X18	LW-6		
	N32-170			●	32		72	170	141	13	60		HS12X20			
T100H-	C20-85	-		●	20	100	52	85	56	13	22	M10	HS10X16	LW-5	CL100-1	* For Drill Installation
	C25-90			●	25		62	90	61	15	20	M16	HS16X18	LW-8		
	C32-95			●	32		72	95	66	15	20					
	C40-105			●	40		82	105	76	15	25	M16	HS16X20	LW-8		

* Shorter than the toolholder for boring bar.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Blank Tool

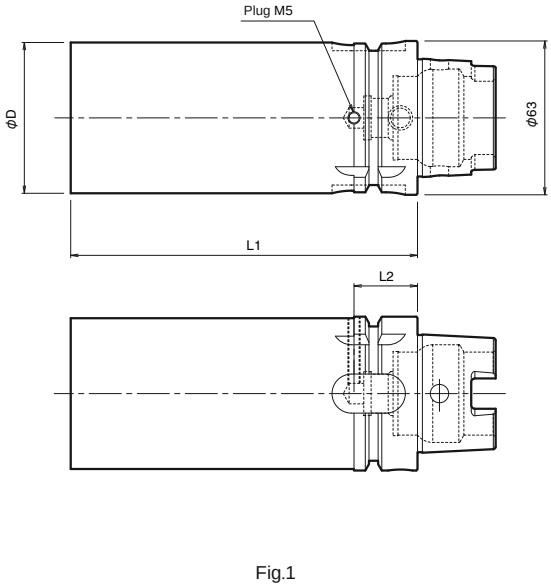


Fig.1

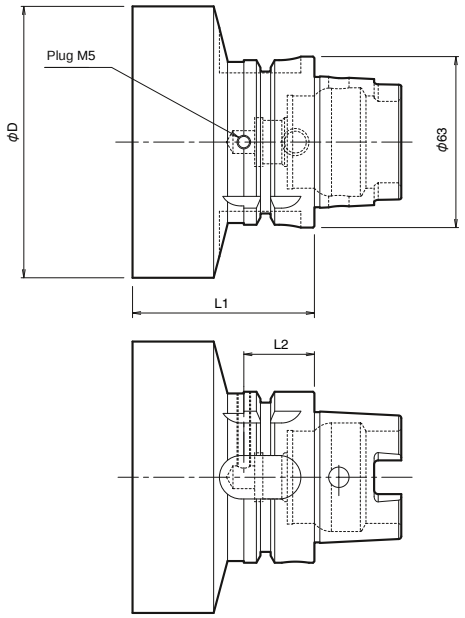


Fig.2

Toolholder Dimensions

Description		(Previous Description)		Std.	Dimension (mm)			Drawing	Spare Parts
					øD	L1	*L2		Coolant Pipe
T63H-	BL62-102	A63-WH-	BL62-102	●	62	102	26	Fig.1	CL63-1
	BL62-142		BL62-142	●		142			
	BL100-67		BL100-67	●	100	67		Fig.2	

* L2 indicates the length from gauge line to plug.

Blank tool is for special order of toolholder.

① Interface part is based on HSK-T standard.
② Tool tip is also heat-treated. Do not re-heat again to avoid deformation of interface.
Material: SNCM439
Hardness: 40~45HRC

⚠ CAUTION
It may be necessary to empty the adjacent pot inside the ATC magazine of the machine depending on the tool size. (Large tool registration setup)
For details, please refer to the instruction of Machine builder.

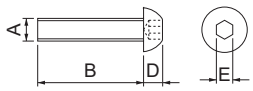
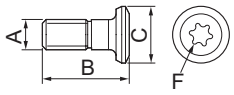
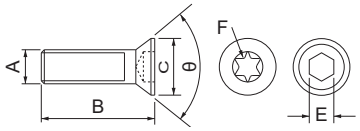
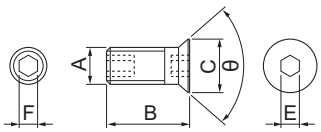
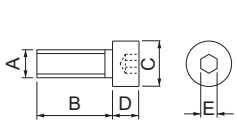
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

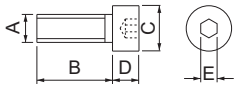
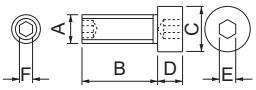
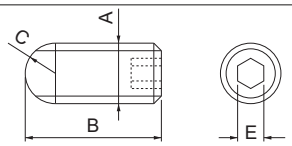
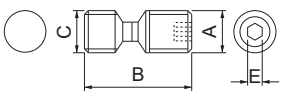
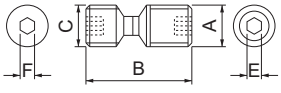
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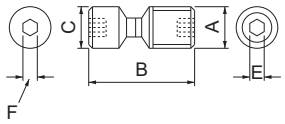
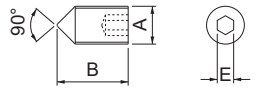
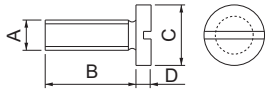
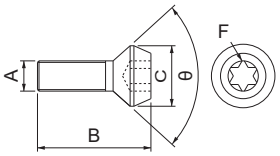
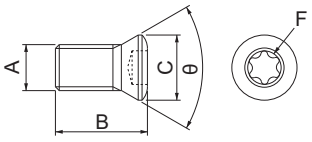
Spare Parts

P1~P20

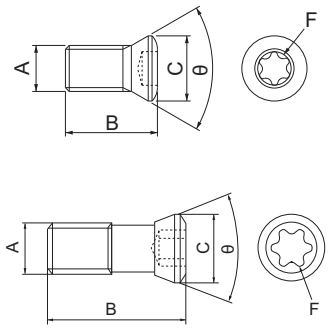
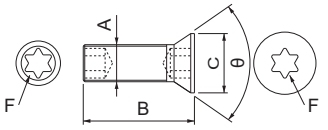
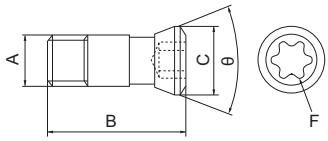
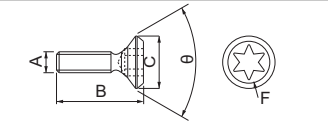
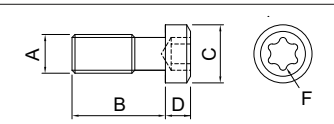
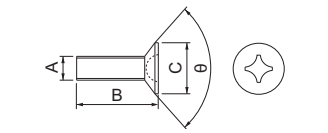
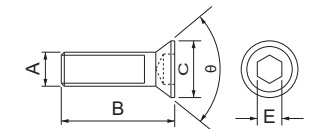
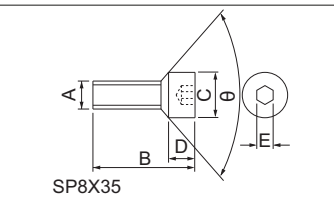
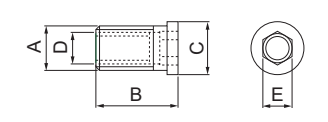
Screws	P2~P6
Pins	P7
Shims	P8~P11
Cartridges	P12
Clamps	P13
Clamp Sets	P14~P15
Chipbreakers	P16
Wrenches / Spanners	P17~P18
Springs / Washers / Plugs / Nuts / Punches	P19

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**BH**	**3X6**	M3X0.5	6.0	-	1.7	2.0	-	-	-	
		3X12	M3X0.5	12.0	-	1.7	2.0	-	-	-	
		6X25	M6X1.0	25.0	-	3.3	4.0	-	-	-	
		8X30	M8X1.25	30.0	-	4.4	5.0	-	-	-	
	**CP**	**8X15TL**	M8X1.25	15.0	15.0	-	-	T25	-	-	L…shows Left-hand Thread
		8X23TL		23.0							
	**GS**	**-40TR**	M4X0.7	10.0	5.8	-	-	T10	-	82°	
	GS	**-50**	M5X0.8	13.0	7.5	-	3.0	-	-	82°	
		-50S	M5X0.8	9.0	7.5	-	3.0	-	-	82°	
	**GS**	**-4090T$^{R}_{L}$W**	M4X0.7	9.0	5.8	-	2.0	2.0	-	82°	R…shows Right-hand Thread, L…shows Left-hand Thread
	**HH**	**3X6**	M3X0.5	6.0	5.5	3.0	2.5	-	-	-	
		3X12		12.0							
	HH	**4X12**	M4X0.7	12.0	7.0	4.0	3.0	-	-	-	
		4X16		16.0							
	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							
		6X18A		18.0							
		6X20		20.0							
		6X25		25.0							
		6X30		30.0							
	HH	**8X25**	M8X1.25	25.0	13.0	8.0	6.0	-	-	-	
		8X35		35.0							
		8X40		40.0							
		8X50		50.0							
		8X55		55.0							
		8X65		65.0							
		8X70		70.0							
		8X80		80.0							
		8X85		85.0							
		8X100		100.0							
		8X110		110.0							
	HH	**10X30**	M10X1.5	30.0	16.0	10.0	8.0	-	-	-	
		10X30M		30.0							
		10X30S		30.0		6.0	7.0				
		10X35		35.0		10.0	8.0				
		10X40		40.0							
	HH	**12X25**	M12X1.75	25.0	18.0	12.0	10.0	-	-	-	
		12X30		30.0							
		12X35M		35.0							
		12X40		40.0							
		12X55		55.0							
		12X65		65.0							
		12X80		80.0							
		12X85		85.0							
		12X100		100.0							
		12X110		110.0							
		12X120		120.0							
		12X130		130.0							
		12X140		140.0							
		12X150		150.0							

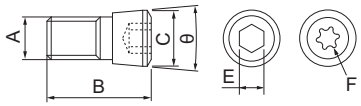
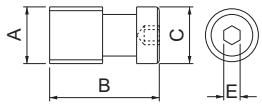
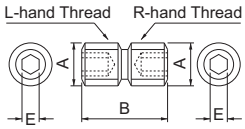
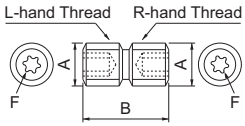
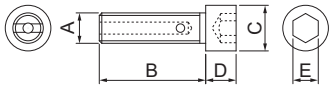
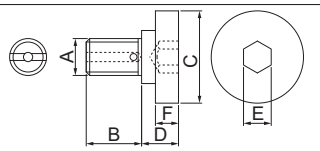
Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**HH**	**16X40**	M16X2.0	40.0	24.0	16.0	14.0	-	-	-	
		16X45		45.0							
		16X65		65.0							
		16X90		90.0							
		16X110		110.0							
		16X130		130.0							
	HH	**20X40**	M20X2.5	40.0	30.0	20.0	17.0	-	-	-	
		20X55		55.0							
		20X75		75.0							
		20X90		90.0							
		20X110		110.0							
		20X120		120.0							
		20X140		140.0							
		20X150		150.0							
		20X170		170.0							
	HH	**24X40**	M24X3.0	40.0	36.0	24.0	19.0	-	-	-	
		24X60		60.0							
		24X75		75.0							
		24X90		90.0							
		24X110		110.0							
		24X120		120.0							
		24X140		140.0							
		24X150		150.0							
		24X170		170.0							
	**HH**	**4X12**	M4X0.7	10.0	7.0	4.0	3.0	2.0	-	-	
	HS	**3X4P**	M3X0.5	3.9	-	-	1.5	-	-	-	
		3X4		4.0							
		3X8		8.0							
		3X12		12.0							
		3X16		16.0							
	HS	**4X4P**	M4X0.7	3.9	-	-	2.0	-	-	-	
		4X4		4.0							
		5X5	M5X0.8	5.0			2.5				
	HS	**6X4P**	M6X0.75	3.9	-	-	3.0	-	-	-	Clamp screw equivalent to JIS B-1177
		6X6	M6X1.0	6.0							
		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							
	HS	**16X12**	M16X2.0	12.0	-	-	8.0	-	-	-	
		16X18		18.0							
		16X20		20.0							
	**HSB**	**4X8R/L**	M4X0.7	8.0	R2.0	-	2.0	-	-	-	R…shows Right-hand Thread, L…shows Left-hand Thread
	**LS**	**-03**	M5X0.8	10.0	M5X0.8	-	2.0	-	-	-	
		-03S		12.2			2.5				
	LS	**-03N**		9.7	M5X0.8	-	2.0	-	-	-	With N is silver plated
		-03SN		12.0			2.5				
	**LS**	**-05**	M5X0.8	15.5	M5X0.8	-	2.0	2.0	-	-	

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	LS	-1	M6X1.0	17.0	6.0	-	2.5	2.5	-	-	With N is silver plated
		-1N									
		-1S		14.2							
		-1SN									
		-1T		21.0							
	LS	-2	M8X1.0	20.0	8.0	-	3.0	3.0	-	-	
		-2N									
		-3		22.0							
		-4		24.0							
		-4N									
	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°	R…shows Right-hand Thread
		-2TR	M2.5X0.45	6.2	4.5			T8			
		-3TR	M3X0.5	7.2	4.8			T10			
		-3STR		6.4	5.2						
		-3.5TR	M3.5X0.6	9.3	5.6			T15			
		-4TR	M4X0.7	7.7	5.8						
		-5TR	M5X0.8	20.0	8.7			T20		90°	
		-2290TR	M2.2X0.45	9.2	2.8			T6		60°	
		-25100TR	M2.5X0.45	10.0	3.5			T7			
		-40115TR	M4X0.7	11.5	5.5			T15			
		-5070TR	M5X0.8	7.0	6.8			T20			
		-5090TR		9.0							
		-50120TR		12.0							
	SB	-1635TR	M1.6X0.35	3.3	2.6	-	-	T6	-	60°	R…shows Right-hand Thread
	SB	-1STR	M2X0.4	5.0	3.1						
		-2035TR		3.7	3.0						
		-2035TRG		3.5	2.7						
		-2040TR		3.8	3.0						
		-2040TRG		4.0	3.0						
		-2042TRG		4.1	2.7						
		-2045TR		4.3	2.7						
		-2045TRN		4.3	2.8					37°	
		-2050TR		4.8	3.0					60°	
		-2060TR		5.8	3.5			T8			
		-2080TR		8.3	2.8			T6			
	SB	-2250TR	M2.2X0.45	5.1	3.1	-	-	T7	-	60°	
		-2255TR		5.5	3.5						
		-2260TR		5.8	3.1						
	SB	-2545TR	M2.5X0.45	4.6	3.5	-	-	T8	-	60°	
		-2555TRG		5.4							
		-2560TR		5.7							
		-2570TR		6.8							
	SB	-3060TR	M3X0.5	5.3	4.2	-	-	T10	-	60°	
		-3060TRG		5.9							
		-3070TRG		7.0							
		-3080TR		8.0							

· For tightening torque of Torx screw, see **P6**.

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
 SB-40125TRN	**SB**	**-4050TRN**	M4X0.5	4.6	5.1	-	-	T10	-	57°	○○ IP shows Torx Plus
		-4060TR	M4X0.7	5.9	5.5			T15		60°	
		-4065TR		6.7							
		-4070TRG		7.0							
		-4070TRN		6.9	5.4						
		-4070TRS		6.7	5.5			T10			
		-4082TPR		8.2	5.5			15IP			
		-4085TR		8.5	5.5			T15			
		-40125TRN		12.5	5.2					50°	
		-40140TR		14.0	5.5					60°	
	SB	**-45130TR**	M4.5X0.75	13.0	6.6	-	-	20IP		55°	
	SB	**-5085TR**	M5X0.8	8.5	6.8	-	-	T20	-	50°	
		-50120TRS		12.0	7.2			15IP		60°	
		-50137K		13.7	9.7			T20		70°	
	SB	**-60120TR**	M6X1.0	12.0	8.5			T25		60°	
	**SB**	**-4070TRW**	M4X0.7	6.7	5.5	-	-	T8	-	60°	R…shows Right-hand Thread
		-4590TRWN	M4.5X0.75	9.3	5.6			T10		57°	
	**SC**	**-30067**	M3X0.35	6.7	4.4	-	-	T8	-	60°	
		-35085	M3.5X0.35	8.5	5.7			T10			
		-40100	M4X0.5	10.0	6.0			T15			
		-50130	M5X0.5	13.0	6.6			T20		40°	
		-60160	M6X0.75	16.0	8.0			T25			
		-60210		21.0	9.6			T30			
	**SE**	**-40120TR**	M4X0.7	12.0	5.1	-	-	T15	-	60°	
		-50125TR	M5X0.8	12.5	6.4			T20			
	**SH**	**-50150TR**	M5X0.8	15.1	7.4	3.2	-	T20	-	-	
	**SP**	**3X4**	M3X0.5	4.0	4.0	-	-	-	-	90°	Below flat head screw additionally processed item
		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	-	-	90°	
 SP8X35	**SP**	**8X35**	M8X1.25	35	11	4.4	5	-	-	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
	SS	**-4N**	M5.5X0.5	8.5	6.6	M4X0.7	4	-	-	-	

・For tightening torque of Torx screw, see **P6**.

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	SV	-60136R	M6X1.0	13.6	6.3	-	4	-	-	6°	Hexagon socket
		-60136TR					-	T20	-		Torx
	TH	8X15	M8X1.25	20.0	8.5	-	4.0	-	-	-	
	W	8X18	M8X1.25	18.0	-	-	4.0	-	-	-	
		8X21	M8X1.0	21.0							
	W	6X17	M6X1	17.0	-	-	-	T20	-	-	
		8X16	M8X1	16.0				T25			
	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				
		12X35H	M12X1.75	35.0	18.0	12.0	8.0				
		16X52H	M16X2.0	36.0	24.0	16.0	12.0				
	HF	20X53H	M20X2.5	35.0	43.0	18.0	14.0	14.0	-	-	With Coolant Hole
		24X60H	M24X3.0	40.5	65.0	19.5	17.0	14.0			

Tightening Torque

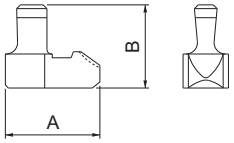
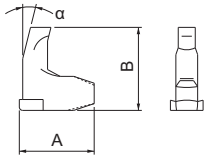
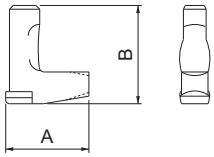
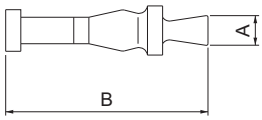
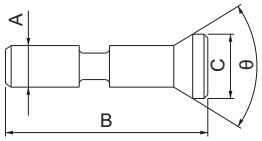
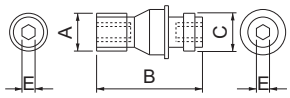
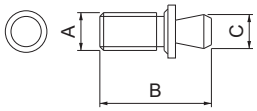
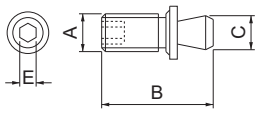
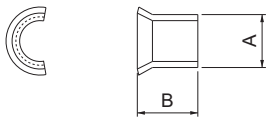
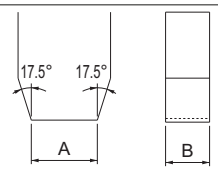
Torx Size	Tightening Torque (N/m)
T6	0.5
T7	0.8
T8	1.0
T10	2.0
T15	3.5
T20	5.0
T25	7.5

Reference

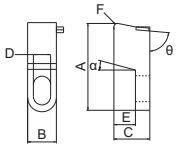
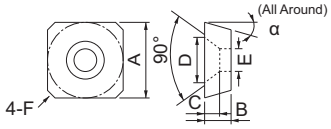
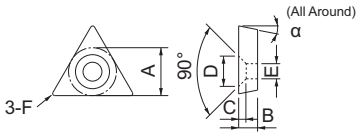
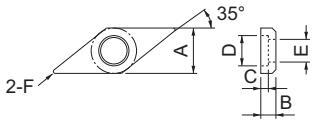
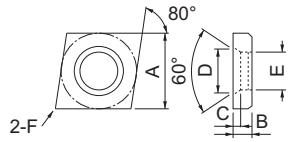
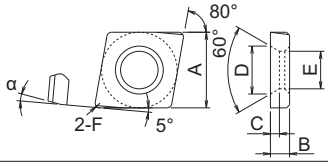
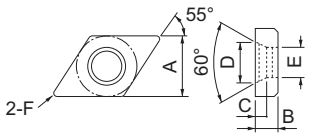
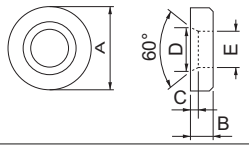
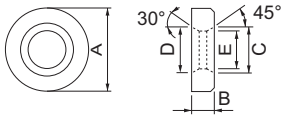
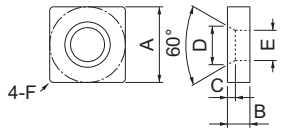
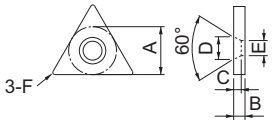
Torx and Torx Plus have different cross-section.

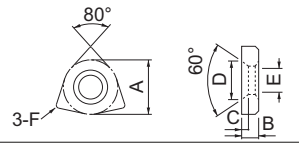
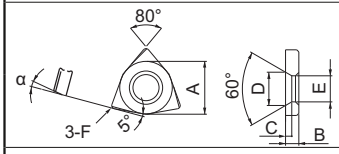
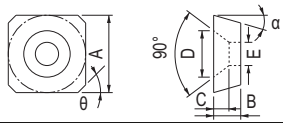
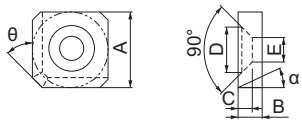
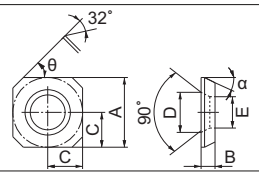
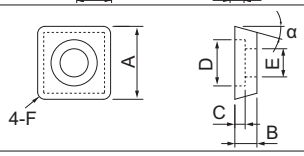
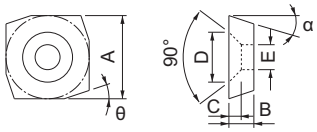
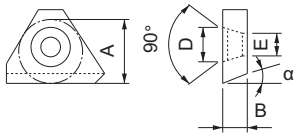
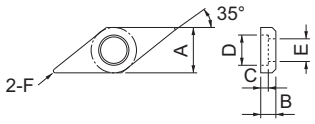
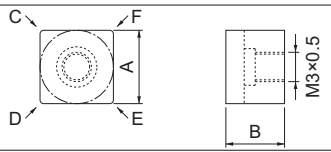
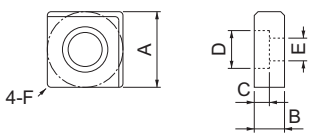
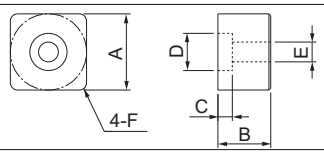
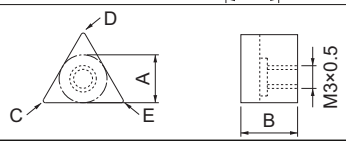


Torx Torx Plus

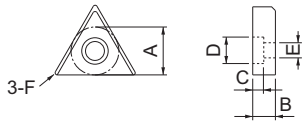
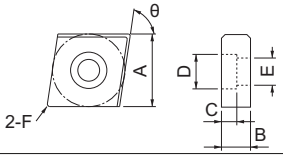
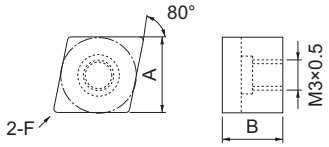
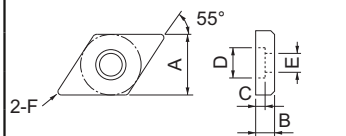
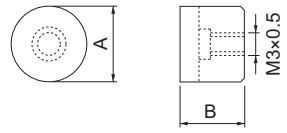
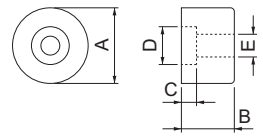
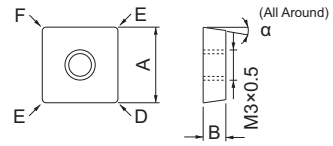
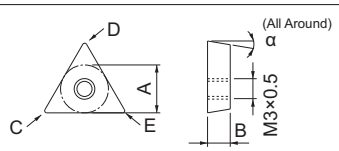
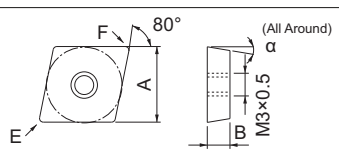
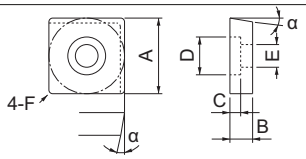
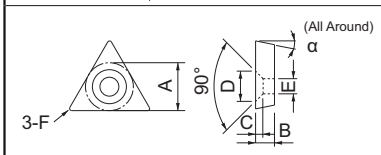
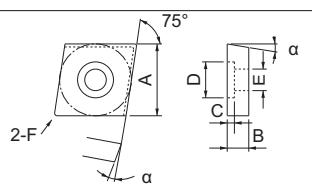
Shape	Description		Dimension (mm)						Angle (°)		Remarks
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	LL	-03	7.8	6.3	-	-	-	-	-	-	
		-03N	7.8	6.3							
		-03S	11.1	8.9							
		-03SN	11.1	8.9							
		-03T	8.3	8.9							
		-03TN	8.3	8.9							
	LL	-05C	10.7	11.7	-	-	-	-	12°	-	
		-1C	13.0	13.3					14°		
		-1CN	13.0	13.3					14°		
		-2C	18.8	17.6					14°		
	LL	-1	10.3	12.0	-	-	-	-	-	-	
		-1N	10.3	12.0							
		-1D	12.3	12.0							
		-1DN	12.3	12.0							
		-2	13.5	13.0							
		-2N	13.5	13.0							
		-3	16.4	13.0							
		-3N	16.4	13.0							
		-4	16.4	14.7							
		-5	17.1	16.7							
		-5N	17.1	16.7							
	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							
	TS	-3S	M5X0.8	15.0	3.60	-	2.0	-	-	-	
	WP	-1S	M5X0.8	17.5	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							
	P	-03	2.8	1.95	-	-	-	-	-	-	
		-03S	3.5	1.95	-	-	-	-	-	-	

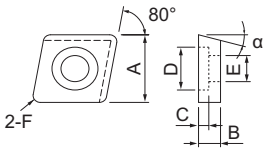
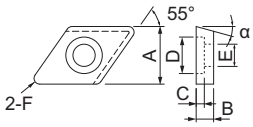
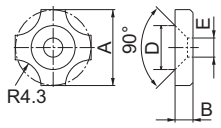
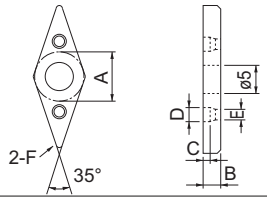
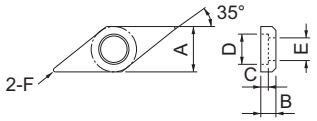
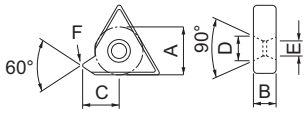
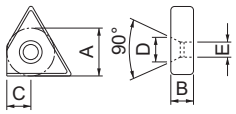
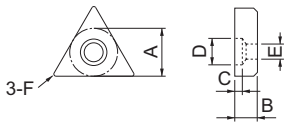
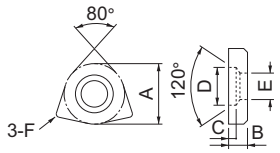
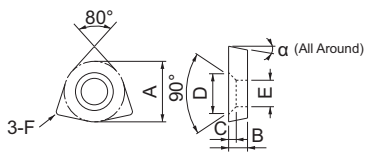
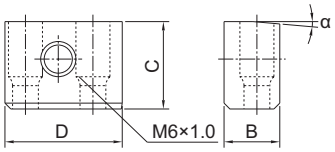
Shims

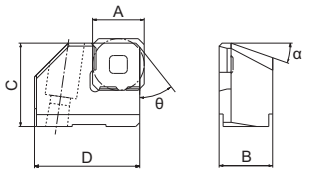
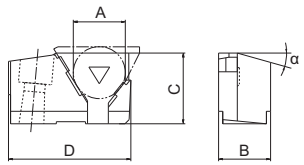
Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**556**	**C**R/L	34.0	10.0	12.7	5.6	7.5	1.6	0°	55°	R…shows Right-hand, L…shows Left-hand Shim Screw: HH5X16
	**KPS**	**-42**	11.5	3.2	2.0	7.2	3.2	C1.0	7°	-	Shim Screw: P3X8
	**KPT**	**-32**	8.0	3.2	1.9	7.0	3.2	R0.4	11°	-	Shim Screw: SP3X8 : SP3X10
		-42	10.5	3.18	1.9	7.0	3.2	R0.8	11°	-	
	**KVN**	**-32**	9.525	3.175	2.1	7.6	5.5	R0.8	-	-	Lock Pin: LP-6S : LP-2S
	**LC**	**-32**	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin: LSP-1
		-32N	9.47	2.4	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
		-42N	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin: LSP-2
		-53	15.9	4.8	1.7	10.0	8.0	R1.2	-	-	Shim Pin: LSP-3
		-53N	15.9	4.8	1.7	10.0	8.0	R1.2	-	-	Shim Pin: LSP-3
	**LC**	**-42**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
		-42NR/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**	**-32**	9.47	2.4	1.3	6.18	4.68	R0.4	-	-	Shim Pin: LSP-1
		-32N	9.47	2.4	1.3	6.18	4.68	R0.4	-	-	
		-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	3.18	6.3	6.3	4.7	-	-	-	Shim Pin: LSP-1
		-12C	10.0	3.18	6.3	6.3	4.7	-	-	-	
		-16C	16.0	3.18	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**	**-32**	9.47	2.7	1.3	6.18	4.68	R0.8	-	-	Shim Pin: LSP-1
		-32N	9.47	2.7	1.3	6.18	4.68	R0.8	-	-	Shim Pin: LSP-1
		-32N-20						R2.0			
		-42	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin: LSP-2
		-42N	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	
		-42N-20						R2.0			

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**LW**	**-32**	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	Shim Pin: LSP-1
		-32N	9.47	2.4	1.3	6.18	4.68	R0.8	-	-	
		-42	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	Shim Pin: LSP-2
		-42N	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	
	**LW**	**-42R/L**	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	R...shows Right-hand, L...shows Left-hand Shim Pin: LSP-2
		-42NR/L	12.65	3.2	1.5	8.01	6.28	R0.8	-	-	R...shows Right-hand, L...shows Left-hand Shim Pin: LSP-2
	**MSD**	**-42**	10.7	3.18	1.85	7.0	3.3	-	20°	45°	Shim Screw: SP3X8
	MSE	**-4245S**	10.3	3.18	2.0	6.0	5.0	-	20°	45°	Shim Screw: SP4X9
	**MSE**	**-4215**	10.53	3.18	1.5	6.4	3.4	-	25°	15°	Shim Screw: SP3X8
		-4245	10.53	3.18	1.5	6.4	3.4	-	25°	45°	Shim Screw: SP3X8
	**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	8.0	6.5	R0.8	15°	-	Shim Screw: SPW-6045
	**MSP**	**-42**	11.3	3.18	1.85	7.0	3.3	-	11°	15°	Shim Screw: SP3X8
	**MTE**	**-42**	9.8	3.18	-	6.4	3.4	-	25°	-	Shim Screw: SP3X8
	**MVN**	**-32**	9.525	3.2	2.1	7.4	6.5	R0.8	-	-	Lock Pin: TS-3S
	**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

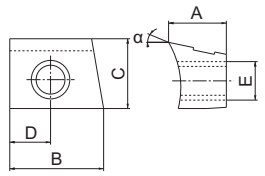
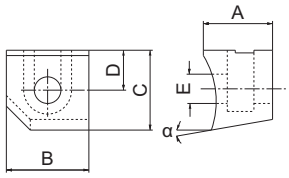
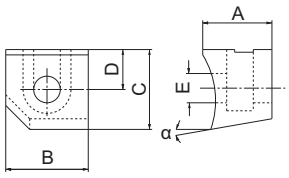
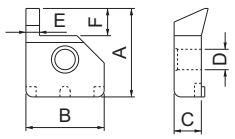
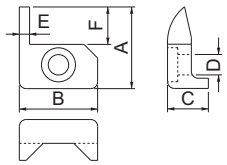
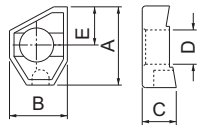
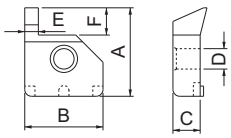
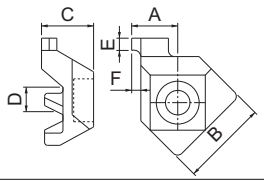
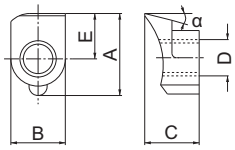
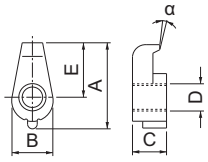
Shims

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	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	6.5	3.5	R0.8	-	80°	Shim Screw: M3X8
		-443	12.7	7.2	2.5	6.5	3.5	R0.8	-	80°	Shim Screw: M3X12
		-454	15.7	8.0	3.4	8.0	4.5	R1.6	-	80°	Shim Screw: M4X10
	SP	-429	9.52	9.52	-	-	-	R1.2	-	-	Shim Screw: HH3X12
	SP	-521	10.0	4.0	2.5	6.0	3.4	R1.2	-	-	Shim Screw: M3X8
		-523		7.2							Shim Screw: M3X12
		-541	12.7	4.0	2.5	6.0	3.4	R1.2	-	-	Shim Screw: M3X8
		-543		7.2							Shim Screw: M3X12
	SP	-826	9.5	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	9.525	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	9.525	3.22	-	-	R0.8	R1.2	8°	-	Shim Screw: BH3X6
	SP	-141P	12.6	4.0	2.5	6.5	3.5	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

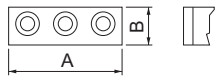
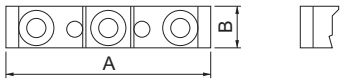
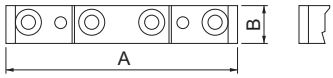
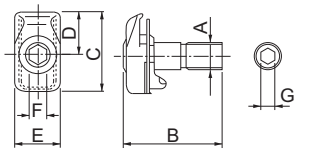
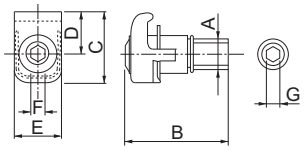
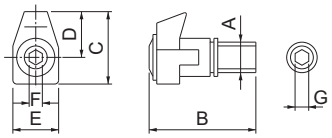
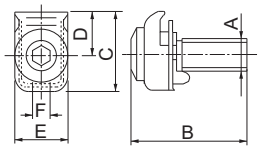
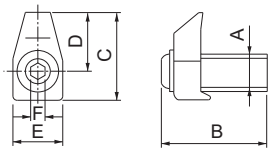
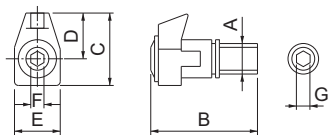
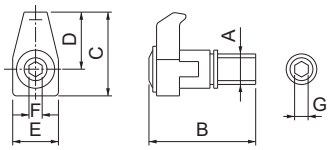
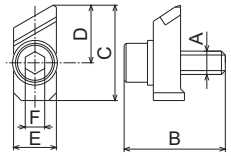
Shape	Description	Dimension (mm)						Angle (°)		Remarks
		A	B	C	D	E	F	α	θ	
	**SP -441P**	12.7	4.0	2.5	6.3	3.5	R1.2	11°	-	Shim Screw: M3X8
	-443P		7.2							Shim Screw: M3X12
	**SP -521P**	10.0	4.0	2.5	6.0	3.5	R1.2	11°	-	Shim Screw: M3X8
	-523P		7.2							Shim Screw: M3X12
	**SP -RC**	12.6	3.0	-	7.35	3.35	-	-	-	Shim Screw: SP3X8
	**SVN -32**	8.0	3.18	1.5	3.1	2.3	R0.4	-	-	Shim Screw: SB-2050TR
	**SVN -32N**	8.2	3.18	1.5	7.0	5.9	R0.6	-	-	Shim Screw: SS-4N
	**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 -2506**	-	9.5	14.9	20	-	-	5°	-	Clamp Screw: SB-40140TR

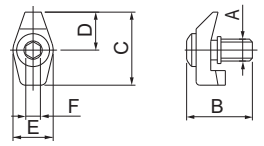
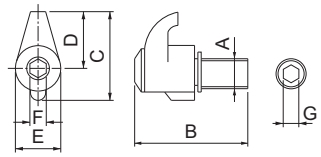
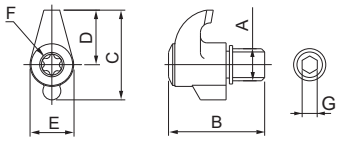
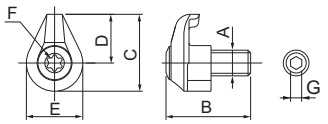
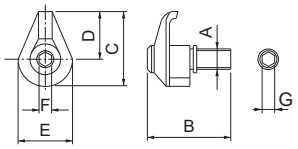
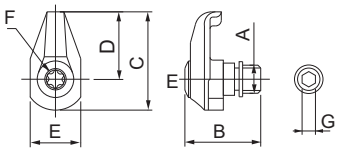
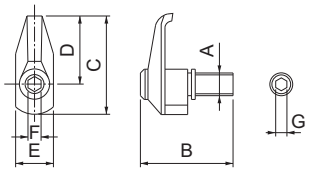
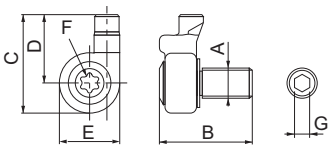
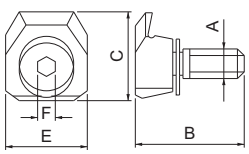
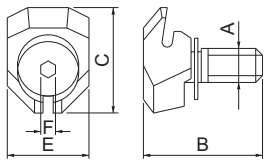
Shape Handed Spare Parts show Right-hand	Description	Dimension (mm)						Angle (°)		Remarks
		A	B	C	D	E	F	α	θ	
	**LSD -445R**	12.7	13.0	20.0	26.5	-	-	20°	45°	Dimension A shows I.D. of Insert
	LSE -445R	12.7	13.0	19.5	26.0	-	-	20°	45°	
	LSO -445R	13.494	12.0	21.3	23.5	-	-	27°	45°	
	LSP -415R	12.7	13.0	18.0	26.0	-	-	15°	15°	
	**LTE -490R**	12.7	12.0	17.0	30.0	-	-	15°	-	Dimension A shows I.D. of Insert

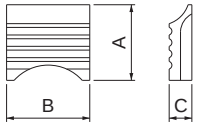
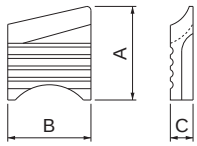
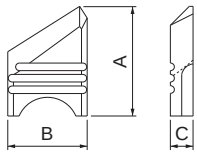
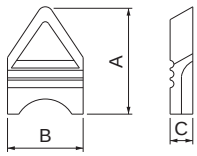
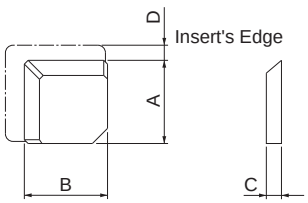
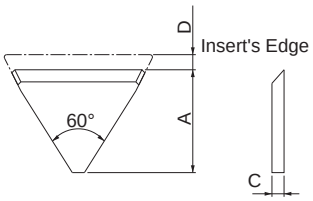
Clamps

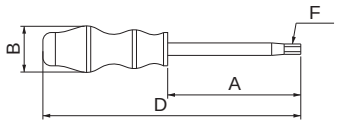
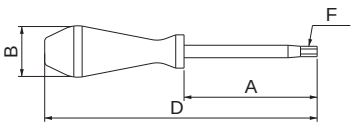
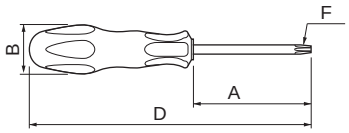
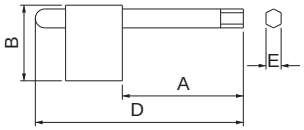
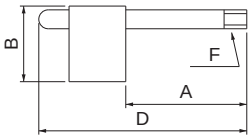
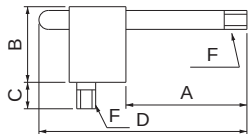
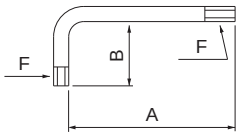
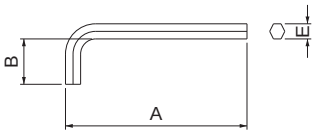
Shape Handed Spare Parts show Right-hand	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**C**	**17R**	12.2	19.5	14.3	8.5	M8X1.25 (L-hand Thread)	-	12°	-	Clamp Screw: W8X18
	**C**	**20R**	15.1	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw: TH8X15
	CH	**-20R**	13.1	15.5	14.8	7.5	5.3	-	10°	-	Clamp Screw: TH8X15
	**C**	**25R**	13.2	15.5	15.0	7.5	5.3	-	10°	-	Clamp Screw: TH8X15
	**CE**	**-111**	35.0	25.0	10.0	8.0	3.0	10.0	-	-	Right-hand
		-121									Left-hand
		-131					4.5		-	-	Right-hand
		-141									Left-hand
	**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	29.0	23.0	8.5		6.0	6.0			
	**CGIA**	**-3R**	10.7	17.0	10.5	5.2	1.8	2.0	-	-	
		-4R					2.5				
		-5R	15.7				3.5	7.0			
	**CP**	**-8TE**	17.9	12.0	12.0	M8X1.25 (L-hand Thread)	10.0	-	15°	-	
	**CP**	**-8W**	20.9	12.0	8.0	M8X1.25 (L-hand Thread)	13.0	-	3°	-	

Clamp Sets

Shape Handed Spare Parts show Right-hand	Description	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	6.5	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	20.0	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

Shape Handed Spare Parts show Right-hand	Description	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	2.5	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			
	-5V		13.5	12.7	7.5	10.3			
	**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	16.7	-	15.0	3.0	-	
	**WCS -8**	M6X1.0	21.0	19.4	-	15.0	3.0	-	

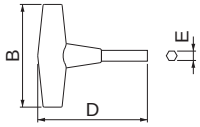
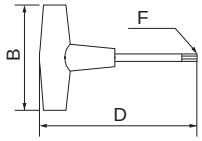
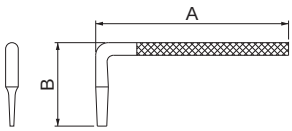
Shape Handed Spare Parts show Right-hand	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	CB	-11	11.5	12.7	3.5	-	-	-	-	-	
		-51	16.0	15.6	3.5	-	-	-	-	-	
	CB	-12	13.8	12.7	3.5	-	-	-	-	-	Right-Hand
		-13	13.8	12.7	3.5	-	-	-	-	-	Left-hand
	CB	-14	18.51	12.7	3.5	-	-	-	-	-	Right-Hand
		-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	-	-	-	-	

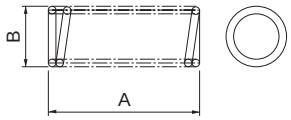
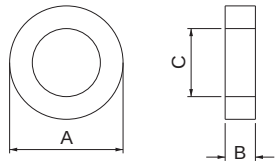
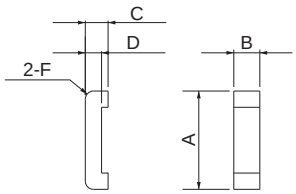
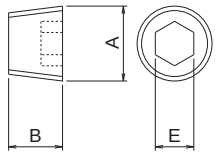
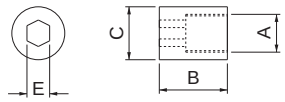
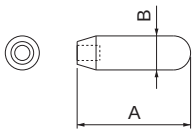
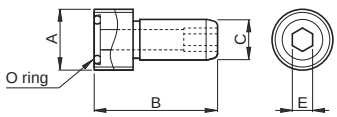
Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**DT**	**-7**	44	16	-	114	-	T7	-	-	Torx
		-8	70	26	-	150	-	T8	-	-	
	**DT**	**-10**	70	29	-	160	-	T10	-	-	Torx
		-15	70	32	-	170	-	T15	-	-	
		-20	90	32	-	190	-	T20	-	-	
		-25	82	36	-	190	-	T25	-	-	
	**DTM**	**-6**	39	17	-	113	-	T6	-	-	Top of Torx is magnetized
		-8	70	24	-	150	-	T8	-	-	
		-15	70	31	-	174	-	T15	-	-	
	DTP	**-15**	81	33	-	186	-	15IP	-	-	Torx Plus
		-20	100			206		20IP			
	**FH**	**-2**	42	20	-	73	2.0	-	-	-	Hexagon
		-2.5	42	20	-	73	2.5	-	-	-	
	**FT**	**-6**	30	20	-	65	-	T6	-	-	Torx
		-7	34	15	-	62	-	T7	-	-	
		-8	35	20	-	74	-	T8	-	-	
		-10	40	20	-	74	-	T10	-	-	
	**FT**	**-15**	43	25.0	10.0	80	-	T15	-	-	Torx
	**LTW**	**-8SS**	45	6.0	-	-	-	T8	-	-	Torx
		-10S	65	10.0	-	-	-	T10	-	-	
		-10SS	50	7.0	-	-	-	T10	-	-	
		-15S	65	10.0	-	-	-	T15	-	-	
		-20	57	20.0	-	-	-	T20	-	-	
	**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	-	-	-	

Reference

L-shape type (LTP-10, LTP-15: described in **F42** and **F43**) is Torx Plus.
Screwdriver type DTP-9 (described in **M116** and **M117**) is also Torx Plus.

Wrenches / Spanners

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**TH**	**-4**	-	80	-	83	4.0	-	-	-	Hexagon
	**TT**	**-25**	-	70	-	70	-	T25	-	-	Torx
		-25L		80		145		T25			
		-30		80		110		T30			
	TTC	**-20**	-	98	-	130	-	T20	-	-	
		-25						T25			
	**LTK**	**-5**	70	30	-	-	-	-	-	-	

Shape	Description		Dimension (mm)						Angle (°)		Remarks
			A	B	C	D	E	F	α	θ	
	**SP**	**-5**	12.0	6.7	-	-	-	-	-	-	Spring
		-6	12.0	7.7							
		-8	11.0	9.7							
	**W**	**-6**	11.5	1.6	6.4	-	-	-	-	-	Washer
		6-14	11.5	1.4	6.4						
		-8	15.5	1.6	8.4						
	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
	**GP**	**-1**	PT1/8	7.0	-	-	5.0	-	-	-	Plug
		-2	PT1/4	9.0	-	-	6.0	-	-	-	
	**WN**	**-1**	M5X8	10.0	7.0	-	3.0	-	-	-	Nut
	**PC**	**-1**	60.0	8.5	-	-	-	-	-	-	Punch
		-2	65.0	10.0	-	-	-	-	-	-	
	**CL63**	**-1**	M18x1.0	36.5	12	-	6.0	-	-	-	Coolant Pipe (For O-Ring, see **P11**)

R Technical Information

R1~R40

General Information R2~R15

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SI Derived Units Conversion Chart

(Bold lined units are the ones by SI Derived Unit.)

(Extracted from JIS Handbook "Steel")

● Force

N	kgf	dyn
1	$1.019\ 72\times10^{-1}$	1×10^{5}
9.806 65	1	$9.806\ 65\times10^{5}$
1×10^{-5}	$1.019\ 72\times10^{-6}$	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}	$1.019\ 72\times10^{-7}$	$1.019\ 72\times10^{-5}$	$1.019\ 72\times10^{-1}$
1×10^{6}	1	$1.019\ 72\times10^{-1}$	$1.019\ 72\times10$	$1.019\ 72\times10^{5}$
$9.806\ 65\times10^{6}$	9.806 65	1	1×10^{2}	1×10^{6}
$9.806\ 65\times10^{4}$	$9.806\ 65\times10^{-2}$	1×10^{-2}	1	1×10^{4}
9.806 65	$9.806\ 65\times10^{-6}$	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}	$1.019\ 72\times10^{-5}$
1×10^{3}	1	1×10^{-3}	1×10^{-2}	$1.019\ 72\times10^{-2}$
1×10^{6}	1×10^{3}	1	1×10	$1.019\ 72\times10$
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.019 72
$9.806\ 65\times10^{4}$	$9.806\ 65\times10$	$9.806\ 65\times10^{-2}$	$9.806\ 65\times10^{-1}$	1

Symbols of cutting conditions

● Cutting conditions below are indicated by the new symbols listed in 2nd column.

1) Turning

Cutting Condition	New symbol	(Previous symbol)	Unit
Cutting speed	Vc	V	m/min
Feed rate	f	f	mm/rev
Depth of cut	ap	d	mm
Edge width	W	W	mm
Workpiece diameter	Dm	D	mm
Power required at spindle	Pc	Pkw	kW
Specific cutting resistance	kc	Ks	MPa
Theoretical surface roughness	h	Rz	μm
Corner radius	rε	R	mm
Revolution	n	N	min^{-1}

Note: 'rε' is read as 'r epsilon'

2) Milling

Cutting Condition	New 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
Number of inserts	Z	Z	teeth
Depth of cut	ap	d	mm
Width of cut	ae	w	mm
Pick feed	Pf	Pf	mm
Power required at spindle	Pc	Pkw	kW
Specific cutting resistance	kc	Ks	MPa
Metal Removal Rate	Q	Q	cm^3/min
Revolution	n	N	min^{-1}

3) Drilling

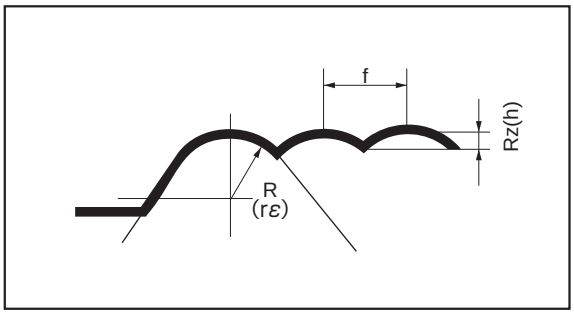
Cutting Condition	New symbol	(Previous symbol)	Unit
Cutting speed	Vc	V	m/min
Feed speed	Vf	F	mm/min
Feed rate	f	f	mm/rev
Drill diameter	Dc	D (Ds)	mm
Power required at spindle	Pc	Pkw	kW
Specific cutting resistance	kc	Ks	MPa
Depth of hole	H	d	mm
Revolution	n	N	min^{-1}

Theoretical (Geometrical) Surface Roughness

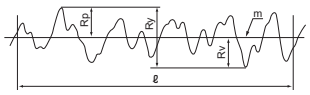
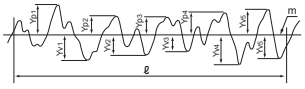
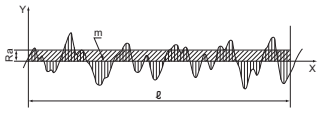
Theoretical Surface Roughness at Turning indicates the minimum roughness value from the cutting conditions and it is shown by the formula as follows:

$$Rz(h)=\frac{f^2}{8R(r\varepsilon)}\times 10^3$$

Rz(h)：Theoretical Surface Roughness〔μm〕
f ：Feed Rate〔mm/rev〕
R(rε)：Corner Radius of Insert〔mm〕



How to Obtain Surface Roughness Values

Type	Symbol	How to Obtain	Explanation
Max. Height Roughness	Rz	Ry is obtained from the distance in micron meter between the highest peak and the lowest valley in the range of sampled reference length (ℓ) to the direction of mean line of the roughness curve. Rz=Rp+Rv	
Ten Points Mean Roughness	RzJIS	Rz is obtained from the total in micron meter of the mean value of the each distance between the mean line and 5 peaks (Yp) from the highest one, and the mean value of the each distance between the mean line and the 5 valleys (Yv) from the lowest one, of the roughness curve in the range of sampled reference length "ℓ". $RzJIS=\frac{(Yp1+Yp2+Yp3+Yp4+Yp5)+(Yv1+Yv2+Yv3+Yv4+Yv5)}{5}$	 *Yp1, Yp2, Yp3, Yp4, Yp5:* Distance from the mean line to 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 when the roughness curve is expressed by y=f(x), taking X-axis to the mean line direction and Y-axis to 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

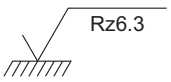
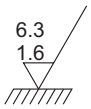
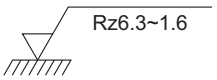
Arithmetical Mean Roughness Ra(μm)	Max. Height Roughness Rz(μm)	Ten PointsMean Roughness RzJIS(μm)	Note: (Relationship with Triangle)
0.025 0.05 0.1 0.2	0.1 0.2 0.4 0.8	0.1 0.2 0.4 0.8	▽▽▽▽
0.4 0.8 1.6	1.6 3.2 6.3	1.6 3.2 6.3	▽▽▽
3.2 6.3	12.5 25	12.5 25	▽▽
12.5 25	50 100	50 100	▽

Note: Finishing symbol (Triangle▽and wave~) was abolished from JIS standard from 1994 Revision.

・How to Indicate

Example
①When Ra is 1.6μm→1.6μmRa
②When Rz is 6.3μm→6.3μmRz
③When RzJIS is 6.3μm→6.3μmRzJIS

Indication in JIS Standard

Example of Ra Indication		Example of Ry, (Rz) Indication	
①When indicating the upper limit only (when upper limit is 6.3μmRa)		①When indicating upper limit onlyIndicate surface roughness following the parameter symbol.	
②When indicating both lower and upper limit (when upper limit is 6.3μmRa, lower limit is 1.6μmRa)		②When indicating both lower and upper limit Indicate surface roughness as (upper limit ~ lower limit) following the parameter symbol.	

Note: The indications of Ra and Rz are different.

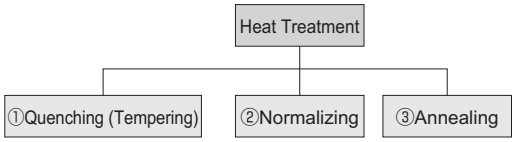
Surface Roughness Symbol Caution

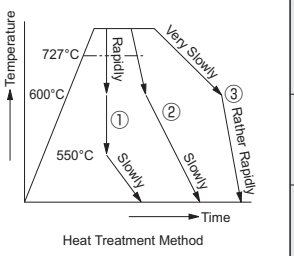
The above information is based on JIS B 0601-2001.
However, some symbols were revised as shown in the right table in accordance with ISO Standard from JIS B 0601-2001 version.
Ten Points Mean Roughness (Rz) was eliminated from 2001 version but it still remains as RzJIS reference, since it was popular 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

One of the ways to determine the hardness of steel is the heat treatment and it is classified to 3 types.



	· Quenching (Tempering)	After heating to over 727°C, 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 over 727°C, 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 over 727°C, 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.

Heat Treatment Method

Hardness Value

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: 3000kgf (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 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/mm²
(2) Value in ( ) is not in practical use, but reference only

Material List (JIS)

Metal

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 Guage 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
Steel for Machine Structural Use		Carbon Steel for Machine Structural Use	SxxC, SxxCK
		Aluminium 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
	Super Alloy	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 Metal

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 Alloy and Aluminum Alloy 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	Germany	UK	France	Russia	USA	Japan	China
	DIN	BS	NF	ГОСТ	AISI / SAE	JIS	GB
Carbon Steel for Machine Structural Use	C10E C10R	040A10 045A10 045M10	XC10		1010	S10C	08 10
		040A12	XC12		1012	S12C	
	C15E C15R	055M15			1015	S15C	15
			XC18		1017	S17C	
	C22 C22E C22R	070M20 C22 C22E C22R	C22 C22E C22R		1020	S20C	20
					1023	S22C	
	C25 C25E C25R	C25 C25E C22R	C25 C25E C25R		1025	S25C	25
				25Г	1029	S28C	
	C30 C30E C30R	080A30 080M30 C30 C30E C30R	C30 C30E C30R	30Г	1030	S30C	30
				30Г		S33C	
	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35Г	1035	S35C	35
				35Г	1038	S38C	
	C40 C40E C40R	080M40 C40 C40E C40R	C40 C40E C40R	40Г	1039 1040	S40C	40
		080A42		40Г	1042 1043	S43C	
	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45Г	1045 1046	S45C	45
		080A47		45Г		S48C	
	C50 C50E C50R	080M50 C50 C50E C50R	C50 C50E C50R	50Г	1049	S50C	50
				50Г	1050 1053	S53C	
	C55 C55E C55R	070M55 C55 C55E C55R	C55 C55E C55R		1055	S55C	55
	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60Г	1059 1060	S58C	60
	C10E	045A10 045M10	XC10			S09CK	
	C15E		XC12			S15CK	15F
			XC18			S20CK	

Material Cross Reference Table

● Steel

Classification	Germany	UK	France	Russia	USA	Japan	China
	DIN	BS	NF	ГОСТ	AISI / SAE	JIS	GB
Nickel Chromium Steel				40XH		SNC236	
						SNC415	
				30XH3A		SNC631	
	15NiCr13	655M13				SNC815	
						SNC836	
Nickel Chromium Molybdenum Steel	20NiCrMo2 20NiCrMoS2	805A20 805M20 805A22 805M22	20NCD 2		8615 8617 8620 8622	SNCM220	
					8637 8640	SNCM240	
						SNCM415	
				20XH2M (20XHM)	4320	SNCM420	
						SNCM431	
					4340	SNCM439	
						SNCM447	
						SNCM616	
						SNCM625	
						SNCM630	
						SNCM815	
Chromium Steel	17Cr3 17CrS3			15X 15XA		SCr415	15Cr 15CrA
				20X	5120	SCr420	20Cr
	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30X	5130 5132	SCr430	30Cr
	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X	5132	SCr435	35Cr
	41Cr4 41CrS4	530M40 41Cr4 41CrS4	41Cr4 41CrS4	40X	5140	SCr440	40Cr
				45X		SCr445	45Cr 50Cr
Chromium Molybdenum Steel	15CrMo4					SCM415	15CrMo
	18CrMo4 18CrMoS4			20XM		SCM418	20CrMo
	20CrMo4	708M20		20XM		SCM420	
						SCM421	
				30XM 30XMA	4131	SCM430	30CrMo 30CrMoA
						SCM432	
	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	35XM	4137	SCM435	35CrMo
	42CrMo4 42CrMoS4	708M40 709M40 42CrMo4 42CrMoS4	42CrMo4 42CrMoS4		4140 4142	SCM440	42CrMo
					4145 4147	SCM445	
						SCM822	

● Steel

Classification	Germany	UK	France	Russia	USA	Japan	China
	DIN	BS	NF	ГОСТ	AISI / SAE	JIS	GB
Manganese Chromium Steel Manganese Steel		150M19			1522	SMn420	20Mn2
		150M36		30Г2 35Г2	1534	SMn433	30Mn2 35Mn2
		150M36		35Г2 40Г2	1541	SMn438	40Mn2
				40Г2 45Г2	1541	SMn443	45Mn2
						SMnC420	
						SMnC443	
Structural Steel with Specified Hardenability Band (H-Shape Steel)					1522H	SMn420H	
						SMn433H	
					1541H	SMn438H	
					1541H	SMn443H	
						SMnC420H	
						SMnC443H	
	17Cr3 17CrS3			15Х		SCr415H	
				20Х	5120H	SCr420H	
	34Cr4 34CrS3	34Cr4 34CrS4	34Cr4 34CrS4	30Х	5130H 5132H	SCr430H	
	37Cr4 34CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35Х	5135H	SCr435H	
	41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40Х	5140H	SCr440H	
						SCN415H	
	18CrMo4 18CrMoS4					SCM418H	
		708H20				SCM420H	
	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4		4135H 4137H	SCM435H	
	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4		4140H 4142H	SCM440H	
					4145H 4147H	SCM445H	
						SCM822H	
						SNC415H	
						SNC631H	
	15NiCr13	655H13				SNC815H	
		805H17 805H20 805H22	20NCD 2		8617H 8620H 8622H	SNCM220H	
					4320H	SNCM420H	

Material Cross Reference Table

● Steel

Classification	Germany	UK	France	Russia	USA		Japan	China
	DIN	BS	NF	ГОСТ	UNS	AISI	JIS	GB
Stainless Steel			Z12CMN17-07Az		S20100	201	SUS 201	1Cr17Mn6Ni5N
		284S16		12Х17Г9АН4	S20200	202	SUS 202	1Cr18Mn8Ni5N
	X12CrNi17 7	301S21	Z11CN17-08	07Х16Н6	S30100	301	SUS 301	1Cr18Mn10Ni5Mo3N 1Cr17Ni7
	X2CrNiN18-7						SUS 301L	
	X12CrNi17 7						SUS 301J1	
		302S25	Z12CN18-09	12Х18Н9	S30200	302	SUS 302	1Cr18Ni9
					S30215	302B	SUS 302B	
	X10CrNiS18 9	303S21	Z8CNF18-09		S30300	303	SUS 303	Y1Cr18Ni9
		303S41		12Х18Н10Е	S30323	303Se	SUS 303Se	Y1Cr18Ni9Se
	X5CrNi18 10	304S31	Z7CN18-09	08Х18Н10	S30400	304	SUS 304	0Cr18Ni9
	X2CrNi19 11	304S11	Z3CN19-11	03Х18Н11	S30403	304L	SUS 304L	00Cr18Ni10
			Z6CN19-09Az		S30451	304N	SUS 304N1	0Cr18Ni9N
					S30452		SUS 304N2	0Cr19Ni10NbN
	X2CrNiN18 10		Z3CN18-10Az		S30453	304LN	SUS 304LN	00Cr18Ni10N
							SUS 304J1	
							SUS 304J2	
					S30431	S30431	SUS 304J3	
	X5CrNi18 12	305S19	Z8CN18-12	06Х18Н11	S30500	305	SUS 305	1Cr18Ni12
							SUS 305J1	
			Z10CN24-13		S30908	309S	SUS 309S	0Cr23Ni13
		310S31	Z8CN25-20	10Х23Н18	S31008	310S	SUS 310S	0Cr25Ni20
	X5CrNiMo17 12 2	316S31	Z7CND17-12-02		S31600	316	SUS 316	0Cr17Ni12Mo2
	X5CrNiMo17 13 3		Z6CND18-12-03					
	X2CrNiMo17 13 2	316S11	Z3CND17-12-02		S31603	316L	SUS 316L	00Cr17Ni14Mo2
	X2CrNiMo17 14 3		Z3CND17-13-03	03Х17Н14М3				
					S31651	316N	SUS 316N	0Cr17Ni12Mo2N
	X2CrNiMoN17 12 2		Z3CND17-11Az		S31653	316LN	SUS 316LN	00Cr17Ni13Mo2N
	X2CrNiMoN17 13 3		Z3CND17-12Az					
	X6CrNiMoTi17 12 2		Z6CNDT17-12	08Х17Н13М2Т	S31635		SUS 316Ti	
							SUS 316J1	0Cr18Ni12Mo2Cu2
							SUS 316J1L	00Cr18Ni14Mo2Cu2
		317S16			S31700	317	SUS 317	0Cr19Ni13Mo3
	X2CrNiMo18 16 4	317S12	Z3CND19-15-04		S31703	317L	SUS 317L	00Cr19Ni13Mo3
			Z3CND19-14Az		S31753		SUS 317LN	
							SUS 317J1	0Cr18Ni16Mo5
							SUS 317J2	
							SUS 317J3L	
					N08367		SUS 836L	
		904S14	Z2NCDU25-20		N08904	N08904	SUS 890L	
	X6CrNiTi18 10	321S31	Z6CNT18-10	08Х18Н10Т	S32100	321	SUS 321	1Cr18Ni9Ti 0Cr18Ni10Ti
	X6CrNiNb18 10	347S31	Z6CNNb18-10	08Х18Н12Б	S34700	347	SUS 347	0Cr18Ni11Nb
			Z6CN18-16		S38400	384	SUS 384	
		394S17	Z2CNU18-10		S30430	304Cu	SUS XM7	0Cr18Ni9Cu3
			Z15CNS20-12		S38100		SUS XM15J1	0Cr18Ni13Si4
					S32900	329	SUS 329J1	0Cr26Ni5Mo2
			Z3CNDU22-05Az	08Х21Н6М2Т	S39240	S31803	SUS 329J3L	
			Z3CNDU25-07Az		S39275	S31260	SUS 329J4L	

● Steel

Classification	Germany	UK	France	Russia	USA		Japan	China
	DIN	BS	NF	ГОСТ	UNS	AISI	JIS	GB
Stainless Steel	X6CrAl13	405S17	Z8CA12		S40500	405	SUS 405	0Cr13Al 0Cr13
			Z3C14				SUS 410L	00Cr12
					S42900	429	SUS 429	
	X6Cr17	430S17	Z8C17	12Х17	S43000	430	SUS 430	1Cr17
	X7CrMoS18		Z8CF17		S43020	430F	SUS 430F	Y1Cr17
	X6CrTi17		Z4CT17		S43035		SUS 430LX	
	X6CrNb17							
			Z4CNb17				SUS 430J1L	
	X6CrMo17 1	434S17	Z8CD17-01		S43400	434	SUS 434	1Cr17Mo
					S43600	436	SUS 436L	
							SUS 436J1L	
			Z3CDT18-02		S44400	444	SUS 444	
					S44700		SUS 447J1	00Cr30Mo2
			Z1CD26-01		S44627		SUS XM27	00Cr27Mo
					S40300	403	SUS 403	1Cr12
	X10Cr13	410S21	Z13C13		S41000	410	SUS 410	1Cr13
	X6Cr13	403S17	Z8C12	08Х13	S41008	410S	SUS 410S	
							SUS 410F2	
					S41025		SUS 410J1	1Cr13Mo 1Cr12Mo
		416S21	Z11CF13		S41600	416	SUS 416	Y1Cr13
	X20Cr13	420S29	Z20C13	20Х13	S42000	420	SUS 420J1	2Cr13
	X30Cr13	420S37	Z33C13	30Х13	S42000	420	SUS 420J2	3Cr13
			Z30CF13		S42020	420F	SUS 420F	Y3Cr13
							SUS 420F2	
							SUS 429J1	
	X20CrNi17 2	431S29	Z15CN16-02	20Х17Н2	S43100	431	SUS 431	1Cr17Ni2
			Z70C15		S44002	440A	SUS 440A	7Cr17
					S44003	440B	SUS 440B	8Cr17
			Z100CD17	95Х18	S44004	440C	SUS 440C	9Cr18 11Cr17 9Cr18Mo
					S44020	S44020	SUS 440F	Y11Cr17
			Z6CNU17-04		S17400	S17400	SUS 630	0Cr17Ni4CuNb
	X7CrNiAl17 7		Z9CNA17-07	09Х17Н7 Ю	S17700	S17700	SUS 631	0Cr17Ni7Al
							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 related)

JIS
SUS630
SUS631

Material Cross Reference Table

● Steel

Classification	Germany	UK	France	Russia	USA		Japan	China
	DIN	BS	NF	ГОСТ	UNS	AISI	JIS	GB
Heat Resisting Steel		331S42	Z35CNWS14-14	45Х14Н14В2М			SUH 31	
		349S52	Z52CMN21-09Az				SUH 35	
	X53CrMnNi21 9	349S54	Z55CMN21-09Az	55Х20 Г 9АН4	S63008		SUH 36	5Cr21Mn9Ni4N
		381S34			S63017		SUH 37	2Cr21Ni12N
							SUH 38	
		309S24	Z15CN24-13		S30900	309	SUH 309	2Cr23Ni13
	CrNi2520	310S24	Z15CN25-20	20Х25Н20С2	S31000	310	SUH 310	2Cr25Ni20
			Z12NCS35-16		N08330	N08330	SUH 330	1Cr16Ni35
			Z6NCTV25-20		S66286		SUH 660	0Cr15Ni25Ti2MoAlVB
					R30155		SUH 661	
	CrAl1205						SUH 21	
	X6CrTi12	409S19	Z6CT12		S40900	409	SUH 409	
			Z3CT12				SUH 409L	
			Z12C25	15Х28	S44600	446	SUH 446	2Cr25N
	X45CrSi9 3	401S45	Z45CS9		S65007		SUH 1	4Cr9Si2
			Z40CSD10	40Х10С2М			SUH 3	4Cr10Si2Mo
		443S65	Z80CSN20-02				SUH 4	8Cr20Si2Ni
				40Х 9С2			SUH 11	
				20Х12ВНМБФР			SUH 600	2Cr12MoVNbN
					S42200		SUH 616	2Cr12NiMoWV

● Representative Classification of Heat Resisting Steell

● 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	Germany	UK	France	Russia	USA	Japan	China
	DIN	BS	NF	ГОСТ	AISI / ASTM	JIS	GB
Carbon Tool Steel			C140E3U	Y13		SK140 (SK1)	T13
			C120E3U	Y12	W1-11$^{1}/_{2}$	SK120 (SK2)	T12
	C105W1		C105E2U	Y11	W1-10	SK105 (SK3)	T11
			C90E2U	Y10	W1-9	SK95 (SK4)	T10
	C80W1		C90E2U C80E2U	Y8Г Y9	W1-8	SK85 (SK5)	T8Mn T9
	C80W1		C80E2U C70E2U	Y8		SK75 (SK6)	T8
	C70W2		C70E2U	Y7		SK65 (SK7)	T7
High Speed Tool Steel		BT1	HS18-0-1	P18	T1	SKH2	W18Cr4V
	S18-1-2-5	BT4	HS18-1-1-5	P18K5Ф2	T4	SKH3	W18Cr4VCo5
		BT5	HS18-0-2-9	P18K5Ф	T5	SKH4	W18Cr4V2Co8
	S12-1-4-5	BT15	HS12-1-5-5		T15	SKH10	W12Cr4V5Co5
	S6-5-2	BM2	HS6-5-2	P6M5	M2	SKH51	W6Mo5Cr4V2
				P6M5Ф3	M3-1	SKH52	CW6Mo5Cr4V2 W6Mo5Cr4V3
	S6-5-3		HS6-5-3	P6M5Ф3	M3-2	SKH53	CW6Mo5Cr4V3
		BM4	HS6-5-4		M4	SKH54	
	S6-5-2-5	BM35	HS6-5-2-5HC	P6M5K5	M35 M41	SKH55	W6Mo5Cr4V2Co5 W7Mo5Cr4V2Co5
					M36	SKH56	
	S10-4-3-10	BT42	HS10-4-3-10			SKH57	
			HS2-9-2		M7	SKH58	W2Mo9Cr4V2
	S2-10-1-8	BM42	HS2-9-1-8		M42	SKH59	W2Mo9Cr4VCo8
Alloy Tool Steel				XB4	F2	SKS11	
	105WCr6		105WCr5	XBГ		SKS2	
						SKS21	W
						SKS5	
					L6	SKS51	
						SKS7	
			C140E3UCr4	13X		SKS8	Cr06
				6XB2C 5XB2CФ	S1	SKS4	5CrW2Si 6CrW2Si
				4XB2C	S1	SKS41	4CrW2Si
		BW2	100V2		W2-9$^{1}/_{2}$	SKS43	
					W2-8	SKS44	
				9XBГ		SKS3	9CrWMn
	105WCr6		105WCr5	XBГ		SKS31	CrWMn
						SKS93	
						SKS94	
						SKS95	8MnSi
	X210Cr12	BD3	X200Cr12	X12	D3	SKD1	Cr12
				X12MФ	D2	SKD10	Cr12Mo1V1
		BD2	X160CrMoV12		D2	SKD11	Cr12MoV
		BA2	X100CrMoV5		A2	SKD12	Cr5Mo1V
			X32WCrV3			SKD4	
		BH21	X30WCrV9		H21	SKD5	3Cr2W8V
	X38CrMoV51	BH11	X38CrMoV5	4X5MФC	H11	SKD6	4Cr5MoSiV
	X40CrMoV51	BH13	X40CrMoV5	4X5MФ1C	H13	SKD61	4Cr5MoSiV1
		BH12	X35CrWMoV5	3X3M3Ф	H12	SKD62	
	X32CrMoV33	BH10	32CrMoV12-18		H10	SKD7	4Cr3Mo3SiV
		BH19			H19	SKD8	
			55CrNiMoV4			SKT3	
	55NiCrMoV6	BH224 / 5	55NiCrMoV7	5XHM		SKT4	5CrNiMo

Material Cross Reference Table

● Steel

Classification	Germany	UK	France	Russia	USA	Japan	China
	DIN	BS	NF	ГОСТ	AISI / ASTM	JIS	GB
Spring Steel				75 80 85	1075 1078	SUP3	
			60Si7	60С2		SUP6	
			60Si7	60С2Г	9260	SUP7	
	55Cr3		55Cr3		5155	SUP9	
			60Cr3		5160	SUP9A	
	50CrV4	735A51, 735H51	51CrV4	ХФА50ХГФА	6150	SUP10	
				50ХГР	51B60	SUP11A	
	54SiCr6	685A57, 685H57	54SiCr6		9254	SUP12	
		705A60, 705H60	60CrMo4		4161	SUP13	
Free Cutting Carbon Steel					1110	SUM11	
					1108	SUM12	Y12
					1212	SUM21	
	9SMn28	(230M07)	S250		1213	SUM22	Y15
	9SMnPb28		S250Pb		12L13	SUM22L	Y12Pb
					1215	SUM23	
						SUM23L	
	9SMnPb28		S250Pb		12L14	SUM24L	Y15Pb
	9SMn36		S300			SUM25	
	15S10				1117	SUM31	
						SUM31L	
		210M15, 210A15	(13MF4)			SUM32	Y20
			(35MF6)		1137	SUM41	Y30 Y35
			(45MF6.1)		1141	SUM42	Y40Mn
		(226M44)	(45MF6.3)		1144	SUM43	
Carbon Chromium Bearing Steel					51100	SUJ1	
	100Cr6		100Cr6	ШХ15	52100	SUJ2	Cr2
					ASTM A 485 Grade 1	SUJ3	
						SUJ4	
						SUJ5	

● Cast Iron

Classification	Germany	UK	France	Russia	USA	Japan	China
	DIN	BS	NF	ГОСТ	AISI / SAE	JIS	GB
Gray Cast Iron		100		СУ10	NO.20	FC100	HT100
	GG15	150	FGL150	СУ15	NO.30	FC150	HT150
	GG20	200	FGL200	СУ20	NO.35	FC200	HT200
	GG25	250	FGL250	СУ25	NO.45	FC250	HT250
	GG30	300	FGL300	СУ30	NO.50	FC300	HT300
	GG35	350	FGL350	СУ35	NO.60	FC350	HT350
	GG40		FGL400	СУ40			
Nodular Cast Iron	GGG40	400 / 17	FGS370-17	ВУ40	60-40-18	FCD400	QT400-18
		420 / 12	FGS400-12	ВУ45	65-45-12	FCD450	QT450-10
	GGG50	500 / 7	FGS500-7	ВУ50	70-50-05	FCD500	QT500-7
	GGG60	600 / 7	FGS600-2	ВУ60	80-60-03	FCD600	QT600-3
	GGG70	700 / 2	FGS700-2	ВУ70	100-70-03	FCD700	QT700-2
	GGG80	800 / 2	FGS800-2	ВУ80	120-90-02	FCD800	QT800-2
		900 / 2		ВУ100			QT900-2

● Non-ferrous Metal

Classification	Germany	UK	France	Russia	USA	Japan	China
	DIN	BS	NF	ГОСТ	ASTM	JIS	GB
Aluminum Alloy	A199.99R			А99	1199		1A99
	A199.98R			А97			1A97
				А95			1A95
	A199.90	1080(1A)	1080A	А8		A1080	1A80
	A199.50	1050(1B)	1050A	А5	1050	A1050	1A50
	AlMg2.5	NS4	5052	Амг	5052	A5052	5A02
		NS5		АМг3			5A03
	AlMg5	NB6		АМг5В	5056	A5056	5A05
		NG61	5957		5456	A5556	5A30
	AlCu2.5Mg0.5		2117	Д18	2036	A2117	2A01
	AlCuMg1	HF15	2017S	Д1		A2017	2A11
	AlCuMg2		2024	Д16АВТВ	2124	A2024	2A12
					2319		2B16
				АК4		A2N01	2A80
				АК2	2218	A2018	2A90
	AlCuSiMn		2014	АК8	2014	A2014	2A14
	AlZnMgCu1.5		7075	В95Р	7175	A7075	7A09
Aluminum Alloy Casting	G-AlSi7Mg	LM25			356.2	AC4C	ZAlSi7Mn
	G-Al12	LM6	A-S12-Y4	АЛ2	413.2	AC3A	ZAlSi12
				АЛ5	355.2		ZAlSi5Cu1Mg
	G-Al12(Cu)				413.0	AC8A	ZAlSi2Cu2Mg1
				АЛ19			ZAlCu5Mn
					201.0		ZAlCu5MnCdVA
	G-AlMg10	LM10	AG11	АЛ8	520.2		ZAlMg10
	G-AlMg5Si			АЛ13			ZAlMg5Si

Insert 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	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
P (Steel)	P01	CA5505	HC5000 HG3305	IC9015 IC9150	KC910	UE6005		GC4005 GC4205	TP1000 TX100	AC700G	T9005
	P10	CA5505 CA5515	GM10 GM20 GM8015 HG8010	IC9015 IC9150 IC9250	KC9010 KC9110	UC6010 UE6005 UE6010 UE6020	CP2 CP5	GC4015 GC3115 GC4215	TP1000 TP100 TX150	AC700G AC2000 AC820P	T9005 T9015
	P20	CA5515 CA5525 CR9025	GM20 GM8020 HG8025	IC9015 IC9025 IC9250 IC9350	KC8050 KC9025 KC9125	UC6010 UE6110 UE6020 F7030	CP2 CP5 CP7	GC4020 GC4025 GC4215 GC4225	TP200 CP250	AC2000 AC3000 AC820P	T9015 T9025
	P30	CA5525 CA5535 CR9025	GM25 GM8035 HG8025 HG8035	IC635 IC9025 IC9350	KC5025 KC9040 KC9140	UE6035 UH6400 F7030		GC4030 GC4225 GC4230 GC4235	TP200 CP300	AC3000 AC630M AC830P	T9025 T9035 T3130
	P40	CA5535	GX30	IC635	KC9045 KC9240	UE6035 UH6400		GC4235 GC4240	TP40 TP300	AC630M AC830P	T9035
M (Stainless Steel)	M10	CA6515	GM10	IC9250 IC9350	KC5010 KC9010 KC9110 KC9215	US7020	CP2 CP5	GC2015	TP100	AC610M	T9015
	M20	CA6525	GM8020 HG8025	IC9025 IC9250 IC9350	KC8050 KC9025 KC9125 KC9225	UC7020 F7030	CP2 CP5	GC2025 GC2030	TP200	AC610M AC630M	T6020 T9025
	M30		GM25 GM8035 HG8035	IC4050	KC9040 KC9240	US735 F7030		GC2040 GC2135	TP300	AC630M	T6030 T3130
	M40		GX30 GF30		KC9045 KC9245				TP40		
K (Cast Iron)	K01	CA4010 CA4505 CA5505	HC5000 GM3005 HG3305	IC428 IC9007 IC9150	KC5410 KC9315 KC910	UC5005 UC5015		GC3205 GC3210	TX100	AC300G	T5105 T5010
	K10	CA4010 CA4115 CA4505 CA4515 CA5505	GM10 GM8015 HG8010 HG3315	IC418 IC428 IC9015 IC9150	KC5010 KC7310 KC9010	UC5015 UC5115 UE6010	CP2 CP5	GC3205 GC3210 GC3215	TX150	AC700G AC410K	T5105 T5115 T5010 T1015
	K20	CA4115 CA4120 CA4515	GM8020 HG8025	IC418 IC9015 IC9150	KC8050 KC9025 KC9120 KC9325	UE6010	CP5	GC3020 GC3215 K20W	TX150 TP200	AC700G AC820P	T5115 T5125 T5020
	K30							GC3040	TP200		T5125

PVD Coated Carbide (Turning)

・This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
P (Steel)	P01	PR915 PR1005								ACZ150	
	P10	PR915 PR930 PR1005 PR1025 PR1115	CY15 CY150 IP2000	IC507 IC907	KC5010 KC5510 KU10T	VP10MF		GC1025	CP200	ACZ150 ACZ310	AH710
	P20	PR930 PR1025 PR1115	CY150 IP2000	IC507 IC570 IC907 IC908	KC5025 KC5525 KC7215 KC7315 KU25T	VP15TF VP20MF UP20M	QM1 VM1 TA1 TAS	GC1020 GC1025 GC4125	CP250	ACZ310 ACZ330 AC520U	AH710 AH730
	P30		CY250 CY9020 HC844 IP3000	IC328 IC928 IC3028	KC7015 KC7020 KC7235 KU25T	VP15TF VP20MF UP20M	ZM3 QM3 TAS		CP500	ACZ330 ACZ350 AC530U	GH330 AH120 AH740
	P40		CY250 HC844	IC328 IC3028	KC7030 KC7040 KC7140		ZM3 QM3 TAS	GC1120 GC2145	CP500	ACZ350	AH140
M (Stainless Steel)	M10	PR915 PR1025	IP50S	IC507 IC907	KC5010 KC5510 KC6005 KC6015	VP10MF		GC1005 GC1025	CP200	EH510Z ACZ150 AC510U	AH710
	M20	PR915 PR930 PR1025 PR1125	IP100S	IC308 IC507 IC907 IC908 IC3028	KC5025 KC5525 KC7020 KC7025	VP15TF VP20MF UP20M	QM1 VM1 TA1 TAS	GC2030 GC4125	CP200 CP500	EH520Z ACZ150 ACZ310 AC520U	AH730 GH330 GH730 SH730
	M30	PR1125	GF30 CY250 CY9020	IC908 IC1008 IC1028 IC3028	KC7030 KC7225	VP15TF VP20MF UP20M	ZM3 QM3 TAS	GC1020 GC1120 GC2035	CP500	ACZ330 ACZ350 AC530U	AH120
	M40			IC928			ZM3 QM3 TAS	GC2145		ACZ350	AH140
K (Cast Iron)	K01									EH10Z	AH110
	K10	PR905	CY100H CY10H	IC507 IC908	KC5010 KC7210	VP05RT		GC1010	CP200	EH10Z EH510Z AC510U	GH110 AH110
	K20	PR905	GF30 CY9020	IC507 IC908	KC7015 KC7215 KC7315	VP10RT VP15TF	QM1 TA1	GC1020 GC1120	CP200 CP250	EH20Z ACZ310	AH120
	K30			IC508 IC3028	KC7225	VP15TF	QM3 TA3	GC4125	CP500	ACZ310	

Insert Cross Reference Table

Cermet (Turning)

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Classification		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
P (Steel)	P01	TN30 **PV30** TN6010 **PV7010**	CH350	IC20N **IC520N**	KT125 HTX	NX1010	T3N T15			T110A	NS520 **GT520** **GT720**
	P10	TN60 TN6010 TN6020 **PV7010** **PV7020**	CH350 **CZ25**	IC20N **IC520N** **IC530N** IC75T	KT315 KT175 HT2	NX2525 **AP25N**	T15 **C7Z**	CT5015 CT525	CM	**T2000Z** T1200A	NS520 **AT530** **GT720** **GT730**
	P20	TN90 TN6020 **PV7020**	CH550 CH7030 **CZ1025**	IC20N **IC520N** **IC530N** IC75T IC30N	PS5	NX2525 NX3035 **AP25N** **UP35N**	C7X **C7Z**	CT530 **GC1525**		T1200A **T2000Z** **T3000Z**	NS530 NS730 **AT530** **GT530** **GT730**
	P30			IC75T IC30N		NX4545 **VP45N**	N40 C7X			T250A **T3000Z**	NS530 NS540 NS730 NS740
M (Stainless Steel)	M10	TN60 TN6020 **PV7020**	CH350		KT315 KT125	NX2525 **AP25N**	T15 C7X **C7Z**	CT5015 CT525	CM	T110A	NS520 **AT530** **GT530** **GT730**
	M20	TN90 TN6020 **PV7020**	CH550 CH7030 **CZ1025**		KT175 HT2 PS5	NX2525 NX3035 **AP25N**	C7X **C7Z**	CT530 **GC1525**		T1200A **T2000Z**	NS530 NS730
	M30					NX4545				T250A **T3000Z**	NS540 NS730
K (Cast Iron)	K01	TN30 **PV30** **PV7005**				NX1010	T3N T15			T110A	NS520 **AT520** **GT520** **GT720**
	K10	TN60 TN6010 **PV7005** **PV7010**	CH350		KT315 HTX	NX2525 **AP25N**	T15 C7X **C7Z**	CT5015		T1200A **T2000Z**	NS530 NS730 **GT530** **GT730**
	K20					NX2525 **AP25N**					

・**Boldface** grade shows PVD Coated Cermet.

Carbide

Classification		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
P (Steel)	P10		WS10	IC70	K2885	STi10T		S1P		ST10P	TX10S
	P20		EX35	IC70 IC50M	K125M	STi20		SMA	S10M	ST20E	TX20 TX25
	P30	PW30	EX35 EX40	IC50M IC54	KMF			SM30	S25M	A30N A30 ST30E	TX30 UX30
	P40		EX45	IC54	PVA			S6	S60M	ST40E	TX40
K (Cast Iron)	K01		WH02 WH05	IC04	K68 K313	HTi05T		H1P		H2 H1	TH03
	K10	KW10 GW15	WH10	IC20	KMI K8735	HTi10		H1P H10 HM		EH10 EH510	G1F TH10 H10T
	K20	GW25	WH20	IC20 IC10	KMF	HTi20T	KM1	H13A	883 890 HX	G10E EH20 EH520	G2F G2 KS20
	K30			IC10 IC28			KM3			G3	G3
V (Wear and Shock Resistant Tool)	V40		WH50			GTi30				G5	D40
	V50	VW50	WH60			GTi35 GTi40 GTi30S				G6	D50
	V60		WB60			GTi40S GTi50S				G7 G8	D60

Coated (Milling)

・This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
P (Steel)	P10	PR730 PR830 PR1025	JX1020		KC715M			GC1025		ACP100	
	P20	PR730 PR830 PR1025	CY150 TB6020 JX1015	IC250 IC520M IC950	KC522M KC525M	F7030 UP20M		GC1030 GC4220 GC4020 GC4030	T250M T25M T20M	ACP200	
	P30	PR660	CY250 CY9020 HC844 TB6045 JX1045	IC328 IC635 IC908 IC928	KC994M KC725M KC792M KC530M	F7030 VP15TF VP30RT		GC4040 GC4230	T250M T25M F25M F30M	AC230 ACP300	T325 GH330 AH120 AH330 AH740
	P40		CY250 HC844 TB6060 JX1060	IC635 IC928 IC4050	KC735M			GC4040 GC4240	T60M T25M	AC230 ACZ330 ACZ350	AH120
M (Stainless Steel)	M10	PR730 PR1025	CY9020 JX1020		KC522M			GC1025 GC1030		EH10Z	
	M20	PR660 PR730 PR1025	CY150 TB6020 JX1015	IC908 IC928	KC730M KC525M	F7030 UP20M VP30RT		GC2030	T250M T25M F20M F25M F30M	ACP200 EH20Z	GH330 AH330
	M30	PR660	CY250 TB6045 JX1045	IC328	KC994M KC725M	F7030 VP15TF		GC2040	T250M T25M F40M	ACP300 ACZ350	AH120
	M40									ACZ350	AH140
K (Cast Iron)	K01		TB6005	IC4100							AH110
	K10	PR905	CY10H CY100H CY9020	IC4010 IC910 DT7150	KC915M	F5010 VP10RT		GC3220	T150M F15M	AC211	T1015 T1020 AH110
	K20	PR905	CY150 TB6020 JX1015	IC328 KC4050	KC920M KC925 KC992M	F5020		GC1020 GC3020	T150M T250M T25M	EH20Z ACZ310 ACK300	AH120
	K30			IC328	KC930			GC3040 GC4040	T250M T25M		

Cermet (Milling)

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Classification		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
P (Steel)	P10	TN60			KT530M KT195M	NX2525			C15M		NS530 NS730
	P20	TN60 TN100M	CH550 CH570 CH7030	IC30N	HT7 KT530M KT605M	NX2525	C7X C7Z	CT530	C15M	T250A	NS530 NS730
	P30			IC30N		NX4545					NS540
M (Stainless Steel)	M10	TN60				NX2525			C15M		
	M20	TN60 TN100M	CH550 CH570 CH7030		KT7 KT530M KT605M	NX2525		CT530	C15M	T250A	NS530 N308
	M30					NX4545			C15M		NS530
K (Cast Iron)	K01										
	K10			IC30N		NX2525					
	K20					NX2525					

Insert Cross Reference Table

Ceramic

・This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Classification		Kyocera	Iscar	Kennamtal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol									
K (Cast Iron)	K01	KA30 A65 KT66 **PT600M**		KW80 KY1615 AC5		HC1 HC2 HC5 HC6 HW2	CC620 CC650		NB90S NB90M WX120	LX11 LX21
	K10	A65 KT66 **A66N** **PT600M**		KB90 KB90X KY3000		WA1 SX1 **SP2** **SX9**	CC690 CC6090 **GC1690**		WX120 **NS260C**	WG300
	K20	KS6000		KY1310 KY3400 KY3500		SX1 SX8 **SP2**	CC690 CC6090 **GC1690**		**NS260C** NS260	FX105 CX710
S (Difficult-to-Cut Material)	S01									
	S10	CF1		KY4300 KY1525 KY1540		WA1 SX9	CC670 CC6080		WX120	WG300
	S20									
H (Hardened Material)	H01	A65 KT66 **A66N** **PT600M**				HC4 HC7 **ZC4**	CC650 CC670		**NB100C**	LX11
	H10	A65 KT66 **A66N** **PT600M**		KY4300		**ZC4** WA1				

・**Boldface** grade shows PVD Coated Ceramic.

CBN

Classification		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
K (Cast Iron)	K01	**KBN60M**		IB85	KD120 PB100	MB710	B20 B22	CB50 CB7050	CBN050C	BN500	BX930 BX950 BX90S
	K10	**KBN60M** **KBN900**	BH200		**KB9610**	MB710 MB730	B22		CBN20 CBN300	BN600 BN700	BX950 BXC90
	K20	**KBN900**	BH250		**KB9640**	MB730 MBS140			CBN350	BNS800	
H (Hardened Material)	H01	KBN510 **KBN10C** **KBN05M** **KBN10M**			KD050 KD081	**MBC010** MB810	B20 B24	CB20 CB7020	CBN10 CBN100 CBN100P	BNX10 **BNC80** **BNC160**	BXA30 BX310 BXC30
	H10	KBN525 **KBN25C** **KBN25M**	BH200	IB50	KD050 KD120 KB1615 **KB9610**	**MBC020** MB820 MB825 MB8025	B24	CB50 CB7050	CBN150 CBN200 CBN300P	BNX20 BN250 BN300 **BNC200**	BXA40 BX330 BX360 **BXC50**
	H20	**KBN30M** **KBN35M** **KBN900**	BH250	IB55	KB1340 KB5625 **KB9640**	**MBC020** MB835 MB8025	B26		CBN350	BNX25 BN350 **BNC300**	BX380 **BXC50**
Iron Sintered Metal	-	KBN65B **KBN65M** **KBN70M**								BN700 BN7500	

・**Boldface** grade shows PVD Coated CBN.

PCD

Classification		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Class	Symbol										
N (Non-ferrous Material)	N01	KPD001			PD100 KD1405	MD205	PD1		PD10	DA90 DA1000 DA2200	DX180 DX160
	N10	KPD001 KPD010 KPD230		ID5	KD100 KD1415	MD220		CD10	PD20	DA150 DA1000 DA2200	DX140
	N20	KPD001 KPD010 KPD230				MD230			PD30	DA200 DA1000 DA2200	DX120

Molded Chipbreaker Cross Reference Table

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Negative Inserts

Cutting Range		Kyocera		Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
		General Chip-breaker	Chipbreaker for Sticky Material / Soft Steel									
Carbon Steel / Alloy Steel	Finishing (With Wiper Edge)	WP				FW	SW		WF	MF2	LUW	AFW
	Finishing - Medium (With Wiper Edge)	WQ			WG	MW	MW		WM	M3	GUW	ASW
	Finishing	DP GP VF	XP XP-T	BE BH FE	SF	FF UF	F FH FS FY PK	WM ZF1	QF PF	FF1	SU FP SP FA FL LU	TF 01 AS TSF
	Finishing - Medium	HQ CQ CJ	XQ	AB B CE CT	NF	FN	SH C SA MV SY	WV WR	QM	MF2	EX GU SK SJ SX UU UJ	TS NS NM CB 11 17 27 ZF
	Medium - Roughing	GS CS HS PS	XS	AE DE AH	TF	MN	MA MH	Z5 ZW1	SM PM	M3 MF3	UA UG	DM TM ZM
	Medium-Roughing High Feed Rate	PT GT HT		AR AY	NR	P	GH	GS	MR	M5 MR5	MU UX	TH 32Y 32 37
	Roughing	Standard PH		RE	GN	PR MG RN	MT Standard	G	Standard 23	MR7	MC MU MX UZ	31 33 F-K
	Roughing One Side / High Feed Rate	PX		H HX HE TE UE	NM	RH RM	HV HX HZ HXD		QR PR HR	R4 R5 R6 R7 RP	HG HP MP	TU 57 65
Stainless Steel	Finishing	GU MQ		BH MP		FP	FS SH FJ	ZF1	MF		SU	SS
	Medium - Roughing	MS MU TK		DE SE PV	TF PP	MP	MS MA MJ ES MH GH GJ	ZP WS	MM MR	MF1 MF3 A3 A5	EX MU UP	SM SA S
Cast Iron	Medium	C Standard		AH VA VY			Standard		KF KM		GZ UX UJ	Standard 33 CF
	Roughing	GC ZS				UN	GH		KR		UZ	CM CH
Non ferrous Metals	Medium - Roughing	AH			PP	GP MS			AL	95	AG	P

Positive Inserts

Cutting Range		Kyocera		Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
		General Chip-breaker	Chipbreaker for Sticky Material / Soft Steel									
Carbon Steel / Alloy Steel	Minute ap	CF										01
	Finishing	DP GP VF	XP		PF SM	11 GF UF	FV SQ SV SMG	AZ3 AZ7	PF UF	FF1	FC FK FP LU	PF 23
	Finishing - Medium ①	HQ	XQ	JE	14	LF	MQ MV	AF1	PM UM	F1	SF SU	PS 24
	Finishing - Medium ②	GK		JQ			No Indication	QD	PF PM			
	Medium	Standard		J	Standard	GM MR	Standard	AM3	PR UR KM	F2	MU SC	PM
Stainless Steel	Finishing	MQ			WF	FW MW	FV		MF		LU	PF SS
Non ferrous Metals	Finishing - Medium	AH			AF AS	HP	AZ		AL		AG AW	AL

Positive Inserts (Automatic Lathe)

Cutting Range		Kyocera	Hitachi	Iscar	Kennametal WIDIA	Mitsubishi	NTK	Sandvik	Seco	Sumitomo	Tungaloy
Carbon Steel / Alloy Steel	Minute ap	CF									01
	Finishing	CK GF	JQ MP	PF SM	11 UF	FV SV SMG	AZ7 ZR	PF	FF1	FC	PF
	Finishing - Medium	GQ	JE	14	LF	AM MV	AM3	PM	F1	SU	PS
	Medium	GK	J	Standard	MF	Standard	QD	PR	F2	SC	PM
Stainless Steel	Finishing	MQ		WF	FW MW	FV		MF		LU	PF
Non ferrous Metals	Finishing - Medium	AH		AF AS	HP	AZ		AL		AG AW	AL

Insert Cross Reference Table

Milling Insert Description Cross Reference Table

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Kyocera	Class	Appli-cation	Hitachi	Iscar	Mitsubishi	Sandvik	Sumitomo	Tungaloy
SDMR1203AUER-H **SDKR1203AUEN-S**	M K	Steel	SDKR42TN	SDKR1203AUTR-HS SDKR1203AUN-76	SDNR1203AEEN-JS		SDMR1203AEEN SDMR1203AETN	SDMR1203AETN-MJ SDKR1203AESR-MJ SDKR1203AETN-MJ SDKR1203AEPN-MS SDKR42ZSR-MJ SDKR42ZPN-MS
SDCN1203AUTN	C		SDC42TN-C9					SDCN1203AETN-12 SDCN42ZTN (SDEN1203AETNCR) (SDEN42ZTNCR)
SDKN1203AUTN	K		SDK42TN-C9	SDKN1203AETN	SDKN1203AEN SDKN1203AETN (SDNN1203AETN1)		SDKN42MT (SDNN1203AETN)	SDKN1203AETN-12 SDKN42ZTN
SDKN1203AUFN	K	Cast Iron	SDK42FN-C9				SDKN42M (SDNN1203AEEN)	SDKN1203AEFN-12 SDKN42ZFN
		Non-ferrous Metal					SDKN42M	(SDCN1203AEFN-D) (SDCN42ZFN-DIA)
SDCN1504AUTN	C	Steel	SDC53TN-C9					SDCN1504AETN SDCN53ZTN
SDKN1504AUTN	K		SDK53TN-C9	SDKN1504AETN	SDKN1504AEN SDKN1504AETN		SDKN53MT	SDKN1504AETN SDKN53ZTN
SEMR1203AFER-H **SEKR1203AFEN-S**	M K	Steel	SEKR42TN	SEKR1203AFTR-HS SEKR1203AFR-HS SEKR1203AFN-76 SEKR1203AFN-42	(SEER1203AFEN-JS)	SEKR1203AZ-WM (SEER1203AZ-WL)	SEMR1203AFEN (SEER1203AFEN)	SEMR1203AFTN-MJ SEKR1203AFSR-MJ SEKR1203AFTN-MJ SEKR1203AFPN-MS
SEMR1204AFER-H	M			(SEKR1204AFTR-HS) (SEKN1204AFTN)		SEKR1204AZ-WM (SEER1204AZ-WL)	SEMR1204AFEN (SEER1204AFEN)	
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 Metal			(SECN1203AFFR1)			
SEKN1203EFTR	K	Steel	SEK42TR-G3		SEKN1203EFTR1	(SECN1203EER)		SEKN1203EFTR SECN1203EFTR SEEN1203EFTR SECN42EFTRCR SEEN42EFTRCR
SPEN1203EESR	E	Cast Iron	(SPK42FR-A3E)		SPEN42EFSR1 SPEN1203EESR1 (SPEN1203EEER1) (SPNN1203EEER1)			
SPMR1203EDER-H **SPKR1203EDER-S**	M K	Steel		SPKR1203EDR-76 SPKR1203EDTR-HS	SPER1203EDER-JS	SPKN1203EDR-WH		SPKR1203EDSR-MJ SPKR42SSR-MJ
SPCN1203EDTR	C					SPAN1203EDR	SPCH42TR-R	SPCN1203EDTR SPCN42STR
SPKN1203EDTR	K		SPK42TR-A3	SPKN1203EDTR SPKN1203EDTR-42	SPKN1203EDR	SPKN1203EDR	(SPCH42TR) (SPCH42TR-R)	SPKN1203EDTR SPKN42STR (SPEN1203EDTR) (SPEN42STR)
SPKN1203EDFR	K	Cast Iron	SPK42FR-A3	SPKN1203EDFR		SPKN1203EDR	(SPCH42R)	SPKN1203EDFR SPKN42SFR
SPKN1504EDTR	K	Steel	SPK53TR-A3	SPKN1504EDTR	SPKN1504EDR	SPKN1504EDR	(SPCH53TR-R)	SPKN1504EDTR SPKN53STR (SPCN1504EDTR) (SPCN53STR)
SPKN1504EDFR	K	Cast Iron	SPK53FR-A3	SPKN1504EDFR			(SPCH53R-R) (SPCH53TR-R)	SPKN1504EDFR (SPKN53SFR)

Note1. Tolerance 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

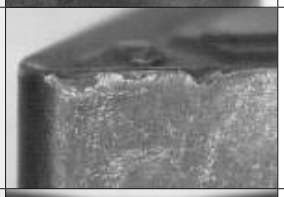
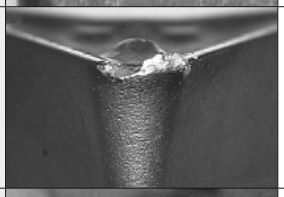
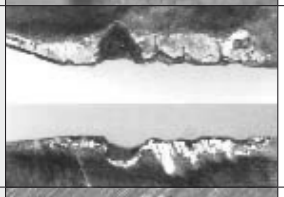
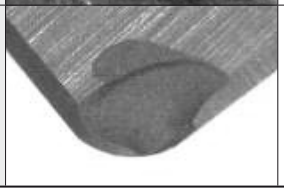
・This table is Kyocera´s own estimation based on publications and is not authorized by companies mentioned in it.

Kyocera	Class	Appli-cation	Hitachi	Iscar	Mitsubishi	Sandvik	Sumitomo	Tungaloy
SPCN1203XPTR	C	Steel	SPC42TR-A5					SPCN1203ZPTR SPCN42ZTR
SPKN1203XPTR	K		SPK42TR-A5					SPKN1203ZPTR SPKN42ZTR (SPEN1203ZPTR) (SPEN42ZTR)
SPKN1203XPFR	K	Cast Iron	SPK42FR-A5					SPKN1203ZPFR SPKN42ZFR
SPKN1504XETR	K	Steel			SPK53C2SR			
TPMR1603PDER-H	M	Steel		(TPKR1603PPTR-HS)	TPER1603PPER-JS	TPKN1603PPR-WH		
TPKN1603PDTR	K		TPK32TR-E0 TPK32TR-G0	TPKN1603PPTR	TPKN1603PPR	TPKN1603PPR	TPKN32TR	
TPKN1603PDFR	K	Cast Iron		TPKN1603PPFR		TPKN1603PPR	TPKN32R	
TPMR2204PDER-H **TPKR2204PDER-S**	M K	Steel		TPKR2204PDTR-HS TPKR2204PDR-76	TPER2204PDER-JS	TPKN2204PDR-WH		TPMR2204PDSR-MJ TPKR2204PDSR-MJ TPKR43ZSR-MJ
TPKN2204PDTR	K		TPK43TR-E0 TPK43TR-G0	TPKN2204PDTR TPKN2204PDTR-42	TPKN2204PDR	TPKN2204PDR	(TPCH43TR)	TPKN2204PPTR TPKN43ZTR (TPCN2204PPTR) (TPCN43ZTR)
TPKN2204PDFR	K	Cast Iron	TPK43FR-E0	TPKN2204PDFR		TPKN2204PDR	(TPCH43R)	TPKN2204PPFR TPKN43ZFR (TPCN2204PPFR) (TPCN43ZFR) (TPEN2204PPTR-16) (TPEN43ZTR)
TEMR1603PTER-H	M	Steel			TEER1603PEER-JS			TEKR1603PEPR-MS
TEKN1603PTTR	K		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 Metal			(TECN1603PEFR1)		TEEN32R	(TECN1603PEFR-D) (TECN32ZFR-DIA)
TEMR2204PTER-H **TEKR2204PTER-S**	M K	Steel			TEER2204PEER-JS			TEKR2204PEPR-MS
TEEN2204PTTR	E		TEK43TR-G0E		TEEN2204PETR1		TEEN43TR	TEEN2204PETR (TECN2204PETR) TEEN43ZTR (TECN43ZTR)
TEKN2204PTTR	K		TEK43TR-G0E		TEKN2204PETR1		TEKN43TR	(TEEN2204PETR) (TECN2204PETR) TEEN43ZTR (TECN43ZTR)
TEKN2204PTFR	K	Cast Iron	TEK43FR-G0E		(TEEN2204PEFR1)		TEKN43R	(TEEN2204PEFR) (TEEN43ZFR)
		Non-ferrous Metal			(TECN2204PEFR1)		(TEEN43R)	(TECN2204PEFR-D) (TECN43ZFR-DIA)
SNCN1204XNTN	C	Steel	SNC43TN-D5		SNC43B2S		(CSN43MT)	SNCN1204ZNTN (SNCN43ZTN)
SNKN1204XNTN	K		SNK43TN-D5		SNK43B2S		(CSN43MT)	SNKN1204ZNTN (SNKN43ZTN)
SNCN1204ENTN	C	Steel			(SNKN1204EN)	(SNKN1204ENN)		
SNMF1204XNTN	M	Steel	(SNKF43TN-D5)		(SNKF43B2S)		(CSNB43MT)	(SNKF1204ZNTN) (SNKF43ZFN)

Note1. Tolerance 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.

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
Plastic Deformation		• Workpiece dimension's change • Crack at nose	• Too high cutting load • Inappropriate tool grade	• Change to harder grade • Reduce f and *ap*
Crack from Wear		• Surface finish's sudden deterioration • Workpiece dimension	• Too high Vc	• Reduce the pre-set tool life • 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(rε) • Change to more rigid toolholder
Fracture from Thermal Crack		• Cracking by heat cycle • Possible in interrupted cutting and milling	• Too high Vc and f	• Reduce f • Reduce Vc • Change to dry cutting
Flaking		• Possible in high-hardness material cutting • Possible in machining with chattering	• Lack of insert toughness • Lack of toolholder's rigidity	• Change to harder grade (TiC-base ceramic to CBN.) • Change to more rigid toolholder • Change edge preparation

Turning

Trouble	Trouble Item	Check Item / Measures	Insert Grade: Change to Harder Grade	Insert Grade: Change to Tougher Grade	Insert Grade: Change to More Thermal Shock Resistant Grade	Insert Grade: Change to More Welding Resistant Grade	Cutting Conditions: Vc (Higher (Larger) ↑ Lower (Smaller)↓)	Cutting Conditions: f (Higher (Larger) ↑ Lower (Smaller)↓)	Cutting Conditions: ap (Higher (Larger) ↑ Lower (Smaller)↓)	Cutting Conditions: Tool Path Review	Cutting Conditions: Coolant: Wet	Cutting Conditions: Coolant: Dry	Tool Geometry: Chipbreaker Review	Tool Geometry: Rake Angle (Larger ↑ Smaller ↓)	Tool Geometry: Corner-R (rε) (Larger ↑ Smaller ↓)	Tool Geometry: Approach Angle (Larger ↑ Smaller ↓)	Tool Geometry: Edge Strength / Honing (Larger ↑ Smaller ↓)	Tool Geometry: Change to Higher Tolerance (M→G)	Tool Geometry: Toolholder Rigidity	Setting: Workpiece / Tool Installation	Setting: Overhang Length	Machine: Power, Rigidity
Unstable Dimension	Unstable Workpiece Dimension	Unsuitable Insert Tolerance																●				
		Tool and Workpiece Evacuation											●	●↑	●↓	●↓			●	●	●	●
	Frequent Offset during Cutting	Flank Wear Increase	●												●↑							
		Unsuitable Cutting Conditions					●↓	●↑														
		Built-up Edge				●	●↑															
Surface Roughness	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 Tool Geometry	●										●	●↑			●↓					
Bur, Chipping	Burr	Unsuitable Cutting Conditions					●↓	●↑		●	●											
		Unsuitable Tool Geometry	●										●	●↑	●↓	●↓	●↓					
	Workpiece Chip Off	Unsuitable Cutting Conditions						●↓	●↓	●												
		Unsuitable Tool Geometry	●										●	●↑	●↑	●↑	●↓		●	●	●	●
	Scuffing	Unsuitable Cutting Conditions					●↑	*2 ●↓			●											
		Unsuitable Tool Geometry	●			●							●	●↑			●↓					
Edge Damage	Wear Increase at Relief Face, Rake Face	Flank Wear	●				●↓				●		●	●↑	●↑		●↓					
		Rake Face Wear	●				●↓	●↓	●↓		●		●	●↑		●↑						
	Notching	Notching				●	●↓				●											
	Chipping	Vibration, Chattering		●				●↓	●↓				●			●↑	●↑		●	●	●	●
	Crack	Unsuitable Tool Geometry		●	●			●↓	●↓				●		●↑	●↑	●↑		●	●	●	●
	Thermal Crack	Work Hardness, Unsuitable Cutting Conditions			●		●↓	●↓	●↓			●	●	●↑			●↓					
	Edge Nose Deformation	Edge Nose Deformation at Interrupted Cutting	●				●↓	●↓	●↓				●	●↓	●↑	●↑	●↑					
	Built-up Edge	Work Hardness, Unsuitable 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.

Milling

Trouble	Trouble Item	Measures: Change to Harder Grade	Change to Tougher Grade	Change to More Thermal Shock Resistant Grade	Change to More Welding Resistant Grade	Vc (Higher (Larger) ↑ Lower (Smaller) ↓)	fz (Higher (Larger) ↑ Lower (Smaller) ↓)	ap (Higher (Larger) ↑ Lower (Smaller) ↓)	Cutter Dia. Cutting Width Review	Tool Path Review	Coolant: Usage of Mist	Coolant: Dry	Insert with Chipbreaker	Relief Angle (Larger ↑ Smaller ↓)	Corner Angle (Larger ↑ Smaller ↓)	Edge Strength / Honing (Larger ↑ Smaller ↓)	Insert Number (More ↑ Less ↓)	Insert Pocket (Larger ↑ Smaller ↓)	Wiper Edge (Relief Angle) Review	Insert Runout Check	Cutter Rigidity	Workpiece / Tool Installation	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				●									● ↑		● ↓								
Machining Accuracy	Poor Surface Finish	Unsuitable Cutting Conditions					● ↑	● ↓	● ↓			●													
		Unsuitable Tool Geometry	●			●											● ↓	● ↓		●	●		●	●	●
	Burr	Unsuitable Cutting Conditions					● ↓	● ↓	● ↓	●	●														
		Unsuitable Tool Geometry													● ↑	● ↓	● ↓			●					
	Workpiece Chip Off	Unsuitable Cutting Conditions						● ↓	● ↓		●														
		Unsuitable Tool Geometry													● ↑	● ↑	● ↓	● ↑		●					
	Poor Planeness / Parallelness	Tool and Workpiece Evacuation						● ↓	● ↓			*5 ●		●	● ↑	● ↓	● ↓	● ↓		●	●	●	●	●	●
Others	Heavy Chattering, Vibration	Unsuitable Cutting Conditions, Installation					● ↓	*1 ● ↓	*2 ● ↓	●	*4 ●			●	● ↑	● ↓	● ↓	● ↓				●	●	●	●
	Damaging Chips	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 Endmilling.
*5) If the surface is warped by cutting heat.
*6) Compressed air is recommended.

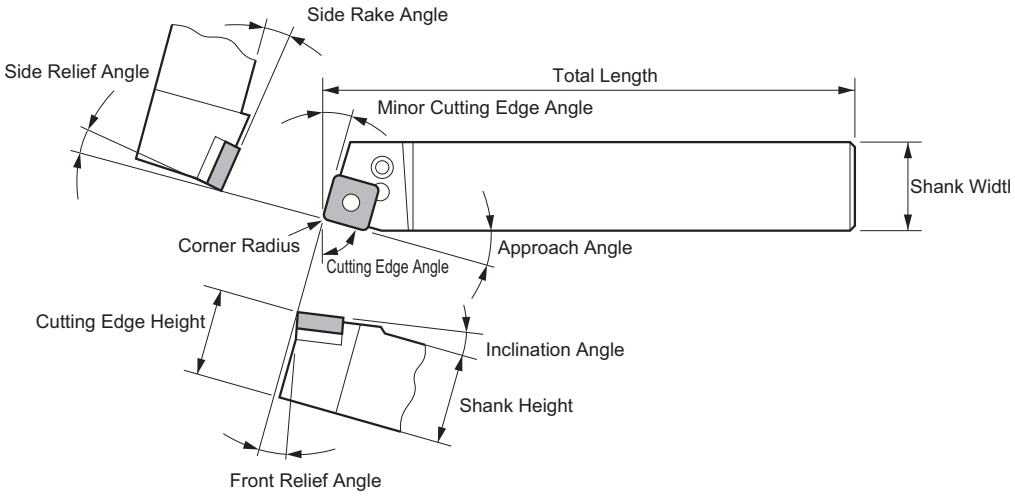
Drilling

Trouble	Trouble Item	Changfe to Harder Grade	Change to Tougher Grade	Vc (Higher (Larger)↑ Lower (Smaller)↓)	f (Higher (Larger)↑ Lower (Smaller)↓)	Coolant Discharge Condition	Chipbreaker Review	Inner Edge's Center Height Check (Core Dia. Check) (Larger ↑ Smaller ↓)	Tool Rigidity Improvement (Short Type)	Workpiece / Tool Installation	Insert Installation	Offset Check	Adjustable Sleeve Usage	Power, Rigidity
		Grade Selection		Cutting Conditions			Tool Geometry			Setting				Machine
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 Tool 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 Chattering / Vibration													
	Unsuitable Cutting Conditions, Installation			●↑	●↓				●	●				●
	Long Chips													
	Unsuitable Cutting Conditions			●↑										
	Unsuitable Chipbreaker						●							
	Machine Failure													
	Lack of Machine Power			●↓	●↓		●							●

*1) For lathe operation

Terms and Angles of Toolholder

Terms and Angles of Turning Toolholder



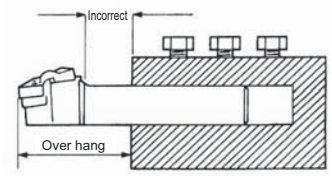
Function of Tool Angle

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 resistance, 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 cutting or interrupted cutting.
	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.
Cuting 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 work surface.	• When it is large, edge strength deteriorates.

Toolholder Rigidity

1. Flexure of Toolholder

$$\delta = \frac{4\times F\times L^3}{E\times b\times h^3} = \frac{4\times k\times d\times f\times L^3}{E\times b\times h^3}$$



Symbol	Name	Measure
δ (Delta)	Deflection	mm
b	Shank Width	mm
h	Shank Height	mm
E	Young ratio	N/mm²
d	ap	mm
f	Feed rate	mm/rev
k	Specific Cutting Resistance	N/mm²
L	Over hang	mm
F	Cutting force	N

(F=k x d x f)

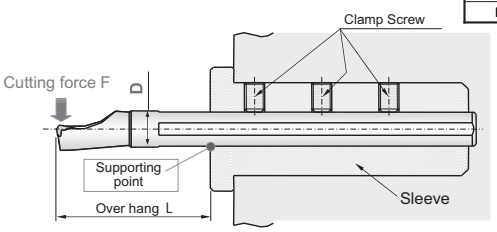
The flexure of toolholder will decrease by increasing of shank height by third root and will decrease of reducing over hang by third root. Minimizing toolholder shank over hang as much as possible is important as well as shank's sectional square measure.

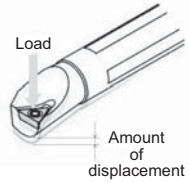
2. Flexure of Boring Bar

$$\delta = \frac{64\times F\times L^3}{3\times E\times \pi\times D^4} = \frac{64\times k\times d\times f\times L^3}{3\times E\times \pi\times D^4}$$

Symbol	Name	Measure
δ (Delta)	Deflection	mm
D	Shank Dia.	mm
E	Young ratio	N/mm²
d	ap	mm
f	Feed rate	mm/rev
k	Specific Cutting Resistance	N/mm²
L	Over hang	mm
F	Cutting force	N

(F=k x d x f)

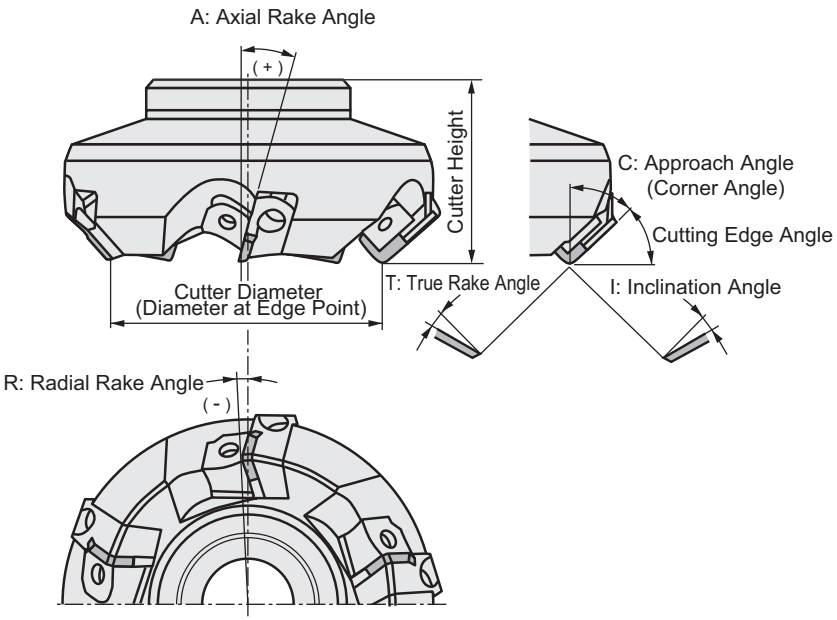


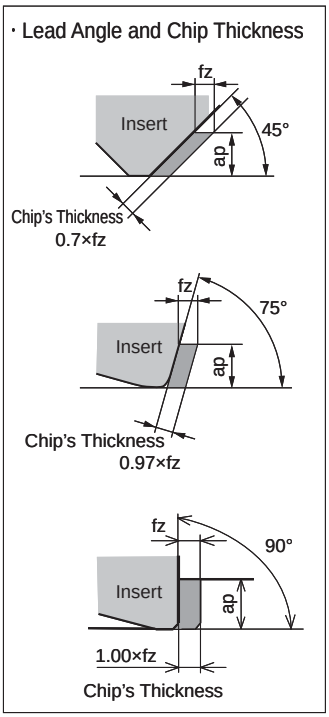


R

Technical Information

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 Less 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 resistance Lower edge strength at corner part

$\tan T = \tan R \times \cos C + \tan A \times \sin C$

$\tan I = \tan A \times \cos C - \tan R \times \sin C$

Turning

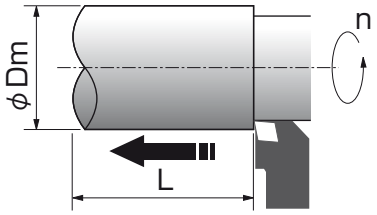
Cutting Speed

$$Vc = \frac{\pi \times Dm \times n}{1000}$$

Vc : Cutting Speed [m/min]

Dm : Workpiece Diameter [mm]

n : Spindle Revolution [min^{-1}]



Power Requirement

$$Pc = \frac{Ks \times Vc \times ap \times f}{6120 \times \eta}$$

$$P_{HP} = \frac{Ks \times Vc \times ap \times f}{4500 \times \eta}$$

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 Resistance [kgf/mm^2]

η : Mechanical Efficiency (0.7 ~ 0.8)

Ks Figure	
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

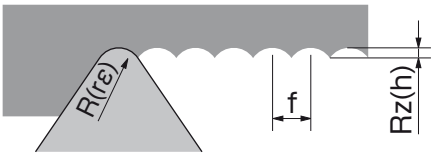
Surface Roughness

$$Rz = h = \frac{f^2}{8 \times R(r\varepsilon)} \times 1000$$

Rz=h : Theoretical Surface Roughness [μm]

f : Feed Rate [mm/rev]

R(rε) : Corner Radius of Insert [mm]



Chip Removal Volume

$$Q = Vc \times ap \times f$$

Q : Chip Removal Volume [cm^3/min]

Vc : Cutting Speed [m/min]

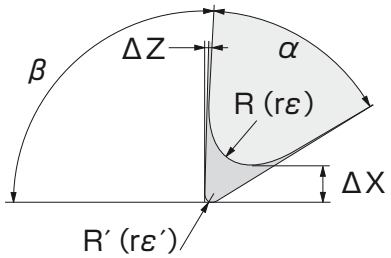
ap : Depth Of Cut [mm]

f : Feed Rate [mm/rev]

Edge position Compensation

$$\triangle X = (R - R') \times \left\{ \frac{\cos\left(\frac{\alpha}{2} + (\beta - 90°)\right)}{\sin\frac{\alpha}{2}} - 1 \right\}$$

$$\triangle Z = (R - R') \times \left\{ \frac{\sin\left(\frac{\alpha}{2} + (\beta - 90°)\right)}{\sin\frac{\alpha}{2}} - 1 \right\}$$



⊿X : X-axis Direction Edge Position Compensation [mm]

⊿Z : Z-axis Direction Edge Position Compensation [mm]

R : Corner-R before Change [mm]

R´ : Corner-R after Change [mm]

α : Insert Corner Angle [°]

β : Toolholder's Cutting Edge Angle [°]

Toolholder Type	Insert Corner Angle α	Cutting Edge Angle β	⊿X	⊿Z
PCLN	80°	95°	0.100× (R-R')	0.100× (R-R')
PTGN	60°	91°	0.714× (R-R')	0.030× (R-R')
PDJN	55°	93°	0.866× (R-R')	0.099× (R-R')
PDHN	55°	107.5°	0.531× (R-R')	0.531× (R-R')
PVLN	35°	95°	2.072× (R-R')	0.273× (R-R')
PVPN	35°	117.5°	1.351× (R-R')	1.351× (R-R')
PSBN	90°	75°	0.225× (R-R')	-0.293× (R-R')

Example: Compensation when changing corner-R from 0.8 to 0.4, using PCLN type toolholder,
⊿X=0.100×(0.8-0.4)=0.04(mm)
⊿Z=0.100×(0.8-0.4)=0.04(mm)

Turning (Cutting Time)

Cutting Time (External Turning Case 1: 1 Pass machining)

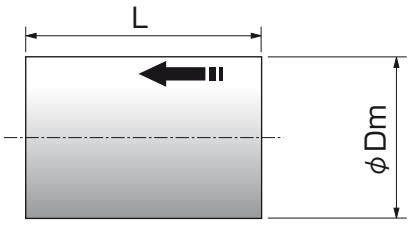
• At Constant Revoluation

$$T = \frac{60 \times L}{f \times n}$$

• At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times Dm}{1000 \times f \times Vc}$$

T : Cutting Time [second]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
Dm : Workpiece Diameter [mm]
Vc : Cutting Speed [m/min]



Cutting Time (External Turning Case 2: Multi-Pass machining)

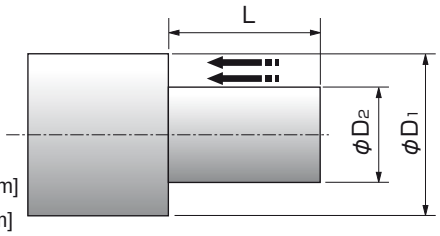
• At Constant Revoluation

$$T = \frac{60 \times L}{f \times n} \times N$$

• At Constant Cutting Speed

$$T = \frac{60 \times \pi \times L \times (D_1 + D_2)}{2 \times 1000 \times f \times Vc} \times N$$

T : Cutting Time [second]
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. Diameter of Workpiece [mm]
D_2 : Min. Diameter 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)

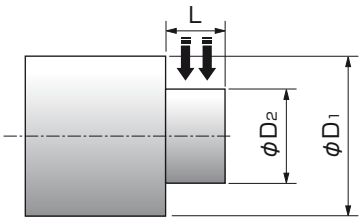
• At Constant Revoluation

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n} \times N$$

• At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2) \times (D_1 - D_2)}{4000 \times f \times Vc} \times N$$

T : Cutting Time [second]
T_1 : Machining Time before reaching Max. Spindle Revolution [second]
L : Cutting Length [mm]
ap : Depth Of Cut per Pass [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Diameter of Workpiece [mm]
D_2 : Min. Diameter 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)

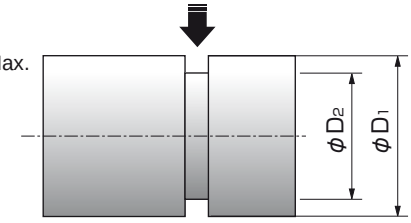
• At Constant Revoluation

$$T = \frac{60 \times (D_1 - D_2)}{2 \times f \times n}$$

• At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_2) \times (D_1 - D_2)}{4000 \times f \times Vc}$$

T : Cutting Time [second]
T_1 : Machining Time before reaching Max. Spindle Revolution [second]
L : Cutting Length [mm]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
D_1 : Max. Diameter of Workpiece [mm]
D_2 : Min. Diameter of Workpiece [mm]
Vc : Cutting Speed [m/min]



Cutting Time (Cut-Off)

• At Constant Revoluation

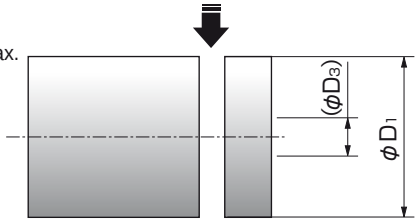
$$T = \frac{60 \times D_1}{2 \times f \times n}$$

• At Constant Cutting Speed

$$T_1 = \frac{60 \times \pi \times (D_1 + D_3) \times (D_1 - D_3)}{4000 \times f \times Vc}$$

$$T_3 = T_1 + \frac{60 \times D_3}{2 \times f \times n_{max}}$$

T : Cutting Time [second]
T_1 : Machining Time before reaching Max. Spindle Revolution [second]
T_3 : Machining Time when reaching Max. Spindle Revolution [second]
f : Feed Rate [mm/rev]
n : Spindle Revolution [min^{-1}]
n_{max} : Max. Spindle Revolution [min^{-1}]
D_1 : Max. Diameter of Workpiece [mm]
D_3 : Diameter when reaching Max. Spindle Revolution [mm]
Vc : Cutting Speed [m/min]



Basic Formulas

Milling

Cutting Speed

$$Vc = \frac{\pi \times Ds \times n}{1000}$$

Vc : Cutting Speed [m/min]

Ds : Cutter Diameter [mm]

n : Spindle Revolution [min^{-1}]

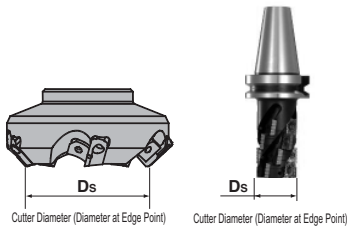


Table Feed & Feed per Tooth

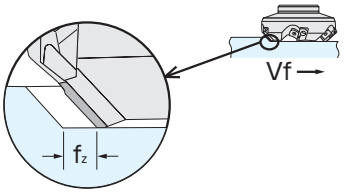
$$f_z = \frac{Vf}{Z \times n}$$

f_z : Feed per Tooth [mm/t]

Vf : Table Feed [mm/min]

Z : Number of Inserts

n : Spindle Revolution [min^{-1}]



Power Requirement

$$Pc = \frac{Ks \times Q}{6120 \times \eta} = \frac{Ks \times ae \times Vf \times ap}{6120000 \times \eta}$$

$$= \frac{Ks \times ae \times fz \times Z \times n \times ap}{6120000 \times \eta}$$

$$P_{HP} = \frac{6120}{4500} \times Pc$$

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 : Number of Inserts

n : Spindle Revolution [min^{-1}]

ap: Depth Of Cut [mm]

Ks: Specific Cutting Resistance [kgf/mm^2]

η : Mechanical Efficiency (0.7 ~ 0.8)

Ks Figure	
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

$$Q = \frac{ae \times Vf \times ap}{1000} = \frac{ae \times fz \times Z \times n \times ap}{1000}$$

Q : Chip Removal Volume [cm^3/min]

ae: Width of Cut [mm]

Vf: Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : Number of Inserts

n : Spindle Revolution [min^{-1}]

ap: Depth Of Cut [mm]

Cutting Time

$$T = \frac{60 \times L'}{Vf} = \frac{60 \times L'}{fz \times Z \times n}$$

T : Cutting Time [second]

L´ : Total Table Transfer Length [mm]

(=L + DS + 2α)

L : Work Length [mm]

Ds: Cutter Diameter [mm]

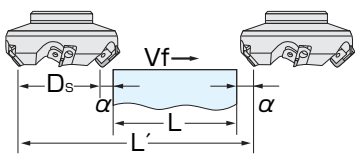
α : Idling Distance [mm]

Vf : Table Feed [mm/min]

f_z : Feed per Tooth [mm/t]

Z : Number of Inserts

n : Spindle Revolution [min^{-1}]



True Rake Angle

$$\tan T = \tan R \times \cos C + \tan A \times \sin C$$

Inclination Angle

$$\tan I = \tan A \times \cos C - \tan R \times \sin C$$

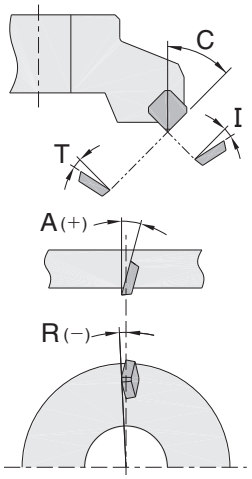
A : Axial Rake Angle A.R. [°] (-90° < A < 90°)

R : Radial Rake Angle R.R. [°] (-90° < R < 90°)

C : Approch Angle [°] (0° < C < 90°)

T : True Rake Angle [°] (-90° < T < 90°)

I : Inclination Angle [°] (-90° < I < 90°)



Ball-Nose Endmill Cutting & Revolution

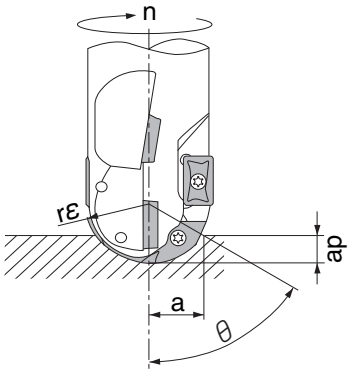
$$n = \frac{1000 \times V_a}{2 \times \pi \times \sqrt{a(2r\varepsilon - ap)}}$$

n : Revolution [min-1]

rε : Radius of Ball-Nose Endmill (Ball Part's redius [mm])

ap : Depth Of Cut [mm]

V_a : Cutting Speed at Point "a" [m/min]



Drilling

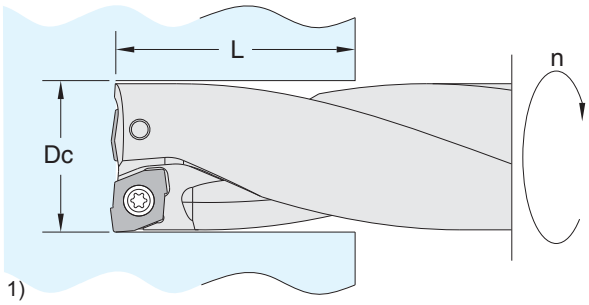
Cutting Speed

$$Vc = \frac{\pi \times Dc \times n}{1000}$$

Vc : Cutting Speed [m/min]

Dc : Drill Diameter [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 : Number of Insert (Number of Insert = 1)

n : Spindle Revolution [min^{-1}]

Cutting Time

$$T = \frac{60 \times L}{f \times n} = \frac{60 \times \pi \times Dc \times L}{1000 \times Vc \times f}$$

T : Cutting Time [second]

L : Drilling Depth [mm]

f : Feed Rate [mm/rev]

n : Spindle Revolution [min^{-1}]

Dc : Drill Diameter [mm]

Vc : Cutting Speed [m/min]

Power Requirement (Reference Value)

$$Pc = \frac{Dc}{20} \times \frac{Vc}{100} \times \left(1 + \left(\frac{2.5 \times f}{0.1}\right)\right)$$

Pc : Power Requirement [kw]

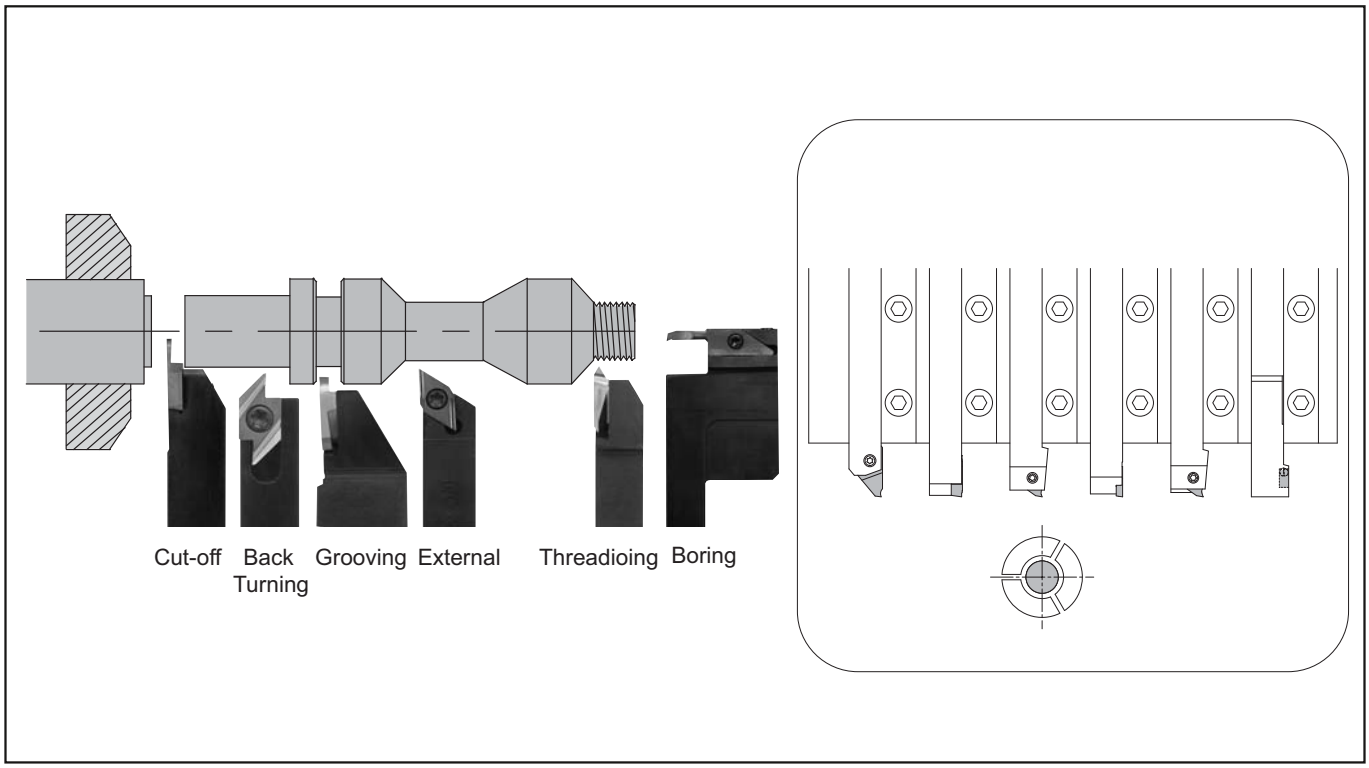
Dc : Drill Diameter [mm]

Vc : Cutting Speed [m/min]

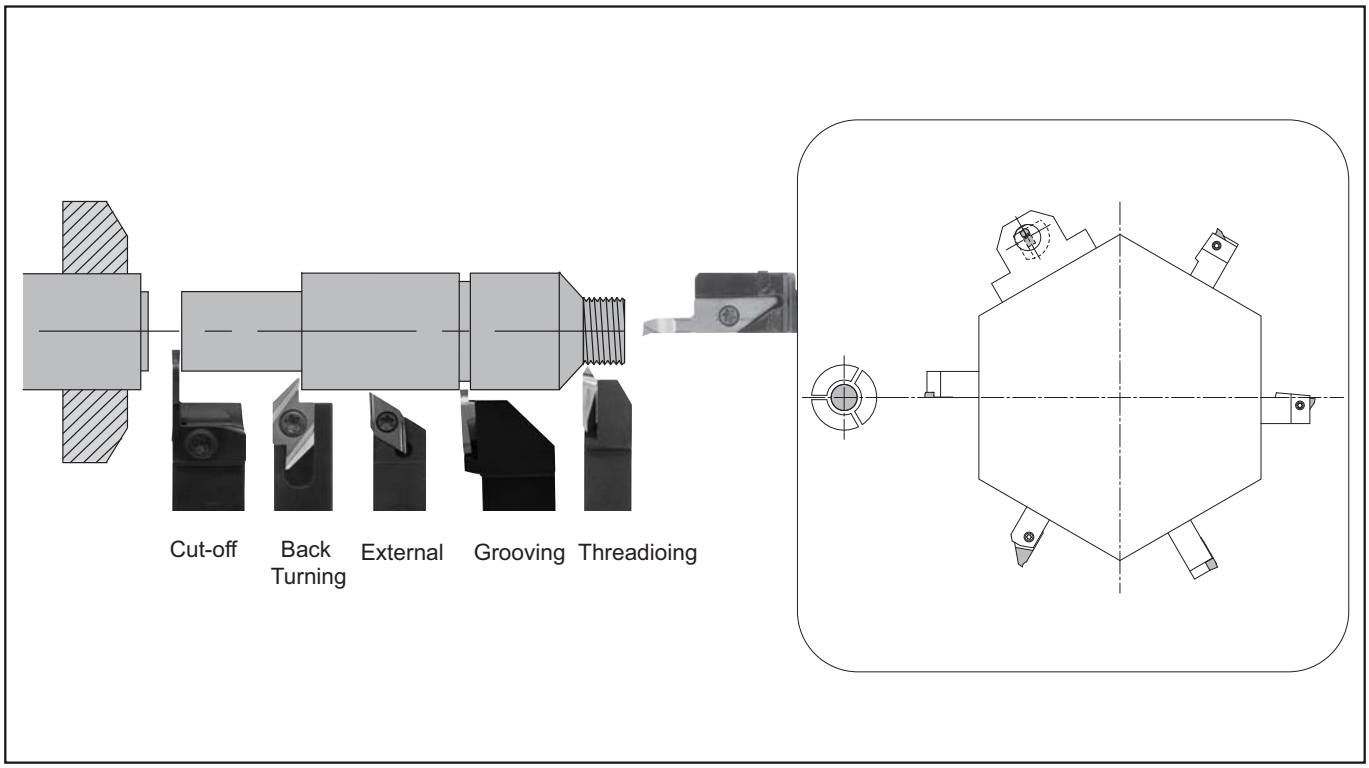
f : Feed Rate [mm/rev]

Tooling Examples of Small Tools

Tooling Example ① CNC Automatic Lathe (Gang Type)

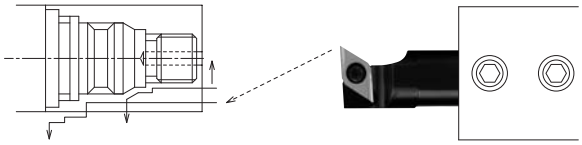


Tooling Example ② CNC Automatic Lathe (Turret Type)

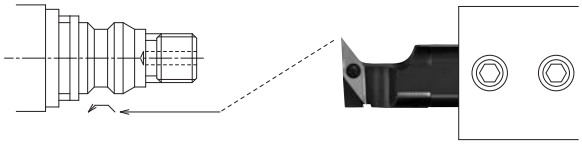


Tooling Example ③ CNC Automatic Lathe (Opposed Gang Type)

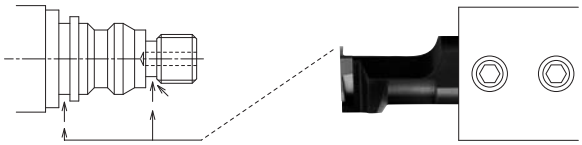
External / Facing



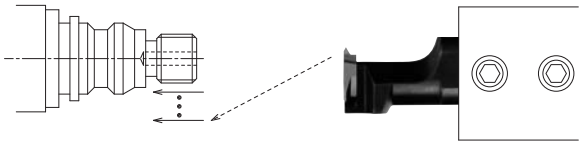
External / Copying



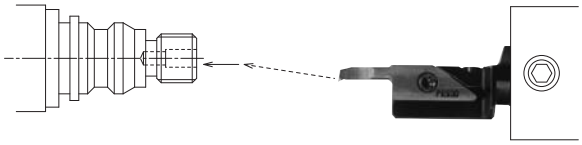
Grooving

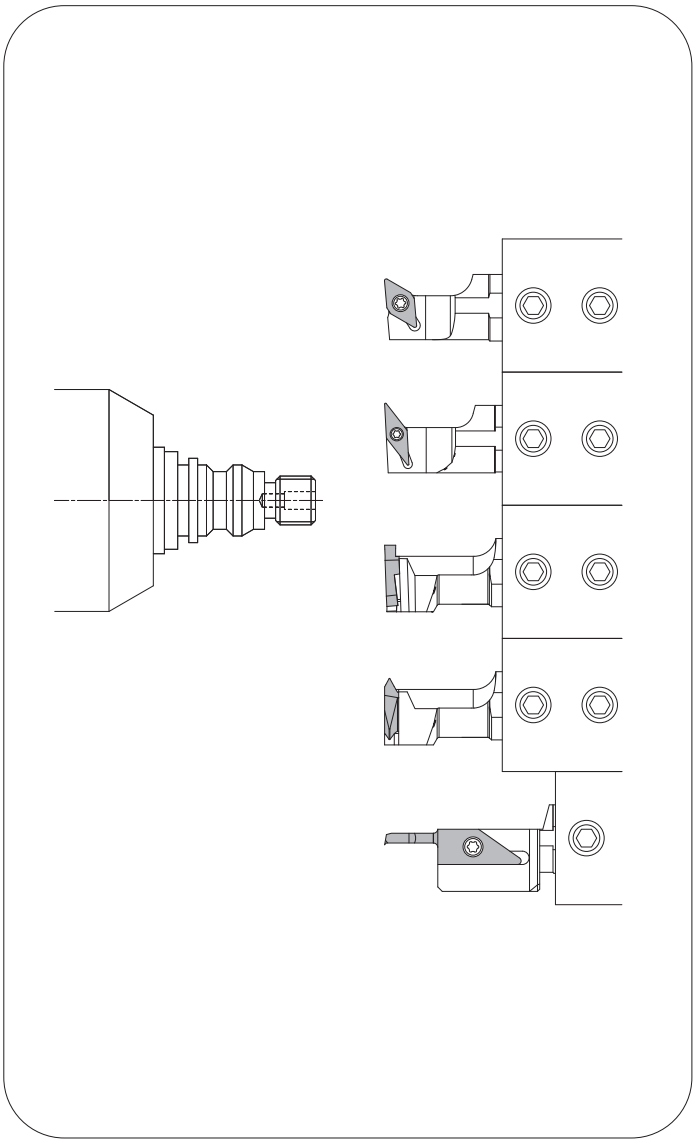


Threading



Boring





Citizen Machinery

Model	Toolholder Dimensions (Gang-Type)	Number of tools	Toolholder Dimensions (Turret-Type)	Number of tools	Sleeve Dia.	Number of tools	Max. Cutting Dia.	Remarks
A12	10×10×100	5			ø19.05 / ø20		ø12	
A16	10×10×100	5			ø19.05 / ø20		ø16	
A20	12(13)×12(13)×120*1	7			ø25.4		ø20	
B12	10×10×100	5			ø19.05 / ø20		ø12	
B20	12(13)×12(13)×120	6			ø19.05 / ø20		ø20	
BL12	10×10×60~120	5			ø20(ø19.05)		ø12	
BL20	12(13)×12(13)×120	4~7			ø20(ø19.05)		ø20	
BL25	12(13)×12(13)×120	4~7			ø20(ø19.05)		ø25	
C12	10×10×120	6			ø19.05		ø12	
C16	10×10×120	6			ø19.05		ø16	
C32	16×16×130	5			ø25.4		ø32	
E16	10×10×60	20			ø19.05		ø16	
E20	16×16×90	20			ø25.4		ø20	
E25	16×16×90	20			ø25.4		ø25	
E32			16(19)×16(13)×90	20	ø25.4		ø32	
F10			10×10×60	10	ø19.05		ø10	
F12			10×10×60	10	ø19.05		ø12	
F16			10×10×60	10	ø19.05		ø16	
F20			16(19)×16(13)×90	10	ø25.4		ø20	
F25			16(19)×16(13)×90	10	ø25.4		ø25	
FL25			16×16×90	12	ø16		ø25	
FL42			16×16×90	12	ø16		ø42	
G32			16(19)×16(19)×90	10	-		ø32	
K12	12×12×100	6			ø19.05 / ø20		ø12	
K16	12×12×100	6			ø19.05 / ø20		ø16	
L10	8×8×100~130	5			ø15.875		ø10	
L16	12(10)×12(10)×130	5			ø19.05		ø16	
L20	12×12×130	5			ø19.05		ø20	
L25	16×16×130	5			ø25.4		ø25	
L32	16×16×130	5			ø25.4		ø32	
M212, M312	10×10×120	5	10×10×60	10	ø19.05		ø12	
M216, M316	10×10×120	5	10×10×60	10	ø19.05		ø16	
M220, M320	16×16×130	5	16×16×90	10	ø25.4		ø20	
M232, M332	16×16×130	5	16×16×90	10	ø25.4		ø32	
M20	13(12)×13(12)×130	5	10×10×60	10	ø19.05		ø20	
MSL12	10×10×120				-		ø12	
R04	8×8×120	5			ø15.875		ø4	
R07	8×8×120	5			ø15.875		ø7	
RL01	10(8)×10(8)×90				ø16(ø20)		ø10	
RL02	16×16×90				ø20		ø20	
RL21	10(12)×10(12)×90				ø19.05		ø35	

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・Manufacturers are in no particular order.

Star Micronics

Model	Toolholder Dimensions (Gang-Type)	Number of tools	Toolholder Dimensions (Turret-Type)	Number of tools	Sleeve Dia.	Number of tools	Max. Cutting Dia.	Remarks
ECAS-12	10×10×95~150	6	-	-	ø22		ø13	
ECAS-20	12×12×80~150	6	-	-	ø22		ø20	
	16×16×80~144		-	-				
ECAS-32T	16×16×80~120	4	16×16×60~78	St.10	ø22 / ø32		ø32	
			16×16×80~88	St.10				
JNC-10			8×8×80~120	5	ø22		ø10	
JNC-16			10×10×80~120	5	ø22		ø16	
JNC-25 / 32			10×10×78~120	1×St.10	ø22			
KJR-16B / 25B								
KNC-16 / 20								
KNC-25Ⅱ / 32Ⅱ								
RNC-10 / 16								
RNC-16 / 16BⅡ								
SA-16R								
SB-16 TYPE-A / C / D	12×12×95~130	5	-	-	ø22 / (ø22)	4		
	12(10)×12(10)×95~130	6	-	-	ø22 / ø22	4/4		
SC20	12×12×95~130	5	-	-	ø22	4		
	12(10)×12(10)×95~130	6	-	-		4/4		
SE-12 / 12B･16 / 16B								
SH-7								
SH-12 / 16								
SI-12 / 12C								
SR-10J	8×8×67~110	6			ø16	4		
SR-16 / 20								
SR-20RⅡ	12×12×100~135	6			ø22			
SR-20RⅢ / 20J	12×12×95~135	6	2 (For opposed SP side, deep hole machining)	4/4			ø20, ø30 (ø24)	
SR-25J / 32J	16×16×95~155	6						
SR-32								
SV-12 / 20	12×12×95~135	5	12×12×70~78	St.8	ø22 / ø32			
	16×16×95~135	4	16×16×65~70					
SV-32	16×16×95~135	4	16×16×60~70 / 80~88	St.8	ø22 / ø32			
SV-32J / 32JⅡ	16×16×95~135	4	16×16×65~70	St.8	ø22 / ø32			
SW-7								
VNC-12								
VNC-20								
VNC-32								

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Tsugami

Model	Toolholder Dimensions (Gang-Type)	Number of tools	Toolholder Dimensions (Turret-Type)	Number of tools	Sleeve Dia.	Number of tools	Max. Cutting Dia.	Remarks
B007-Ⅱ	7×7×85 (8)×(8)×(85) (10)×(10)×(85)	8			ø25		ø7	
B012-Ⅲ / Ⅴ	12×12×85	9			ø20		ø12	
B018-Ⅲ	12×12×85	9			ø20		ø18	
B020-Ⅴ	12×12×85	9			ø20		ø20	
BA20	12×12×85	6			ø25		ø20	
BA26	12(16)×12(16)×85	6			ø25		ø26	
BC18	12×12×85	10			ø25 / ø10		ø18	
BC25	12×12×85	10			ø10 / ø25		ø25	
BE12	12×12×85	9			ø20		ø12	
BE18	12×12×85	9			ø20		ø18	
BH20	12×12×85	4	12×12×90 16×16×90	St.12	ø25 / ø32		ø20	
BH38	16×16×100	7	20×20×125	St.12	ø25 / ø32		ø38.1	
BM07	8×8×85	9			ø20		ø7	
BM16	12×12×85	9			ø20		ø16	
BM16E	12×12×85	9			ø20		ø16	
BN12	12×12×85	7			ø20		ø12	
BN20	12(16)×12(16)×85	7			ø20		ø20	
BS12-Ⅲ	12×12×85	7 or 10			ø14 / ø25		ø12	
BS12-Ⅴ	12×12×85	8 or 12			ø20 / ø25		ø12	
BS18-Ⅲ	12×12×85	7 or 10			ø14 / ø25		ø18	
BS20-Ⅲ	16×16×100	7 or 10			ø16 / ø25		ø20	
BS20-Ⅴ	12×12×85	8 or 12			ø20 / ø25		ø20	
BS26-Ⅲ	16×16×100	7 or 10			ø16 / ø25		ø26	
BS32-Ⅲ	16×16×100	6			ø16 / ø25		ø32	
BU12	12×12×85	4	12×12×80	St.8	ø20		ø51	
BU20	12×12×85	4	12×12×80	St.8	ø20		ø20	
BU26	16×16×100	7	20×20×90	St.8	ø20 / ø32		ø26	
BU38	16×16×100	7	20×20×90	St.8	ø20 / ø32		ø38	
BW07	12×12×85	7			ø20		ø7	
BW12	12×12×85	7			ø20		ø12	
BW20	12(16)×12(16)×85	7			ø20		ø20	
C004-Ⅱ / Ⅲ	12×12×60~100	6~8			-		ø100	
C15	10×10×60~100	10~14			-		ø75	
C150	12×12×60~100	4~6			-		ø75	
C220	12×12×60~100	6~8			-		ø100	
C300	16×16×100~130	6~10			-		ø150	
M34J	-	-	20×20×125	St.12	ø20 / ø32		ø34	
M42J	-	-	20×20×125	St.12	ø25 / ø32		ø42	
M42SD	-	-	20×20×125	St.12	ø25 / ø32		ø42	
M50	-	-	20×20×100	St.12	ø32		ø51	
M50J	-	-	20×20×100	St.12	ø20 / ø32		ø51	
MB35	-	-	20×20×90	2×St.8	ø20 / ø32		ø35	
MB38	-	-	20×20×90	2×St.8	ø20 / ø32		ø38	
MB50	-	-	20×20×90	2×St.8	ø20 / ø32		ø50	
MU26	-	-	20×20×90	2×St.8	ø20 / ø32		ø26	
MU38	-	-	20×20×90	2×St.8	ø20 / ø32		ø38	
NU50	-	-	20×20×100	St.12	ø20 / ø32		ø51	
TMA8-Ⅱ	20×20×100~125	1			ø25 / ø32		ø65	
TMU1	20×20×100~125	1	20×20×125	St.16	ø25 / ø32		ø38	

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・Manufacturers are in no particular order.

Nomura VTC

Model	Toolholder Dimensions (Gang-Type)	Number of tools	Toolholder Dimensions (Turret-Type)	Number of tools	Sleeve Dia.	Number of tools	Max. Cutting Dia.	Remarks
NN-10C	10×10×130	6			ø17		ø10	
NN-10CS	10×10×130	5			ø17		ø10	
NN-10SB5	10×10×130	5			ø23		ø10	
NN-10SⅡ	10×10×130	5			ø23		ø10	
NN-10T	10×10×130	7			ø23		ø10	
NN-16SB5	10×10×130	5			ø23		ø16	
NN-16HⅢ	12×12×130	6			ø23		ø16	
NN-16UB5	12×12×130	5			ø23		ø16	
NN-16UⅢ	12×12×130	5			ø23		ø16	
NN-16J	12×12×130	6			ø23		ø16	
NN-20HⅢ	12×12×130	6			ø23		ø20	
NN-20UB5	12×12×130	5			ø23		ø20	
NN-20UB7	12×12×130	6			ø23		ø20	
NN-20UⅢ	12×12×130	5			ø23		ø20	
NN-20YB	12×12×130	8			ø23		ø20	
NN-25YB / 32YB	16×16×130	8			ø23 / ø32		ø25	
NS-P1053A	9.5×9.5×130	5			-		ø10	
NN-20J	12×12×130	6			ø23		ø20	
NN-16SB6	12×12×130	5			ø22		ø16	

Miyano

Model	Toolholder Dimensions (Gang-Type)	Number of tools	Toolholder Dimensions (Turret-Type)	Number of tools	Sleeve Dia.	Number of tools	Max. Cutting Dia.	Remarks
ABX-51TH3			20×20×125	St.36	ø25	72	ø51	
ABX-64TH3			20×20×125	St.36	ø25	72	ø64	
ABX-51SY			20×20×125	St.24	ø25	48	ø51	
ABX-64SY			20×20×125	St.24	ø25	48	ø64	
BNC-34C$_5$			20×20×125	St.8	ø25	16	ø34	
BNC-42C$_5$			20×20×125	St.8	ø25	16	ø42	
BND-34C$_5$			20×20×125	St.12	ø25	24	ø34	
BND-34S$_5$			20×20×125	St.12	ø25	24	ø34	
BND-42C$_5$			20×20×125	St.12	ø25	24	ø42	
BND-42S$_5$			20×20×125	St.12	ø25	24	ø42	
BND-51S$_2$			20×20×125	St.12	ø25	24	ø51	
BND-51SY2			20×20×125	St.12	ø25	24	ø51	
BNE-34S5			20×20×125	St.24	ø25	48	ø34	
BNE-34SY5			20×20×125	St.24	ø25	48	ø34	
BNE-51S5			20×20×125	St.24	ø25	48	ø51	
BNE-51SY5			20×20×125	St.24	ø25	48	ø51	
BNJ-34S			20×20×125	St.18	ø25	30	ø34	
BNJ-34SY			20×20×125	St.18	ø25	30	ø34	
BNJ-42S			20×20×125	St.18	ø25	30	ø42	
BNJ-42SY			20×20×125	St.18	ø25	30	ø42	
BNJ-51SY2			20×20×125	St.18	ø25	30	ø51	
BX-20S	16×16×120	9			ø20	8	ø20	
BX-26S	16×16×120	9			ø20	8	ø26	
B6-16	12×12×80	6	12×12×80(Cross Slide)	St.6	ø38		ø16	Multi-Spindle Automatic Lathe
G6-26		6	13×13×120(Cross Slide)	St.6	ø41.275		ø26	
F6-26		6	13×13×120(Cross Slide)	St.6	ø41.275		ø26	
MZ-32		6	13×13×120(Cross Slide)	St.6	ø41.275		ø32	
E6-C62		6	13×13×120(Cross Slide)	St.6	ø41.275		ø62	

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Automatic Lathe List by Manufacturer

Eguro

Model	Toolholder Dimensions (Gang-Type)	Number of tools	Toolholder Dimensions (Turret-Type)	Number of tools	Sleeve Dia.	Number of tools	Max. Cutting Dia.	Remarks
SANAX-6	12×12	5 (Max.)		5	ø16		ø15	
SANAX-8	16×16	5 (Max.)		5	ø25 / ø30		ø20	
	12×12	7 (Max.)		5	ø25 / ø30		ø20	
SANAX-10	16×16	5 (Max.)		5	ø25 / ø30		ø25.5	
EBN-10EX	12×12	6 (Max.)			ø20		ø25.5	
NUCBOY-8EX	12×12	6 (Max.)			ø20		ø20	
NUCLET-10EX	16×16	10 (Max.)			ø20		ø25.5	
NUCPAL-10EX	16×16	10 (Max.)			ø20		ø25.5	

Amada Wasino

Model	Toolholder Dimensions (Gang-Type)	Number of tools	Toolholder Dimensions (Turret-Type)	Number of tools	Sleeve Dia.	Number of tools	Max. Cutting Dia.	Remarks
G05	16×16				ø20		ø50×40	
G06	16×16				ø20		ø60×60	
G07	16×16				ø20		ø100×100	
G07M	16×16				ø20		ø100×100	
G07F	20×20				ø20		ø120×120	
GG5	16×16				ø20		ø50×40	
GS04	16×16				ø20		ø30×20	
J1			20×20	8	ø25		ø120×120	
J3			25×25	8	ø32		ø170	
J5			25×25	8	ø32		ø240	
JJ1			20×20	8	ø25		ø50×50	
JJ3			25×25	8	ø32		ø100×100	
JJ3M			25×25	12	ø32		ø100×100	
Ai8			20×20	8	ø25		ø50×50	
A12				12	ø25		ø50×80	
A18S				18	ø25		ø50×80	
AD12				9	ø25		ø50×80	
AD18S				15	ø25		ø50×80	
AA1			20×20	8	ø25		ø50×50	

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16ER/L AG○○	**J12, J14**	Insert (Threading) / TF series
16ER/L G○○	**J12, J14**	Insert (Threading) / TF series
16ER/L A○○-TF	**J12, J14**	Insert (Threading) / TF series
16ER/L AG○○-TF	**J12, J14**	Insert (Threading) / TF series
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16ER/L ○○BSPT	**J10**	Insert (Threading)
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16ER/L ○○BSPT-TS	**J10**	Insert (Threading)
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16ER/L ○○UN	**J8**	Insert (Threading)
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16ER/L ○○○ISO-TF	**J6**	Insert (Threading) / TF series
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16ER/L ○○○○	**J12**	Insert (Threading)
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11IR/L ○○BSPT-TF	**J11**	Insert (Threading) / TF series
11IR/L ○○BSPT-TS	**J11**	Insert (Threading)
11IR/L ○○○ISO	**J7**	Insert (Threading)
11IR/L ○○○ISO-TF	**J7**	Insert (Threading) / TF series
11IR/L ○○○○○	**J13, J15**	Insert (Threading)
16IR/L A○○	**J13, J15**	Insert (Threading)
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16IR/L G○○	**J13, J15**	Insert (Threading)
16IR/L ○○BSPT	**J11**	Insert (Threading)
16IR/L ○○BSPT-TF	**J11**	Insert (Threading) / TF series
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16IR/L ○○○ISO-TS	**J7**	Insert (Threading)
16IR/L ○○○TR	**J15**	Insert (Threading)
16IR/L ○○○○(○)	**J13, J15**	Insert (Threading)
16IR/L ○○○○(○)-TS	**J13**	Insert (Threading)
22IR/L N○○	**J13, J15**	Insert (Threading)
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22IR/L ○○○ISO	**J7**	Insert (Threading)
22IR/L ○○○TR	**J15**	Insert (Threading)
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3AESM ○○○-○○○-○○	**L42**	Solid End Mill
5DEKM ○○○-○○○-○○	**L37**	Solid End Mill
5DERM ○○○-○○○-○○-R○○○	**L37**	Solid End Mill
2FEKM ○○○-○○○-○○	**L18**	Solid End Mill
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4FESW ○○○-○○○-○○	**L11**	Solid End Mill (for Automatic Lathe)
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4PGRM ○○○-○○○-○○-R○○○	**L27**	Solid End Mill
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○NFSM ○○○-○○○-○○	**L40**	Solid End Mill
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○RDSM ○○○-○○○-○○	**L23**	Solid End Mill
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○YFSM ○○○-○○○-○○	**L36**	Solid End Mill
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A

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A63-WH-	C○○-○○(○)	**N11**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	KGBA$^{R}/_{L}$-16	**N10**	Grooving (HSK Tooling) / Previous Description
A63-WH-	KGBA$^{R}/_{L}$-22-○○	**N10**	Grooving (HSK Tooling) / Previous Description
A63-WH-	KTNR-○○	**N10**	Threading (HSK Tooling) / Previous Description
A63-WH-	N○○-○○(○)	**N11**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	PCLN$^{R}/_{L}$-DX12	**N6**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	PCMNN-□12	**N6**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	PDJN$^{R}/_{L}$-DX15	**N6**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	PDNNN-□15	**N7**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	PTGN$^{R}/_{L}$-DX16	**N7**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	PWLN$^{R}/_{L}$-DX08	**N8**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	S2525$^{R}/_{L}$-105	**N4**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	SVLB$^{R}/_{L}$-DX16	**N9**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	SVVBN-□16	**N9**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	WTENN-□16	**N7**	Toolholder (HSK Tooling) / Previous Description
A63-WH-	WWMNN-□08	**N8**	Toolholder (HSK Tooling) / Previous Description
A○○□-	PCLN$^{R}/_{L}$○○-○○	**F66**	Boring Bar
A○○□-	PDUN$^{R}/_{L}$○○-○○	**F67**	Boring Bar
A○○□-	PTUN$^{R}/_{L}$○○-○○	**F68**	Boring Bar
A○○□-	PWLN$^{R}/_{L}$○○-○○	**F69**	Boring Bar
A○○□-	SCLC$^{R}/_{L}$○○-○○E	**F50**	Boring Bar
A○○□-	SCLC$^{R}/_{L}$○○-○○AE	**F25**	Boring Bar (Dynamic Bar)
A○○□-	SCLP$^{R}/_{L}$○○-○○AE	**F27**	Boring Bar (Dynamic Bar)
A○○□-	SCLP$^{R}/_{L}$○○-○○E	**F50**	Boring Bar
A○○□-	SDQC$^{R}/_{L}$○○-○○AE	**F30**	Boring Bar (Dynamic Bar)
A○○□-	SDUC$^{R}/_{L}$○○-○○AE	**F29**	Boring Bar (Dynamic Bar)
A○○□-	SDZC$^{R}/_{L}$○○-○○AE	**F31**	Boring Bar (Dynamic Bar)
A○○□-	STLC$^{R}/_{L}$○○-○○AE	**F34**	Boring Bar (Dynamic Bar)
A○○□-	STLP$^{R}/_{L}$○○-○○AE	**F33**	Boring Bar (Dynamic Bar)
A○○□-	STUP$^{R}/_{L}$○○-○○E	**F56**	Boring Bar
A○○□-	SVJB$^{R}/_{L}$○○-○○AE	**F37**	Boring Bar (Dynamic Bar)
A○○□-	SVJC$^{R}/_{L}$○○-○○AE	**F37**	Boring Bar (Dynamic Bar)
A○○□-	SVJP$^{R}/_{L}$○○-○○AE	**F37**	Boring Bar (Dynamic Bar)
A○○□-	SVPB$^{R}/_{L}$○○-○○AE	**F37**	Boring Bar (Dynamic Bar)
A○○□-	SVPC$^{R}/_{L}$○○-○○AE	**F37**	Boring Bar (Dynamic Bar)
A○○□-	SVUB$^{R}/_{L}$○○-○○AE	**F39**	Boring Bar (Dynamic Bar)
A○○□-	SVUC$^{R}/_{L}$○○-○○AE	**F39**	Boring Bar (Dynamic Bar)
A○○□-	SVZB$^{R}/_{L}$○○-○○AE	**F39**	Boring Bar (Dynamic Bar)
A○○□-	SVZC$^{R}/_{L}$○○-○○AE	**F39**	Boring Bar (Dynamic Bar)
A○○□-	SWUB$^{R}/_{L}$○○-○○AE	**F41**	Boring Bar (Dynamic Bar)
A○○□-	SWUP$^{R}/_{L}$○○-○○AE	**F41**	Boring Bar (Dynamic Bar)
AABSR	○○○○□-○○F	**E8**	Toolholder (Turning)
AABWR	○○○○□-○○F	**E9, E10**	Toolholder (Turning)
ABS	○○R○○○○	**B72**	Insert (Turning)
ABS	○○R○○○○M	**B72**	Insert (Turning)
ABW	○○$^{R}/_{L}$○○○○	**B72**	Insert (Turning)
ABW	○○R○○○○M	**B72**	Insert (Turning)
ACLC$^{R}/_{L}$	○○○○□-○○F	**E11**	Toolholder (Turning)
AD○○□		**F45**	Boring Bar (AD Bar Adapter)
ADJC$^{R}/_{L}$	○○○○□-○○F	**E14**	Toolholder (Turning)
ADNC$^{R}/_{L}$	○○○○□-○○F	**E20**	Toolholder (Turning)
AJ-	○×○○(-○.○)	**K11**	Spare Parts (Adjusting Screw / Chamfering Attachment)
AJ-412		**M25**	Spare Parts (Adjusting screw)
AP-1416		**M112, M113**	Spare Parts (Cam Pin)
AP-1820		**M112, M113**	Spare Parts (Cam Pin)
APKT	○○○○(○○)PDER-V	**M17**	Insert (Milling)
APMT	○○○○○○E$^{R}/_{L}$-NB○	**M17**	Insert (Milling)
APMT	○○○○○○ER-NB○P	**M17**	Insert (Milling)
AVJB$^{R}/_{L}$	○○○○□-○○F	**E24**	Toolholder (Turning)
AVVB$^{R}/_{L}$	○○○○□-○○F	**E23**	Toolholder (Turning)

B

BCS	-○	**H19, P14**	Spare Parts (Clamp Set)
BDGT	○○○○○○FR-JA	**M16**	Insert (Milling)
BDMT	○○○○○○ER-JS	**M16**	Insert (Milling)
BDMT	○○○○○○ER-JT	**M16**	Insert (Milling)
BDMT	○○○○○○ER-N○	**M17**	Insert (Milling)
BDMT	○○○○○○FR	**C27, M21**	Insert (Milling)
BGIAR	○○-○	**G48**	Blade (Grooving)

Description	Page	Category
BH3X6	**F74, P2**	Spare Parts (Bolt)
BH3X12	**D33, D34, D35, F74, P2**	Spare Parts (Bolt)
BH6X25	**G11, P2**	Spare Parts (Bolt)
BH8X30	**G26, P2**	Spare Parts (Bolt)

C

C○○□-	SCLC$^{R}/_{L}$○○-○○	**F49**	Boring Bar
C○○□-	SCLC$^{R}/_{L}$○○-○○A	**F25**	Boring Bar (Dynamic Bar)
C○○□-	SCLP$^{R}/_{L}$○○○○	**F49**	Boring Bar
C○○□-	SCLP$^{R}/_{L}$○○-○○-○/○	**F49**	Boring Bar
C○○□-	SDUC$^{R}/_{L}$○○-○○	**F51**	Boring Bar
C○○□-	SJLC$^{R}/_{L}$○○-○○○	**F53**	Boring Bar
C○○□-	SJZC$^{R}/_{L}$○○-○○○	**F53**	Boring Bar
C○○□-	STLB$^{R}/_{L}$○○-○○A	**F33**	Boring Bar (Dynamic Bar)
C○○□-	STUB$^{R}/_{L}$○○-○○	**F55**	Boring Bar
C○○□-	STUP$^{R}/_{L}$○○-○○	**F55**	Boring Bar
C○○□-	STUP$^{R}/_{L}$○○-○○-○/○	**F55**	Boring Bar
C○○□-	STXB$^{R}/_{L}$○○-○○○	**F58**	Boring Bar
C○○□-	STXP$^{R}/_{L}$○○-○○	**F58**	Boring Bar
C○○□-	STZB$^{R}/_{L}$○○-○○○	**F58**	Boring Bar
C○○□-	SWUB$^{R}/_{L}$○○-○○	**F65**	Boring Bar
C○○□-	SWUB$^{R}/_{L}$○○-○○A	**F41**	Boring Bar (Dynamic Bar)
C○○□-	SWUB$^{R}/_{L}$○○-○○-○/○	**F65**	Boring Bar
C○○□-	SWUP$^{R}/_{L}$○○-○○	**F65**	Boring Bar
C○○□-	SWUP$^{R}/_{L}$○○-○○-○/○	**F65**	Boring Bar
C17R		**M41, P13**	Spare Parts (Clamp)
C20R		**M31, P13**	Spare Parts (Clamp)
C25R		**M39, P13**	Spare Parts (Clamp)
C43R		**M28**	Spare Parts (Clamp)
C44R		**M28**	Spare Parts (Clamp)
C90SD	○○○○-12$^{R}/_{L}$	**M112, M113**	Spare Parts (Cartridge)
C90SP	○○○○-10$^{R}/_{L}$	**M112, M113**	Spare Parts (Cartridge)
C91R		**M40**	Spare Parts (Clamp)
C92R		**M40**	Spare Parts (Clamp)
CB-11		**D25, D34, D35, P16**	Spare Parts (Chipbreaker)
CB-12		**D26, F72, P16**	Spare Parts (Chipbreaker)
CB-13		**D26, F72, P16**	Spare Parts (Chipbreaker)
CB-14		**D23, P16**	Spare Parts (Chipbreaker)
CB-15		**D23, P16**	Spare Parts (Chipbreaker)
CB-16		**D22, D23, F72 P16**	Spare Parts (Chipbreaker)
CB-17		**D22, P16**	Spare Parts (Chipbreaker)
CB-51		**D25, P16**	Spare Parts (Chipbreaker)
CB-S3220		**E28, P16**	Spare Parts (Chipbreaker)
CB-S4220		**E28, P16**	Spare Parts (Chipbreaker)
CBSN$^{R}/_{L}$	○○○○□-○○	**D38**	Toolholder (Turning)
CBSN$^{R}/_{L}$	○○○○B-12-A20	**F71**	Boring Bar (for Bearing Machining)
CB-T2212		**E29, P16**	Spare Parts (Chipbreaker)
CB-T3220		**E29, P16**	Spare Parts (Chipbreaker)
CCET	○○○○○○(○)F$^{R}/_{L}$-USF	**B48**	Insert (Turning)
CCET	○○○○○○(○)MF$^{R}/_{L}$-USF	**B48**	Insert (Turning)
CCET	○○○○○○(○)M$^{R}/_{L}$-FSF	**B47**	Insert (Turning)
CCET	○○○○○○(○)$^{R}/_{L}$-FSF	**B47**	Insert (Turning)
CCGT	○○○○○○	**B46, B74**	Insert (Turning)
CCGT	○○○○○○AH	**B46**	Insert (Turning)
CCGT	○○○○○○E$^{R}/_{L}$-U	**B48, B74**	Insert (Turning)
CCGT	○○○○○○FN-Z	**B46**	Insert (Turning)
CCGT	○○○○○○(○)F$^{R}/_{L}$-U	**B48, B74**	Insert (Turning)
CCGT	○○○○○○(○)M	**B46**	Insert (Turning)
CCGT	○○○○○○M-CF	**B45**	Insert (Turning)
CCGT	○○○○○○ME$^{R}/_{L}$-U	**B48**	Insert (Turning)
CCGT	○○○○○○(○)MF	**B46**	Insert (Turning)
CCGT	○○○○○○MF-GF	**B45**	Insert (Turning)
CCGT	○○○○○○MFP-GF	**B45**	Insert (Turning)
CCGT	○○○○○○MF-GQ	**B45**	Insert (Turning)
CCGT	○○○○○○MFP-GQ	**B45**	Insert (Turning)
CCGT	○○○○○○(○)MF$^{R}/_{L}$-U	**B48**	Insert (Turning)
CCGT	○○○○○○(○)M$^{R}/_{L}$-F	**B47**	Insert (Turning)

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○ : Figure, □ : Alphabet

Description	Page	Category
CCGT ○○○○○○MP-CF	**B45**	Insert (Turning)
CCGT ○○○○○○R/L-A3	**B46**	Insert (Turning)
CCGT ○○○○○○(○)R/L-F	**B47, B74**	Insert (Turning)
CCGT ○○○○○○(○)R/L-FS	**B47**	Insert (Turning)
CCGW ○○○○○○	**B47, C18**	Insert (Turning)
CCGW ○○○○○○NE	**C18**	Insert (Turning)
CCGW ○○○○○○SE	**C18**	Insert (Turning)
CCLNR/L ○○○○□-○○	**D22**	Toolholder (Turning)
CCLNR/L ○○○○□-○○A	**D32**	Toolholder (Turning)
CCLNR/L ○○○○B-○○A	**F74**	Boring Bar / Previous Description
CCLNR/L ○○○○□-○○GX	**D28**	Toolholder (Turning)
CCMT ○○○○○○	**B46, B74, C18**	Insert (Turning)
CCMT ○○○○○○GK	**B45, B74**	Insert (Turning)
CCMT ○○○○○○HQ	**B45, B74**	Insert (Turning)
CCMT ○○○○○○MQ	**B46**	Insert (Turning)
CCMT ○○○○○○NE	**C18**	Insert (Turning)
CCMT ○○○○○○SE	**C18**	Insert (Turning)
CCMW ○○○○○○ME	**C10**	Insert (Turning) / Previous Description
CCMW ○○○○○○ME-T	**C10**	Insert (Turning) / Previous Description
CCMW ○○○○○○SE	**C10**	Insert (Turning) / Previous Description
CCMW ○○○○○○SE-T	**C10**	Insert (Turning) / Previous Description
CCMW ○○○○○○S○○○○○MET	**C10**	Insert (Turning)
CCMW ○○○○○○S○○○○○SET	**C10**	Insert (Turning)
CCMW ○○○○○○T○○○○○ME	**C10**	Insert (Turning)
CCMW ○○T○○○T○○○○○ME	**C10**	Insert (Turning)
CCMW ○○T○○○T○○○○○SE	**C10**	Insert (Turning)
CCMW ○○T○○○ME	**C10**	Insert (Turning) / Previous Description
CCMW ○○T○○○S2E	**C10**	Insert (Turning) / Previous Description
CCMW ○○T○○○SE	**C10**	Insert (Turning) / Previous Description
CCMW ○○T○○○SE-T	**C10**	Insert (Turning) / Previous Description
CCMW ○○T○○○S○○○○○MET	**C10**	Insert (Turning)
CCMW ○○T○○○S○○○○○SET	**C10**	Insert (Turning)
CCMW ○○○○○○T○○○○○SE	**C10**	Insert (Turning)
CCRNR/L ○○○○□-○○A	**D32**	Toolholder (Turning)
CDHNR/L ○○○○□-○○GX	**D29**	Toolholder (Turning)
CDJNR/L ○○○○□-○○	**D23**	Toolholder (Turning)
CDJNR/L ○○○○□-○○GX	**D29**	Toolholder (Turning)
CE-010	**D22, D23, F72, P14**	Spare Parts (Clamp Set)
CE-020	**D25, D26, D34, D35, P14**	Spare Parts (Clamp Set)
CE-030	**D27, P14**	Spare Parts (Clamp Set)
CE-030A	**D25, D27, D32, D33, D34, D35, D36, P14**	Spare Parts (Clamp Set)
CE-040	**D25, D27, D35, P14**	Spare Parts (Clamp Set)
CE-111	**G26, P13**	Spare Parts (Clamp)
CE-121	**G26, P13**	Spare Parts (Clamp)
CE-131	**G26, P13**	Spare Parts (Clamp)
CE-141	**G26, P13**	Spare Parts (Clamp)
CE-220	**D22, D25, P14**	Spare Parts (Clamp Set)
CE-320	**F72, P14**	Spare Parts (Clamp Set)
CE-360S	**F74, P14**	Spare Parts (Clamp Set)
CE-410	**D28, D29, D30, D31, F73, P14**	Spare Parts (Clamp Set)
CE-430	**D29, P14**	Spare Parts (Clamp Set)
CELNR/L ○○○○B-○○	**F72**	Boring Bar / Previous Description
CELNR/L ○○○○□-○○	**D23**	Toolholder (Turning)
CGA-3R/L	**G17, P13**	Spare Parts (Clamp)
CGA-4R/L	**G17, P13**	Spare Parts (Clamp)
CGA-5R/L	**G17, P13**	Spare Parts (Clamp)
CGBR/L	**G11, P13**	Spare Parts (Clamp)
CGH-1R/L	**G16, G45, P13**	Spare Parts (Clamp)
CGH-2R/L	**G16, G45, P13**	Spare Parts (Clamp)
CGH-3R/L	**G16, P13**	Spare Parts (Clamp)
CGIA-3R	**G48, P13**	Spare Parts (Clamp)
CGIA-4R	**G48, P13**	Spare Parts (Clamp)
CGIA-5R	**G48, P13**	Spare Parts (Clamp)
CH-20R	**M32, M33, P13**	Spare Parts (Clamp)
CINR/L ○○○○S-○○	**J17**	Toolholder (Threading)
CL63-1	**N4, N5, N6, N7, N8, N9, N10, N11, N12, P19**	Spare Parts (Coolant Pipe)

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CL100-1	**N4, N5, N11**	Spare Parts (Coolant Pipe)
CNGA ○○○○○○	**B17, B81, C5**	Insert (Turning)
CNGA ○○○○○○ME	**C5**	Insert (Turning) / Previous Description
CNGA ○○○○○○ME-T	**C5**	Insert (Turning) / Previous Description
CNGA ○○○○○○MEW	**C5**	Insert (Turning) / Previous Description
CNGA ○○○○○○SE	**C5**	Insert (Turning) / Previous Description
CNGA ○○○○○○SE-T	**C5**	Insert (Turning) / Previous Description
CNGA ○○○○○○S○○○○○	**B81, C5**	Insert (Turning)
CNGA ○○○○○○S○○○○○ME	**C5**	Insert (Turning)
CNGA ○○○○○○S○○○○○MET	**C5**	Insert (Turning)
CNGA ○○○○○○S○○○○○MEW	**C5**	Insert (Turning)
CNGA ○○○○○○S○○○○○SE	**C5**	Insert (Turning)
CNGA ○○○○○○S○○○○○SET	**C5**	Insert (Turning)
CNGA ○○○○○○T○○○○○	**B81, C5**	Insert (Turning)
CNGA ○○○○○○T○○○○○ME	**C5**	Insert (Turning)
CNGA ○○○○○○T○○○○○SE	**C5**	Insert (Turning)
CNGA ○○○○○○-T○○	**B75**	Insert (Turning)
CNGG ○○○○○○AH	**B18**	Insert (Turning)
CNGG ○○○○○○DP	**B14**	Insert (Turning)
CNGG ○○○○○○HQ	**B14**	Insert (Turning)
CNGG ○○○○○○R/L	**B18, B40**	Insert (Turning)
CNGG ○○○○○○R/L-25R	**B18**	Insert (Turning)
CNGG ○○○○○○R/L-A3	**B18**	Insert (Turning)
CNGG ○○○○○○R/L-S	**B18, B40**	Insert (Turning)
CNGG ○○○○○○Z	**B18**	Insert (Turning)
CNGM ○○○○○○BB○	**C5**	Insert (Turning) / Previous Description
CNGM ○○○○○○S○○○○○BB○	**C5**	Insert (Turning)
CNGN ○○○○○○	**B81**	Insert (Turning)
CNGN ○○○○○○S○○○○○	**B81**	Insert (Turning)
CNGN ○○○○○○T○○○○○	**B81**	Insert (Turning)
CNGU ○○○○○○ME R/L-U	**B38**	Insert (Turning)
CNGU ○○○○○○MF R/L-F	**B38**	Insert (Turning)
CNGU ○○○○○○MF R/L-U	**B38**	Insert (Turning)
CNGU ○○○○○○MF-SK	**B38**	Insert (Turning)
CNGX ○○○○○○T○○○○○	**B81**	Insert (Turning)
CNMA ○○○○○○	**B17, B40, B81**	Insert (Turning)
CNMA ○○○○○○S○○○○○	**B81**	Insert (Turning)
CNMA ○○○○○○-T○○	**B81**	Insert (Turning)
CNMG ○○○○○○	**B16, B40**	Insert (Turning)
CNMG ○○○○○○AH	**B18**	Insert (Turning)
CNMG ○○○○○○C	**B17**	Insert (Turning)
CNMG ○○○○○○CJ	**B14**	Insert (Turning)
CNMG ○○○○○○CQ	**B14, B40**	Insert (Turning)
CNMG ○○○○○○CS	**B15, B40**	Insert (Turning)
CNMG ○○○○○○GC	**B17**	Insert (Turning)
CNMG ○○○○○○GP	**B14, B40**	Insert (Turning)
CNMG ○○○○○○GS	**B15, B40**	Insert (Turning)
CNMG ○○○○○○GT	**B15, B40**	Insert (Turning)
CNMG ○○○○○○GU	**B17**	Insert (Turning)
CNMG ○○○○○○HK	**B15**	Insert (Turning)
CNMG ○○○○○○HQ	**B14, B40**	Insert (Turning)
CNMG ○○○○○○HS	**B15, B40**	Insert (Turning)
CNMG ○○○○○○HT	**B15, B40**	Insert (Turning)
CNMG ○○○○○○HU	**B17**	Insert (Turning)
CNMG ○○○○○○MQ	**B17**	Insert (Turning)
CNMG ○○○○○○MS	**B17**	Insert (Turning)
CNMG ○○○○○○MU	**B17**	Insert (Turning)
CNMG ○○○○○○PH	**B16**	Insert (Turning)
CNMG ○○○○○○PS	**B15**	Insert (Turning)
CNMG ○○○○○○PT	**B15**	Insert (Turning)
CNMG ○○○○○○TK	**B17**	Insert (Turning)
CNMG ○○○○○○TN-V	**B15**	Insert (Turning)
CNMG ○○○○○○WP	**B14**	Insert (Turning)
CNMG ○○○○○○WQ	**B14, B40**	Insert (Turning)
CNMG ○○○○○○XP	**B16, B40**	Insert (Turning)
CNMG ○○○○○○XP-T	**B16, B40**	Insert (Turning)
CNMG ○○○○○○XQ	**B16, B40**	Insert (Turning)
CNMG ○○○○○○XS	**B16, B40**	Insert (Turning)
CNMG ○○○○○○ZS	**B17**	Insert (Turning)
CNMM ○○○○○○M	**C17**	Insert (Turning)
CNMM ○○○○○○M-NE	**C17**	Insert (Turning)
CNMM ○○○○○○M-SE	**C17**	Insert (Turning)
CNMM ○○○○○○PX	**B16**	Insert (Turning)
CNMN ○○○○○○	**B81, C9**	Insert (Turning)
CNMN ○○○○○○S○○○○○	**C9**	Insert (Turning)

Description	Page	Category
CNMN ○○○○○○T○○○○○	**B81**	Insert (Turning)
CNMP ○○○○○○TK	**B14, B40**	Insert (Turning)
CNMU ○○○○○○E-GK	**B38**	Insert (Turning)
CP-2D	**D14**	Spare Parts (Clamp)
CP-3D	**D8, D10, D12, D20**	Spare Parts (Clamp)
CP-5D	**D16**	Spare Parts (Clamp)
CP-8TE	**M41, P13**	Spare Parts (Clamp)
CP-8W	**M41, P13**	Spare Parts (Clamp)
CPGB ○○○○○○	**C10**	Insert (Turning) / Previous Description
CPGB ○○○○○○ME	**C10**	Insert (Turning) / Previous Description
CPGB ○○○○○○ME-T	**C10**	Insert (Turning) / Previous Description
CPGB ○○○○○○SE	**C10**	Insert (Turning) / Previous Description
CPGB ○○○○○○SE-T	**C10**	Insert (Turning) / Previous Description
CPGB ○○○○○○S○○○○○MET	**C10**	Insert (Turning)
CPGB ○○○○○○S○○○○○SET	**C10**	Insert (Turning)
CPGB ○○○○○○T○○○○○	**C10**	Insert (Turning)
CPGB ○○○○○○T○○○○○ME	**C10**	Insert (Turning)
CPGB ○○○○○○T○○○○○SE	**C10**	Insert (Turning)
CPMB ○○○○○○	**B49**	Insert (Turning)
CPMH ○○○○○○	**B49, B74, C18**	Insert (Turning)
CPMH ○○○○○○HQ	**B49, B74**	Insert (Turning)
CPMH ○○○○○○NE	**C18**	Insert (Turning)
CPMH ○○○○○○R/L-Y	**B49, B74**	Insert (Turning)
CPMT ○○○○○○GP	**B49, B74**	Insert (Turning)
CPMT ○○○○○○XP	**B49, B74**	Insert (Turning)
CPMT ○○○○○○XQ	**B49, B74**	Insert (Turning)
CP-RCR/L	**D38, F71, P14**	Spare Parts (Clamp Set)
CP8X○○TL	**M26, P2**	Spare Parts (Screw)
CPS-1	**F61, P15**	Spare Parts (Clamp Set)
CPS-2	**F60, F61, P15**	Spare Parts (Clamp Set)
CPS-2P	**E28, E29, P15**	Spare Parts (Clamp Set)
CPS-2S	**M85, P15**	Spare Parts (Clamp Set)
CPS-2TR	**M82, P15**	Spare Parts (Clamp Set)
CPS-3	**E28, E29, F60, F61, P15**	Spare Parts (Clamp Set)
CPS-4V	**G41, P15**	Spare Parts (Clamp Set)
CPS-5E	**M85, P15**	Spare Parts (Clamp Set)
CPS-5F	**G41, M132, P15**	Spare Parts (Clamp Set)
CPS-5R/L	**D17, P15**	Spare Parts (Clamp Set)
CPS-5S	**J16, J17, N10, P15**	Spare Parts (Clamp Set)
CPS-5V	**G41, G58, G60, G70, P15**	Spare Parts (Clamp Set)
CPS-6F	**M132, P15**	Spare Parts (Clamp Set)
CPS-6M	**M27, M31, M39, P15**	Spare Parts (Clamp Set)
CPS-6S	**J16, J17, N10, P15**	Spare Parts (Clamp Set)
CPS-6V	**G41, G60, G63, G70, M144, P15**	Spare Parts (Clamp Set)
CPS-8V	**G60, G63, G70, P15**	Spare Parts (Clamp Set)
CRDNN ○○○○□-○○	**D27**	Toolholder (Turning)
CRDNN ○○○○□-○○A	**D33**	Toolholder (Turning)
CRSNR/L ○○○○□-○○	**D27**	Toolholder (Turning)
CRSNR/L ○○○○□-○○A	**D33**	Toolholder (Turning)
CS-2D	**D14**	Spare Parts (Screw)
CS-3D	**D8, D10, D12, D20**	Spare Parts (Screw)
CS-5D	**D16**	Spare Parts (Screw)
CSBPR/L ○○○○□-○○N	**E28**	Toolholder (Turning)
CSDNN ○○○○□-○○	**D25**	Toolholder (Turning)
CSDNN ○○○○□-○○A	**D35**	Toolholder (Turning)
CSDNN ○○○○□-○○GX	**D30**	Toolholder (Turning)
CSDPN ○○○○□-○○N	**E28**	Toolholder (Turning)
CSKNR/L ○○○○□-○○	**D25**	Toolholder (Turning)
CSKNR/L ○○○○□-○○A	**D34**	Toolholder (Turning)
CSKNR/L ○○○○B-○○	**F72**	Boring Bar / Previous Description
CSKNR/L ○○○○B-○○A	**F74**	Boring Bar / Previous Description
CSKNR/L ○○○○□-○○GX	**D31**	Toolholder (Turning)
CSKPR/L ○○○○B-○○	**F60**	Boring Bar / Previous Description
CSKPR/L ○○○○□-○○N	**E28**	Toolholder (Turning)
CS-NR/L ○○○○□-○○	**D25**	Toolholder (Turning)
CS-NR/L ○○○○□-○○GX	**D31**	Toolholder (Turning)

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CSRNR/L ○○○○□-○○	**D25**	Toolholder (Turning)
CSRNR/L ○○○○□-○○A	**D34**	Toolholder (Turning)
CSRNR/L ○○○○□-○○GX	**D30**	Toolholder (Turning)
CSSNR/L ○○○○□-○○	**D25**	Toolholder (Turning)
CSSNR/L ○○○○□-○○A	**D35**	Toolholder (Turning)
CSSNR/L ○○○○□-○○GX	**D30**	Toolholder (Turning)
CSSPR/L ○○○○□-○○N	**E28**	Toolholder (Turning)
CSYNR/L ○○○○□-○○	**D25**	Toolholder (Turning)
CSYNR/L ○○○○□-○○A	**D34**	Toolholder (Turning)
CSYNR/L ○○○○□-○○GX	**D31**	Toolholder (Turning)
CT○○T○ -45A	**K11**	Insert (Drilling) / Chamfering
CTFPR/L ○○○○□-○○N	**E29**	Toolholder (Turning)
CTGPR/L ○○○○□-○○N	**E29**	Toolholder (Turning)
CTJNR/L ○○○○□-○○	**D26**	Toolholder (Turning)
CTJNR/L ○○○○□-○○A	**D36**	Toolholder (Turning)
CTTPR/L ○○○○□-○○N	**E29**	Toolholder (Turning)
CTUCR/L ○○○○B-○○	**F72**	Boring Bar / Previous Description
CTUNR/L ○○○○B-○○A	**F74**	Boring Bar / Previous Description
CTUNR/L ○○○○□-○○	**D26**	Toolholder (Turning)
CTUNR/L ○○○○□-○○A	**D36**	Toolholder (Turning)
CTUPR/L ○○○○B-○○	**F61**	Boring Bar / Previous Description
D		
DC ○○○○M-SC	**K4, K5, K6**	Insert (Drilling)
DC-44	**D8**	Spare Parts (Shim)
DCET ○○○○○○(○)FR/L-JSF	**B55**	Insert (Turning)
DCET ○○○○○○(○)FR/L-USF	**B54**	Insert (Turning)
DCET ○○○○○○(○)MR/L-FSF	**B53**	Insert (Turning)
DCET ○○○○○○(○)MFR/L-JSF	**B55**	Insert (Turning)
DCET ○○○○○○(○)MFR/L-USF	**B54**	Insert (Turning)
DCET ○○○○○○(○)R/L-FSF	**B53**	Insert (Turning)
DCGT ○○○○○○	**B51, B75**	Insert (Turning)
DCGT ○○○○○○AH	**B55**	Insert (Turning)
DCGT ○○○○○○CF	**B50, B75**	Insert (Turning)
DCGT ○○○○○○CK	**B50**	Insert (Turning)
DCGT ○○○○○○EN-Z	**B75**	Insert (Turning)
DCGT ○○○○○○(○)ER/L-J	**B55**	Insert (Turning)
DCGT ○○○○○○ER/L-U	**B54, B75**	Insert (Turning)
DCGT ○○○○○○FN-Z	**B52**	Insert (Turning)
DCGT ○○○○○○(○)FR/L-J	**B55**	Insert (Turning)
DCGT ○○○○○○(○)FR/L-U	**B54, B75**	Insert (Turning)
DCGT ○○○○○○(○)M	**B51**	Insert (Turning)
DCGT ○○○○○○○○○MER/L-J	**B55**	Insert (Turning)
DCGT ○○○○○○MER/L-U	**B54**	Insert (Turning)
DCGT ○○○○○○(○)MF	**B51**	Insert (Turning)
DCGT ○○○○○○○○○MFR/L-U	**B54**	Insert (Turning)
DCGT ○○○○○○MF-GF	**B50**	Insert (Turning)
DCGT ○○○○○○MF-GQ	**B51**	Insert (Turning)
DCGT ○○○○○○MFP-GF	**B50**	Insert (Turning)
DCGT ○○○○○○MFP-GQ	**B51**	Insert (Turning)
DCGT ○○○○○○(○)MFR/L-J	**B55**	Insert (Turning)
DCGT ○○○○○○(○)MFR/L-U	**B54**	Insert (Turning)
DCGT ○○○○○○(○)MR/L-F	**B53**	Insert (Turning)
DCGT ○○○○○○M-CF	**B50**	Insert (Turning)
DCGT ○○○○○○MP-CF	**B50**	Insert (Turning)
DCGT ○○○○○○M-CK	**B50**	Insert (Turning)
DCGT ○○○○○○MP-CK	**B50**	Insert (Turning)
DCGT ○○○○○○R/L-A3	**B55**	Insert (Turning)
DCGT ○○○○○○(○)R/L-F	**B53**	Insert (Turning)
DCGT ○○○○○○R/L-FS	**B53**	Insert (Turning)
DCGW ○○○○○○	**B55**	Insert (Turning)
DCLNR/L ○○○○□-○○	**D8**	Toolholder (Turning)
DCMT ○○○○○○	**B51, B75, C19**	Insert (Turning)
DCMT ○○○○○○GK	**B51**	Insert (Turning)
DCMT ○○○○○○GP	**B50, B75**	Insert (Turning)
DCMT ○○○○○○HQ	**B51, B75**	Insert (Turning)
DCMT ○○○○○○MQ	**B52**	Insert (Turning)
DCMT ○○○○○○NE	**C19**	Insert (Turning)
DCMT ○○○○○○SE	**C19**	Insert (Turning)
DCMT ○○○○○○XP	**B52, B75**	Insert (Turning)
DCMT ○○○○○○XQ	**B52, B75**	Insert (Turning)
DCMT ○○○○○○R/L-NE	**C19**	Insert (Turning)
DCMW ○○○○○○	**C11**	Insert (Turning) / Previous Description
DCMW ○○○○○○ME	**C11**	Insert (Turning) / Previous Description

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DCMW ○○○○○○ME-T	**C11**	Insert (Turning) / Previous Description
DCMW ○○○○○○SE	**C11**	Insert (Turning) / Previous Description
DCMW ○○○○○○SE-T	**C11**	Insert (Turning) / Previous Description
DCMW ○○○○○○S○○○○○MET	**C11**	Insert (Turning)
DCMW ○○○○○○S○○○○○SET	**C11**	Insert (Turning)
DCMW ○○○○○○T○○○○○	**C11**	Insert (Turning)
DCMW ○○○○○○T○○○○○ME	**C11**	Insert (Turning)
DCMW ○○○○○○T○○○○○SE	**C11**	Insert (Turning)
DD-43	**D10**	Spare Parts (Shim)
DD-44	**D10**	Spare Parts (Shim)
DDJN$^{R}/_{L}$ ○○○○□-○○○○	**D10**	Toolholder (Turning)
DDHN$^{R}/_{L}$ ○○○○□-○○○○	**D10**	Toolholder (Turning)
DMC ○○○	**M78**	Endmill
DMC ○○○H	**M79**	Endmill
DMC ○○○SX	**M78**	Endmill
DMC ○○○SXT	**M78**	Endmill
DMC ○○○SX-○○○	**M78**	Endmill
DMC ○○○-S○○	**M78**	Endmill
DNGA ○○○○○○	**B82, C6**	Insert (Turning)
DNGA ○○○○○○ME	**C6**	Insert (Turning) / Previous Description
DNGA ○○○○○○ME-T	**C6**	Insert (Turning) / Previous Description
DNGA ○○○○○○SE	**C6**	Insert (Turning) / Previous Description
DNGA ○○○○○○SE-T	**C6**	Insert (Turning) / Previous Description
DNGA ○○○○○○S○○○○○	**B82, C6**	Insert (Turning)
DNGA ○○○○○○S○○○○○ME	**C6**	Insert (Turning)
DNGA ○○○○○○S○○○○○MET	**C6**	Insert (Turning)
DNGA ○○○○○○S○○○○○SE	**C6**	Insert (Turning)
DNGA ○○○○○○S○○○○○SET	**C6**	Insert (Turning)
DNGA ○○○○○○T○○○○○	**B82, C6**	Insert (Turning)
DNGA ○○○○○○T○○○○○ME	**C6**	Insert (Turning)
DNGA ○○○○○○T○○○○○SE	**C6**	Insert (Turning)
DNGA ○○○○○○-T○○	**B82**	Insert (Turning)
DNGG ○○○○○○AH	**B23**	Insert (Turning)
DNGG ○○○○○○DP	**B19**	Insert (Turning)
DNGG ○○○○○○$^{R}/_{L}$	**B23, B41**	Insert (Turning)
DNGG ○○○○○○$^{R}/_{L}$-A3	**B23**	Insert (Turning)
DNGG ○○○○○○$^{R}/_{L}$-S	**B23, B41**	Insert (Turning)
DNGM ○○○○○○BB○	**C6**	Insert (Turning)
DNGM ○○○○○○S○○○○○BB○	**C6**	Insert (Turning)
DNGN ○○○○○○	**B82**	Insert (Turning)
DNGN ○○○○○○S○○○○○	**B82**	Insert (Turning)
DNGN ○○○○○○T○○○○○	**B82**	Insert (Turning)
DNGU ○○○○○○ME$^{R}/_{L}$-U	**B39**	Insert (Turning)
DNGU ○○○○○○(○)MF$^{R}/_{L}$-F	**B39**	Insert (Turning)
DNGU ○○○○○○MF$^{R}/_{L}$-U	**B39**	Insert (Turning)
DNGU ○○○○○○MF-SK	**B39**	Insert (Turning)
DNGX ○○○○○○T○○○○○	**B82**	Insert (Turning)
DNMA ○○○○○○	**B23, B41**	Insert (Turning)
DNMG ○○○○○○	**B20, B41**	Insert (Turning)
DNMG ○○○○○○AH	**B23**	Insert (Turning)
DNMG ○○○○○○C	**B23**	Insert (Turning)
DNMG ○○○○○○CJ	**B19**	Insert (Turning)
DNMG ○○○○○○CQ	**B19, B41**	Insert (Turning)
DNMG ○○○○○○CS	**B20, B41**	Insert (Turning)
DNMG ○○○○○○GC	**B23**	Insert (Turning)
DNMG ○○○○○○GP	**B19, B41**	Insert (Turning)
DNMG ○○○○○○GS	**B20, B41**	Insert (Turning)
DNMG ○○○○○○GT	**B20, B41**	Insert (Turning)
DNMG ○○○○○○GU	**B22**	Insert (Turning)
DNMG ○○○○○○HK	**B19**	Insert (Turning)
DNMG ○○○○○○HQ	**B19, B41**	Insert (Turning)
DNMG ○○○○○○HS	**B20, B41**	Insert (Turning)
DNMG ○○○○○○HT	**B20, B41**	Insert (Turning)
DNMG ○○○○○○HU	**B22**	Insert (Turning)
DNMG ○○○○○○MQ	**B22**	Insert (Turning)
DNMG ○○○○○○MS	**B22**	Insert (Turning)
DNMG ○○○○○○MU	**B22**	Insert (Turning)
DNMG ○○○○○○PH	**B21**	Insert (Turning)
DNMG ○○○○○○PS	**B20**	Insert (Turning)
DNMG ○○○○○○PT	**B20**	Insert (Turning)
DNMG ○○○○○○$^{R}/_{L}$-ST	**B22**	Insert (Turning)
DNMG ○○○○○○TK	**B22**	Insert (Turning)
DNMG ○○○○○○TN-V	**B19**	Insert (Turning)
DNMG ○○○○○○XP	**B21, B41**	Insert (Turning)
DNMG ○○○○○○XP-T	**B21, B41**	Insert (Turning)
DNMG ○○○○○○XQ	**B21, B41**	Insert (Turning)
DNMG ○○○○○○XS	**B21, B41**	Insert (Turning)
DNMG ○○○○○○ZS	**B23**	Insert (Turning)
DNMM ○○○○○○M	**C17**	Insert (Turning)
DNMM ○○○○○○M-NE	**C17**	Insert (Turning)
DNMM ○○○○○○M-SE	**C17**	Insert (Turning)
DNMM ○○○○○○PX	**B21**	Insert (Turning)
DNMP ○○○○○○TK	**B19, B41**	Insert (Turning)
DNMU ○○○○○○E-GK	**B39**	Insert (Turning)
DPET ○○○○○○(○)F$^{R}/_{L}$-USF	**B56**	Insert (Turning)
DPET ○○○○○○(○)M$^{R}/_{L}$-FSF	**B56**	Insert (Turning)
DPET ○○○○○○(○)MF$^{R}/_{L}$-USF	**B56**	Insert (Turning)
DPET ○○○○○○(○)$^{R}/_{L}$-FSF	**B56**	Insert (Turning)
DR ○○-○○	**M96**	Spare Parts (Drive-Ring)
DR ○○-○○□	**M96**	Spare Parts (Drive-Ring)
DR ○○○○-○○○○	**M97**	Spare Parts (Drive-Ring)
DR ○○○○-○○○○□	**M97**	Spare Parts (Drive-Ring)
DR12CR-IN	**K47**	Cartridge (Drill)
DR12CR-OUT	**K47**	Cartridge (Drill)
DR20CR-IN	**K47**	Cartridge (Drill)
DR20CR-OUT	**K47**	Cartridge (Drill)
DS ○○○	**K37**	Insert (Drilling)
DS-44	**D12**	Spare Parts (Shim)
DSBN$^{R}/_{L}$ ○○○○□-○○	**D12**	Toolholder (Turning)
DT-7	**G36, G37, G38, K38, K40, K42, K44, M136, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DT-8	**K40, K42, K44, M69, M83, M86, M87, M91, M120, M130, M138, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DT-9	**K11**	Spare Parts (Trox Wrench / Screwdriver type)
DT-10	**M34, M43, M69, M74, M86, M87, M91, M120, M123, M124, M130, M134, M136, M138, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DT-15	**K11, K40, K42, K44, K46, M38, M62, M63, M83, M86, M87, M91, M120, M123, M124, M130, M138, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DT-20	K25, K27, K29, K30, K41, K42, K43, K44, K45, K46, K47, M43, M80, M120, M123, M124, P17	Spare Parts (Trox Wrench / Screwdriver type)
DT-25	**K25, K27, K29, K30, K41, K43, K47, M124, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DT-32	**D14**	Spare Parts (Shim)
DTGN$^{R}/_{L}$ ○○○○□-○○	**D14**	Toolholder (Turning)
DTM-6	**K24, K26, K28, K30, M52, M53, M86, M87, M91, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DTM-7	**K24, K26, K28, K30**	Spare Parts (Trox Wrench / Screwdriver type)
DTM-8	**K24, K26, K28, K30, M44, M45, M46, M56, M57, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DTM-10	**K24, K26, K28, K30**	Spare Parts (Trox Wrench / Screwdriver type)
DTM-15	**K25, K26, K28, K30, M44, M45, M46, M56, M57, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DTP-9	**M112, M113**	Spare Parts (Trox Wrench / Screwdriver type)
DTP-15	**M22, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DTP-20	**M42, P17**	Spare Parts (Trox Wrench / Screwdriver type)
DV-33	**D16**	Spare Parts (Shim)
DVLN$^{R}/_{L}$ ○○○○□-○○	**D16**	Toolholder (Turning)
DVPN$^{R}/_{L}$ ○○○○□-○○	**D16**	Toolholder (Turning)
DW-44	**D20**	Spare Parts (Shim)
DWLN$^{R}/_{L}$ ○○○○□-○○	**D20**	Toolholder (Turning)
DVVNN ○○○○□-○○	**D16**	Toolholder (Turning)

Description		Page	Category
E			
ENGN	○○○○○○	**B83**	Insert (Turning)
ENGN	○○○○○○S○○○○○	**B83**	Insert (Turning)
ENGN	○○○○○○T○○○○○	**B83**	Insert (Turning)
E○○□-	SCLC$^{R}_{L}$○○-○○	**F50**	Boring Bar
E○○□-	SCLC$^{R}_{L}$○○-○○A	**F25**	Boring Bar (Dynamic Bar)
E○○□-	SCLC$^{R}_{L}$○○-○○A-○/○	**F25**	Boring Bar
E○○□-	SCLP$^{R}_{L}$○○-○○	**F50**	Boring Bar
E○○□-	SCLP$^{R}_{L}$○○-○○A	**F27**	Boring Bar (Dynamic Bar)
E○○□-	SCLP$^{R}_{L}$○○-○○A-○/○	**F27**	Boring Bar (Dynamic Bar)
E○○□-	SDQC$^{R}_{L}$○○-○○A	**F30**	Boring Bar (Dynamic Bar)
E○○□-	SDQC$^{R}_{L}$○○-○○A-○/○	**F30**	Boring Bar (Dynamic Bar)
E○○□-	SDUC$^{R}_{L}$○○-○○A	**F29**	Boring Bar (Dynamic Bar)
E○○□-	SDUC$^{R}_{L}$○○-○○A-○/○	**F29**	Boring Bar (Dynamic Bar)
E○○□-	SDZC$^{R}_{L}$○○-○○A	**F31**	Boring Bar (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○A	**F33**	Boring Bar (Dynamic Bar)
E○○□-	STLP$^{R}_{L}$○○-○○A-○/○	**F33**	Boring Bar (Dynamic Bar)
E○○□-	STUP$^{R}_{L}$○○-○○	**F56**	Boring Bar
E○○□-	SVPB$^{R}_{L}$○○-○○A	**F37**	Boring Bar (Dynamic Bar)
E○○□-	SVPC$^{R}_{L}$○○-○○A	**F37**	Boring Bar (Dynamic Bar)
E○○□-	SVUB$^{R}_{L}$○○-○○A	**F39**	Boring Bar (Dynamic Bar)
E○○□-	SVUC$^{R}_{L}$○○-○○A	**F39**	Boring Bar (Dynamic Bar)
E○○□-	SWUB$^{R}_{L}$○○-○○A	**F41**	Boring Bar (Dynamic Bar)
E○○□-	SWUB$^{R}_{L}$○○-○○A-○/○	**F41**	Boring Bar (Dynamic Bar)
E○○□-	SWUP$^{R}_{L}$○○-○○A	**F41**	Boring Bar (Dynamic Bar)
E○○□-	SWUP$^{R}_{L}$○○-○○A-○/○	**F41**	Boring Bar (Dynamic Bar)
F			
FGG$^{R}_{L}$	○○○○-○○	**G19**	Insert (Grooving / Plunge&Turn)
FH-2		**P17**	Spare Parts (Hexagon Wrench / Flag type)
FH-2.5		**P17**	Spare Parts (Hexagon Wrench / Flag type)
FMM	○○-○○	**G67**	Insert (Grooving / Plunge&Turn)
FMN	○	**G67**	Insert (Grooving / Plunge&Turn)
FPMT	○○○○○○ER	**M20**	Insert (Milling)
FS-	○○	**K11**	Spare Parts (Drill fitting screw for Chamfering Attachment)
FT-6		**P17**	Spare Parts (Trox Wrench / Flag type)
FT-7		**F34, P17**	Spare Parts (Trox Wrench / Flag type)
FT-8		**P17**	Spare Parts (Trox Wrench / Flag type)
FT-10		**P17**	Spare Parts (Trox Wrench / Flag type)
FT-15		**G15, P17**	Spare Parts (Trox Wrench / Flag type)
FTK	○	**G69**	Insert (Cut-Off)
FTS-15		**F44**	Spare Parts (Trox Wrench / Flag type)
G			
GA	○○	**G17**	Insert (Grooving)
GB	○○$^{R}_{L}$○○○	**C24, G10**	Insert (Grooving)
GB	○○$^{R}_{L}$○○○R	**G10**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○	**C16, C24, G6, G7, G8**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○MY	**G7**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○R	**G8**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○	**C16, C24, G6, G7, G8**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○MY	**G7**	Insert (Grooving)
GBA	○○$^{R}_{L}$○○○-○○○R	**G8**	Insert (Grooving)
GE$^{R}_{L}$	○○○-○○○□	**G34, G35**	Insert (Grooving)
GER	○○○-○○○□□	**G34, G35**	Insert (Grooving)
GFV$^{R}_{L}$	○○○○□-○○○(○)□	**G60**	Toolholder (Grooving)
GFVS$^{R}_{L}$	○○○○□-HB	**G62**	Toolholder (Grooving)
GFVS$^{R}_{L}$	○○○○□-HC	**G62**	Toolholder (Grooving)
GFVS$^{R}_{L}$	○○○○□-○○AA	**G58**	Toolholder (Grooving)
GFVS$^{R}_{L}$	○○○○□-○○○(○)□	**G62, G63**	Toolholder (Grooving)
GFVT$^{R}_{L}$	○○○○□-HB	**G62**	Toolholder (Grooving)
GFVT$^{R}_{L}$	○○○○□-HC	**G62**	Toolholder (Grooving)
GFVT$^{R}_{L}$	○○○○□-○○AA	**G58**	Toolholder (Grooving)
GFVT$^{R}_{L}$	○○○○□-○○○(○)□	**G62, G63**	Toolholder (Grooving)
GH	○○○○-○○	**B90, G17, G45**	Insert (Grooving)
GHU	○○○○	**G17, G45**	Insert (Grooving)
GIA	○○	**G48**	Insert (Grooving)
GIFV$^{R}_{L}$	○○○○B-○○○□	**G70**	Toolholder (Grooving)
GIV$^{R}_{L}$	○○○○-○□E	**G41**	Toolholder (Grooving)
GIV$^{R}_{L}$	○○○○-○□W	**G41**	Toolholder (Grooving)
GIV$^{R}_{L}$	○○○○-○□	**G41**	Toolholder (Grooving)
GIV$^{R}_{L}$	○○○○-○□(□)	**G41**	Toolholder (Grooving)

Description		Page	Category
GMG	○○○○-○○	**G18, G47, G68**	Insert (Grooving / Plunge&Turn) / Previous Description
GMG	○○○○-○○R	**G18, G47, G68**	Insert (Grooving / Plunge&Turn) / Previous Description
GMG	○○○○-○○MG	**G18, G47, G68**	Insert (Grooving / Plunge&Turn) / Previous Description
GMG	○○○○-○○RU	**G18**	Insert (Grooving / Plunge&Turn) / Previous Description
GMG	○○○○-○○○R	**G18, G47, G68**	Insert (Grooving / Plunge&Turn)
GMG	○○○○-○○○MG	**G18, G47, G68**	Insert (Grooving / Plunge&Turn)
GMG	○○○○-○○○MS	**G18**	Insert (Grooving / Plunge&Turn)
GMG	○○○○-○○○RU	**G18**	Insert (Grooving / Plunge&Turn)
GMGA	○○○○-○○R	**G19, G47, G68**	Insert (Grooving / Plunge&Turn) / Previous Description
GMGA	○○○○-○○○R	**G19, G47, G68**	Insert (Grooving / Plunge&Turn)
GMM	3014-04	**G19**	Insert (Grooving / Plunge&Turn)
GMM	3014-15R	**G19**	Insert (Grooving / Plunge&Turn)
GMM	3014-15RU	**G19**	Insert (Grooving / Plunge&Turn)
GMM	○○○○$^{R}_{L}$-MT-15D	**G20, H10**	Insert (Grooving / Plunge&Turn)
GMM	○○○○$^{R}_{L}$-TK-8D	**G20, H10**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-MT	**G20, H10**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-NB	**G20, H10**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-TK	**G20, H10**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-○○	**G18, G47, G68**	Insert (Grooving / Plunge&Turn) / Previous Description
GMM	○○○○-○○R	**G18**	Insert (Grooving / Plunge&Turn) / Previous Description
GMM	○○○○-TMR	**H10**	Insert (Grooving / Plunge&Turn)
GMM	○○○○$^{R}_{L}$-TMR-6D	**H10**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-○○V	**G46**	Insert (Grooving / Plunge&Turn) / Previous Description
GMM	○○○○-○○MS	**G18**	Insert (Grooving / Plunge&Turn) / Previous Description
GMM	○○○○-○○VR	**G46**	Insert (Grooving / Plunge&Turn) / Previous Description
GMM	○○○○-○○○R	**G18**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-○○○V	**G46**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-○○○MS	**G18**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-○○○MW	**G18, G47, G68**	Insert (Grooving / Plunge&Turn)
GMM	○○○○-○○○VR	**G46**	Insert (Grooving / Plunge&Turn)
GMN	○ (.○)	**C16, C24, G20, G21, H10**	Insert (Grooving / Plunge&Turn)
GMN	○-TK	**G20, H10**	Insert (Grooving / Plunge&Turn)
GM$^{R}_{L}$	○-TK-8D	**G20, H10**	Insert (Grooving / Plunge&Turn)
GM$^{R}_{L}$	○-○(○)D	**G20, H10**	Insert (Grooving / Plunge&Turn)
GMGW	○○○○-○○R	**C25, G26**	Insert (Grooving / Plunge&Turn)
GMGW	○○○○-○○R-HR	**C25, G26**	Insert (Grooving / Plunge&Turn)
GOMT	○○○○○○ER-D	**M18**	Insert (Milling)
GP-1		**K40, K42, K44, P18**	Spare Parts (Plug)
GP-2		**K40, K41, K42, K43, K44, K45, K46, P18**	Spare Parts (Plug)
GS	91-○	**B90, G26**	Insert (Grooving)
GS-40TR		**P2**	Spare Parts (Screw)
GS-50		**F60, G15, G24, G44, G46, J22, J23, P2**	Spare Parts (Screw)
GS-50S		**F60, P2**	Spare Parts (Screw)
GS-4090T$^{R}_{L}$W		**P2**	Spare Parts (Screw)
GV$^{R}_{L}$	○○○□R	**G42**	Insert (Grooving)
GV$^{R}_{L}$	○○○□(□)	**C24, G42, M133**	Insert (Grooving)
GV$^{R}_{L}$	○○○-○○○□(□)	**C24, G42, M133**	Insert (Grooving)
GVF$^{R}_{L}$	○○○□	**C24, G65, G71, M140**	Insert (Grooving)
GVF$^{R}_{L}$	○○○AA	**G59**	Insert (Grooving)
GVF$^{R}_{L}$	○○○□R	**G65, G71**	Insert (Grooving)
GVF$^{R}_{L}$	○○○-○○○□	**C24, G65, G71, M140**	Insert (Grooving)
GVF$^{R}_{L}$	○○○-○○○□R	**G65, G71**	Insert (Grooving)
GVF$^{R}_{L}$	○○○-○○○AA	**G59**	Insert (Grooving)
H			
HA○○	PCLN$^{R}_{L}$12-○○	**F42**	Boring Bar (AD Bar Interchangeable Head)
HA○○	PDUN$^{R}_{L}$15-○○	**F43**	Boring Bar (AD Bar Interchangeable Head)
HA○○	PTFN$^{R}_{L}$16-○○	**F43**	Boring Bar (AD Bar Interchangeable Head)
HA○○	SCLC$^{R}_{L}$09-○○	**F44**	Boring Bar (AD Bar Interchangeable Head)
HA○○	SDUC$^{R}_{L}$11-○○	**F44**	Boring Bar (AD Bar Interchangeable Head)
HF20x53H		**M46, P6**	Spare Parts (Bolt with Coolant Hole)
HF24x60H		**M46, P6**	Spare Parts (Bolt with Coolant Hole)
HH3X6		**F76, P2**	Spare Parts (Bolt)
HH3X12		**D32, D33, D34, D35, D36, F76, P2**	Spare Parts (Bolt)

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HH5X15	**G48, P2**	Spare Parts (Bolt)
HH5X16	**D23, G23, G24, G25, H13, P2**	Spare Parts (Bolt)
HH5X20	**F45, G66, G67, P2**	Spare Parts (Bolt)
HH5X25	**G23, G24, G25, G66, G67, H13, H19, P2**	Spare Parts (Bolt)
HH5×30	**F45, P2**	Spare Parts (Bolt)
HH6X12	**K47, P2**	Spare Parts (Bolt)
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HH6X25	**G16, G23, G27, G45, G68, H13, P2**	Spare Parts (Bolt)
HH6X30	**F45, H19, P2**	Spare Parts (Bolt)
HH8X25	**M22, M57, P2**	Spare Parts (Bolt)
HH8X35	**M69, P2**	Spare Parts (Bolt)
HH8X40	**M69, P2**	Spare Parts (Bolt)
HH8X50	**M69, M130, P2**	Spare Parts (Bolt)
HH8X55	**M130, P2**	Spare Parts (Bolt)
HH8X65	**M69, M130, P2**	Spare Parts (Bolt)
HH8X70	**P2**	Spare Parts (Bolt)
HH8X80	**P2**	Spare Parts (Bolt)
HH8X85	**P2**	Spare Parts (Bolt)
HH8X25H	**M46, P6**	Spare Parts (Bolt with Coolant Hole)
HH8X100	**P2**	Spare Parts (Bolt)
HH8X110	**P2**	Spare Parts (Bolt)
HH10X25	**M124**	Spare Parts (Bolt)
HH10X30	**M57, M124, P2**	Spare Parts (Bolt)
HH10X30H	**M46, P6**	Spare Parts (Bolt with Coolant Hole)
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HH10X30S	**M22, P2**	Spare Parts (Bolt)
HH10X35	**M101, P2**	Spare Parts (Bolt)
HH10X40	**M57, P2**	Spare Parts (Bolt)
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HH12X35	M38, M101, M112, M113	Spare Parts (Bolt)
HH12X35H	**M46, P6**	Spare Parts (Bolt with Coolant Hole)
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HH12X40	**M57, M69, P2**	Spare Parts (Bolt)
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HPBR/L ○○○○-○○○	**F18**	2 edges Tip-Bar (Boring)
HPBR/L ○○○○-○○○NB	**F18**	2 edges Tip-Bar (Boring)
HPBTR/L ○○○○-○○○	**F18**	2 edges Tip-Bar (Back Borning)
HPFGR/L ○○○○-○○	**G53**	2 edges Tip-Bar (Internal Face Grooving)
HPGR/L ○○○○-○○	**G30**	2 edges Tip-Bar (Internal Grooving)
HPTR ○○○○○-○○-○○○	**J24**	2 edges Tip-Bar (Internal Threading)
HS3X4	**F13, F14, F21, F75, P3**	Spare Parts (Screw)
HS3X8	**F13, F14, P3**	Spare Parts (Screw)
HS3X12	**F13, F14, P3**	Spare Parts (Screw)
HS3X16	**F13, P3**	Spare Parts (Screw)
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HS8X10	**N11, P3**	Spare Parts (Screw)
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HS12X16	**N11, P3**	Spare Parts (Screw)
HS12X18	**N11, P3**	Spare Parts (Screw)
HS12X20	**N11, P3**	Spare Parts (Screw)
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HS12X30	**N4, N5, P3**	Spare Parts (Screw)
HS12X35	**N5, P3**	Spare Parts (Screw)
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JCET ○○○○○○R/L-FSF	**B57**	Insert (Turning)
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KGAR/L ○○○○□-○	**G17**	Toolholder (Grooving)
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KGBAR/L ○○○○□22-○○	**G9**	Toolholder (Grooving)
KGBAR/L ○○○○□22-○○T5	**G9**	Toolholder (Grooving)
KGBAR/L ○○○○□-○○	**G9**	Toolholder (Grooving)
KGBASR/L ○○○○□22-○○	**G9**	Toolholder (Grooving)
KGBASR/L ○○○○□22-○○T5	**G9**	Toolholder (Grooving)
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KGHS$^{R}_{L}$ ○○○○□-○	**G16**	Toolholder (Grooving)
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KGMM$^{R}_{L}$ ○○○○□-○	**G24**	Toolholder (Grooving/Plunge&Turn)
KGMS$^{R}_{L}$ ○○○○□-○	**G24**	Toolholder (Grooving/Plunge&Turn)
KGMU$^{R}_{L}$ ○○○○□	**G25**	Toolholder (Grooving/Plunge&Turn)
KGMW$^{R}_{L}$ ○○○○□-○	**G27**	Toolholder (Grooving/Plunge&Turn)
KIGBA$^{R}_{L}$ ○○○○-○○	**G43**	Toolholder (Grooving)
KIGH$^{R}_{L}$ ○○○○B-○	**G45**	Toolholder (Grooving)
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KTKH$^{R}_{L}$ ○○○○□-○T○○S	**H17**	Toolholder (Cut-Off)
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LNEU ○○○○-○○S	**M102**	Insert (Milling)
LNUN ○○○○○○	**B89**	Insert (Turning) / Previous Description
LNUN ○○○○○○P○○○○○	**B89**	Insert (Turning)
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LS-1P	**F43**	Spare Parts (Lock Screw)
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LS-3P	**F43**	Spare Parts (Lock Screw)
LS-03S	**P3**	Spare Parts (Lock Screw)
LS-1S	**P4**	Spare Parts (Lock Screw)
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LS-03SN	**D14, F66, F68, F69, P3**	Spare Parts (Lock Screw)
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MHD	○○(○)-BT50-SA	**M72**	Endmill (Helical "Plus Mill")
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MHD	○○(○)-FMA-SA	**M72**	Endmill (Helical "Plus Mill")
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MHD	○○-S○○-SB	**M67**	Endmill (Helical "Plus Mill")
MHD	○○-S○○-○RSA	**M129**	Endmill (Helical "Plus Mill")
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MOF	○○○○○R-○○-○T-M	**M22**	Face Mill
MOFX	○○○○○R-○○-○(○)T-SF	**M25**	Face Mill
MOFX	○○○○○□○○-○(○)T-MSF	**M25**	Face Mill
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MRF	○○-S○○-○○○	**M120**	Endmill (Ball-Nose)
MRFW	○○-S○○	**M120**	Endmill (Ball-Nose)
MRFW	○○-S○○-○○○	**M120**	Endmill (Ball-Nose)
MRP	○○○R-○○	**M124**	Face Mill ("Radius Mill")
MRP	○○○R-○○-○T	**M124**	Face Mill ("Radius Mill")
MRP	○○○R-○○E-○T	**M124**	Face Mill ("Radius Mill")
MRP	○○○-S○○-○○	**M123**	Endmill (Radius Mill)
MRP	○○○-S○○-○○-○T	**M123**	Endmill (Radius Mill)
MRP	○○○-S○○-○○-○T-○○○	**M123**	Endmill (Radius Mill)
MRP	○○○-S○○-○○-○○○	**M123**	Endmill (Radius Mill)
MRP	○○○-W○○-○T○○○-○○(○)	**M123**	Endmill (Radius Mill)
MSD	45○○	**M31**	Face Mill (with Shank)
MSD	45○○-32	**M31**	Face Mill (with Shank)
MSD	45○○(○○)R	**M31**	Face Mill

Description		Page	Category
MSD-42		**M31, P9**	Spare Parts (Shim)
MSE	15○○	**M39**	Face Mill (with Shank)
MSE	45○○	**M27**	Face Mill (with Shank)
MSE	15○○-32	**M39**	Face Mill (with Shank)
MSE	45○○-32	**M27**	Face Mill (with Shank)
MSE	45○○○R-○T	**M26**	Face Mill
MSE	45○○○R-○T-M	**M26**	Face Mill
MSE	45○○○R-○T-M-SF	**M28**	Face Mill
MSE	45○○○R-○T-SF	**M28**	Face Mill
MSE-4215		**M39, P9**	Spare Parts (Shim)
MSE-4245		**M27, P9**	Spare Parts (Shim)
MSE-4245S		**M26, P9**	Spare Parts (Shim)
MS-FRW1		**M96, M97**	Spare Parts (Wrench / for MSTA)
MSO	45○○○R	**M32**	Face Mill
MSO	45○○○R-09	**M34**	Face Mill
MSO	45○○○R-E	**M32**	Face Mill
MSO	90○○○R-○○	**M43**	Face Mill
MSO	90○○○R-○○-○T	**M42**	Face Mill
MSO	90○○○R-○○-○T-M	**M42**	Face Mill
MSO	45○○R-13E-○T	**M32**	Face Mill
MSO	45○○-S	**M32**	Face Mill (with Shank)
MSO	45○○-S32-09	**M34**	Face Mill (with Shank)
MSO	90○○-S32-○○	**M43**	Face Mill (with Shank)
MSO-5200		**M42, P9**	Spare Parts (Shim)
MSO-4T245		**M32, M33, P9**	Spare Parts (Shim)
MSP	15○○	**M39**	Face Mill (with Shank)
MSP	15○○(○)R	**M39**	Face Mill
MSP-42		**M39, P9**	Spare Parts (Shim)
MSR	○○○R-○	**M62**	Face Mill
MSR	○○○R-○M	**M62**	Face Mill
MSR	○○○R-○-31.75	**M62**	Face Mill
MSR	○○○R-BT50-○	**M63**	Face Mill
MSRS	○○○○○R-○(○)□	**M37**	Face Mill
MSRS	○○○○○R-○(○)□-M	**M37**	Face Mill
MSTA	○○(○)□○○-○(○)T	**M96**	Slot Mill
MSTA	○○□○○○-○(○)T	**M97**	Slot Mill
MSTB	○○(○)□□○○○○-○T	**M100, M101**	Slot Mill
MSTB	○○○○□□○○○-○T	**M100**	Slot Mill
MSTC	○○○□□○○○○-○○-○(○)T	**M106, M107, M108, M109, M110, M111**	Slot Mill
MSTC	○○○□□○○○-○○○-○○	**M106, M108, M110**	Slot Mill
MT-	○	**K11**	Spare Parts (Clamp Screw)
MTE	90○○	**M41**	Face Mill (with Shank)
MTE	90○○(○)R	**M41**	Face Mill
MTE	90○○○R-○T-SF	**M40**	Face Mill
MTE	90○○○R-○T-M-SF	**M40**	Face Mill
MTE	90○○-32	**M41**	Face Mill (with Shank)
MTE-42		**M41, P9**	Spare Parts (Shim)
MTES	○○○	**M81**	Endmill
MTP	90○○	**M41**	Face Mill (with Shank)
MTPS	○○○	**M85**	Endmill
MVG	○○○○	**M140**	Endmill (Ring Grooving for M / C)
MVLN$^{R}_{L}$	○○○○□-○○	**D17**	Toolholder (Turning)
MVN-32		**D17, P9**	Spare Parts (Shim)
MVVNN	○○○○□-○○	**D17**	Toolholder (Turning)
N			
NDCT	○○○○○○FR	**M18**	Insert (Milling)
NDCT	○○○○○○TR	**M18**	Insert (Milling)
NDCT	○○○○○○TRX	**M18**	Insert (Milling)
NDCW	○○○○○○FRX	**C27, M18, M21**	Insert (Milling)
NDCW	○○○○○○FRX-NE	**C27, M21**	Insert (Milling)
NDCW	○○○○○○TR	**M18**	Insert (Milling)
NDCW	○○○○○○TRX	**M18**	Insert (Milling)
NDKT	○○○○○○ER-N○	**M18**	Insert (Milling)
NDKT	○○○○○○ER-V	**M19**	Insert (Milling)
NDKT	○○○○○○TR	**M18**	Insert (Milling)
NDKW	○○○○○○ER	**M19**	Insert (Milling)
NDMM	○○○○○○ER-T	**M19**	Insert (Milling)
NDMM	○○○○○○ER-SP	**M19**	Insert (Milling)
NDMM	○○○○○○ER-N○	**M19**	Insert (Milling)
NDMT	○○○○○○ER-D	**M19**	Insert (Milling)
NDMT	○○○○○○ER-DH	**M19**	Insert (Milling)
NEMT	○○○○○○ER-D	**M19**	Insert (Milling)
NEMT	○○○○○○ER-DH	**M19**	Insert (Milling)

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O			
OFMR	○○○○○EN-SH	**M13**	Insert (Milling)
OFMR	○○○○○○EN-GT	**M13**	Insert (Milling)
OFMT	○○○○○○EN-GT	**M13**	Insert (Milling)
OFMT	○○○○○○□□-SH	**M13**	Insert (Milling)
P			
P-03		**D14, P7**	Spare Parts (Shim Pin)
P-03S		**D14, F66, F68, F69, P7**	Spare Parts (Shim Pin)
PC-1		**D8, D11, D12, D13, D14, D19, D20, D37, F66, F67, F68, F69, N7, P19**	Spare Parts (Punch)
PC-2		**D8, D11, D12, D13, D14, D19, D20, D37, F66, F70, N6, N7, N8, P19**	Spare Parts (Punch)
PC-2K		**F42, F43**	Spare Parts (Punch)
PCLN$^{R}_{L}$	○○○○B-○○	**F66**	Boring Bar / Previous Description
PCLN$^{R}_{L}$	○○○○B-○○H	**F66**	Boring Bar / Previous Description
PCLN$^{R}_{L}$	○○○○□-○○	**D8**	Toolholder (Turning)
PDHN$^{R}_{L}$	○○○○□-○○	**D11**	Toolholder (Turning)
PDJN$^{R}_{L}$	○○○○□-○○	**D11**	Toolholder (Turning)
PDJN$^{R}_{L}$	○○○○□-○○U	**D11**	Toolholder (Turning)
PDUN$^{R}_{L}$	○○○○B-○○	**F67**	Boring Bar / Previous Description
PDUN$^{R}_{L}$	○○○○B-○○H	**F67**	Boring Bar / Previous Description
PH-	○○○○	**F21, F75, G32, G57, J26**	Sleeve (for Tip-Bar / Previous description)
PH	○○○○-○○	**F21, F75, G32, G57, J26**	Sleeve (for Tip-Bar)
PRGC$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
PRGC$^{R}_{L}$	○○○○□-○○BE	**D37**	Toolholder (Turning)
PRGC$^{R}_{L}$	○○○○□-○○BF	**D37**	Toolholder (Turning)
PRGN$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
PRXC$^{R}_{L}$	○○○○□-○○	**D19**	Toolholder (Turning)
PSB$^{R}_{L}$	○○○○-○○NBS	**C16, C26, F20**	Tip-Bar (Boring)
PSB$^{R}_{L}$	○○○○-○○S	**F20**	Tip-Bar (Boring)
PSBN$^{R}_{L}$	○○○○□-○○	**D12**	Toolholder (Turning)
PSBT$^{R}_{L}$	○○○○-○○S	**F20**	Tip-Bar (Boring)
PSDNN	○○○○□-○○	**D13**	Toolholder (Turning)
PSFG$^{R}_{L}$	○○○○-○○S	**G57**	Tip-Bar (Grooving)
PSG$^{R}_{L}$	○○○○-○○S	**G32**	Tip-Bar (Grooving)
PSH	○○○○-○○○	**F19, G31, G53, J25**	Sleeve (for 2 edges Tip-Bar)
PSKN$^{R}_{L}$	○○○○□-○○	**D12**	Toolholder (Turning)
PSSN$^{R}_{L}$	○○○○□-○○	**D13**	Toolholder (Turning)
PSTR	○○○○-○○S	**J26**	Tip-Bar (Threading)
PTFN$^{R}_{L}$	○○○○□-○○	**D14**	Toolholder (Turning)
PTGN$^{R}_{L}$	○○○○□-○○	**D14**	Toolholder (Turning)
PTUN$^{R}_{L}$	○○○○B-○○	**F68**	Boring Bar / Previous Description
PTUN$^{R}_{L}$	○○○○B-○○H	**F68**	Boring Bar / Previous Description
PVLN$^{R}_{L}$	○○○○□-○○Q	**D18**	Toolholder (Turning)
PVPN$^{R}_{L}$	○○○○□-○○Q	**D18**	Toolholder (Turning)
PVVNN	○○○○□-○○Q	**D18**	Toolholder (Turning)
PWLN$^{R}_{L}$	○○○○B-○○	**F69**	Boring Bar / Previous Description
PWLN$^{R}_{L}$	○○○○B-○○H	**F69**	Boring Bar / Previous Description
PWLN$^{R}_{L}$	○○○○□-○○	**D20**	Toolholder (Turning)
R			
RBG	○○W	**B89**	Insert (Turning) / Previous Description
RBG	○○K○○○○○	**B89**	Insert (Turning)
RCGX	○○○○M0-AQ	**B57**	Insert (Turning)
RCGX	○○○○○○P○○○○○	**B89**	Insert (Turning)
RCGX	○○○○○○S○○○○○	**B89**	Insert (Turning)
RCGX	○○○○○○T○○○○○	**B89**	Insert (Turning)
RCMA	○○○○○○	**B89**	Insert (Turning) / Previous Description
RCMA	○○○○○○P○○○○○	**B89**	Insert (Turning)
RCMA	○○○○○○P○○○-○○	**B89**	Insert (Turning) / Previous Description
RCMA	○○○○○○T○○○○○	**B89**	Insert (Turning)
RCMT	○○○○M0-BB	**B73, D37**	Insert (Turning)
RCMX	○○○○M0	**B57, B75**	Insert (Turning)
RDFG	○○FR	**M20**	Insert (Milling)

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RDHX	○○○○M0T	**M20**	Insert (Milling)
RDMT	○○○○M0-H	**M20**	Insert (Milling)
RNGN	○○○○○○	**B83**	Insert (Turning)
RNGN	○○○○○○K○○○○○	**B83**	Insert (Turning)
RNGN	○○○○○○P○○○○○	**B83**	Insert (Turning)
RNGN	○○○○○○S○○○○○	**B83**	Insert (Turning)
RNGN	○○○○○○T○○○○○	**B83**	Insert (Turning)
RNMG	○○○○○○	**B24**	Insert (Turning)
RNMN	○○○○○○	**C9**	Insert (Turning) / Previous Description
RNMN	○○○○○○S○○○○○	**C9**	Insert (Turning)
RPMT	○○○○○○	**M20**	Insert (Milling)
RPMT	○○○○M0	**M20**	Insert (Milling)
RPMT	○○○○M0-H	**M20**	Insert (Milling)
RPMT	○○○○M0-BB	**B73**	Insert (Turning)
S			
S○○□-	CCLN^{R}/$_{L}$○○-○○A	**F74**	Boring Bar
S○○□-	CCLN^{R}/$_{L}$○○-○○GX	**F73**	Boring Bar
S○○□-	CDUN^{R}/$_{L}$○○-○○GX	**F73**	Boring Bar
S○○□-	CELN^{R}/$_{L}$○○-○○	**F72**	Boring Bar
S○○□-	CSKN^{R}/$_{L}$○○-○○	**F72**	Boring Bar
S○○□-	CSKN^{R}/$_{L}$○○-○○A	**F74**	Boring Bar
S○○□-	CSKN^{R}/$_{L}$○○-○○GX	**F73**	Boring Bar
S○○□-	CSKP^{R}/$_{L}$○○-○○	**F60**	Boring Bar
S○○□-	CTUC^{R}/$_{L}$○○-○○	**F72**	Boring Bar
S○○□-	CTUN^{R}/$_{L}$○○-○○A	**F74**	Boring Bar
S○○□-	CTUP^{R}/$_{L}$○○-○○	**F61**	Boring Bar
S○○□-	KTGFL16	**G13**	Sleeve Holder (Grooving)
S○○□-	KTTXL16	**J20**	Sleeve Holder (Threading)
S○○□-	PCLN^{R}/$_{L}$○○-○○	**F66**	Boring Bar
S○○□-	PDUN^{R}/$_{L}$○○-○○	**F67**	Boring Bar
S○○□-	PTUN^{R}/$_{L}$○○-○○	**F68**	Boring Bar
S○○□-	PWLN^{R}/$_{L}$○○-○○	**F69, F70**	Boring Bar
S○○□-	SCLCL○○	**E13**	Sleeve Holder (Turning)
S○○□-	SCLC^{R}/$_{L}$○○-○○	**F49**	Boring Bar
S○○□-	SCLC^{R}/$_{L}$○○-○○A	**F25**	Boring Bar (Dynamic Bar)
S○○□-	SCLC^{R}/$_{L}$○○-○○E	**F49**	Boring Bar
S○○□-	SCLC^{R}/$_{L}$○○-○○AE	**F25**	Boring Bar (Dynamic Bar)
S○○□-	SCLP^{R}/$_{L}$○○-○○	**F49**	Boring Bar
S○○□-	SCLP^{R}/$_{L}$○○-○○A	**F27**	Boring Bar (Dynamic Bar)
S○○□-	SCLP^{R}/$_{L}$○○-○○E	**F49**	Boring Bar
S○○□-	SDLC^{R}/$_{L}$○○	**E19**	Sleeve Holder (Turning)
S○○□-	SDQC^{R}/$_{L}$○○-○○A	**F30**	Boring Bar (Dynamic Bar)
S○○□-	SDUC^{R}/$_{L}$○○	**E19**	Sleeve Holder (Turning)
S○○□-	SDUC^{R}/$_{L}$○○-○○	**F51**	Boring Bar
S○○□-	SDUC^{R}/$_{L}$○○-○○A	**F29**	Boring Bar (Dynamic Bar)
S○○□-	SDUC^{R}/$_{L}$○○-○○E	**F51**	Boring Bar
S○○□-	SDZC^{R}/$_{L}$○○-○○	**F52**	Boring Bar
S○○□-	SDZC^{R}/$_{L}$○○-○○A	**F31**	Boring Bar (Dynamic Bar)
S○○□-	SDZC^{R}/$_{L}$○○-○○E	**F52**	Boring Bar
S○○□-	SSKP^{R}/$_{L}$○○-○○	**F60**	Boring Bar
S○○□-	STLB^{R}/$_{L}$○○-○○A	**F33**	Boring Bar (Dynamic Bar)
S○○□-	STLB^{R}/$_{L}$○○-○○AE	**F33**	Boring Bar (Dynamic Bar)
S○○□-	STLC^{R}/$_{L}$○○-○○A	**F34**	Boring Bar (Dynamic Bar)
S○○□-	STLP^{R}/$_{L}$○○-○○A	**F33**	Boring Bar (Dynamic Bar)
S○○□-	STUB^{R}/$_{L}$○○-○○	**F54**	Boring Bar
S○○□-	STUB^{R}/$_{L}$○○-○○E	**F54**	Boring Bar
S○○□-	STUP^{R}/$_{L}$○○-○○	**F54**	Boring Bar
S○○□-	STUP^{R}/$_{L}$○○-○○E	**F54**	Boring Bar
S○○□-	STW^{R}/$_{L}$15	**F9, G55**	Toolholder (for Twin Bar)
S○○□-	STWP^{R}/$_{L}$○○-○○	**F57, J28**	Toolholder (Boring / Threading)
S○○□-	STWP^{R}/$_{L}$○○-○○E	**F57, J28**	Toolholder (Boring / Threading)
S○○□-	SVJB^{R}/$_{L}$○○-○○A	**F37**	Boring Bar (Dynamic Bar)
S○○□-	SVJB^{R}/$_{L}$○○-○○E	**F62**	Boring Bar
S○○□-	SVJB^{R}/$_{L}$○○-○○EN	**F62**	Boring Bar
S○○□-	SVJC^{R}/$_{L}$○○-○○A	**F37**	Boring Bar (Dynamic Bar)
S○○□-	SVJC^{R}/$_{L}$○○-○○E	**F62**	Boring Bar
S○○□-	SVJP^{R}/$_{L}$○○-○○A	**F37**	Boring Bar (Dynamic Bar)
S○○□-	SVJP^{R}/$_{L}$○○-○○E	**F62**	Boring Bar
S○○□-	SVNR12	**F14**	Toolholder (for System Tip-Bar)
S○○□-	SVNR12N	**F14**	Toolholder (for System Tip-Bar)
S○○□-	SVNR12S	**F14**	Toolholder (for System Tip-Bar)
S○○□-	SVNR12SN	**F14**	Toolholder (for System Tip-Bar)
S○○□-	SVNR12XN	**F17**	Toolholder (for System Tip-Bar)

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S○○□-	SVNR12SXN	**F17**	Toolholder (for System Tip-Bar)
S○○□-	SVPB^{R}/$_{L}$○○-○○A	**F37**	Boring Bar (Dynamic Bar)
S○○□-	SVPB^{R}/$_{L}$○○-○○E	**F62**	Boring Bar
S○○□-	SVPB^{R}/$_{L}$○○-○○EN	**F62**	Boring Bar
S○○□-	SVPC^{R}/$_{L}$○○-○○A	**F37**	Boring Bar (Dynamic Bar)
S○○□-	SVUB^{R}/$_{L}$○○	**E27**	Sleeve Holder (Turning)
S○○□-	SVUC^{R}/$_{L}$○○	**E27**	Sleeve Holder (Turning)
S○○□-	SVPC^{R}/$_{L}$○○-○○E	**F62**	Boring Bar
S○○□-	SVUB^{R}/$_{L}$○○-○○A	**F39**	Boring Bar (Dynamic Bar)
S○○□-	SVUC^{R}/$_{L}$○○-○○A	**F39**	Boring Bar (Dynamic Bar)
S○○□-	SVUB^{R}/$_{L}$○○-○○E	**F63**	Boring Bar
S○○□-	SVUB^{R}/$_{L}$○○-○○EN	**F63**	Boring Bar
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S○○□-	SVZB^{R}/$_{L}$○○-○○E	**F63**	Boring Bar
S○○□-	SVZB^{R}/$_{L}$○○-○○EN	**F63**	Boring Bar
S○○□-	SVZC^{R}/$_{L}$○○-○○A	**F39**	Boring Bar (Dynamic Bar)
S○○□-	SVZC^{R}/$_{L}$○○-○○E	**F63**	Boring Bar
S○○□-	SWUB^{R}/$_{L}$○○-○○	**F65**	Boring Bar
S○○□-	SWUB^{R}/$_{L}$○○-○○A	**F41**	Boring Bar (Dynamic Bar)
S○○□-	SWUB^{R}/$_{L}$○○-○○AE	**F41**	Boring Bar (Dynamic Bar)
S○○□-	SWUB^{R}/$_{L}$○○-○○E	**F65**	Boring Bar
S○○□-	SWUB^{R}/$_{L}$○○-○○-○○	**F65**	Boring Bar
S○○□-	SWUP^{R}/$_{L}$○○-○○A	**F41**	Boring Bar (Dynamic Bar)
S○○□-	SWUP^{R}/$_{L}$○○-○○E	**F65**	Boring Bar
S○○□-	SYXP^{R}/$_{L}$○○-○○E	**F59**	Boring Bar
S○○□-	WWLN^{R}/$_{L}$○○-○○E	**F70**	Boring Bar
S○○-	CH○○	**K10**	Toolholder ("Magic Drill" / Chamfering Attachment)
SF○○-	DRC○○○M-○	**K12, K13, K14**	Toolholder ("Magic Drill")
SS○○-	DRC○○○M-○	**K7, K8, K9**	Toolholder ("Magic Drill")
S○○-	DRS○○○○○	**K38**	Toolholder ("Magic Drill")
S○○-	DRX○○○M-○-○○	**K24, K25, K26, K27, K28, K29, K30**	Toolholder ("Magic Drill")
S○○-	DRZ○○○○○-12CR	**K47**	Toolholder ("Magic Drill")
S○○-	DRZ○○○○○-20CR	**K47**	Toolholder ("Magic Drill")
S○○-	DRZ○○○○(○○)-○○	**K40, K41, K42, K43, K44, K45, K46**	Toolholder ("Magic Drill")
SABSR	○○○○□-○○F	**E8**	Toolholder (Turning)
SABWR	○○○○□-○○F	**E9, E10**	Toolholder (Turning)
SB-1STR		**F54, F55, F58, P4**	Spare Parts (Screw)
SB-3STR		**F49, F50, F57, J28, P4**	Spare Parts (Screw)
SB-1TR		**F54, F55, F56, F58, P4**	Spare Parts (Screw)
SB-2TR		**F54, F55, F56, F58, J17, P4**	Spare Parts (Screw)
SB-3TR		**F54, F55, F56, F57, J28, P4**	Spare Parts (Screw)
SB-3.5TR		**J16, J17, P4**	Spare Parts (Screw)
SB-4TR		**F49, F50, F54, F55, F56, F57, F60, F71, G15, G44, J22, J23, P4**	Spare Parts (Screw)
SB-5TR		**G23, G24, G46, H13, P4**	Spare Parts (Screw)
SB-1635TR		**F25, F49, F53, P4**	Spare Parts (Screw)
SB-2035TR		**F25, F33, F41, P4**	Spare Parts (Screw)
SB-2040TR		**F49, F59, F65, J17, P4**	Spare Parts (Screw)
SB-2045TR		**F59, K24, K26, K28, K40, K42, K44, P4**	Spare Parts (Screw)
SB-2050TR		**E22, E25, E26, E27, F37, F39, F41, F63, F65, J17, P4**	Spare Parts (Screw)
SB-2060TR		**P4**	Spare Parts (Screw)
SB-2080TR		**K38, P4**	Spare Parts (Screw)
SB-2250TR		**F34, K24, K26, K28, K30, M136, P4**	Spare Parts (Screw)
SB-2255TR		**G36, G37, G38, P4**	Spare Parts (Screw)
SB-2260TR		**K40, K42, K44, M136, P4**	Spare Parts (Screw)

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SB-2290TR	**K38, P4**	Spare Parts (Screw)
SB-2545TR	**F25, F31, F33, F41, F49, F50, F65, M44, M45, M78, P4**	Spare Parts (Screw)
SB-2560TR	**E13, E19, F29, F30, F31, F34, F51, F52, F65, M69, M83, M130, M138, P4**	Spare Parts (Screw)
SB-2570TR	**E5, E12, E13, E15, E16, E17, E21, E22, E23, E24, E25, E26, E27, F37, F39, F63, G36, G37, G38, K24, K26, K28, K30, K40, K42, K44, P4**	Spare Parts (Screw)
SB-25100TR	**K38, P4**	Spare Parts (Screw)
SB-3060TR	**F27, F33, M34, M78, M123, M134, M138, P4**	Spare Parts (Screw)
SB-3080TR	**D14, E4, E8, E9, E10, E22, F9, F12, F13, F14, F17, F44, G36, G55, K24, K26, K28, K30, M43, M69, M74, M123, M124, M130, M136, P4**	Spare Parts (Screw)
SB-4060TR	**M78, M79, P5**	Spare Parts (Screw)
SB-4065TR	**E13, F25, F27, F29, F30, F31, F33, F41, F65, M78, M79, M132, P4**	Spare Parts (Screw)
SB-4085TR	**D8, D10, D12, D16, D20, E12, E15, E16, E17, E19, E21, F51, F52, G36, J17, K25, K26, K28, K30, K40, K42, K44, K46, M83, M123, M124, M130, M132, M138, P5**	Spare Parts (Screw)
SB-5070TR	**M134, P5**	Spare Parts (Screw)
SB-5085TR	**K25, K27, K29, K30, K41, K42, K43, K44, K45, K46, K47, M43, M80, P5**	Spare Parts (Screw)
SB-5090TR	**E12, F71, K25, K27, K29, K30, M134, P5**	Spare Parts (Screw)
SB-40115TR	**M123, M124, P5**	Spare Parts (Screw)
SB-40140TR	**G48, M38, M62, M63, P5**	Spare Parts (Screw)
SB-45130TR	**M42, P5**	Spare Parts (Screw)
SB-50120TR	**M123, M124, P5**	Spare Parts (Screw)
SB-60120TR	**K25, K27, K29, K30, K41, K43, K47, M38, M62, M63, M124, P5**	Spare Parts (Screw)
SB-4082TPR	**M22, P5**	Spare Parts (Screw)
SB-2035TRG	**M52, P4**	Spare Parts (Screw)
SB-2040TRG	**M86, M87, M91, P4**	Spare Parts (Screw)
SB-2042TRG	**K24, K26, K28, K30, M52, M53, P4**	Spare Parts (Screw)
SB-2555TRG	**M44, M45, M46, M56, M57, M86, M87, M91, P4**	Spare Parts (Screw)
SB-3060TRG	**P4**	Spare Parts (Screw)
SB-3070TRG	**M86, M87, M91, P4**	Spare Parts (Screw)
SB-4070TRG	**M86, M87, M91, P5**	Spare Parts (Screw)
SB-2045TRN	**G36, G37, P4**	Spare Parts (Screw)
SB-4050TRN	**H8, P5**	Spare Parts (Screw)
SB-4070TRN	**M44, M45, M46, M56, M57, P5**	Spare Parts (Screw)
SB-40125TRN	**E23, E24, F37, F39, F63, N9, P5**	Spare Parts (Screw)
SB-3590TRP	**M112, M113**	Spare Parts (Screw)
SB-4070TRS	**G12, G13, J22, P5**	Spare Parts (Screw)
SB-50120TRS	**M22, P5**	Spare Parts (Screw)

Description	Page	Category
SB-4070TRW	**G12, J20, P5**	Spare Parts (Screw)
SB-4590TRWN	**E6, H6, J18, P5**	Spare Parts (Screw)
SC-30067	**M120, P5**	Spare Parts (Screw)
SC-35085	**M120, P5**	Spare Parts (Screw)
SC-40100	**M120, P5**	Spare Parts (Screw)
SC-50130	**M120, P5**	Spare Parts (Screw)
SC-60160	**M120, P5**	Spare Parts (Screw)
SC-60210	**M120, P5**	Spare Parts (Screw)
SCAC$^{R}/_{L}$ ○○○○□-○○	**E12**	Toolholder (Turning)
SCAC$^{R}/_{L}$ ○○○○□-○○FF	**E12**	Toolholder (Turning)
SCGT ○○○○○○$^{R}/_{L}$-A3	**B58**	Insert (Turning)
SCLC$^{R}/_{L}$ ○○○○□-○○	**E12**	Toolholder (Turning)
SCLC$^{R}/_{L}$ ○○○○B-○○	**F49**	Boring Bar / Previous Description
SCLC$^{R}/_{L}$ ○○○○B-○○E	**F49**	Boring Bar / Previous Description
SCLC$^{R}/_{L}$ ○○○○B-○○W	**F49**	Boring Bar / Previous Description
SCLC$^{R}/_{L}$ ○○○○B-○○EH	**F50**	Boring Bar / Previous Description
SCLC$^{R}/_{L}$ ○○○○B-○○WH	**F50**	Boring Bar / Previous Description
SCLNR ○○○○□-○○FF	**E4**	Toolholder (for Small Double-Sided Tools)
SCLP$^{R}/_{L}$ ○○○○B-○○	**F49**	Boring Bar / Previous Description
SCLP$^{R}/_{L}$ ○○○○B-○○E	**F49**	Boring Bar / Previous Description
SCLP$^{R}/_{L}$ ○○○○B-○○W	**F49**	Boring Bar / Previous Description
SCLP$^{R}/_{L}$ ○○○○B-○○EH	**F50**	Boring Bar / Previous Description
SCLP$^{R}/_{L}$ ○○○○B-○○WH	**F50**	Boring Bar / Previous Description
SCLP$^{R}/_{L}$ ○○○○B-○○W-○/○	**F49**	Boring Bar / Previous Description
SCMT ○○○○○○HQ	**B58**	Insert (Turning)
SDCN ○○○○AUTN	**M10**	Insert (Milling)
SDCT ○○○○○□□-□□	**M115**	Insert (Milling)
SDCT ○○○○○□$^{R}/_{L}$-□□	**M115**	Insert (Milling)
SDET ○○○○○□□-□□	**M115**	Insert (Milling)
SDET ○○○○○□$^{R}/_{L}$-□□	**M115**	Insert (Milling)
SDJC$^{R}/_{L}$ ○○○○□-○○	**E15**	Toolholder (Turning)
SDJC$^{R}/_{L}$ ○○○○□-○○F	**E15**	Toolholder (Turning)
SDLNR ○○○○□-○○FF	**E4**	Toolholder (for Small Double-Sided Tools)
SDKN ○○○○AUFN	**C27, M10, M21**	Insert (Milling)
SDKN ○○○○AUTN	**M10**	Insert (Milling)
SDKN ○○○○AUFN-NE	**C27, M21**	Insert (Milling)
SDKR ○○○○AUEN-S	**M10**	Insert (Milling)
SDKW ○○○○○○FN	**M13**	Insert (Milling)
SDKW ○○○○○○TN	**M13**	Insert (Milling)
SDKW ○○○○○○AESN	**M13**	Insert (Milling)
SDKW ○○○○○○AETN	**M13**	Insert (Milling)
SDLC$^{R}/_{L}$ ○○○○□-○○FF	**E16**	Toolholder (Turning)
SDLP$^{R}/_{L}$ ○○○○□-○○F(F)	**E16**	Toolholder (Turning)
SDMR ○○○○AUER-H	**M10**	Insert (Milling)
SDMT ○○○○AESR-H	**M13**	Insert (Milling)
SDMT ○○○○E-K	**M13**	Insert (Milling)
SDMT ○○T○○○C	**M13**	Insert (Milling)
SDNCN ○○○○□-○○	**E21**	Toolholder (Turning)
SDNC$^{R}/_{L}$ ○○○○□-○○F	**E21**	Toolholder (Turning)
SDUC$^{R}/_{L}$ ○○○○B-○○	**F51**	Boring Bar / Previous Description
SDUC$^{R}/_{L}$ ○○○○B-○○E	**F51**	Boring Bar / Previous Description
SDUC$^{R}/_{L}$ ○○○○B-○○W	**F51**	Boring Bar / Previous Description
SDXC$^{R}/_{L}$ ○○○○□-○○	**E17**	Toolholder (Turning)
SDZC$^{R}/_{L}$ ○○○○B-○○	**F52**	Boring Bar / Previous Description
SDZC$^{R}/_{L}$ ○○○○B-○○E	**F52**	Boring Bar / Previous Description
SE-3070TRP	**M112, M113**	Spare Parts (Screw)
SE-40050TR	**M101, M102**	Spare Parts (Screw)
SE-40055TR	**M101, M102**	Spare Parts (Screw)
SE-40068TR	**M101, M102**	Spare Parts (Screw)
SE-40080TR	**M102**	Spare Parts (Screw)
SE-40090TR	**M101, M102**	Spare Parts (Screw)
SE-40100TR	**M102**	Spare Parts (Screw)
SE-40120TR	**G22, H12, H17, P5**	Spare Parts (Screw)
SE-50125TR	**G22, H12, H17, P5**	Spare Parts (Screw)
SEEN ○○○○AFFN	**C27, M21**	Insert (Milling)
SEEN ○○○○AFTN	**M10**	Insert (Milling)
SEEN ○○○○AFFN-NE	**C27, M21**	Insert (Milling)
SEEN ○○○○AFFR-W	**C27, M10, M21**	Insert (Milling)
SEEN ○○○○AFTR-W	**M10**	Insert (Milling)
SEGN ○○○○○○	**C23**	Insert (Milling)
SEGN ○○○○○○NE	**C23**	Insert (Milling)
SEKN ○○○○AFFN	**M10**	Insert (Milling)
SEKN ○○○○AFTN	**M10**	Insert (Milling)
SEKN ○○○○EFTR	**M10**	Insert (Milling)

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Description		Page	Category
SEKR	○○○○AFEN-S	**M10**	Insert (Milling)
SEKT	○○○○AFEN-S	**M13**	Insert (Milling)
SEKW	○○○○○○FN	**M13**	Insert (Milling)
SEKW	○○○○○○TN	**M13**	Insert (Milling)
SEKW	○○○○AFTN	**M13**	Insert (Milling)
SEMM	○○○○○○PESR	**M14**	Insert (Milling)
SEMR	○○○○AFER-H	**M10**	Insert (Milling)
SEMT	○○○○○○C	**M13**	Insert (Milling)
SF$^{R}/_{L}$-	○○○(○)□	**G62, G63, G64**	Blade (Grooving)
SH-	○○○○	**F75**	Sleeve (for Boring Bar / Previous description)
SH	○○○○-○○○	**F75**	Sleeve (for Boring Bar)
SH-	50150TR	**M25, P5**	Spare Parts (Cartridge Clamp Screw)
SHA	○○○○-○○○	**G38**	Sleeve (for Automatic Lathe SIGE)
SHA	○○○○.○-○○○	**G38**	Sleeve (for Automatic Lathe SIGE)
SHC-	○○○○○○	**F76**	Coolant Sleeve (for Boring Bar / Previous description)
SHC	○○○○-○○	**F76**	Coolant Sleeve (for Boring Bar)
SHE	○○○○-○○	**K33**	Adjustable Sleeve (for Magic Drill)
SHEM	○○○○-○○	**K39**	Adjustable Sleeve (for Magic Drill)
SHL-	○	**F76**	Spare Parts (Back Cover)
SIGE$^{R}/_{L}$	○○○○□-EH	**G36**	Toolholder (Grooving)
SIGE$^{R}/_{L}$	○○○○□-WH	**G37**	Toolholder (Grooving)
SIGER	○○○○□-WH-90	**G38**	Toolholder (Grooving / for Automatic Lathe)
SIN$^{R}/_{L}$	○○○○S-○○	**J17**	Toolholder (Threading)
SIN$^{R}/_{L}$	○○○○S-○○E	**J17**	Toolholder (Threading)
SIT$^{R}/_{L}$	○○○○-○○	**F57, J28**	Toolholder (Boring / Threading)
SJLC$^{R}/_{L}$	○○○○B-○○W	**F53**	Boring Bar / Previous Description
SJS-	○	**F76**	Coolant Joint
SJZC$^{R}/_{L}$	○○○○B-○○W	**F53**	Boring Bar / Previous Description
SLT	○○-○○□□□	**M98**	Insert (Slot Mill MSTA)
SNCN	○○○○XNTN	**M12**	Insert (Milling)
SNGA	○○○○○○	**B27, B84**	Insert (Turning)
SNGA	○○○○○○ME	**C7**	Insert (Turning) / Previous Description
SNGA	○○○○○○ME-T	**C7**	Insert (Turning) / Previous Description
SNGA	○○○○○○S○○○○○	**B84**	Insert (Turning)
SNGA	○○○○○○T○○○○○	**B84**	Insert (Turning)
SNGA	○○○○○○S○○○○○ME	**C7**	Insert (Turning)
SNGA	○○○○○○S○○○○○MET	**C7**	Insert (Turning)
SNGA	○○○○○○T○○○○○ME	**C7**	Insert (Turning)
SNGG	○○○○○○$^{R}/_{L}$-25R	**B27**	Insert (Turning)
SNGG	○○○○○○$^{R}/_{L}$-B/C	**B27, B42**	Insert (Turning)
SNGN	○○○○○○	**B84, B85**	Insert (Turning)
SNGN	○○○○○○K	**B85**	Insert (Turning) / Previous Description
SNGN	○○○○○○P○○○○○	**B85**	Insert (Turning)
SNGN	○○○○○○S○○○○○	**B84, B85**	Insert (Turning)
SNGN	○○○○○○T○○○○○	**B84, B85**	Insert (Turning / Milling)
SNGN	○○○○○○-T○○	**B84**	Insert (Turning)
SNGX	○○○○○○T○○○○○	**B85**	Insert (Turning)
SNKN	○○○○XNTN	**M12**	Insert (Milling)
SNMA	○○○○○○	**B27, B42**	Insert (Turning)
SNMA	○○○○○○S○○○○○	**B84**	Insert (Turning)
SNMA	○○○○○○-T○○	**B84**	Insert (Turning)
SNMF	○○○○○○-21	**B73, D38**	Insert (Turning)
SNMF	○○○○XNTN	**M12**	Insert (Milling)
SNMG	○○○○○○	**B25, B42**	Insert (Turning)
SNMG	○○○○○○C	**B27**	Insert (Turning)
SNMG	○○○○○○GC	**B27**	Insert (Turning)
SNMG	○○○○○○HK	**B25**	Insert (Turning)
SNMG	○○○○○○HQ	**B25, B42**	Insert (Turning)
SNMG	○○○○○○HS	**B25, B42**	Insert (Turning)
SNMG	○○○○○○HT	**B25, B42**	Insert (Turning)
SNMG	○○○○○○MQ	**B26**	Insert (Turning)
SNMG	○○○○○○MS	**B26**	Insert (Turning)
SNMG	○○○○○○PH	**B25**	Insert (Turning)
SNMG	○○○○○○PS	**B25**	Insert (Turning)
SNMG	○○○○○○PT	**B25**	Insert (Turning)
SNMG	○○○○○○$^{R}/_{L}$-C	**B27**	Insert (Turning)
SNMG	○○○○○○$^{R}/_{L}$-ST	**B26**	Insert (Turning)
SNMG	○○○○○○XP	**B26, B42**	Insert (Turning)
SNMG	○○○○○○XQ	**B26, B42**	Insert (Turning)
SNMG	○○○○○○XS	**B26, B42**	Insert (Turning)
SNMG	○○○○○○ZS	**B27**	Insert (Turning)
SNMM	○○○○○○PX	**B26**	Insert (Turning)
SNMN	○○○○○○	**B27, B42, B85, C9, M11**	Insert (Turning / Milling)
SNMN	○○○○○○S○○○○○	**C9**	Insert (Turning)
SNMN	○○○○○○T○○○○○	**B79**	Insert (Turning)
SOKN	13T3AXFN	**M11**	Insert (Milling)
SOKN	13T3AXFN-NE	**C27, M21**	Insert (Milling)
SOKN	13T3AXTN	**M11**	Insert (Milling)
SOKR	13T3AXEN-J	**M10**	Insert (Milling)
SOMT	0903AXEN-J	**M14**	Insert (Milling)
SOMW	0903AXFN	**M14**	Insert (Milling)
SOMW	0903AXTN	**M14**	Insert (Milling)
SP-2D		**D14**	Spare Parts (Spring)
SP-3D		**D8, D10, D12, D20**	Spare Parts (Spring)
SP-5D		**D16**	Spare Parts (Spring)
SP3X4		**F12, F14, F17, P5**	Spare Parts (Clamp Screw)
SP3X6		**M32, M33, P5**	Spare Parts (Screw)
SP3X8		**D38, E28, E29, J16, J17, M27 , M31, M39, M41, N10, P5**	Spare Parts (Screw)
SP3X10		**F60, F61, F72, P5**	Spare Parts (Screw)
SP4X9		**M26, P5**	Spare Parts (Clamp Screw)
SP8X35		**M24, P5**	Spare Parts (Clamp Bolt for BT50 Arbor)
SP-5		**G48, P19**	Spare Parts (Spring)
SP-6		**G11, G16, G17, G45, P19**	Spare Parts (Spring)
SP-8		**G26, P19**	Spare Parts (Spring)
SP-129		**D34, D35, P9**	Spare Parts (Shim)
SP-141		**D25, D30, D31, D34, D35, P9**	Spare Parts (Shim)
SP-143		**D25, D34, D35, P9**	Spare Parts (Shim)
SP-148		**D34, D35, P9**	Spare Parts (Shim)
SP-162		**D25, D30, D31, P9**	Spare Parts (Shim)
SP-219		**D36, P9**	Spare Parts (Shim)
SP-221		**D26, P10**	Spare Parts (Shim)
SP-223		**D26, P10**	Spare Parts (Shim)
SP-342		**D23, P10**	Spare Parts (Shim)
SP-429		**D32, P10**	Spare Parts (Shim)
SP-441		**D22, D28, P10**	Spare Parts (Shim)
SP-443		**D22, P10**	Spare Parts (Shim)
SP-454		**D22, P10**	Spare Parts (Shim)
SP-521		**D29, P10**	Spare Parts (Shim)
SP-523		**P10**	Spare Parts (Shim)
SP-541		**D29, P10**	Spare Parts (Shim)
SP-543		**P10**	Spare Parts (Shim)
SP-826		**D33, P10**	Spare Parts (Shim)
SP-829		**D33, P10**	Spare Parts (Shim)
SP-841		**D27, D33, P10**	Spare Parts (Shim)
SP-843		**D27, D33, P10**	Spare Parts (Shim)
SP-849		**D33, P10**	Spare Parts (Shim)
SP-861		**D27, P10**	Spare Parts (Shim)
SP-130A		**F74, P10**	Spare Parts (Shim)
SP-210A		**F74, P10**	Spare Parts (Shim)
SP-420A		**F74, P10**	Spare Parts (Shim)
SP-141P		**F72, F73, P10**	Spare Parts (Shim)
SP-143P		**F72, P10**	Spare Parts (Shim)
SP-230P		**F72, P10**	Spare Parts (Shim)
SP-341P		**F72, P10**	Spare Parts (Shim)
SP-441P		**F73, P11**	Spare Parts (Shim)
SP-443P		**P11**	Spare Parts (Shim)
SP-521P		**F73, P11**	Spare Parts (Shim)
SP-523P		**P11**	Spare Parts (Shim)
SPCN	○○○○EDTR	**M11**	Insert (Milling)
SPCN	○○○○EETR1	**M11**	Insert (Milling)
SPCN	○○○○XPTR	**M11**	Insert (Milling)
SPCT	○○T○○○□□-□□	**M114**	Insert (Milling)
SPCT	○○T○○○□$^{R}/_{L}$-□□	**M114**	Insert (Milling)
SPEN	○○○○EESR	**M11**	Insert (Milling)
SPET	○○T○○○□$^{R}/_{L}$-□□	**M114**	Insert (Milling)
SPGH	○○○○○○$^{R}/_{L}$	**B58**	Insert (Turning)
SPGN	○○○○○○	**B58, B88, C15, C23, M11**	Insert (Turning / Milling)
SPGN	○○○○○○NE	**C23**	Insert (Turning)
SPGN	○○○○○○S○○○○○	**B88**	Insert (Turning)

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SPGN	○○○○○○S○○○○○MET	**C15**	Insert (Turning)
SPGN	○○○○○○T○○○○○	**B88, C15**	Insert (Turning)
SPGR	○○○○○○R/L	**B58**	Insert (Turning)
SPKN	○○○○EDFR	**M11**	Insert (Milling)
SPKN	○○○○EDTR/L	**M11**	Insert (Milling)
SPKN	○○○○XETR	**M11**	Insert (Milling)
SPKN	○○○○XPFR	**M11**	Insert (Milling)
SPKN	○○○○XPTR/L	**M11**	Insert (Milling)
SPKR	○○○○EDER-S	**M11**	Insert (Milling)
SPMN	○○○○○○	**B58, B75, M11**	Insert (Turning)
SPMR	○○○○EDER-H	**M11**	Insert (Milling)
SPMR	○○○○○○	**B58**	Insert (Turning)
SPMR	○○○○○○G	**B58, B75**	Insert (Turning)
SPMT	○○○○EDER-NB□	**M14, M35**	Insert (Milling)
SPMT	○○○○□□□□-NB○□	**M14, M35**	Insert (Milling)
SPMT	○○○○□□□□-V	**M14, M35**	Insert (Milling)
SPMT	○○○○○○E-Z	**M15**	Insert (Milling)
SP-RC		**D38, P11**	Spare Parts (Shim)
SPUN	○○○○○○	**B58, M11**	Insert (Turning)
SPW-6045		**M42, P5**	Spare Parts (Screw)
SRCPR/L	○○○○B-○○-A○○	**F71**	Boring Bar (for Bearing Machining)
SSKPR/L	○○○○B-○○	**F60**	Boring Bar / Previous Description
STGCR/L	○○○○□-○○	**E22**	Toolholder (Turning)
STGPR/L	○○○○□-○○	**E22**	Toolholder (Turning)
STLNR	○○○○□-○○FF	**E5**	Toolholder (for Small Double-Sided Tools)
STUBR/L	○○○○B-○○	**F54**	Boring Bar / Previous Description
STUBR/L	○○○○B-○○E	**F54**	Boring Bar / Previous Description
STUBR/L	○○○○B-○○W	**F55**	Boring Bar / Previous Description
STUPR/L	○○○○B-○○	**F54**	Boring Bar / Previous Description
STUPR/L	○○○○B-○○E	**F54**	Boring Bar / Previous Description
STUPR/L	○○○○B-○○W	**F55**	Boring Bar / Previous Description
STUPR/L	○○○○B-○○EH	**F56**	Boring Bar / Previous Description
STUPR/L	○○○○B-○○WH	**F56**	Boring Bar / Previous Description
STUPR/L	○○○○B-○○W-○/○	**F55**	Boring Bar / Previous Description
STWR/L	○○○○□-15	**F9, G55**	Toolholder (for Twin Bar)
STWSR	○○○○□-15T	**F9, G55**	Toolholder (for Twin Bar)
STXBR/L	○○○○○B-○○W	**F58**	Boring Bar / Previous Description
STXPR/L	○○○○○B-○○W	**F58**	Boring Bar / Previous Description
STZBR/L	○○○○○B-○○W	**F58**	Boring Bar / Previous Description
SVJBR/L	○○○○□-○○	**E24**	Toolholder (Turning)
SVJBR/L	○○○○□-○○F	**E24**	Toolholder (Turning)
SVJBR/L	○○○○□-○○N	**E24**	Toolholder (Turning)
SVJBR/L	○○○○B-○○E	**F62**	Boring Bar / Previous Description
SVJCR/L	○○○○B-○○E	**F62**	Boring Bar / Previous Description
SVJPR/L	○○○○B-○○E	**F62**	Boring Bar / Previous Description
SVLPR/L	○○○○□-○○F	**E25**	Toolholder (Turning)
SVLPR/L	○○○○□-○○FF	**E25**	Toolholder (Turning)
SVNR	○○○○□-12	**F13**	Toolholder (for System Tip-Bar)
SVNR	○○○○□-12N	**F12**	Toolholder (for System Tip-Bar)
SS-4N		**E23, E24, F37, F39, F63, N9, P5**	Spare Parts (Shim Screw)
SVN-32		**N9, P11**	Spare Parts (Shim)
SVN-32N		**E23, E24, F37, F39, F63, N9, P11**	Spare Parts (Shim)
SVNSR	○○○○□-12-○○	**F13**	Toolholder (for System Tip-Bar)
SVNSR	○○○○□-12-○○N	**F12**	Toolholder (for System Tip-Bar)
SVNSR	○○○○□-12-○○XN	**F17**	Toolholder (for System Tip-Bar)
SVPBR/L	○○○○□-○○	**E24**	Toolholder (Turning)
SVPBR/L	○○○○□-○○N	**E24**	Toolholder (Turning)
SVPPR/L	○○○○□-○○	**E26**	Toolholder (Turning)
SVPPR	○○○○□-○○FF	**E26**	Toolholder (Turning)
SVQBR/L	○○○○B-○○E	**F62**	Boring Bar / Previous Description
SVQCR/L	○○○○B-○○E	**F62**	Boring Bar / Previous Description
SVUBR/L	○○○○B-○○E	**F63**	Boring Bar / Previous Description
SVUCR/L	○○○○B-○○E	**F63**	Boring Bar / Previous Description
SVVBN	○○○○□-○○	**E23**	Toolholder (Turning)
SVVBN	○○○○□-○○N	**E23**	Toolholder (Turning)
SV-60136R		**M40, P6**	Spare Parts (Screw)
SV-60136TR		**M28, P6**	Spare Parts (Screw)
SWUBR/L	○○○○B-○○	**F65**	Boring Bar / Previous Description
SWUBR/L	○○○○B-○○E	**F65**	Boring Bar / Previous Description
SWUBR/L	○○○○B-○○W	**F65**	Boring Bar / Previous Description
SWUBR/L	○○○○B-○○-○○	**F65**	Boring Bar / Previous Description
SWUBR/L	○○○○B-○○W-○/○	**F65**	Boring Bar / Previous Description
SWUPR/L	○○○○B-○○E	**F65**	Boring Bar / Previous Description

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SWUPR/L	○○○○B-○○W	**F65**	Boring Bar / Previous Description
SWUPR/L	○○○○B-○○W-○/○	**F65**	Boring Bar / Previous Description
SYXPR/L	○○○○□-○○F	**E27**	Toolholder (Turning)
T			
T63H-	BL○○○-○○(○)	**N12**	Blank Tool (HSK Tooling)
T63H-	C○○-○○(○)	**N11**	Toolholder (HSK Tooling)
T63H-	KGBAR/L-16	**N10**	Grooving (HSK Tooling)
T63H-	KGBAR/L-22-○○	**N10**	Grooving (HSK Tooling)
T63H-	KTNR-○○	**N10**	Threading (HSK Tooling)
T63H-	N○○-○○(○)	**N11**	Toolholder (HSK Tooling)
T63H-	PCLNR/L-DX12	**N6**	Toolholder (HSK Tooling)
T63H-	PCMNN-□12	**N6**	Toolholder (HSK Tooling)
T63H-	PDJNR/L-DX15	**N6**	Toolholder (HSK Tooling)
T63H-	PDNNN-□15	**N7**	Toolholder (HSK Tooling)
T63H-	PTGNR/L-DX16	**N7**	Toolholder (HSK Tooling)
T63H-	PWLNR/L-DX08	**N8**	Toolholder (HSK Tooling)
T63H-	S2525R/L-○○(○)	**N4**	Toolholder (HSK Tooling)
T63H-	S2020R-105T	**N5**	Toolholder (HSK Tooling)
T63H-	S2525-○○F	**N5**	Toolholder (HSK Tooling)
T63H-	SVLBR/L-DX16N	**N9**	Toolholder (HSK Tooling)
T63H-	SVVBN-□16N	**N9**	Toolholder (HSK Tooling)
T63H-	WTENN-□16	**N7**	Toolholder (HSK Tooling)
T63H-	WWMNN-□08	**N8**	Toolholder (HSK Tooling)
T100H-	C○○-○○(○)	**N11**	Toolholder (HSK Tooling)
T100H-	N○○-○○(○)	**N11**	Toolholder (HSK Tooling)
T100H-	S2525-○○○F	**N5**	Toolholder (HSK Tooling)
T100H-	S2525R/L-○○(○)	**N4**	Toolholder (HSK Tooling)
T100H-	S2525R-○○○T	**N5**	Toolholder (HSK Tooling)
TBGN	○○○○○○	**B88, C15, C23**	Insert (Turning)
TBGN	○○○○○○S○○○○○	**B88**	Insert (Turning)
TBGN	○○○○○○T○○○○○	**B88, C15**	Insert (Turning)
TBGT	○○○○○○CF	**B59, B76**	Insert (Turning)
TBGT	○○○○○○ (○)MR/L	**B59**	Insert (Turning)
TBGT	○○○○○○M-CF	**B59**	Insert (Turning)
TBGT	○○○○○○MP-CF	**B59**	Insert (Turning)
TBGT	○○○○○○ (○)R/L	**B59, B76**	Insert (Turning)
TBGW	○○○○○○	**B59, B76, C19**	Insert (Turning)
TBGW	○○○○○○NE	**C19**	Insert (Turning)
TBMT	○○○○○○	**C19**	Insert (Turning)
TBMT	○○○○○○DP	**B59**	Insert (Turning)
TBMT	○○○○○○NE	**C19**	Insert (Turning)
TCET	○○○○○○(○)FR/L-USF	**B60**	Insert (Turning)
TCET	○○○○○○(○)MFR/L-USF	**B60**	Insert (Turning)
TCGN	○○○○○○	**B64, B88**	Insert (Turning)
TCGN	○○○○○○T○○○○○	**B88**	Insert (Turning)
TCGR	○○○○○○R/L-F	**B64**	Insert (Turning)
TCGT	○○○○○○ER/L-U	**B60, B76**	Insert (Turning)
TCGT	○○○○○○(○)FR/L-U	**B60, B76**	Insert (Turning)
TCGT	○○○○○○MER/L-U	**B60**	Insert (Turning)
TCGT	○○○○○○(○)MFR/L-U	**B60**	Insert (Turning)
TCGT	○○○○○○R/L	**B59**	Insert (Turning)
TCGT	○○○○○○R/L-A3	**B60**	Insert (Turning)
TCGW	○○○○○○	**B60, C19**	Insert (Turning)
TCGW	○○○○○○NE	**C19**	Insert (Turning)
TCGW	○○○○○○SE	**C19**	Insert (Turning)
TCMT	○○○○○○	**C19, C20**	Insert (Turning)
TCMT	○○○○○○HQ	**B59, B76**	Insert (Turning)
TCMT	○○○○○○NE	**C19, C20**	Insert (Turning)
TCMT	○○○○○○SE	**C20**	Insert (Turning)
TCMW	○○○○○○SE	**C11**	Insert (Turning) / Previous Description
TCMW	○○○○○○T○○○○○SE	**C11**	Insert (Turning)
TEEN	○○○○PTFR	**C27, M21**	Insert (Milling)
TEEN	○○○○PTFR-NE	**C27, M21**	Insert (Milling)
TEEN	○○○○PTTR	**M12**	Insert (Milling)
TEKN	○○○○PTFR	**C27, M12, M21**	Insert (Milling)
TEKN	○○○○PTFR-NE	**C27, M21**	Insert (Milling)
TEKN	○○○○PTTR	**M12**	Insert (Milling)
TEKR	○○○○PTER-S	**M12**	Insert (Milling)
TEMR	○○○○PTER-H	**M12**	Insert (Milling)
TEMT	○○○○○○-AQ	**M15**	Insert (Milling)
TG	○○R/L○○○	**G15, G44**	Insert (Grooving)
TGF	○○R/L○○○	**C24, G14**	Insert (Grooving)
TGF	○○R/L○○○-○○○	**G14, C24**	Insert (Grooving)

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TGF	○○R/LS○○○-S	G14	Insert (Grooving)
TGF	○○R/LS○○○-SRG	G14	Insert (Grooving)
TH-4		P18	Spare Parts (Hexagon Wrench / T-shape type)
TH8X15		M31, M32, M33, M39, P6	Spare Parts (Screw)
TKN	○	H15	Insert (Cut-Off)
TKN	○-P	H15	Insert (Cut-Off)
TKR/L	○	H15	Insert (Cut-Off)
TKR/L	○-P	H15	Insert (Cut-Off)
TKF	○○R/L○○○-NB(○.○)	C25, H7	Insert (Grooving / Cut-Off)
TKF	○○R/L○○○-NB-○○DR	H7	Insert (Cut-Off)
TKF	○○R/L○○○-S	H7	Insert (Cut-Off)
TKF	○○R/L○○○-S-○○DR	H7	Insert (Cut-Off)
TKFB	○○R○○○○○M	B72, E6	Insert (Back turning)
TKFS	○○R/L○○○-S	H9	Insert (Cut-Off)
TKFT	12R/L○□□□□(□)	J18	Insert (Threading)
TH-3L		M112, M113	Spare Parts (Wrench)
TN-32		J16, J17, N10, P11	Spare Parts (Shim)
TN-43		J16, J17, N10, P11	Spare Parts (Shim)
TNEG	○○○○○○R/L-SSF	B32	Insert (Turning)
TNGA	○○○○○○	B31, B86, C7	Insert (Turning)
TNGA	○○○○○○ME	C7	Insert (Turning) / Previous Description
TNGA	○○○○○○SE	C7	Insert (Turning) / Previous Description
TNGA	○○○○○○ME-T	C7	Insert (Turning) / Previous Description
TNGA	○○○○○○SE-T	C7	Insert (Turning) / Previous Description
TNGA	○○○○○○S○○○○○	B86, C7	Insert (Turning)
TNGA	○○○○○○S○○○○○ME	C7	Insert (Turning)
TNGA	○○○○○○S○○○○○MET	C7	Insert (Turning)
TNGA	○○○○○○S○○○○○SE	C7	Insert (Turning)
TNGA	○○○○○○S○○○○○SET	C7	Insert (Turning)
TNGA	○○○○○○T○○○○○	B86, C7	Insert (Turning)
TNGA	○○○○○○T○○○○○ME	C7	Insert (Turning)
TNGA	○○○○○○T○○○○○SE	C7	Insert (Turning)
TNGA	○○○○○○-T○○	B86	Insert (Turning)
TNGG	○○○○○○AH	B31	Insert (Turning)
TNGG	○○○○○○DP	B28	Insert (Turning)
TNGG	○○○○○○R/L	B32, B43	Insert (Turning)
TNGG	○○○○○○R/L-25R	B32, B43	Insert (Turning)
TNGG	○○○○○○R/L-A3	B31	Insert (Turning)
TNGG	○○○○○○R/L-B/C/D	B32, B43	Insert (Turning)
TNGG	○○○○○○R/L-S	B32, B43	Insert (Turning)
TNGG	○○○○○○R/L-Y	B43	Insert (Turning)
TNGM	○○○○○○BB○	C7	Insert (Turning) / Previous Description
TNGM	○○○○○○S○○○○○BB○	C7	Insert (Turning)
TNGN	○○○○○○	B31, B86, B87	Insert (Turning)
TNGN	○○○○○○S○○○○○	B86, B87	Insert (Turning)
TNGN	○○○○○○T○○○○○	B86, B87	Insert (Turning)
TNGN	○○○○○○-T○○	B86	Insert (Turning)
TNGU	○○○○○○ME R/L-U	B39	Insert (Turning)
TNGU	○○○○○○(○)MF R/L-F	B39	Insert (Turning)
TNGU	○○○○○○(○)MF R/L-U	B39	Insert (Turning)
TNMA	○○○○○○	B31, B43	Insert (Turning)
TNMG	○○○○○○	B29, B42	Insert (Turning)
TNMG	○○○○○○AH	B31	Insert (Turning)
TNMG	○○○○○○C	B31	Insert (Turning)
TNMG	○○○○○○CQ	B28, B42	Insert (Turning)
TNMG	○○○○○○CS	B28, B42	Insert (Turning)
TNMG	○○○○○○DP	B28	Insert (Turning)
TNMG	○○○○○○GC	B31	Insert (Turning)
TNMG	○○○○○○GP	B28, B42	Insert (Turning)
TNMG	○○○○○○GS	B28, B42	Insert (Turning)
TNMG	○○○○○○GT	B29, B42	Insert (Turning)
TNMG	○○○○○○GU	B30	Insert (Turning)
TNMG	○○○○○○HK	B28	Insert (Turning)
TNMG	○○○○○○HQ	B28, B42	Insert (Turning)
TNMG	○○○○○○HS	B29, B42	Insert (Turning)
TNMG	○○○○○○HT	B29, B42	Insert (Turning)
TNMG	○○○○○○HU	B30	Insert (Turning)
TNMG	○○○○○○MQ	B30	Insert (Turning)
TNMG	○○○○○○MS	B30	Insert (Turning)
TNMG	○○○○○○MU	B30	Insert (Turning)
TNMG	○○○○○○PH	B29	Insert (Turning)
TNMG	○○○○○○PS	B28	Insert (Turning)
TNMG	○○○○○○PT	B29	Insert (Turning)

Description		Page	Category
TNMG	○○○○○○PX	B29	Insert (Turning)
TNMG	○○○○○○TK	B30	Insert (Turning)
TNMG	○○○○○○R/L-C	B32, B43	Insert (Turning)
TNMG	○○○○○○R/L-ST	B30	Insert (Turning)
TNMG	○○○○○○XP	B29, B43	Insert (Turning)
TNMG	○○○○○○XP-T	B29, B43	Insert (Turning)
TNMG	○○○○○○XQ	B30, B43	Insert (Turning)
TNMG	○○○○○○XS	B30, B43	Insert (Turning)
TNMG	○○○○○○ZS	B31	Insert (Turning)
TNMM	○○○○○○M	C17	Insert (Turning)
TNMM	○○○○○○M-NE	C17	Insert (Turning)
TNMM	○○○○○○M-SE	C17	Insert (Turning)
TNMM	○○○○○○PX	B28	Insert (Turning)
TNMN	○○○○○○	B31, C9	Insert (Turning)
TNMN	○○○○○○S○○○○○	C9	Insert (Turning)
TNMP	○○○○○○TK	B28, B42	Insert (Turning)
TNN	○○ER/L○○W	J8	Insert (Threading / Previous description)
TNN	○○ER/L○○PT	J10	Insert (Threading / Previous description)
TNN	○○ER/L○○UN	J8	Insert (Threading / Previous description)
TNN	○○ER/L○○NPT	J10	Insert (Threading / Previous description)
TNN	○○ER/L○○PT-TS	J10	Insert (Threading / Previous description)
TNN	○○ER/L○○W-TS	J8	Insert (Threading / Previous description)
TNN	○○ER/L○○○M	J6	Insert (Threading / Previous description)
TNN	○○ER/L○○○M02	J6	Insert (Threading / Previous description)
TNN	○○ER/L○○○M-TS	J6	Insert (Threading / Previous description)
TNN	○○ER/L○○○TR	J14	Insert (Threading / Previous description)
TNN	○○ER/L○○○○	J12	Insert (Threading / Previous description)
TNN	○○ER/L○○○○-TS	J12	Insert (Threading / Previous description)
TNN	○○IR/L○○W	J9	Insert (Threading / Previous description)
TNN	○○IR/L○○PT	J11	Insert (Threading / Previous description)
TNN	○○IR/L○○UN	J9	Insert (Threading / Previous description)
TNN	○○IR/L○○NPT	J11	Insert (Threading / Previous description)
TNN	○○IR/L○○PT-TS	J11	Insert (Threading / Previous description)
TNN	○○IR/LL○○W-TS	J9	Insert (Threading / Previous description)
TNN	○○IR/L○○○M	J7	Insert (Threading / Previous description)
TNN	○○IR/L○○○M-TS	J7	Insert (Threading / Previous description)
TNN	○○IR/L○○○TR	J15	Insert (Threading / Previous description)
TNN	○○IR/L○○○○(○)	J13, J15	Insert (Threading / Previous description)
TNN	○○IR/L○○○○(○)-TS	J13	Insert (Threading / Previous description)
TNW-32		J16, N10, P11	Spare Parts (Shim)
TPET	○○○○○○(○)FR/L-USF	B63	Insert (Turning)
TPET	○○○○○○(○)MR/L-FSF	B63	Insert (Turning)
TPET	○○○○○○(○)MFR/L-USF	B63	Insert (Turning)
TPET	○○○○○○(○)R/L-FSF	B63	Insert (Turning)
TPGB	○○○○○○(○)	B63, B76, C12, C20, J28	Insert (Turning / Threading)
TPGB	○○○○○○ME	C12	Insert (Turning) / Previous Description
TPGB	○○○○○○ME-T	C12	Insert (Turning) / Previous Description
TPGB	○○○○○○NE	C20	Insert (Turning)
TPGB	○○○○○○SE	C12, C20	Insert (Turning)
TPGB	○○○○○○SE-T	C12	Insert (Turning) / Previous Description
TPGB	○○○○○○S○○○○○MET	C12	Insert (Turning)
TPGB	○○○○○○S○○○○○SET	C12	Insert (Turning)
TPGB	○○○○○○T○○○○○	C12	Insert (Turning)
TPGB	○○○○○○T○○○○○ME	C12	Insert (Turning)
TPGB	○○○○○○T○○○○○SE	C12	Insert (Turning)
TPGH	○○○○○○MR/L	B62	Insert (Turning)
TPGH	○○○○○○MR/L-H	B62	Insert (Turning)
TPGH	○○○○○○R/L	B62, B76	Insert (Turning)
TPGH	○○○○○○R/L-H	B62, B76	Insert (Turning)
TPGN	○○○○○○	B65, B77, B88, C15, C23, M12, M21	Insert (Turning / Milling)
TPGN	○○○○○○ME	C15	Insert (Turning) / Previous Description
TPGN	○○○○○○NE	C23, M21	Insert (Turning / Milling)
TPGN	○○○○○○SE	C15, C23	Insert (Turning)
TPGN	○○○○○○SE-T	C15	Insert (Turning) / Previous Description
TPGN	○○○○○○S○○○○○	B88	Insert (Turning)
TPGN	○○○○○○S○○○○○SET	C15	Insert (Turning)
TPGN	○○○○○○T○○○○○	B88, C15, M21	Insert (Turning / Milling)
TPGN	○○○○○○T○○○○○ME	C15	Insert (Turning)
TPGN	○○○○○○T○○○○○SE	C15	Insert (Turning)
TPGR	○○○○○○R/L-A/B/C	B64, B77	Insert (Turning)
TPGR	○○○○○○R/L-F	B64	Insert (Turning)
TPGT	○○○○○○CF	B61, B76	Insert (Turning)
TPGT	○○○○○○M-CF	B61	Insert (Turning)
TPGT	○○○○○○MP-CF	B61	Insert (Turning)

Description		Page	Category
TPGW	○○○○○○ME	C13	Insert (Turning) / Previous Description
TPGW	○○○○○○ME-T	C13	Insert (Turning) / Previous Description
TPGW	○○○○○○SE	C13	Insert (Turning) / Previous Description
TPGW	○○○○○○SE-T	C13	Insert (Turning) / Previous Description
TPGW	○○○○○○S○○○○○MET	C13	Insert (Turning)
TPGW	○○○○○○S○○○○○SET	C13	Insert (Turning)
TPGW	○○○○○○T○○○○○ME	C13	Insert (Turning)
TPGW	○○○○○○T○○○○○SE	C13	Insert (Turning)
TPKN	○○○○PDFR	M12	Insert (Milling)
TPKN	○○○○PDTR	M12	Insert (Milling)
TPKR	○○○○PDER-S	M12	Insert (Milling)
TPMH	○○○○○○	C21	Insert (Turning)
TPMH	○○○○○○NE	C21	Insert (Turning)
TPMH	○○○○○○SE	C21	Insert (Turning)
TPMH	○○○○○○R/L-NE	C21	Insert (Turning)
TPMN	○○○○○○	B65, B77, M12	Insert (Turning / Milling)
TPMR	○○○○PDER-H	M12	Insert (Milling)
TPMR	○○○○○○	B64, B77	Insert (Turning)
TPMR	○○○○○○DP	B64, B77	Insert (Turning)
TPMR	○○○○○○G	B64, B77	Insert (Turning)
TPMR	○○○○○○GP	B64, B77	Insert (Turning)
TPMR	○○○○○○HQ	B64, B77	Insert (Turning)
TPMT	○○○○○○GP	B61, B76	Insert (Turning)
TPMT	○○○○○○HQ	B61, B76	Insert (Turning)
TPMT	○○○○○○XP	B61, B76	Insert (Turning)
TPMT	○○○○○○XQ	B61, B76	Insert (Turning)
TS-3S		D17, P7	Spare Parts (Lock Pin)
TT	43ER/L○○○M	J22	Insert (Threading)
TT	○○R/L○○○○	J22, J23	Insert (Threading)
TT-25		M120, P18	Spare Parts (Trox Wrench / T-shape type)
TT-30		M120, P18	Spare Parts (Trox Wrench / T-shape type)
TT-15L		M101	Spare Parts (Trox Wrench / T-shape type)
TT-25L		M38, M62, M63, P18	Spare Parts (Trox Wrench / T-shape type)
TTC-20		M25, M28, P18	Spare Parts (Trox Wrench / T-shape type)
TTC-25		M26, M40, P18	Spare Parts (Trox Wrench / T-shape type)
TTX	32R○○○○(○)	J21	Insert (Threading)
TTX	32R○○○○(○)S	J21	Insert (Threading)
TWBR	○○○○○-○○○	F8	Twin Bar (Turning)
TWBTR	○○○○○-○○○	F8	Twin Bar (Turning)
TWFGL	○○○	G54	Twin Bar (Grooving)
TWFGTR	○○○	G54	Twin Bar (Grooving)
V			
VBET	○○○○○○(○)MR/L-FSF	B66	Insert (Turning)
VBET	○○○○○○(○)R/L-FSF	B66	Insert (Turning)
VBGT	○○○○○○FN-Z	B66	Insert (Turning)
VBGT	○○○○○○(○)MR/L-F	B66	Insert (Turning)
VBGT	○○○○○○(○)MR/L-Y	B67	Insert (Turning)
VBGT	○○○○○○(○)R/L-F	B66, B77	Insert (Turning)
VBGT	○○○○○○(○)R/L-Y	B67, B77	Insert (Turning)
VBGW	○○○○○○ME	C13	Insert (Turning) / Previous Description
VBGW	○○○○○○ME-T	C13	Insert (Turning) / Previous Description
VBGW	○○○○○○SE	C13	Insert (Turning) / Previous Description
VBGW	○○○○○○SE-T	C13	Insert (Turning) / Previous Description
VBGW	○○○○○○S○○○○○MET	C13	Insert (Turning)
VBGW	○○○○○○S○○○○○SET	C13	Insert (Turning)
VBGW	○○○○○○T○○○○○ME	C13	Insert (Turning)
VBGW	○○○○○○T○○○○○SE	C13	Insert (Turning)
VBMT	○○○○○○	C22	Insert (Turning)
VBMT	○○○○○○GP	B66, B77	Insert (Turning)
VBMT	○○○○○○HQ	B66, B77	Insert (Turning)
VBMT	○○○○○○NE	C22	Insert (Turning)
VBMT	○○○○○○SE	C22	Insert (Turning)
VBMT	○○○○○○VF	B66, B77	Insert (Turning)
VCGT	○○○○○○	B67	Insert (Turning)
VCGT	○○○○○○AH	B67	Insert (Turning)
VCGT	○○○○○○FN-Z	B67	Insert (Turning)
VCGT	○○○○○○R/L-A3	B67	Insert (Turning)
VCGW	○○○○○○ME	C14	Insert (Turning) / Previous Description
VCGW	○○○○○○ME-T	C14	Insert (Turning) / Previous Description
VCGW	○○○○○○SE	C14	Insert (Turning) / Previous Description
VCGW	○○○○○○SE-T	C14	Insert (Turning) / Previous Description
VCGW	○○○○○○S○○○○○MET	C14	Insert (Turning)
VCGW	○○○○○○S○○○○○SET	C14	Insert (Turning)
VCGW	○○○○○○T○○○○○ME	C14	Insert (Turning)
VCGW	○○○○○○T○○○○○SE	C14	Insert (Turning)

Description		Page	Category
VCMT	○○○○○○	C22	Insert (Turning)
VCMT	○○○○○○HQ	B67, B77	Insert (Turning)
VCMT	○○○○○○NE	C22	Insert (Turning)
VCMT	○○○○○○VF	B67, B77	Insert (Turning)
VNBR	○○○○-○○(○)	F11	System Tip-Bar (Boring)
VNBR	○○○○○-○○(○)S	F10	System Tip-Bar (Boring)
VNBR	○○○○-○○(○)NB	C26, F11	System Tip-Bar (Boring)
VNBTR	○○○○-○○(○)	F11	System Tip-Bar (Boring)
VNBXR	○○○○○-○○(○)S	F16	System Tip-Bar (Boring)
VNFGR	○○○○-○○	G56	System Tip-Bar (Grooving)
VNFGR	○○○○-○○NB	C26, G56	System Tip-Bar (Grooving)
VNGR	○○○○-○○	G33	System Tip-Bar (Grooving)
VNGR	○○○○-○○NB	C26, G33	System Tip-Bar (Grooving)
VNGA	○○○○○○	B34, B87, C8	Insert (Turning)
VNGA	○○○○○○ME	C8	Insert (Turning) / Previous Description
VNGA	○○○○○○ME-T	C8	Insert (Turning) / Previous Description
VNGA	○○○○○○SE	C8	Insert (Turning) / Previous Description
VNGA	○○○○○○SE-T	C8	Insert (Turning) / Previous Description
VNGA	○○○○○○S○○○○○	B87, C8	Insert (Turning)
VNGA	○○○○○○S○○○○○ME	C8	Insert (Turning)
VNGA	○○○○○○S○○○○○MET	C8	Insert (Turning)
VNGA	○○○○○○S○○○○○SE	C8	Insert (Turning)
VNGA	○○○○○○S○○○○○SET	C8	Insert (Turning)
VNGA	○○○○○○T○○○○○	B87, C8	Insert (Turning)
VNGA	○○○○○○T○○○○○ME	C8	Insert (Turning)
VNGA	○○○○○○T○○○○○SE	C8	Insert (Turning)
VNGG	○○○○○○R/L	B34, B43	Insert (Turning)
VNMA	○○○○○○	B87	Insert (Turning)
VNMA	○○○○○○S○○○○○	B87	Insert (Turning)
VNMG	○○○○○○	B33, B43	Insert (Turning)
VNMG	○○○○○○DP	B33	Insert (Turning)
VNMG	○○○○○○GP	B33, B43	Insert (Turning)
VNMG	○○○○○○GU	B34	Insert (Turning)
VNMG	○○○○○○HQ	B33, B43	Insert (Turning)
VNMG	○○○○○○MQ	B34	Insert (Turning)
VNMG	○○○○○○MS	B34	Insert (Turning)
VNMG	○○○○○○MU	B34	Insert (Turning)
VNMG	○○○○○○TN-V	B33	Insert (Turning)
VNMG	○○○○○○VF	B33	Insert (Turning)
VNMG	○○○○○○XP	B33, B43	Insert (Turning)
VNMM	○○○○○○M	C17	Insert (Turning)
VNMM	○○○○○○M-NE	C17	Insert (Turning)
VNMM	○○○○○○M-SE	C17	Insert (Turning)
VNTR	○○○-○○	J27	System Tip-Bar (Threading)
VPET	○○○○○○(○)FR/L-USF	B69	Insert (Turning)
VPET	○○○○○○(○)MR/L-FSF	B69	Insert (Turning)
VPET	○○○○○○(○)MFR/L-USF	B69	Insert (Turning)
VPET	○○○○○○(○)R/L-FSF	B69	Insert (Turning)
VPGT	○○○○○○CF	B68,B77	Insert (Turning)
VPGT	○○○○○○CK	B68	Insert (Turning)
VPGT	○○○○○○FR/L-U	B77	Insert (Turning)
VPGT	○○○○○○M-CF	B68	Insert (Turning)
VPGT	○○○○○○M-CK	B68	Insert (Turning)
VPGT	○○○○○○MF-GF	B68	Insert (Turning)
VPGT	○○○○○○MFP-GF	B68	Insert (Turning)
VPGT	○○○○○○MP-CF	B68	Insert (Turning)
VPGT	○○○○○○MP-CK	B68	Insert (Turning)
W			
W-6		G16, G45, P19	Spare Parts (Washer)
W-8		G26, P19	Spare Parts (Washer)
W6-14		P19	Spare Parts (Washer)
W6X17		M28, P6	Spare Parts (Screw)
W6X18		M112, M113	Spare Parts (Wedge Lock Screw)
W6X20		M112, M113	Spare Parts (Wedge Lock Screw)
W8X16		M40, P6	Spare Parts (Screw)
W8X18		M41, P6	Spare Parts (Screw)
W8X21		M25, P6	Spare Parts (Wedge Lock Screw)
WB-5		F76, P19	Spare Parts (Washer)
WB-6		F76, P19	Spare Parts (Washer)
WB-8		F76, P19	Spare Parts (Washer)
WBGT	○○○○○○MR/L-CF	B70	Insert (Turning)
WBGT	○○○○○○ (○)MR/L-F	B70	Insert (Turning)
WBGT	○○○○○○ (○)R/L-F	B70, B78	Insert (Turning)
WBGT	○○○○○○MPR/L-CF	B70	Insert (Turning)
WBGW	○○○○○○R/L	B70	Insert (Turning)
WBGW	○○○○○○R/L-SE	C14	Insert (Turning) / Previous Description
WBGW	○○○○○○R/L-SE-T	C14	Insert (Turning) / Previous Description

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Description	Page	Category
WBGW ○○○○○○S○○○○○R/L-SET	C14	Insert (Turning)
WBGW ○○○○○○T○○○○○R/L-SE	C14	Insert (Turning)
WBMT ○○○○○○L-NE	C22	Insert (Turning)
WBMT ○○○○○○L	C22	Insert (Turning)
WBMT ○○○○○○R/L-DP	B70, B78	Insert (Turning)
WC- ○○	M112, M113	Spare Parts (Wedge)
WCGT ○○○○○○R/L-F	B70	Insert (Turning)
WCMT ○○○○○○	M15	Insert (Turning)
WCS-1N	D15, N7, P15	Spare Parts (Clamp Set)
WCS-8	D20, F70, N8, P15	Spare Parts (Clamp Set)
WDRC○(○)	K9	Spare Parts (Wrench / for "Magic Drill DRC")
WN-1	D15, D20, N7, N8, P19	Spare Parts (Shim Nut)
WNGA ○○○○○○	B87	Insert (Turning) / Previous Description
WNGA ○○○○○○ME	C8	Insert (Turning) / Previous Description
WNGA ○○○○○○ME-T	C8	Insert (Turning) / Previous Description
WNGA ○○○○○○SE	C8	Insert (Turning) / Previous Description
WNGA ○○○○○○SE-T	C8	Insert (Turning) / Previous Description
WNGA ○○○○○○S○○○○○	B87	Insert (Turning)
WNGA ○○○○○○S○○○○○ME	C8	Insert (Turning)
WNGA ○○○○○○S○○○○○MET	C8	Insert (Turning)
WNGA ○○○○○○S○○○○○SE	C8	Insert (Turning)
WNGA ○○○○○○S○○○○○SET	C8	Insert (Turning)
WNGA ○○○○○○T○○○○○	B87	Insert (Turning)
WNGA ○○○○○○T○○○○○ME	C8	Insert (Turning)
WNGG ○○○○○○AH	B37	Insert (Turning)
WNGG ○○○○○○R/L	B37, B44	Insert (Turning)
WNGG ○○○○○○R/L-S	B37, B44	Insert (Turning)
WNMA ○○○○○○	B37, B44	Insert (Turning)
WNMG ○○○○○○	B36, B44	Insert (Turning)
WNMG ○○○○○○C	B37	Insert (Turning)
WNMG ○○○○○○CJ	B35	Insert (Turning)
WNMG ○○○○○○CQ	B35, B44	Insert (Turning)
WNMG ○○○○○○CS	B35, B44	Insert (Turning)
WNMG ○○○○○○GC	B37	Insert (Turning)
WNMG ○○○○○○GP	B35, B44	Insert (Turning)
WNMG ○○○○○○GS	B35, B44	Insert (Turning)
WNMG ○○○○○○GT	B36, B44	Insert (Turning)
WNMG ○○○○○○GU	B36	Insert (Turning)
WNMG ○○○○○○HQ	B35, B44	Insert (Turning)
WNMG ○○○○○○HS	B36, B44	Insert (Turning)
WNMG ○○○○○○HT	B36, B44	Insert (Turning)
WNMG ○○○○○○HU	B36	Insert (Turning)
WNMG ○○○○○○MQ	B37	Insert (Turning)
WNMG ○○○○○○MS	B37	Insert (Turning)
WNMG ○○○○○○MU	B37	Insert (Turning)
WNMG ○○○○○○PS	B36	Insert (Turning)
WNMG ○○○○○○PT	B36	Insert (Turning)
WNMG ○○○○○○TK	B37	Insert (Turning)
WNMG ○○○○○○WP	B35	Insert (Turning)
WNMG ○○○○○○WQ	B35, B44	Insert (Turning)
WNMG ○○○○○○XP	B36, B44	Insert (Turning)
WNMG ○○○○○○XQ	B36, B44	Insert (Turning)
WNMG ○○○○○○XS	B36, B44	Insert (Turning)
WNMG ○○○○○○ZS	B37	Insert (Turning)
WNMM ○○○○○○M	C17	Insert (Turning)
WNMM ○○○○○○M-NE	C17	Insert (Turning)
WNMM ○○○○○○M-SE	C17	Insert (Turning)
WNMP ○○○○○○TK	B35	Insert (Turning)
WOF07R	M25	Spare Parts (Cartridge)
WP-1S	D15, N7, P7	Spare Parts (Shim Pin)
WP5X11	F70, P7	Spare Parts (Shim Pin)
WP5X15	D20, N8, P7	Spare Parts (Shim Pin)
WPGT ○○○○○○M R/L-Y	B71	Insert (Turning)
WPGT ○○○○○○R/L-Y	B71, B78	Insert (Turning)
WPGW ○○○○○○	B71	Insert (Turning)
WPMT ○○○○○○	C22	Insert (Turning)
WPMT ○○○○○○GP	B71, B78	Insert (Turning)
WPMT ○○○○○○HQ	B71, B78	Insert (Turning)
WPMT ○○○○○○NE	C22	Insert (Turning)
WSP-1	D15, N7, P19	Spare Parts (Spacer)
WTENN ○○○○□-○○N	D15	Toolholder (Turning)
WTJNR/L ○○○○□-○○N	D15	Toolholder (Turning)
WTKNR/L ○○○○□-○○N	D15	Toolholder (Turning)
WTN-33	D15, N7, P11	Spare Parts (Shim)
WTN-33-20	D15, P11	Spare Parts (Shim)
WWLNR/L ○○○○□-○○	D20	Toolholder (Turning)
WWLNR/L ○○○○B-○○E	F70	Boring Bar / Previous Description
WWN-42	D20, N8, P11	Spare Parts (Shim)
WWP-42	F70, P11	Spare Parts (Shim)
WWP-42-16	F70, P11	Spare Parts (Shim)

Y

YPGT ○○○○○○FR/L-U	B78	Insert (Turning)
YPGT ○○○○○○R/L-F	B78	Insert (Turning)

Z

ZCMT ○○○○○○	K37	Insert (Drilling)
ZCMT ○○○○○○SP	K37	Insert (Drilling)
ZCMT ○○○○○○SU	K37	Insert (Drilling)
ZXMT ○○○○○○GM	K22	Insert (Drilling)
ZXMT ○○○○○○GH	K22	Insert (Drilling)
ZXMT ○○○○○○SM	K22	Insert (Drilling)